

# **TWO RIVERS – OTTAUQUECHEE REGIONAL PLAN**

## **REGIONAL COMMISSION STAFF (2012)**

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**Adopted – June 27, 2012**

**Effective – July 27, 2012**

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# REGIONAL COMMISSIONERS

June 2012

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Chair - William B. Emmons, III

Vice-Chair - David Brandau

Secretary – Paul Haskell

Treasurer - Jerry Fredrickson

Nancy Jones, Bradford

Frank Roderick, Corinth

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## Representation by Town

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Town of Bethel	Yaroslav Stanchak, Olena Stanchak (Alt.)
Town of Bradford	Nancy Jones, Bobette Scribner (Alt.)
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Town of Topsham	Thomas Flannigan
Town of Tunbridge	Michael Sacca
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Town of West Fairlee	Nancy Malmquist
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## At-Large Commissioners

Upper Valley Lake Sunapee Regional Planning Commission  
Agriculture

Christine Walker  
Jennifer Colby

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# I. INTRODUCTION

## A. The Regional Commission

The Two Rivers-Ottawaquechee Regional Commission (Regional Commission) is a compact of thirty municipalities in east-central Vermont. It was founded in 1970 by the acts of its constituent towns and is a political subdivision of state government. The Regional Commission's programs are governed by representatives appointed by the Selectboard from each of its member towns. The Regional Commission exists to advocate for the needs of its members and to help bridge the opportunities and concerns that exist between towns and the State. The Regional Commission's primary purposes are to provide technical services to town officials, act as a resource for local governments, and to conduct regional planning and development activities.

## B. Plan Purpose and Design

The Two Rivers-Ottawaquechee Regional Plan (Regional Plan; Plan) is a policy statement on growth and development of the region. Its purpose is to give guidance to municipalities and other political subdivisions in the region, and the State of Vermont on appropriate development, improvement and conservation of the region's physical and human resources. In regulatory proceedings, the policies contained in this Plan are mandatory unless specifically written to be suggestions.

This Plan is an expression of values and a vision for growth and management for the next eight years. It is not a static or inflexible document. The Regional Commission, with the involvement and participation of the public, will periodically review and update this Plan to reflect new conditions and needs.

In addition, the specific purposes of the Plan are as follows:

- (1) to analyze data about existing conditions within the region;
- (2) to determine current and future land use needs for the citizens of the region;
- (3) to determine areas most desirable and suitable for development while encouraging appropriate and efficient expenditures of public and private funds in the process of that development; and
- (4) to serve as the guide for the region, towns, and individuals to use in meeting needs for land use development, through delineation of policies and specific implementation procedures.

Adoption of the Plan does not change the structure or role of local or State government. The Plan intends to strengthen local government by providing information and guidance on growth management. It seeks to facilitate cooperation among these governments. Adoption of this Plan means that the Regional Commission commits its staff and program resources to achieving the

region's goals and to fulfilling the Plan's program recommendations. Adoption of this Plan documents the support of the region's towns for the principles contained within its chapters.

This Regional Plan replaces the Plan that was adopted May 30, 2007 and effective July 4, 2007. Much of the background information goals, policies, and recommendations contained in this Plan are based upon the work reflected in the earlier version of the Regional Plan.

### **C. Legal Authority and Use of the Plan**

This Regional Commission is authorized pursuant to the provisions of the Vermont Municipal Planning and Development Act (24 VSA Chapter 117 §4345a). The Act sets forth the duties of the Regional Commission, including the following:

- (1) promote the mutual cooperation of municipalities and advise towns on the development and conservation of town resources;
- (2) advise towns with respect to public financing;
- (3) provide technical assistance to towns in the preparation and maintenance of plans, bylaws and related implementation activities;
- (4) cooperate with planning, legislative, or executive authorities of neighboring states, regions, counties, or municipalities to promote coordination of planning;
- (5) prepare a Regional Plan and amendments that are consistent with the goals established in §4302 and that are compatible with approved municipal and adjoining Regional Plans;
- (6) develop strategies specifically designed to assist municipalities in managing growth and development;
- (7) review proposed state capital expenditures for compatibility with the Regional Plans; and
- (8) appear before District Environmental Commissions to aid them making a determination as to conformance of proposed developments or subdivisions to the ten criteria set forth in Act 250 (10 VSA §6086).

The Act requires that regional commissions prepare and adopt a Regional Plan (24 VSA §4348). Adoption of the plan requires a sixty percent majority vote of the regional commissioners following at least two public hearings with notice. Any Regional Plan, including prior amendments, expires eight years from its effective date unless readopted or extended by the regional commission following public hearing and a vote of regional commissioners.

All Regional Plans are required to be consistent with the goals of the Act and are to contain at a minimum certain elements or sections dealing with land use, transportation, housing, economic development and implementation measures. Furthermore, the Plan must address how it relates to the development trends, needs, plans and Regional Plans of adjacent municipalities and regions.



This Plan is to be used by the Regional Commission, municipal planning commissions, selectboards, State agencies, landowners, and citizens in a number of ways:

- (1) provide a framework for planning and development initiatives at the local level;
- (2) guide basic decisions for planning programs at the Regional Commission;
- (3) serve as a basis for evaluation and review of developments and subdivisions proposed under Act 250.

The goals and policies of this Plan shall be reasonably and uniformly applied, and shall not be contrary to the public interest. No specific goal or policy in the Plan shall be construed or applied in isolation from the other goals and policies of the Plan. The goals expressed in the Plan should not always be viewed as ends in themselves, but shall be considered as they relate to broader regional objectives for land use, economic development, community development, recreation, etc. Thus, the goals expressed were used to guide development of its policies. 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 re-evaluation and compromise.

#### **D. Ongoing Planning Activities**

The basic assumption made in establishing the goals and policies of the Plan is that 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, natural resources of high quality are still within easy access for most of New England's urban dwellers. 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.

As a result of this growth, the Plan will have to be refined on an ongoing basis. The majority of policies contained in this Plan are directives for action which will continue to apply indefinitely. An example of a policy with timeless applicability is found in the Land Use chapter, regarding compact development patterns and maintenance of the rural character. Until all land development or redevelopment activity ceases, this policy will determine the suitability of proposed development. This is not to suggest however that the Plan is a fixed and unchangeable document. The Plan itself must be continually updated and revised to serve as a relevant and practical guide for the physical, economic and social development of the region.

This is a comprehensive plan for the region, as specified by state statute. The effect of the Plan will not be limited to a specific agency, such as this Regional Commission or to a single topic area, such as land use. Given the scope of the Plan, many entities should be involved in achieving the plan's goals and policies. Though general suggestions for Plan implementation are provided in this section, the more detailed programmatic steps necessary to actualize policies are left for the agencies involved to determine. This was done for three principal reasons. First,

agencies specializing in areas outside the traditional purview of the Regional Commission have the appropriate technical personnel and resources to develop detailed implementation strategies. Second, because this Plan is not binding on the majority of organizations necessary for its implementation, the participation of many key organizations can not be mandated or guaranteed. Third, financial resources and constraints of the various organizations will play a major role in determining the manner and extent of each organization's participation.

(A final topic which is raised in each regional issue area of the Plan is funding for implementation.) Additional funding for implementing plan policies for all areas of the Plan is necessary.

Within each Plan section, additional activities necessary to complete that specific area of the Plan are identified. Such additional activities may include the collection of data on topics where information currently does not exist. In addition, short-term, long-term and ongoing recommendations are discussed in relation to possible implementing agencies. Finally, a general monitoring methodology is proposed. In some instances, the activities identified can be accomplished by the Regional Commission acting as a forum for addressing the identified needs and concerns, or through providing technical assistance to agencies involved. In other instances, the ongoing planning activities identified require that agencies and organizations historically involved with addressing the issue be responsible for implementation and monitoring.

### **E. Use of the Plan in Regulatory Proceedings**

#### **Act 250**

The Land Use and Development Act (10 VSA Chapter 151) establishes a review and approval process for all major subdivision and development projects in Vermont. The process enables various parties, including town selectboards and planning commissions, the State of Vermont, and the Regional Commission, to participate in the review of projects and to provide testimony with regard to the project's affect on human and natural resources. Prior to granting approval, a District Environmental Commission, consisting of three members appointed by the Governor, must find that the proposed subdivision or development satisfies certain criteria or thresholds including water and air quality, erosion control, public services, wildlife habitats, aesthetics, public investments and town and Regional Plans.

In all cases, the District Commission is required to make findings with regard to the conformance of the particular project to the goals and policies of the Plan. Projects defined or found by the District Commission as having "substantial regional impact" must be in accord with the Regional Plan. The burden to demonstrate conformity by law rests with the applicant (10 VSA §6088(a)).

Criterion 10 of Act 250 requires that before a Land Use Permit can be granted by the District Environmental Commission, it must find that the proposed development or subdivision be in conformance with any duly adopted local and Regional Plan or local capital program (10 VSA §6086). 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 regional and a

town plan are in conflict. In Act 250 proceedings, the Environmental Court or District Commission is faced with determining which plan or portions of a local or Regional Plan apply.

### **Section 248**

The Vermont Public Service Board has been granted judicial power to entertain proceedings and to determine facts upon which it may issue a Certificate of Public Good for new electrical or gas transmission or generation facilities in the State (30 VSA §248). Under this section, no utility may commence construction of such facilities without first obtaining such a Certificate. Prior to granting the Certificate, the Board must find that the project meets with specific criteria. One criterion establishes that the facility must be planned to not unduly interfere with the "orderly development of the region" (30 VSA §248(b)). These criteria also require that the Board give due consideration to the recommendations of both municipal and regional planning commissions and related plans.

It is the intent of the Regional Commission, where necessary or appropriate, to appear as a party in a proceeding affecting the region and provide evidence concerning matters relevant to the Regional Plan. Furthermore, it is the intent of the Regional Commission to coordinate its review of proposed facilities with local officials and to evaluate municipal plans, as necessary, for compatibility with this section.

Since proposals under Section 248 are exempt from municipal zoning bylaws, it is important to reflect in municipal plans the interests of the municipality concerning electrical or gas transmission or generation facilities.

### **F. Developments of Regional Impact**

Complete and objective analyses and deliberation on all elements of a particular development is required prior to concluding whether a development results in a substantial regional impact. In considering a development, the Regional Commission shall evaluate the probable direct and indirect costs and benefits associated with the project and the existing and potential capacity of the region to accommodate new growth. Information generally included in an applicant's Act 250 application should be relied upon as primary evidence in determining substantial regional impact. Additional data and analysis may be required to assist the Regional Commission in making its determination.

This Plan includes eight criteria, developed by the Regional Commission's Act 250 Committee which qualify a development as resulting in substantial regional impact. These criteria are not exclusive but should be considered the principal indicators of regional impact. If a proposal under review affects more than the immediate area or municipality where the project is to be located (through application of any or all of these criteria) it shall be concluded that a development of substantial regional impact exists. The specific criteria are outlined in Chapter XIII – Plan Implementation.

### **G. Definitions of “Goal”, “Policy” and “Recommendation”**

Goal: A goal represents the state of affairs that a plan is intended to achieve.

Policy: A policy is an expression of how to meet a goal.

Recommendation: A recommendation is a means by which to implement a policy, through an action by a person or group.

### **H. Structure of the Plan**

The format of this Plan is intended to include all plan elements as required by law (24 VSA §4348). The statute establishes that a Regional Plan is to include basic policies on land use, housing, transportation, and natural resources. Each chapter of the Plan focuses on particular issue areas of regional or statewide interest. Background issues, goals, policies, and recommendations are contained in each chapter. The final chapter of the Plan discusses the various means and methods available to the Regional Commission to implement plan goals and policies. In addition, the Plan states the Regional Commission's determination of:

- (1) whether the Plan contains the elements as required by law;
- (2) whether the Plan is compatible with plans of adjoining regions; and,
- (3) whether the Plan meets with the goals of Chapter 117 §4302.

### **I. 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 new data or trends are identified, it will be necessary for the Regional Commission to incorporate relevant goals and policies into its planning process. Furthermore, it should be emphasized that while the Regional Commission is legally responsible for the preparation and adoption of the Plan, any individual or organization may request the Regional Commission to modify or amend the Plan.

## II. HISTORY AND DEVELOPMENT

### A. Background

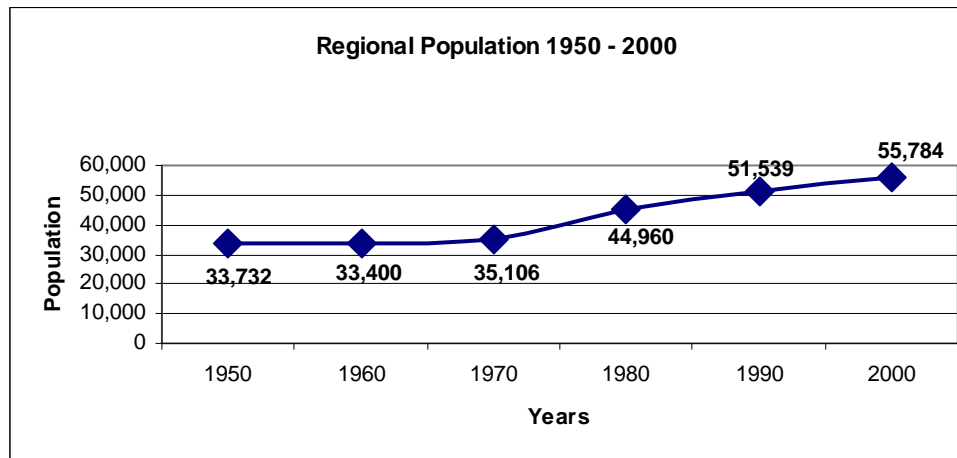
This chapter provides an historic perspective on demographic, social, and economic factors influencing change within the region. Additionally, a section on the region's cultural and social tradition is included. The data presented are intended to provide the framework necessary for analysis of future development goals. In sum, through this assessment, the community at large will be given a better sense of what the region is about and the values it deems important. The principal data sources used include the State of Vermont, U.S. Department of Commerce (U.S. Census Bureau), the Regional Commission and municipalities.

### B. Population

#### Population Patterns

Population and the rate of growth are major influences on the overall development of the region. Increases or decreases in population relate directly to the design and capacity of this region's infrastructure. The density and overall distribution pattern of population, and population movements within the region, affect the type of public facilities necessary to provide an adequate level of service. Public investments can be more effectively prioritized and implemented when population characteristics and trends are understood.

Figure 1 contains population statistics for the region as compiled from the U.S. Census Bureau. The population of the region in 2000 was 55,784, and in 1990 it was 51,539; the region grew by 8.2% or 4,245 people over the decade of the 1990s. Vermont's overall population increased by the same percentage, 8.2%, to a total of 608,809; (Pomfret requested, and was granted, an eighteen person adjustment to their town population, thus adjusting the State's official count.) The towns experiencing the highest percentages of growth in the region weren't the traditional centers of population but were the outlying towns and the towns in between that are making the transition from outlying town to new growth area.



Source: U.S. Census Bureau

**Figure 1: Two Rivers-Ottawaquechee Region Population 1950 - 2000**

Employment opportunities, cost of land, housing availability, and commuting distance to work were the key factors influencing the growth rates in the region. The communities of White River Junction, Vermont, and Hanover and Lebanon, New Hampshire are the economic and employment centers for this region. Outlying-towns (towns beyond the traditional centers of commerce) experienced a migration of younger families who sought to purchase homes or land for home construction. Communities experiencing rapid increases in population were close to employers and major access roads.

	1950	1960	1970	1980	1990	2000	Actual Change '50 - '00	Percentage of Change '50 - '00
Barnard	439	435	569	790	872	958	519	118.22%
Bethel	1,534	1,356	1,347	1,715	1,866	1,968	434	28.29%
Bradford	1,551	1,619	1,627	2,191	2,522	2,619	1,068	68.86%
Braintree	626	536	751	1,065	1,174	1,194	568	90.73%
Bridgewater	903	776	783	867	895	980	77	8.53%
Brookfield	792	597	606	959	1,089	1,222	430	54.29%
Chelsea	1,025	957	983	1,091	1,166	1,250	225	21.95%
Corinth	786	775	683	904	1,244	1,461	675	85.88%
Fairlee	571	569	604	770	883	967	396	69.35%
Granville	213	215	255	288	309	303	90	42.25%
Hancock	391	323	283	334	340	382	-9	-2.30%
Hartford	5,827	6,355	6,477	7,963	9,404	10,385	4,558	78.22%
Hartland	1,559	1,592	1,806	2,396	2,988	3,223	1,664	106.74%
Newbury	1,667	1,452	1,440	1,699	1,985	1,955	288	17.28%
Norwich	1,532	1,790	1,966	2,398	3,093	3,544	2,012	131.33%
Pittsfield	225	254	249	396	389	427	202	89.78%
Plymouth	348	308	283	405	440	555	207	59.48%
Pomfret	586	600	620	856	874	979	393	67.06%
Randolph	3,499	3,414	3,882	4,689	4,764	4,853	1,354	38.70%
Rochester	937	879	884	1,054	1,181	1,171	234	24.97%
Royalton	1,331	1,388	1,399	2,100	2,389	2,603	1,272	95.57%
Sharon	470	485	541	828	1,211	1,411	941	200.21%
Stockbridge	427	392	389	508	618	674	247	57.85%
Strafford	680	548	536	731	902	1,045	365	53.68%
Thetford	1,046	1,049	1,422	2,188	2,438	2,617	1,571	150.19%
Topsham	733	638	686	767	944	1,142	409	55.80%
Tunbridge	774	743	791	925	1,154	1,309	535	69.12%
Vershire	284	236	299	442	560	629	345	121.48%
W. Fairlee	363	333	337	427	633	726	363	100.00%
Woodstock	2,613	2,786	2,608	3,214	3,212	3,232	619	23.69%
Region	33,732	33,400	35,106	44,960	51,539	55,784	22,052	65.37%

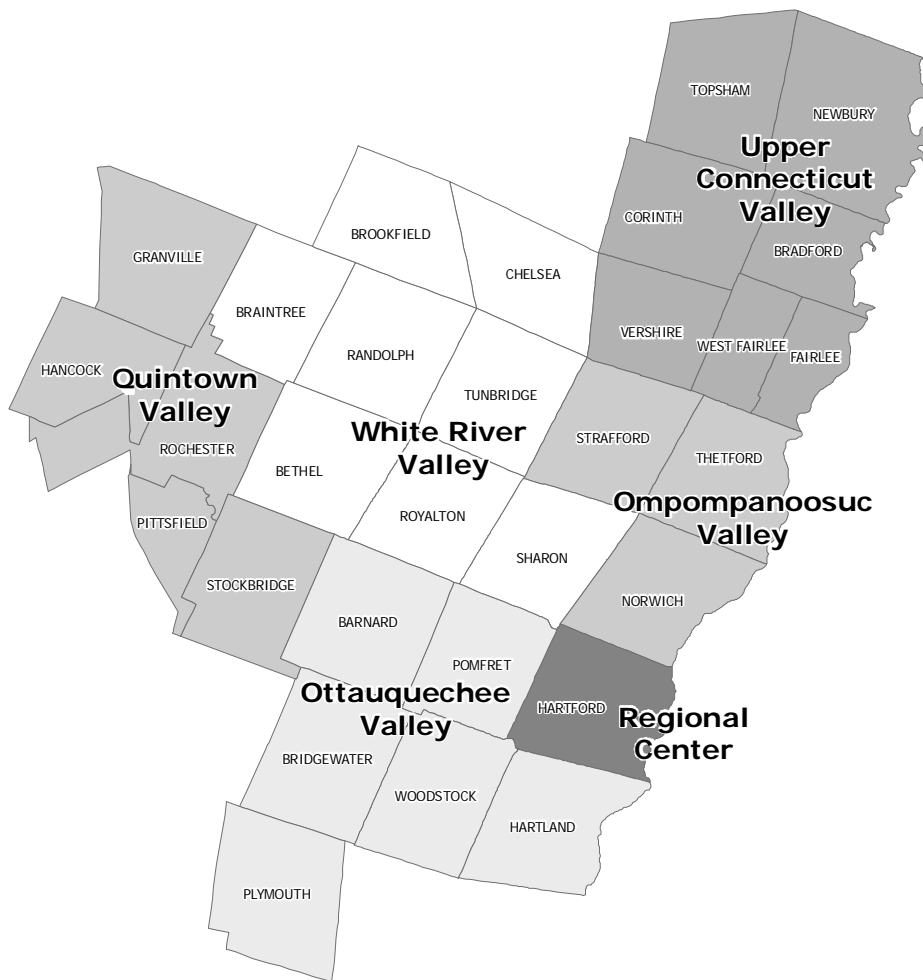
Source: U.S. Census Bureau

As was the case for many mid-sized traditional centers in Vermont, they experienced slower growth rates than the smaller outlying towns around them in this region. Randolph saw a 39%

increase, and Woodstock saw only a 24% rate of growth over fifty years; the average rate of growth for the region was 65%. Another influence on regional growth was the second-home market. Access to Interstates, a beautiful working landscape, and a variety of natural and recreational assets has made this region attractive as a destination for second-home development. Other factors influencing rates of population growth are the perceived quality of school systems, the relative property tax burden for comparable housing, land values in outlying towns, and the market value for single-family housing.

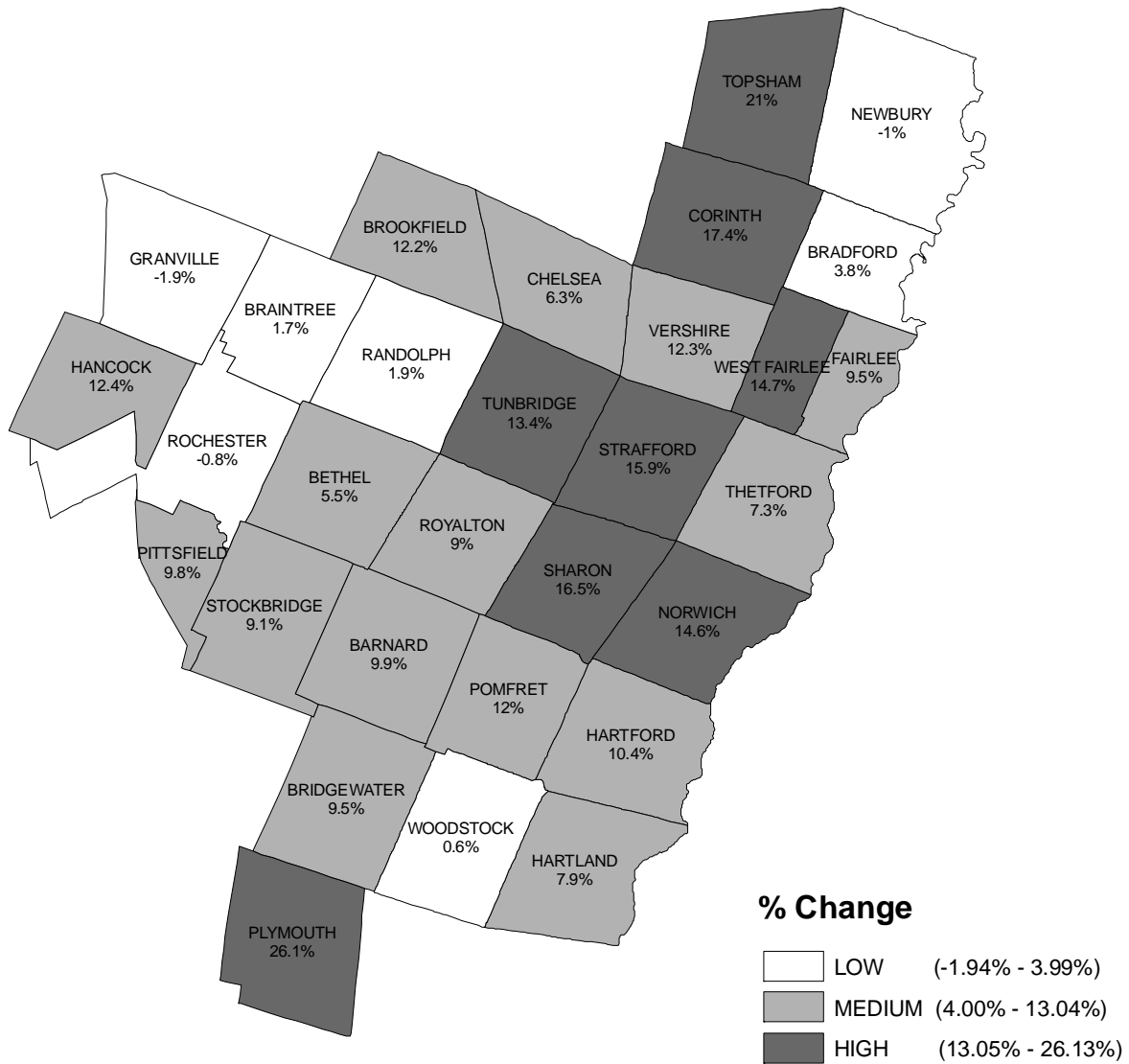
In the graphic below, the region has been divided into sub-regions based upon geographic, economic, watershed, and transportation relationships, with the Town of Hartford as the regional center. Evaluating the characteristics of sub-regions reveals information that is useful for planning. Five sub-regions surround the Regional Center, they are the Ompompanoosuc Valley, Ottauquechee Valley, Quintown Valley, Upper Connecticut Valley, and the White River Valley. Figure 2 illustrates the towns in each sub-region; see also Labor Market Area map (Figure 20) and Watersheds and Basins map (Figure 6).

**Figure 2: Sub-regions and Regional Center**



Source: Two Rivers – Ottauquechee Regional Commission

Figure 3: Percentage of Population Change 1990 – 2000



Source: Census 2000

**Poverty Status of Population**

The Census data on poverty were derived from the income data. The U.S. Census Bureau determines poverty thresholds based on the age, number of people in a household, and the presence of children. When the Social Security Administration created the poverty definition in 1964, it focused on family food consumption; the U.S. Department of Agriculture used data about the nutritional needs of children and adults to construct food plans for families. Within each food plan, dollar amounts varied according to the total number of people in the family and family composition, such as the number of children within each family. Poverty thresholds are revised annually to allow for changes in the cost of living as reflected in the Consumer Price



Index. The poverty thresholds are the same for all parts of the country, they are not adjusted for regional, state or local variations in the cost of living.

Size of Family Unit	Weighted Average Threshold	Number of related children under 18 years old								
		None	One	Two	Three	Four	Five	Six	Seven	Eight or more
One Person Household	\$8,501									
One person under 65 years old	\$8,667	\$8,667								
One person 65 years old and over	\$7,990	\$7,990								
Two Person Household	\$10,869									
Two Person Household with householder under 65 years old	\$11,214	\$11,156	\$11,483							
Two Person Household with householder 65 years old and over	\$10,075	\$10,070	\$11,440							
Three people	\$13,290	\$13,032	\$13,410	\$13,423						
Four people	\$17,029	\$17,184	\$17,465	\$16,895	\$16,954					
Five people	\$20,127	\$20,723	\$21,024	\$20,380	\$19,882	\$19,578				
Six people	\$22,727	\$23,835	\$23,930	\$23,436	\$22,964	\$22,261	\$21,845			
Seven people	\$25,912	\$27,425	\$27,596	\$27,006	\$26,595	\$25,828	\$24,934	\$23,953		
Eight people	\$28,967	\$30,673	\$30,944	\$30,387	\$29,899	\$29,206	\$28,327	\$27,412	\$27,180	
Nine people or more	\$34,417	\$36,897	\$37,076	\$36,583	\$36,169	\$35,489	\$34,554	\$33,708	\$33,499	\$32,208

Source: Census 2000

The regional poverty numbers are equal-to or lower-than the poverty numbers for the State of Vermont, but there are towns where the poverty numbers exceed the regional or statewide averages. The Town of Bethel's poverty rates exceeded the state and regional numbers. The Town of Bradford's poverty rates exceeded the state and regional numbers in every category but elder poverty. The Town of Strafford's numbers are just the opposite, Strafford has low poverty rates for all groups *except* the elderly; Strafford has the 3<sup>rd</sup> highest rate of poverty among the elderly. The towns of Vershire (18.6%), Bethel (15.7%), Strafford (13.9%), Fairlee (13.4%), and Bridgewater (11.9%) have the region's highest rates of poverty among the elderly, persons aged 65 years old or older.

The towns of Vershire (11.4%), Topsham (9.3%), Chelsea (9%), Granville (8.7%), and Newbury (8.6%) have the region's highest rates of poverty among families with children. The towns of Plymouth (54.5%), Vershire (52.6%), Bridgewater (40%), Royalton (33.8%), Topsham (32.4%), Hancock (31.3%), and Bradford (30.2%) have the region's highest rates of poverty among female householders, with "no husband present" as the Census specifies. With state and regional female householder poverty rates at 24.1%, these six towns have exceptionally high rates of poverty among single, female parents of children. Poverty rates for "individuals" gives an overall view of poverty in a town, the highs or lows of selected groups' poverty rates are

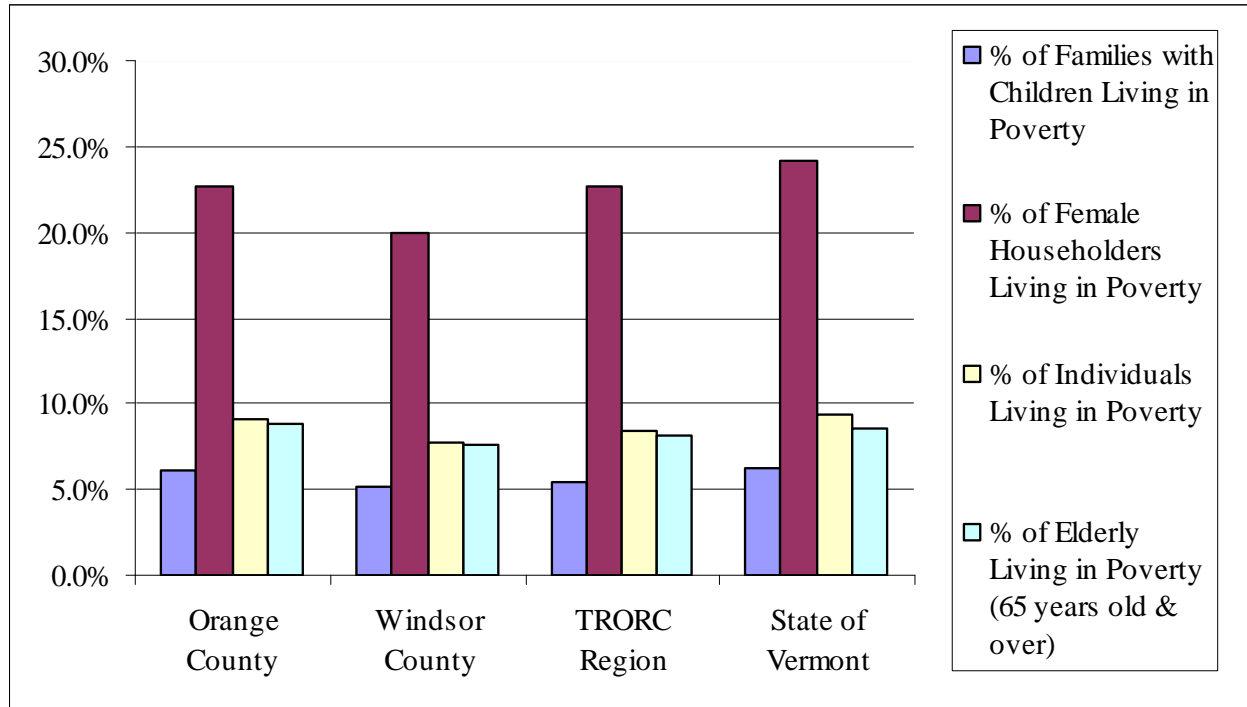
combined into one general measure of poverty. The Census 2000 poverty rate for individuals in Vermont was 9.4%, the region's poverty rate for individuals was 8.4%. Towns with the highest poverty rates for individuals were: Chelsea (15.3%), Royalton (15%), Vershire (13.4%), Newbury (12.9%), and Topsham (12.8%).

	% of Families with Children Living in Poverty	% of Female Householders Living in Poverty	% of Individuals Living in Poverty	% of Elderly Living in Poverty (65 years old & over)
Barnard	4.7%	26.1%	6.3%	2.4%
Bethel	7.9%	27.1%	10.6%	15.7%
Bradford	7.9%	30.2%	11.3%	8.1%
Braintree	2.7%	11.4%	6.5%	4.3%
Bridgewater	4.9%	40.0%	7.9%	11.9%
Brookfield	2.5%	18.5%	6.1%	5.3%
Chelsea	9.0%	29.8%	15.3%	18.5%
Corinth	7.1%	24.0%	10.7%	7.7%
Fairlee	2.6%	15.2%	5.6%	13.4%
Granville	8.7%	26.1%	11.5%	0.0%
Hancock	6.6%	31.3%	8.4%	7.8%
Hartford	5.3%	18.2%	8.5%	4.9%
Hartland	1.3%	11.8%	2.6%	1.0%
Newbury	8.6%	20.0%	12.9%	10.6%
Norwich	1.5%	0.0%	3.8%	6.2%
Pittsfield	1.6%	0.0%	4.2%	6.0%
Plymouth	3.5%	54.5%	5.4%	8.7%
Pomfret	3.4%	5.9%	4.8%	5.9%
Randolph	5.3%	26.8%	7.9%	7.5%
Rochester	4.2%	25.7%	6.0%	1.0%
Royalton	7.6%	33.8%	15.0%	11.6%
Sharon	5.3%	26.8%	7.3%	9.4%
Stockbridge	2.0%	9.1%	5.3%	8.0%
Strafford	3.6%	9.4%	7.9%	13.9%
Thetford	4.0%	7.7%	5.7%	6.9%
Topsham	9.3%	32.4%	12.8%	8.8%
Tunbridge	8.4%	22.6%	12.1%	8.3%
Vershire	11.4%	52.6%	13.4%	18.6%
West Fairlee	8.0%	25.0%	10.7%	8.7%
Woodstock	4.3%	17.9%	6.4%	3.7%
Region	5.4%	22.7%	8.4%	8.2%
Vermont	6.3%	24.1%	9.4%	8.5%

Source: Census 2000

The following towns have elevated proportions of people living in poverty for at least one of the four groups selected: Bethel, Bradford, Bridgewater, Chelsea, Fairlee, Granville, Newbury, Plymouth, Royalton, Strafford, Topsham, and Vershire. The towns of Bradford and Vershire had high poverty rates for three of the four groups, and Bridgewater and Topsham had highs for two

of the four groups. Looking at Table 20 - Housing Affordability, Median Value, and 1990s Construction, it is clear that housing costs are part of the poverty problem. The towns with the highest rates of poverty also have the highest percentages of households that pay more than 30% of their income on housing; this is considered unaffordable. Affordable housing costs a household 30% or less of their income.



Source: Census 2000

Figure 4: Poverty Rates for Selected Groups - 2000

**Income of Population**

According to the 2000 Census, the region’s median family income ranged from highs of \$78,178 in Norwich, \$57,300 in Woodstock and \$56,250 in Pomfret, to lows of \$33,646 in Corinth and \$31,750 in Granville. During the 1990s, Vermont’s median family income grew by 40% while the region’s median family income grew by 43%, but in terms of real dollars, the regional median family income was \$2,456 lower than that of the State.



Source: Royalton Historical Society

Photo 1: Population sample, 1915

<b>Table 4: Median Family Income 1990 and 2000</b>			
	<b>1990</b>	<b>2000</b>	<b>% Change</b>
Barnard	\$37,813	\$48,125	27.3%
Bethel	\$32,098	\$41,250	28.5%
Bradford	\$31,026	\$42,128	35.8%
Braintree	\$33,125	\$45,357	36.9%
Bridgewater	\$33,636	\$47,500	41.2%
Brookfield	\$35,592	\$51,071	43.5%
Chelsea	\$30,238	\$40,625	34.4%
Corinth	\$28,500	\$33,646	18.1%
Fairlee	\$31,250	\$48,250	54.4%
Granville	\$26,875	\$31,750	18.1%
Hancock	\$22,813	\$40,000	75.3%
Hartland	\$34,877	\$55,354	58.7%
Hartford	\$38,469	\$51,286	33.3%
Newbury	\$27,614	\$42,262	53.0%
Norwich	\$58,377	\$78,178	33.9%
Pittsfield	\$34,375	\$47,000	36.7%
Plymouth	\$29,018	\$46,667	60.8%
Pomfret	\$40,288	\$56,250	39.6%
Randolph	\$30,833	\$50,756	64.6%
Rochester	\$27,935	\$41,131	47.2%
Royalton	\$32,582	\$42,898	31.7%
Sharon	\$36,488	\$47,500	30.2%
Stockbridge	\$34,091	\$44,821	31.5%
Strafford	\$35,417	\$52,596	48.5%
Thetford	\$41,068	\$55,323	34.7%
Topsham	\$27,240	\$37,440	37.4%
Tunbridge	\$30,417	\$45,670	50.1%
Vershire	\$30,208	\$40,714	34.8%
West Fairlee	\$30,568	\$42,500	39.0%
Woodstock	\$39,318	\$57,330	45.8%
Regional Median	\$32,340	\$46,169	42.8%
State Median	\$34,780	\$48,625	39.8%

Source: Census 2000

### Age of Population

Between 1990 and 2000 the region and the State grew at a rate of 8.2%. The State saw a slight increase in the size of the child-aged population over the decade, but the region saw a slight decrease. In 2000, the population of persons aged nineteen years and younger constituted roughly 27% of the State and regional populations, but the region had a lower population of young adults (aged 20 to 24) than did the State, 4.4% for the region and 6.2% for the state. The region had a larger proportion of elderly persons (aged 65 years and over) than did the State, 13.7% for the region and 12.7% for the State. The bulk of the growth in the regional population happened in age groups that did not have school-aged children associated with them. The

region's growth was most driven by the in migration of people aged forty-five through seventy looking for a high quality of life, secure real estate investments, and changes in lifestyle.

Town	Census 2000	Projection				% Change			
		2005	2010	2015	2020	2000-05	2005-10	2010-15	2015-20
Barnard	958	986	1,009	1,028	1,049	2.9	2.4	1.8	2.1
Bethel	1,968	2,018	2,057	2,095	2,135	2.5	1.9	1.9	1.9
Bradford	2,619	2,656	2,699	2,742	2,786	1.4	1.6	1.6	1.6
Braintree	1,194	1,200	1,201	1,208	1,209	0.5	0.1	0.5	0.1
Bridgewater	980	1,012	1,039	1,069	1,100	3.3	2.7	2.8	2.9
Brookfield	1,222	1,272	1,308	1,338	1,365	4.1	2.9	2.3	2.1
Chelsea	1,250	1,255	1,251	1,248	1,247	0.4	-0.3	-0.3	0.0
Corinth	1,461	1,525	1,574	1,621	1,678	4.4	3.2	3.0	3.5
Fairlee	967	999	1,025	1,050	1,074	3.3	2.7	2.4	2.3
Granville	303	317	325	331	339	4.7	2.5	1.9	2.3
Hancock	382	390	393	395	401	2.2	0.8	0.5	1.5
Hartford	10,385	10,600	10,790	11,007	11,226	2.1	1.8	2.0	2.0
Hartland	3,223	3,289	3,319	3,342	3,372	2.0	0.9	0.7	0.9
Newbury	1,955	1,968	1,973	1,983	1,994	0.7	0.2	0.5	0.6
Norwich	3,544	3,703	3,791	3,854	3,947	4.5	2.4	1.7	2.4
Pittsfield	427	436	440	446	455	2.1	0.8	1.4	2.0
Plymouth	555	575	590	601	610	3.7	2.6	1.8	1.4
Pomfret	979	1,021	1,027	1,028	1,032	4.3	0.6	0.1	0.4
Randolph	4,853	4,849	4,845	4,855	4,869	-0.1	-0.1	0.2	0.3
Rochester	1,171	1,168	1,162	1,156	1,154	-0.2	-0.5	-0.5	-0.2
Royalton	2,603	2,729	2,825	2,897	2,958	4.8	3.5	2.6	2.1
Sharon	1,411	1,507	1,595	1,684	1,781	6.8	5.8	5.6	5.8
Stockbridge	674	702	725	745	769	4.1	3.3	2.8	3.2
Strafford	1,045	1,086	1,104	1,125	1,153	3.9	1.7	1.9	2.5
Thetford	2,617	2,682	2,724	2,775	2,835	2.5	1.6	1.9	2.2
Topsham	1,142	1,218	1,299	1,392	1,491	6.7	6.6	7.1	7.1
Tunbridge	1,309	1,353	1,374	1,388	1,409	3.4	1.6	1.0	1.5
Vershire	629	670	701	731	763	6.6	4.6	4.2	4.3
West Fairlee	726	779	823	868	915	7.3	5.7	5.4	5.5
Woodstock	3,232	3,164	3,073	2,998	2,941	-2.1	-2.9	-2.4	-1.9
Region	55,784	57,128	58,063	58,999	60,057	2.4	1.6	1.6	1.8
Orange County	28,226	28,976	29,544	30,122	30,737	2.7	2.0	2.0	2.0
Windsor County	57,418	58,154	58,553	58,960	59,446	1.3	0.7	0.7	0.8
Vermont	608,827	625,935	639,241	652,199	666,041	2.8	2.1	2.0	2.1

Source: VT Department of Aging and Independent Living; analysis by Massachusetts Institute for Social and Economic Research, 2003

### Future Population Projections

Future population projections are functions of two components; an estimate of natural changes in population that considers births and deaths, and estimates of migration. In 2003, the Vermont Department of Aging and Independent Living contracted with the Massachusetts Institute for

Social and Economic Research to produce population projections for the state, counties, and municipalities in Vermont that was based on the 2000 Census and would project growth to 2020. The projections were based on the assumption that economic conditions throughout Vermont would remain stable.

Comparing the population projections with the growth rates from 1950 – 2000 shows that most of the towns with the highest percentages of growth over the past fifty years are projected to continue to grow faster than the regional, county and state averages, but a few are not. Sharon, Vershire and West Fairlee had the three highest rates of growth over the past fifty years and they are also projected to continue experiencing high growth rates into 2020. The towns of Norwich and Royalton are projected to continue their above-average rates of growth but not at the escalated pace of Sharon, Vershire or West Fairlee. The towns of Barnard, Hartland and Thetford are projected to have their growth slow to a rate closer to the regional average.

Looking at the towns that experienced moderate or slow growth over the past fifty years, the town of Topsham is projected to be the fastest growing town from 2005 - 2020. Bridgewater, Brookfield, Corinth and Granville are projected to grow faster than the regional, county and state averages; the remaining towns will experience growth near the regional and state averages. Finally, the projections indicate that four towns, Chelsea, Randolph, Rochester and Woodstock, will lose population as they approach 2020.

### **Planning Implications**

Population change in the region will be influenced primarily by economic and social conditions existing throughout the Northeast. Without in migration of people into the region, population would decline. Population decline is not likely to be the case, however. Despite the obstacles presented by local incomes that don't keep pace with escalating real estate values, people are still drawn to this region of Vermont because of its rugged rural landscape, the varying seasons, superior environment and independent character.

Towns within thirty minutes of the primary service and employment centers (e.g. Rutland, Montpelier/Barre, and White River Junction/Hanover/Lebanon) will experience higher growth than towns that are beyond that commuting distance, or towns that are closer to the employment centers but have prohibitive costs of living. Accordingly, the transportation facilities connecting new growth areas to service and employment centers will carry higher volumes of traffic.

## **C. Economy**

### **Current Economy and Jobs**

The 2000 Census reported that thirty-eight percent of the regional workforce, (people who live in the region but may or may not work in it), was employed in occupations classified as "Management, Professional, or Related Occupations". This increase was the result of the addition of 2,778 jobs over ten years. The role of "Production, Transportation, and Material Moving Occupations" grew significantly over the 1990s rising from 4% of the region's occupations to 12%. "Service Occupations" were the only other group that saw job growth, albeit slight, and employment in "Sales and Office Occupations" remained stable. "Extraction and Maintenance Operation Occupations" and "Farming, Fishing, and Forestry Occupations"

saw job losses over the 1990s. Families and individuals working in “Farming, Fishing, and Forestry Occupations” or “Extraction and Maintenance Operation Occupations” made the decision to leave those professions and take employment in the more lucrative occupations in “Management, Professional, or Related Occupations” or “Production, Transportation, and Material Moving Occupations” that saw growth in White River Junction, Vermont and Hanover, Lebanon, and West Lebanon, New Hampshire. The occupational profiles of the region and state are nearly identical.

	Management, Professional, and Related Occupations	Service Occupations	Sales and Office Occupations	Farming, Fishing, and Forestry Occupations	Construction, Extraction, & Maintenance Occupations	Production, Transportation, & Material Moving Occupations
2000 Percentages	38%	15%	23%	2%	10%	12%
1990 Percentages	31%	14%	24%	6%	22%	4%

Source: U.S. Census Bureau

### Salary Classification and Work Patterns

The proportions of employment in private sector, public sector, and self-employed endeavors in the region is nearly identical from 1990 to 2000, changed only by a slight drop in self-employment and increase in public sector employment in 2000. The State of Vermont has a higher percentage of private sector employment (75%) than the region; the region has a higher proportion of self-employment than does the state (10%).

	Private Wage and Salary Workers	Government Workers	Self-employed workers in their own business, not incorporated	Unpaid Family Workers
2000 Percentages	71%	16%	13%	0%
1990 Percentages	71%	15%	14%	0%

Source: U.S. Census

The Vermont Department of Employment and Training (DET) maintains data on the types and numbers of jobs present in each local economy. DET data for 1999 (the same year the 2000 Census data was collected) showed that the total number of jobs in the region was 19,882. The 2000 Census reported that 29,025 persons living in the region stated they were employed. If all of the jobs in the regional economy were filled only by residents of the region, still more than

9,000 workers would have to travel outside the region to find employment. And in actuality, this number is even higher because some portion of the jobs in the region are held by people who don't live within it. This region houses the employees of other region's businesses. For instance, the region's top two major employers - Dartmouth College and Dartmouth Hitchcock Medical Center - are located outside the region. Randolph is home to at least five of the region's major employers.

**Table 8: Major Employers Located In or Near the Region**

Employers with 1,000 or more employees:

Dartmouth College	-	Hanover, NH
Dartmouth Hitchcock Medical Center	-	Lebanon, NH

Employers with 500 - 999 employees:

Killington/Pico Mountain Resort	-	Killington, VT
Town of Hartford, VT	-	Hartford, VT
U.S. 1 <sup>st</sup> & 2 <sup>nd</sup> Class Post Offices	-	throughout region
Veterans Administration Hospital	-	Hartford, VT

Employers with 250 - 499 employees:

G.W. Plastics, Inc.	-	Bethel, VT
Hartford School District	-	Hartford, VT
Simon Pearce (US), Inc.	-	Quechee, VT
State of Vermont	-	throughout region
Vermont Castings, Inc.	-	Bethel, VT
Woodstock Resort Corp	-	Woodstock, VT
Mt. Ascutney Hospital & Health Center	-	Windsor, VT

Employers with 100 - 249 employees:

Bradford Oil	-	Bradford, VT
Chesapeake Hardwood Products, Inc.	-	Hancock, VT
Copeland Furniture	-	Bradford, VT
DuBois & King, Inc.	-	Randolph, VT
Gifford Medical Center	-	Randolph, VT
King Arthur Flour Company	-	Norwich, VT
Oxbow Union High School District #30	-	Bradford, VT
Pompanoosuc Mills Corp.	-	Thetford, VT
Randolph Town School District	-	Randolph, VT
Vermont Law School	-	Royalton, VT
Vermont Technical College	-	Randolph, VT
Visiting Nurses Alliance of VT & NH	-	throughout region
Woodstock Union High School District	-	Woodstock, VT



### Gender and the Labor Force

Women in the region constituted 46% of the workforce in 2001; in 1990, 48% of the workforce was female and in 1980 it was 44%. Five towns had percentages of women in the workforce of 60% or higher: Corinth (67.2%), Randolph (63.4%), Strafford (60.7%), Pomfret (59.6%), and Newbury (58.3%). Three towns had percentages of women in the workforce of 30% or lower: Pittsfield (28.9%), Plymouth (28.8%), and Topsham (27.5%).

	Workers 16 years and over	Car, Truck, Van (drove alone)	Car, Truck, Van (carpooled)	Public Transportation (and taxis)	Walked	Other Means of Transport	Worked at Home	Mean Travel Time to Work (minutes)
Barnard	497	388	23	4	24	2	56	25.1
Bethel	956	693	148	0	40	9	66	23.5
Bradford	1251	895	202	11	69	17	57	23.6
Braintree	614	468	112	0	19	1	14	25.5
Bridgewater	501	396	48	0	20	5	32	21.2
Brookfield	652	486	90	1	19	3	53	26.4
Chelsea	597	447	75	8	31	11	25	26.2
Corinth	656	522	65	0	13	8	48	30.9
Fairlee	569	408	76	0	23	2	60	21.7
Granville	184	106	52	0	4	0	22	22.4
Hancock	161	101	21	3	17	0	19	20.4
Hartford	5327	4284	638	38	143	43	181	19.3
Hartland	1777	1330	243	0	61	15	128	21.0
Newbury	936	695	104	3	55	3	76	25.3
Norwich	1747	1236	247	24	58	11	171	19.7
Pittsfield	238	176	16	0	25	0	21	21.2
Plymouth	265	196	36	4	8	7	14	22.5
Pomfret	539	406	67	0	21	2	43	21.8
Randolph	2487	1726	371	13	183	35	159	21.7
Rochester	622	470	47	4	46	0	55	22.8
Royalton	1311	873	201	6	109	0	122	25.9
Sharon	775	607	99	0	10	1	58	25.8
Stockbridge	355	292	39	0	10	3	11	28.7
Strafford	549	425	36	0	20	5	63	28.3
Thetford	1440	1079	186	0	24	5	146	24.0
Topsham	543	408	88	0	15	0	32	31.4
Tunbridge	675	521	95	2	26	4	27	26.9
Vershire	288	197	43	2	18	4	24	30.6
West Fairlee	368	255	49	3	12	14	35	29.8
Woodstock	1652	1168	182	7	100	30	165	20.0
Regional Totals:	28532	21254	3699	133	1223	240	1983	24.5
Regional Percent:		74.5%	13.0%	0.5%	4.3%	0.8%	7.0%	24.5
Vermont Percent:		75.2%	11.9%	0.7%	5.6%	0.9%	5.7%	21.6

Source: US Census

Prepared by: Two Rivers - Ottauquechee Regional Commission

### **Mode of Travel and Travel Time To Work**

Seventy-four percent of the region's workforce drives a single-occupancy vehicle to work, according to the 2000 Census. This is slightly lower than the county or statewide percentages. The region has a longer, average commuting-time than Windsor County or the State, but is lower than Orange County's 25.3 minutes. The mean travel-time-to-work for the State was 21.6 minutes; it was 24.5 minutes for the region. The longest commutes occurred in the towns that grew the fastest over the past decade. The region's travel times may be comparable to those of the state or nation, but they are increasing at a faster rate than those of the state or nation.

### **Planning Implications**

If population projections for the region hold true, the number of people entering the work force will increase. The number of jobs available above the natural growth of the work force will affect future population of the area and housing. If few jobs are created, workers will be forced to migrate elsewhere. Rapid job formation, exceeding natural growth in the Greater Upper Valley Area will result in a net in-migration of people into the region. This area is generally defined as communities drawing primarily on Lebanon, White River Junction, and Hanover for primary services.

Cooperation and coordination among neighboring employment centers is essential to secure the proper balance between population and employment. Evaluation of and improvements to transportation systems and facilities should be a part of this inter-regional effort. As noted earlier, a sizable portion of the resident work force commutes to communities outside of the region.

The natural work force changes in the Upper Connecticut Valley area (job entries versus attrition rates) can more than likely be accommodated in the future without undue hardship on public services as the rate of change would be relatively slow. Adding to this, however, the advent of new industries, service facilities, or business expansions located in area employment centers could place growth pressures on surrounding towns and the State to provide services. Demands for rehabilitation or improvements to public infrastructure necessary to accommodate or plan for increased economic activity are likely to be the result. The adequacy or sufficiency of existing transportation facilities could be impacted.

Vermont, hence the region, is not an isolated economy. It competes with neighboring states, the rest of the nation, and, increasingly, with the world. This competition will have an impact upon the region's competitive position. The creation of new jobs will, for example, be driven by the quality of the work force and the relative position of industry and commerce in compensation and benefit packages.

The type and rate of growth will be affected by economic policies and programs enacted by the State and its comparative advantages/disadvantages with other areas. Factors likely to influence economic change are:

1. competitive tax structures and the overall tax climate for businesses and corporations;

2. advancement of a statewide transportation system based upon solid planning and implementation;
3. competitive energy costs and availability to accommodate economic development expansion;
4. strength of marketing the benefits of job creation and private sector investment in the region or the state;
5. comparative costs stringency and predictability of the regulatory permit process;
6. extent of investment into telecommunication systems to bring rural areas of the region into the electronic workplace making it possible to access worldwide data and markets; and
7. work force competency and education.

Travel and tourism is an increasing business enterprise in Vermont and as well as the region. There are numerous reasons for this, including the region's close proximity to major population centers in the Northeast, the wide and diverse range of amenities and interests available to satisfy the tourist, and the area's varied and unique historic, cultural and natural resources. The sensitivity of planners toward innovative transportation and implementation programs to retain these special values will positively impact the long-term quality of the tourism and the recreation industry.

#### **D. Cultural Traditions, Land Use and Transportation - 1760 to the Present**

In most environments, land has been put to use in a succession of stages, depending upon its resources and location. Each of these changes has connected the region to the state more extensively, as well as to the larger New England region.

The settlement of the region, which has become the dominant land use pattern we experience today, began after the 1760s, following the end of the French and Indian War. Immigration into the region came largely from southern New England and continued into the early 1800s. With the opening of private turnpikes, military roads, and bridges, young people seeking new opportunities in farming fled to the Connecticut River Valley towns. In the early 1800s, the region's population reached an all time high.

While transportation improvements were being advanced in the region, others were being made outside the region. The result was a transportation system that had an economic impact. It enabled locally grown produce and raw materials to reach outside markets. This pattern continues to this day.

With the improvements to transportation to the west, including the famous Erie Canal, Vermont's farmers lost some of their goods market to New York and Ohio. Additionally, improved access to other areas set the stage for westward migration out of the region, a

movement that continued into the early part of the 20th century. Much has been written about the drift of the region's farmers to the west. Not all of the region's residents chose to leave the area however. Many sought an enterprise in sheep farming, putting to use the rocky uplands. The sheep industry flourished with Orange and Windsor counties being one of the leading production areas in the 1850s.

Like the earlier years, transportation improvements were major factors setting off the decline in the sheep industry. Improved access to growing competition in the west, combined with comparatively higher annual costs for sheep farming in the region, made Vermont less competitive. The sheep era did, however, bring in the woolen industry. This was the first major move of employment toward non-agricultural pursuits. The number of mills increased dramatically. Factories began to emerge, as most towns in the region give evidence to today, with dams and mills situated on major rivers.

Concurrently came the emergence of the railroad as an attractive alternative to the fragmented system of roads and trails. Low population and few industries along the rail lines limited the ability of the railroads to operate successfully at first. To be successful, railroads had to rely on additional traffic from out of state. Formed in the 1840s, the Central Vermont Railroad extended lines through the White River Valley to be followed shortly thereafter by the Connecticut and Passumpsic River line (currently the Boston and Maine) along the eastern side of the region. Following the development of these and other main lines throughout the region and Vermont during the late 1870s, a number of short rail lines emerged. These included the White River Railroad, a twenty mile line extending from Bethel to Rochester, the Woodstock Railroad, a fifteen mile line extending from White River Junction to Woodstock, and the Montpelier and Wells River Railroad, extending from Wells River and New Hampshire to Montpelier. All of these lines reflected the need to transport goods, raw materials and people to and from some of the interior communities located away from major rail centers and lines. By the middle of this century these lines fell into financial decline, and were eventually discontinued and liquidated.

In sum, the railroads can be credited as a contributor to the economic development of the region; they brought its people into the region. Railroads need to be recognized as key factors for the development and maturity of the State's tourism and recreation business today, a vital and growing part of the region's economy. The implications resulting from rail line development heavily influence the land use patterns and cultural values of our villages and countryside today. Also, it should come as no revelation that most of the region's primary highways follow closely the course of existing or former railroad lines.



*Source: Royalton Historical Society*

**Photo 2: Oxen on Chelsea Street in South Royalton, 1915**

During the nineteenth century, a gradual, yet profound revolution in travel was taking place altering our understanding of time, distance and the landscape. Trains were first, but they were not without their limitations; they were fixed to particular locations and stops. Freedom to roam was enabled with a new form of transportation - the automobile. By the late teens and early 1920s, changes in the highway landscape began to be tailored to the automobile and away from the earlier modes of transport. Soon highway building became the shaper of the region's landscape. Roadside trees were cut and roads were widened, flattened and straightened. Just as dramatic as changes to the roadway itself were the injection of a new roadside landscape. New highway related land uses moved into the picture. Roadside marketplaces began to extend away from the village and hamlet centers, particularly on the heavier traveled routes such as U.S. Routes 4 and 5. Advertising signs slowly began to inundate areas outside of villages and hamlets as a mean of luring the traveler to gas stations, restaurants, lodges, and other land uses appropriate to the automobile user.

During the 1960s and 1970s, the region entered into an evolution of yet another transportation network imposed upon the landscape - the superhighway. Interstates 91 and 89 were completed throughout the region and Vermont. The interstate system can be credited as the first national highway system planned by the federal government.

The four lane interstate system bypassed most of the region's villages and tended to siphon off traffic from the older parallel truck roads such as Routes 5, 12, and 14, spelling economic hardships for some of the so-called business routes. Some gas stations closed and motor courts lost the traffic necessary to keep operating. Ownership changes and replacements for older uses resulted.

The region has thirteen interchange areas on I-91 and I-89. Some of these interchange areas have proven to be prime targets for roadside commercial development. Since land access to other points along the Interstates has been prohibited, land around the interchanges has become sought after and highly valuable. Oil companies, national franchised restaurants, and motels have begun to emerge on the landscape around these areas. While not yet prevalent within this region, the interchange area throughout Vermont is becoming somewhat a center for certain uses historically held to be within the town center. These include retail shops in large complexes, such as shopping centers, automobile service and sales, trucking terminals, and other non-residential vehicular oriented uses. For the region, the core of the retail marketplace still remains within village centers and along roads leading to and from them. In some cases, such as in Bethel, Randolph, and Bradford, some downtown area merchants have felt that they have become an economic casualty of major road building and the development that has followed. Now the same source of funding that built or rebuilt major highways (the federal government), is being used to resuscitate life into these areas, (i.e., sidewalks, bikeways, road improvements, historic preservation, and parking areas).

The identity of the region today is a composite of its landscape, people, institutions, and history. All these factors contribute to its character. The case has been made in numerous forums that Vermont, hence the region, exhibits some of the finest landscapes and environments in the United States and elsewhere. The region's rural character and traditions are heavily influenced by its pattern of development and the sense of community that comes from people living and working here. When looked at over time, this pattern of settlement and its scale have worked for the sociological, psychological, and aesthetic benefit of the region. Overall, it has provided a system that is both economical and efficient.

### III. LAND USE

#### **A. Background Issues**

The identity of the region is a composite of its landscape, people, institutions, and history. All these factors contribute to its character. Over the past thirty years, the region has experienced a period of unprecedented economic growth and profound changes to its landscape. These trends will continue. This growth has generally benefited the region by providing new and expanded job opportunities and income growth. This growth has also resulted in increased social and cultural diversity. The results have not been universally pleasing when translated to the landscape of the region.

Indiscriminate commercial strips, residential sprawl characteristic of an urban setting, and the loss of open space have occurred in some areas of the region, particularly those closest to the interstate highways and heavily traveled state roads.

All municipalities in the region have planning programs, yet many are ill-equipped to deal with the complex challenges brought about by rising real estate and property taxes, and strained community services, particularly schools. Much of this unplanned growth jeopardizes town character, public services, natural resources, and the stock available for affordable housing.

The region supports the professional planning assistance program of the Regional Commission and the use of innovative land use planning techniques that allow for better growth management. Regional Commissioners and staff agree that area leaders in government and private business need to work together more closely to develop and implement such a program.

It is the basic assumption of the Regional Commission that the region can continue to grow and develop economically, and with the involvement of its concerned citizens and solid local and regional planning the region can avoid substantial alteration of its special character, its landscape and quality of life.

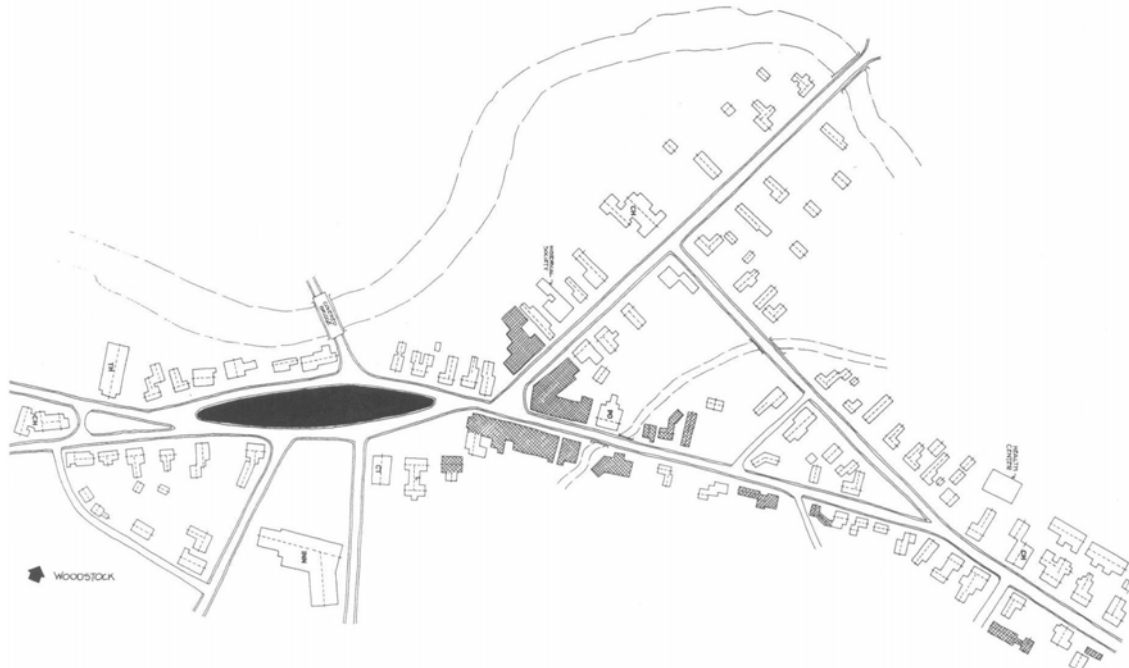
#### **B. Goals - The Future Pattern of Settlement**

First in importance in formulation of the proposed land use pattern for the region is consideration of the existing settlement pattern. The region has already been settled into clusters of residences and other activities in the form of villages and hamlets surrounded by less dense settlement, rural in character, or large spaces in natural vegetation. This existing settlement pattern has demonstrated itself to be of a sociological, psychological, and aesthetic benefit to the region, while at the same time providing a system of centers both efficient and economical for the conduct of business enterprise and for the provision of social and community facilities and services. This pattern must be protected and enhanced and is supported by state planning law. This is best accomplished by adopting as a policy, the use of this pattern for guiding future development of the region.

### Regional Growth Areas

Due to severe physical site limitations and the relatively high costs incidental to land development in certain areas as compared to others, much of the region is neither readily available nor suited for intense development. Major growth or investments must be channeled into or adjacent to existing or planned settlement centers and to areas where adequate public facilities and services are available. Regional Growth Areas are the traditional developed areas in the region. They are differentiated into the following seven types: Regional Center, Town Centers, Village Settlements, Hamlet Areas, Designated Growth Centers, Designated Downtowns, and Designated Village Centers as well as expansion areas that are designated to accommodate future growth based on the capacity to provide infrastructure and suitable land without threatening critical resources or creating sprawl.

#### Drawing 1: Example of a Regional Growth Area - Village of Woodstock



Source: Vermont Townscape © 1987

Traditionally, the growth areas in this region have consisted of a mix of land uses, or a solely residential community. New regional growth areas must also include plans for open space for parks, recreational areas, and similar uses. Land development adjacent to and surrounding such areas should be developed at low densities to provide diversity in the landscape and a range of choice in rural living environments. Concurrently, owners of lands not suitable for intense development should be encouraged, through public and private means, to maintain valuable resource lands in productivity or for conservation.

### Designated Growth Centers

Signed into law in May of 2006, Act 183 – *An Act Relating To Creation of Designated Growth Centers and Downtown Tax Credit Program* created a definition of Designated Growth Centers that is focused on compact development that is located within Designated Downtowns,



Designated Village Centers, new town center areas, or adjacent areas that are contiguous to, or lying close to and not widely separated from, these designated areas provided that they exhibit strong land use, economic, and transportation relationships to the Designated Downtowns or Village Centers.

In addition to being either within or adjacent to a Designated Downtown, Designated Village Center, or new town center, a Designated Growth Center is defined as substantially containing eight different characteristics:

- a) a mixture of uses;
- b) existing or planned public spaces;
- c) prominent community focal points such as civic buildings or common areas;
- d) densities of land development that are significantly greater than those allowed in areas outside the growth center;
- e) existing or planned investments in infrastructure including a circulation system that is conducive to pedestrian/non-vehicular traffic and supports the use of public transit;
- f) it results in compact concentrated areas of land development that are served by existing or planned infrastructure and are separated by rural countryside or working landscape;
- g) it is planned in accordance with the planning and development goals under 24 VSA Chapter 117 §4302 and conforms to smart growth principles; and
- h) it is planned to reinforce the purposes of Act 250 (10 VSA Chapter 151).

Municipalities interested in pursuing Designated Growth Center status and benefits must submit an application to the Vermont Downtown Board after it has been presented at public hearings. In addition to the eight characteristics above, the proposed Designated Growth Center must be planned to conform to eight smart growth principles which emphasize historic and compact development patterns, the protection of important environmental, natural and historic features, the minimization of conflicts with agricultural and forest industries, a diversity of housing, and more. A complete list of the smart growth principles are given in Chapter XV - Definitions of this Plan.

To award Growth Center Designation, the Downtown Board must find that the application demonstrates the following:

- a) the proposal meets the definition of a Designated Growth Center;
- b) important natural resources and historic resources within the proposed Designated Growth Center have been identified and any anticipated impacts have been mitigated;
- c) the applicant has a regionally confirmed planning process and municipal plan;
- d) the applicant has adopted zoning and subdivision bylaws that implement their municipal plan;
- e) the municipal plan and bylaws provide reasonable protection for important natural and historic resources located outside the proposed Designated Growth Center;
- f) the applicant has adopted a capital budget and program and has existing and planned infrastructure to implement the proposed Designated Growth Center;
- g) the proposed Designated Growth Center is an appropriate size and reinforces any existing designated downtown, village center or new town center located in the municipality or adjacent municipality;
- h) growth cannot be achieved within any of the above (g) existing areas.

- i) the municipal plan has incorporated guidelines from the Secretary of Agriculture in order to avoid the conversion of primary agricultural soils, wherever possible; and
- j) the municipal plan and bylaws further the goal of retaining a more rural character in the areas surrounding the growth center to the extent that a more rural character exists.

The benefits received from designation include automatic fulfillment of the public purpose requirements for use of incremental tax revenues for public infrastructure and improvements (TIFs); VEDA incentives on a priority basis; state infrastructure and development assistance; stormwater revolving loan funds; technical and financial assistance for brownfield remediation; priority for Community Development Block Grants; state priority for investments (after Designated Downtowns and Designated Village Centers) and regulatory incentives. Designated Growth Center status lasts twenty years. The Downtown Board must review the designation every five years and require corrective actions if it determines the Designated Growth Center no longer meets the standards.

### **Downtown Designation and Village Center Designation**

The Regional Commission finds that economically strong downtowns and village centers are critical to the health and well being of our municipalities. They are the natural location for small businesses and other uses that together constitute the diverse fabric and quality of small town living. Historically, Vermonters have sustained a commitment to make both private and public investments within these areas; the result includes an attractive environment for enhancing the vitality of these areas.

It is the intent of the Regional Commission to preserve and encourage development of the region's downtowns and village centers, to encourage investment in housing, historic preservation, transportation (including parking facilities), and to reflect traditional settlement patterns. Furthermore, the Regional Commission believes that dynamic planning programs focused on downtowns and villages will serve to minimize the ill effects of sprawl and unplanned development throughout the countryside.

In 1997, Vermont enacted the Historic Downtown Development Act ( 24 VSA Chapter 76A) to recognize local efforts to revitalize traditional villages and downtowns. Under the law, towns may apply to the Vermont Downtown Development Board for designation as a downtown or village center. If designated, commercial property owners in downtowns and villages are eligible for state tax credits for rehabilitation of historic structures, facade improvements and building code improvements; if the tax credits cannot be used by the property owner, they may be sold to banks. In addition to tax credits, designated villages and downtowns receive priority consideration in Vermont's Municipal Planning Grant Program and the federal funding programs guided by the Vermont HUD (U.S. Department of Housing and Urban Development) Consolidated Plan, including the Vermont Community Development Program.

As of December 2006, the region has the following Designated Downtowns and Village Centers. Bradford, Randolph and White River Junction are Designated Downtowns. Bethel, Brookfield (Pond Village), Chelsea, East Randolph, Fairlee, Hartland Four Corners, Hartland Three Corners, North Hartland, North Tunbridge, Norwich, Pittsfield, Rochester, Royalton, Sharon,

South Royalton, South Strafford, Tunbridge, Wells River, West Fairlee, and Woodstock are Designated Village Centers.

### **Land Use Goals**

The land use goals outlined within this section are of primary importance to this Plan. They represent the foundation of the planning and development program for the region. These goals are intended to be applied uniformly throughout the region in conjunction with the implementation techniques included as part of this Plan. Only through a uniform and consistent program of implementation can meaningful land use decisions be accomplished.

The goals outlined within this section recognize and accept the following as in the public interest:

- (1) maintain and improve the accessibility and economic viability regional growth areas;
- (2) encourage full use of regional growth areas;
- (3) provide for intensive development only in regional growth areas where adequate public services and facilities are currently available or planned to be made available concurrently with such development;
- (4) make local and state infrastructure investments in regional growth areas;
- (5) protect the character of rural areas and their natural resources by avoiding sprawling development, and incompatible land uses;
- (6) protect the natural environment by preservation and wise use of natural resources;
- (7) maintain and enhance local comprehensive planning and regulation on issues of local concern;
- (8) maintain investments in the transportation network by assuring that development will not degrade the level of service or functionality;
- (9) reserve land at Interchange Areas for the development of services for the traveling public and transport of goods, not for the development of high traffic-generating commercial activities that are unrelated to services for the traveling public or trucking industry, or institutional uses such as governmental offices or post offices. Interchange Area development should not be promoted to the detriment of regional growth areas or the public investments made therein.

### **C. Policies for Land Use Settlement**

For the purposes of this Plan, seven types of land use areas have been established and identified. These areas have certain existing characteristics that identify them within the region. These areas are:

- Regional Center
- Town Centers
- Village Settlements
- Hamlet Areas
- Rural Areas
- Conservation and Resource Areas
- Interchange Areas

The region's land use areas are depicted on Map 4, the Future Land Use Areas map that is included in this Plan. The Regional Center, Town Centers, Village Settlements and Interchange Areas are identified by boundaries. Hamlet Areas are identified by center points; when making land use decisions using the policies in this Plan, Hamlet Areas must include the locally recognized extent of the hamlet as it is designated in the appropriate town plan. Conservation and Resource Areas are defined by a set of parameters, and Rural Areas are the remaining lands in the region.

### **Regional Center**

Regional Centers are those areas where public sewer and water utilities exist, transportation infrastructure is capable of handling significant volumes of commuting and commercial traffic, a public transportation system provides options and there are intermodal opportunities present; some Designated Growth Centers and Designated Downtowns are included in this land use area. People use Regional Centers for the variety of employment and business opportunities, governmental and judicial functions, hospitals, schools, cultural and civic activities. White River Junction is the Regional Center.

### **Policies**

- (1) Regional Centers should support a mixture of single family, two family, and multiple family structures at the highest densities in the region.
- (2) Commercial uses, services, offices, wholesale business, industry, transport facilities, and community facilities and programs that serve regional needs and markets are encouraged to locate and to provide the broadest possible range of employment in these areas.
- (3) A balance of public and private capital investment determines the economic well being of a town or region. In Regional Centers, intense growth is encouraged when a complete complement of public services such as water, sewer, and highways are available. Continued maintenance or expansion of such facilities must occur in relation to available tax revenues, at reasonable levels of public and private capital investment, and if additional development is to be accommodated.
- (4) Local capital planning programs and public investment strategies should encourage renovation of and in-filling within Regional Centers or expansion areas.

- (5) Investment in public and private housing for the elderly and low or moderate income families should be most directed to Regional Centers and away from unsettled rural areas.
- (6) Retail establishments providing goods and services to a regional clientele should be located in Regional Centers to minimize the blighting effects of sprawl and strip-development along major highways and to maintain rural character.
- (7) To avoid structural obsolescence and deterioration, conversion of larger older homes to newer more economical uses, particularly for homes with historic merit, is encouraged. See Historic Resources section for more information.
- (8) In areas containing structures and buildings of architectural or engineering significance, new development must be planned to be compatible with existing development and to not unduly impact the general and special character of the area.
- (9) Major developments like large governmental, medical, commercial, industrial buildings must be located in Regional Centers where utilities, facilities, and human capital are concentrated.

### **Town Centers**

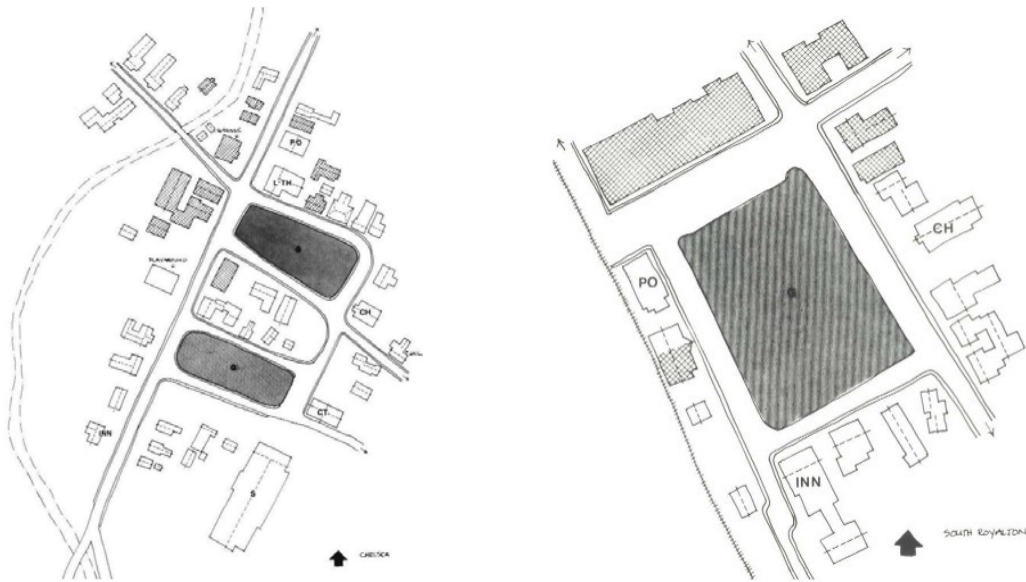
Town Centers are those areas where central public utilities for water and sewer are available, and where there exists a central location for commercial activities, schools, cultural and civic activities for the town and the surrounding communities; Designated Downtowns and some Designated Growth Centers are included in this land use area. Town Centers include the immediate area within and around the centers of Bethel, Bradford, Chelsea, Fairlee, Norwich, Randolph, Rochester, South Royalton, Wells River, Wilder and Woodstock.

### **Policies**

- (1) Town Centers must support a mixture of single family, two family, and multiple family structures at high densities.
- (2) Commercial uses, services, offices, wholesale business, industry, transport facilities, and community facilities and services are encouraged to locate and to provide the broadest possible range of employment in these areas.
- (3) A balance of public and private capital investment determines the economic well being of a town or region. In Town Centers, intense growth is encouraged when a reasonable complement of public services such as water, sewer, and highways are available. Continued maintenance or expansion of such facilities must occur in relation to available tax revenues, at reasonable levels of public and private capital investment, and if additional development is to be accommodated.
- (4) Local capital planning programs and public investment strategies should encourage renovation and in-filling within Town Centers or expansion areas.

- (5) Investment in public and private housing for the elderly and low or moderate income families must be directed to Town Centers and away from unsettled rural areas.
- (6) Principal retail establishments must be located in Town Centers, Designated Downtowns, or Designated Growth Centers to minimize the blighting effects of sprawl and strip-development along major highways and maintain rural character.
- (7) Conversion of larger older homes, particularly those with historic merit, is encouraged for new, more economical use to avoid structural obsolescence and deterioration. See Historic Resources section for more information.
- (8) In areas containing structures and buildings of architectural or engineering significance, new development must be planned to be compatible with existing development and not unduly impact the general and special character of the area.
- (9) Postal facilities and similar governmental offices, should be located in Town Centers where other public services are available or planned. Development of governmental offices distant from and unrelated to community centers contributes to increased traffic, scattered development, and costly public services. Such a pattern of development is incompatible with the goals and policies of this Plan.

**Drawing 2: Two Examples of Town Centers - Chelsea and South Royalton**

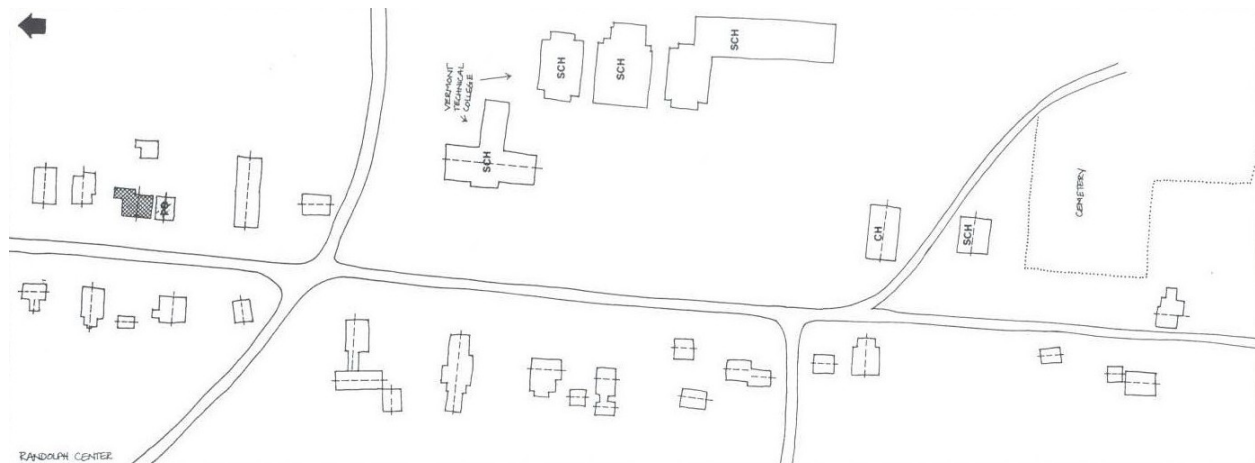


Source: Vermont Townscape © 1987

### Village Settlements

Village Settlements are those areas that have developed into small community centers; Designated Village Centers and some Designated Growth Centers are included in this land use area. Village Settlements normally consist of mixed land uses at medium densities; some have public sewer or water systems, but others do not. Village Settlements generally have consolidated groups of structures located on a major regional highway. Village Settlements are not usually afforded direct access to the Interstate. Examples of Village Settlements include Barnard, Bridgewater, East Randolph, East Thetford, East Topsham, Granville, Hancock, Hartford Village, Hartland Four Corners, Hartland Three Corners, Newbury, North Hartland, Pittsfield, Plymouth Union (Plymouth), Pond Village (Brookfield), Post Mills (Thetford), Quechee, Randolph Center, Royalton Village, Sharon, South Woodstock, Stockbridge, Taftsville, Thetford Center, Tunbridge, Tyson (Plymouth), West Fairlee, and West Woodstock.

**Drawing 3: Example of a Village Settlement - Randolph Center**



Source: Vermont Townscape © 1987

### Policies

- (1) Village Settlements should support housing types at a densities that are lower than Town Centers but higher than the areas surrounding the Village Settlement. Village Settlements that have neither public water nor sewer should plan for densities that can be supported by the soils present, in order to avoid ground and surface water contamination. A range of densities should be available within Village Settlements.
- (2) Conversion of larger older homes and particularly those with historic merit should be permitted for new, more economical use to avoid structural obsolescence and deterioration.
- (3) Shops and services, tourist businesses, lodging, public facilities and business and industrial enterprises at a small scale with appropriate design characteristics that fit the context of the area are encouraged.
- (4) New development in Village Settlements should be coordinated with, and in close proximity to, existing structures. New development must not place undue burdens on municipal or regional facilities, utilities and services, including transportation systems. To provide for a concentration of land uses and the maintenance of open space, larger or more intense development proposals should be encouraged to locate in areas that have central water and sewer systems.
- (5) In Village Settlements containing structures and buildings of architectural or engineering significance, new development should be planned so as to be reasonably compatible with existing development and so as not to unduly impact the general and special character of the area.
- (6) Detailed soil surveys and site analysis should be used to identify appropriate densities in villages without public water and sewer and for locating new Village Settlements.



- (7) Long-range planning for the provision of public services in these areas is encouraged. Services, planned and existing, should be coordinated so that the future expansion of services can be more accurately evaluated.
- (8) Existing postal facilities, and similar governmental offices, should be retained in Village Settlements and not be relocated into Rural Areas.

### **Hamlet Areas**

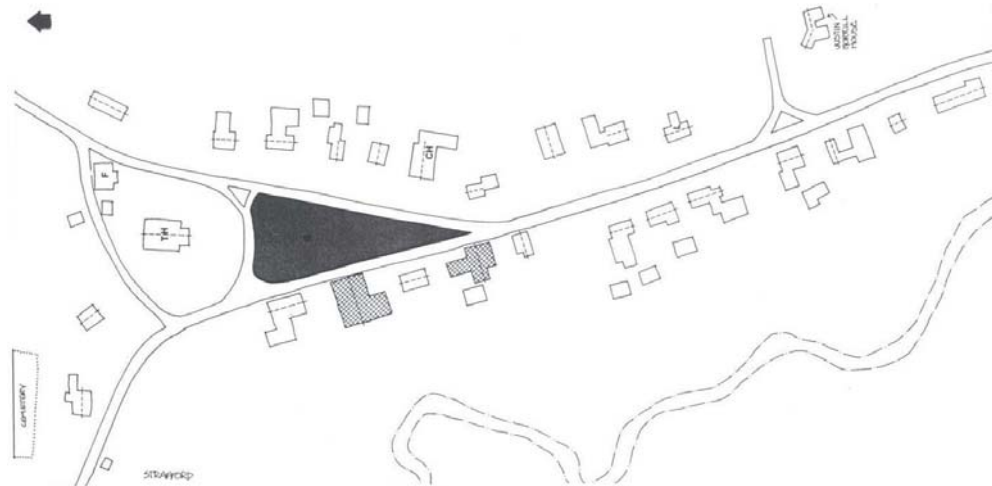
Hamlet Areas consist of groupings of buildings, smaller in scale than Village Settlements. They historically have served as the location for single family homes, with few stores and businesses supported primarily by local residents. Hamlets are not regional market or trade centers. These areas generally do not contain a community water supply or sewer system. Minor community facilities and services sometimes are located in these areas. Examples of Hamlet Areas are Bridgewater Center, Bridgewater Corners, Corinth, East Barnard, East Bethel, East Braintree, East Brookfield, East Corinth, East Granville, Gaysville (Stockbridge), North Pomfret, North Thetford, North Tunbridge, South Pomfret, South Strafford, Strafford, Thetford Hill, Vershire, Vershire Center, Waits River (Topsham), West Braintree, West Bridgewater, West Brookfield, West Hartford, West Newbury, West Topsham, and areas immediately adjoining such areas.

### **Policies**

- (1) The density of development in Hamlet Areas reflects the existing settlement patterns, physical land capability, and the availability of utilities for expansion. Particular densities for development should be designated within the town plans of each of the respective communities within the region. A range of densities should be available within Hamlet Areas.
- (2) Hamlet Areas should support primarily single and two family homes in rural areas and mixed dwelling types in the more developed areas. Business enterprises that fit the context of the immediate area are encouraged.
- (3) Major traffic thoroughfares through Hamlet Areas should be planned or enhanced with traffic calming elements.
- (4) Buildings should be clustered to encourage open space in surrounding areas. Where unusual natural features, soil limitations, or special resources including high value agriculture land are identified, use of cluster development concepts is encouraged to protect such resources from unnecessary development.
- (5) Where adjacent subdivisions are planned, they must provide for common open space systems to link active recreation areas such as playgrounds, playfields, and natural areas.
- (6) Design features which contribute to the aesthetic value of residential and non-residential areas, including the provision of open spaces, trees and natural ground cover, and the conservation of stream valleys, historic landmarks and structures must be utilized in planning subdivisions.

- (7) Existing postal facilities, and similar governmental offices, should be retained in Hamlet Areas and not be relocated into Rural Areas.

**Drawing 4: Example of a Hamlet - Strafford**



Source: Vermont Townscape © 1987

### Rural Areas

Most land in the region lies outside of the regional growth areas. Remaining areas are generally rural in character. Rural Areas consist primarily of a mixed pattern of land uses, including residential, small-scale businesses, outdoor recreational, agricultural, forestry, and natural resource uses. Development within these areas has been largely dependent on site limitations, including soil composition, slope, and elevation, and ease of access to community services.

New growth in the region has and will continue to place excessive land development pressures on Rural Areas, particularly in those communities that are nearest to major highways and serve larger populations. Here, land use changes will occur at a relatively faster rate, despite local planning efforts and public investment strategies that give priority to new projects within defined growth areas (e.g. Interstate Interchange Areas and traditional Regional and Town Centers, Village Settlements, and Hamlet Areas). It is in the interest of the region that the present land use features within Rural Areas be maintained and remain dominant. These include significant amounts of open space, farmsteads, compatible building styles, low-density residential settlements, lightly traveled two lane roads, and numerous agricultural and forestry operations.

Not all land within Rural Areas is similar nor should be treated the same for development. Some land is steep, inaccessible, wet, subject to flooding, or lack basic utilities; this land should remain undeveloped. Other land, consisting of highly scenic landscapes, ecologically sensitive lands, or irreplaceable natural resources and should be conserved or be developed only in ways that retain these features. No land development should be endorsed where the effect of the proposed use unnecessarily impacts these areas. To do so would be incompatible with land use policies contained in this Plan.

The bulk of new development over the past thirty years in the region has occurred in outlying areas, including Rural Areas. This is evidenced by the large number of new homes, schools, public facilities, rural highway improvements, power line upgrades, and land subdivisions being sited and developed away from the Designated Downtowns, Designated Village Centers, Designated Growth Centers, and other regional growth areas. Given the trend of people moving into rural areas, land is under pressure for non-residential development. Regional land use policy focuses most business uses within or close to the Regional Center or Town Centers or other more densely settled areas. Rural Areas, however, have been identified as possible sites for certain non-residential uses on the condition that such uses do not unduly compromise one of the principal objectives for the Rural Area - to retain rural character.

Home enterprises are appropriate land uses within Rural Areas. A home enterprise is intended to support the land use features noted above because these are attributes that are valuable to both the quality of life and the economic character of the region. Home enterprises are more dominant land uses than home occupations. A home enterprise may serve to provide alternative uses to older secondary buildings such as barns or similar outbuildings that sustain rural character yet allow alternative sites for small businesses. Land use policies should allow for the preservation and restoration of secondary buildings that are suitable for redevelopment while at the same time preventing the subdivision of large acreage parcels. Also of importance is the intent of providing opportunities for alternative entrepreneurial activities in outlying areas. Accommodating home enterprises can only be accomplished when rural character is protected. The impact of traffic on roads, use of sensitive site design principles, degree of visual impact from neighboring uses and public highways, extent of use of traditional building designs or styles, should all be major factors in evaluating proposed home enterprises. Business ventures that employ relatively large number of employees or are operated by persons or owners not residing on the property are not considered home enterprises. Examples of home enterprises include but are not limited to consulting services, research laboratories, custom furniture and restoration shops, commercial gardening operations, and small-scale repair shops.

### **Policies**

- (1) Rural lands should be developed only in areas where potential for agriculture, forestry or mineral extraction is relatively low. In circumstances where lands are proposed for residential or non-residential uses, development should be planned to minimize or avoid adverse impacts on these resources. Where no reasonable alternative exists but to locate such development in areas exhibiting high resource potential, the project must be planned to minimize the reduction of such potential by providing for reasonable population densities, off-site mitigation, reasonable rates of growth, the use of cluster planning and community planning designed to economize on the cost of roads, utilities, and land usage.
- (2) Maintenance or enhancement of the rural environment or setting is a primary goal for Rural Areas; the development of large undeveloped tracts should occur at a density and design that meets this goal. Rural land proximate to regional growth areas should be considered locations for uses at higher densities, but only when sprawl and strip development are avoided. Areas further away from regional growth areas should accommodate residential uses at lower densities.

- (3) New land development and subdivision should be planned and sited to promote the continued use of agricultural and forestry land for their intended purposes. To minimize the potential conflicts between agricultural and non-agricultural uses, projects must be planned and sited to substantially satisfy the following:
  - (a) residential and other non-agricultural uses or structures should be sited on the least productive soils for agricultural and forestry uses;
  - (b) if the tract or lot contains woodland, non-agricultural uses should be contained within the woodland, or be located along edges of open fields, to enable new construction to be visually absorbed or screened by natural landscape features;
  - (c) siting of proposed buildings or structures should be planned as to minimize any blocking or interruption of scenic vistas as viewed from a public highway;
  - (d) dwelling units and accessory buildings or structures, and proposed lots for development or sale, should be laid out or clustered so that they conserve the maximum feasible amount of farm, pasture land, or managed woodland; and
  - (e) roads, sewage disposal and water supply systems, curb cuts, power lines and other land improvements necessary or desirable to accommodate development of such parcels must be planned so as to minimize conflicts with agricultural and forestry operations and necessary wildlife habitat.
- (4) Use of the planned unit development design scheme, is strongly encouraged as a means of providing an environment more amenable to a higher quality of life in the region.
- (5) Planning and implementation of development or subdivisions must reflect the following principles:
  - (a) balancing of landowners' rights to use their land, with the corresponding rights of abutting and neighboring landowners to live without undue disturbances (e.g., noise, smoke, fumes, dust, odor, glare, stormwater runoff, etc.);
  - (b) convenience and safety of vehicular and pedestrian movement within the site, and in relation to adjacent areas or roads;
  - (c) adequacy of waste disposal methods and protection from pollution of surface or groundwater;
  - (d) protection of historic and natural environmental features on the site under review, and in adjacent areas;
  - (e) compact development that allows for use of shorter power lines and shorter, narrower, and interconnected roads that result in lower maintenance costs; and

- (f) when new roads are being constructed, consideration should be given to burying power and phone lines if cost effective.
- (6) Non-residential uses, including small service businesses, small professional offices and inns are acceptable land uses for Rural Areas provided that such uses are planned as relatively small in size or scale, are not primary or dominant uses in an area, do not unduly conflict with existing or planned residential, forestry or agricultural uses, and do not unduly affect rural character.
- (7) The Regional Commission recognizes the right of a resident to use a minor portion of a dwelling unit for an occupation which is customary in Rural Areas provided it does not create a nuisance or have an undue adverse effect on the values noted in this Plan as being important to sustaining the character of Rural Areas.
- (8) Major retail enterprises or service centers which draw principally on regional market shares (including factory outlets, large grocery stores, fast food establishments, and shopping malls) are inappropriate in Rural Areas. Such uses are encouraged to locate within or in the expansion area(s) around the existing Regional Center, Town Centers, Designated Growth Centers, or Designated Downtowns. Major retail enterprises and service centers must be of a scale and intensity that fits with the existing development that is present.
- (9) As has been stated in other sections of this Plan, new development has the potential to fragment working fields or forests, detract from the scenic nature of rural landscapes, lessen mobility of traffic on roads due to increased access points, drain economic viability from villages and downtowns, and impinge on natural habitat. It is in the interest of the Regional Commission to diligently evaluate all developments to determine if it results in these impacts and if they can be mitigated through good design.

To meet this test, the development must:

- (a) Not materially decrease mobility or the functional use or safety of a highway;
- (b) Not impinge on wetlands, other natural resources, including habitat;
- (c) Be of a type or nature that is not appropriate for location within regional growth areas;
- (d) Not unnecessarily fragment large tracts of forest or agricultural lands;
- (e) Be of a design that is compatible with surrounding land uses; and
- (f) Avoid floodplains or other hazardous areas.

### Conservation and Resource Areas

Conservation and Resource Areas are those natural areas in need of special protection because of their fragile nature, irreplaceable value, and unique and important ecological functions. These areas consist of the following sub-groups:

- (1) land in excess of 2,500 feet elevation;
- (2) steep slopes - those in excess of twenty-five percent gradient;
- (3) soils which are predominantly wet or shallow;
- (4) wetlands classified by the State of Vermont or U.S. Army Corp of Engineers;
- (5) floodplains and areas immediate to lakes, ponds or streams; and
- (6) land identified as containing critical wildlife habitats and threatened or endangered species.

### Sub-Groups: High Elevations, Steep Slopes, and Marginal Soils

Land in excess of 2,500 feet in elevation has been accepted by the State of Vermont as being in a fragile environment. The land is predominantly steep, soil depth to bedrock is usually extremely shallow, recovery rates to damaged vegetation are low and susceptibility to erosion is high. These areas are largely in forest land. These highland areas have served as sources of clean water for streams and rivers at lower elevations as well as ground water supplies for wells and springs situated in the valleys.

### Policies

- (1) Land above 2,500 feet elevation should be maintained predominantly in a natural wilderness state, except in cases of wind power and/or telecommunications projects endorsed by this Plan.
- (2) Green Mountain National Forest Service (GMNFS) acquisition of lands above 2,500 feet is encouraged between willing parties. Management plans prepared by the GMNFS must recognize the concept of preservation as well as forest utilization.
- (3) Passive outdoor recreation and forestry uses are encouraged provided these uses do not unduly impact other significant resources of the site.
- (4) Permanent uses such as dwellings and other similar uses are discouraged.
- (5) Any use deemed appropriate to high elevations should be sensitive to slow vegetative recovery and severe soil limitations and should avoid erosion.
- (6) Large scale or large tract land developments or subdivision are not supported in areas where steep slopes, wet, or shallow soils are predominant, unless it can be demonstrated

that such developments or subdivisions will not be unduly detrimental to the environment. Where this can be adequately proven, density of settlement should be relatively low. Passive outdoor recreational, forestry, agricultural, and low density residential uses are examples of the preferred uses for critical areas, subject to overcoming site limitations.

- (7) Development of snowmobile, hiking, and cross country ski trails and similar recreational facilities are appropriate uses subject to meeting acceptable management practices and applicable state law.
- (8) Where permitted, land development or subdivision must be planned to minimize reduction of the resource value of such areas for forestry by providing reasonable population densities, use of cluster development, and new community planning designed to economize on the costs of roads, utilities, and land usage.

### **Sub-Groups: Wetlands and Floodplains**

Wetlands and floodplains are fragile areas. How these lands are managed has a direct bearing on the quality and quantity of water resources. Wetlands are valuable for a number of purposes, including water retention during wet periods and water recharge during dry periods. They cleanse water, provide plant and wildlife habitat and diversity, and are often valuable for fish spawning. They also fulfill an important recreational and aesthetic role by providing opportunities for nature study and scenic enjoyment.

Floodplains are lowlands along rivers, streams, and lakes which periodically become inundated with water during times of high rainfall or spring runoff. They are important for retaining waters that might cause damage or destruction elsewhere. Floodplains are often the best agricultural lands because of their thick glacial deposits, minimum slope and proximity to surface water. Floodways are stream channels and any adjacent floodplain areas that carry the bulk and force of the river's flow, and must be kept free of encroachment in order to prevent a 100-year flood from resulting in substantial increase in flood heights.



*K. Kanz © 2001*

**Photo 3: A hayfield serves as floodplain during spring runoff****Policies**

- (1) Structural development or intensive land uses shall not occur in Class I and Class II wetlands unless there is an overriding public interest.
- (2) Developments, and their associated stormwater discharges, that are adjacent to wetlands should be planned so they do not cause undue disturbance to wetland areas. Maintenance of a naturally vegetated buffer strip between a wetland and the project site is required to prevent ground water pollution and direct discharges into a wetland.
- (3) The Agency of Natural Resources should improve wetland mapping incorporating better data from local efforts where available.
- (4) Structural development and placement of fill within the limits of the 100-year floodplain is discouraged. Where careful planning at the local level accepts development within the floodplain, the development should be designed to achieve no, net loss of hydrologic or hydraulic capacity, and located so they do not impede the floodwaters and endanger the health, safety, and welfare of the public.
- (5) No structural development should be located within the limits of a floodway except projects involving health, safety, or transportation.
- (6) Natural areas, non-structural outdoor recreational and agricultural uses are the preferred land uses within floodplains. Commercial, industrial, and residential uses are strongly discouraged, except as noted above.
- (7) Development outside of existing or planned regional growth areas, should not be located immediately adjacent to watercourses, lakes, ponds or shorelines. Such areas should principally be maintained in a natural vegetative state for environmental and aesthetic purposes.

**Sub-Groups: Wildlife Resources and Endangered Species**

Maintenance of reasonably abundant populations of diverse wildlife species is a goal of this region. Improperly planned development or land subdivision can significantly detract from or counter this goal.

The loss of wildlife lessens public enjoyment of the outdoors. Loss of certain rural or remote landscapes to suburban landscapes adversely affects habitats for larger animals, including bear and moose, as these species are dependent on large wooded habitats. Fragmentation of forest lands into small discontinuous units can contribute to population decline and loss of certain habitats. Destruction or significant imperilment of necessary wildlife habitat or endangered species are not in the public interest unless such loss from the public is substantially outweighed by the benefits to the public from the development of lands containing such habitats or species. To ensure survival and perpetuation of significant habitats, the Regional Commission supports



local, regional and state efforts to monitor and prevent unnecessary destruction or impairment of critical habitats.

### **Policies**

- (1) In areas defined as exhibiting significant wildlife habitats, planning for land development or subdivision should be sensitive to the economic, social, cultural, recreational, or other benefits to the public of the habitat. Where loss of the resource is imminent due to a development or subdivision, all feasible and reasonable means to prevent significant loss or imperilment of the resource should be employed. To minimize potential conflicts between wildlife resources and land development the following principles should be considered:
  - (a) design in such a manner as to promote the most appropriate use of land for residential or non-residential uses by clustering or concentrating the density of land use within some sections of the parcel or involved lands in order to maintain or preserve significant habitats in large and undisturbed tracts;
  - (b) design projects in such a manner as to avoid fragmentation of large forest tracts to maintain natural habitats between two or more land developments or subdivision; and
  - (c) conservation of significant habitats by a grant of easement or covenant for protected areas.
- (2) Significant deer wintering areas (those identified and mapped by the State of Vermont) should be protected from residential development and other uses that threaten the ability of the habitat to support deer. Commercial, residential, and industrial developments are discouraged within deer wintering areas. Certain types of development may be permitted adjacent to deer wintering areas on finding by Vermont Department of Fish and Wildlife, or other wildlife experts, that the integrity of the area will not be unduly disturbed. Use of mitigation techniques is encouraged.
- (3) Protection of threatened or endangered species are matters of public interest. The Regional Commission supports efforts at the local, state and federal levels to inventory and, where necessary, protect these resources for educational, recreational, and other purposes. Land development or subdivision which unduly impacts these resources are discouraged and are considered incompatible activities.
- (4) In areas identified and mapped by the Vermont Department of Fish and Wildlife as containing necessary wildlife habitat, land development and subdivision planning should utilize Department guidelines for protection of threatened or endangered species.

## Interchange Areas

### Background

The Regional Commission recognizes that areas in close proximity to its thirteen interchanges on Interstates I-89 and I-91 are prime areas for development due principally to their ease of public access and favorable site conditions. The Regional Commission acknowledges that these areas are important transfer points for traffic entering and exiting the region. The benefits of Interstate travel are well documented. However, in many areas in the Northeast, particularly in more developed areas, the lack of planning for development at interchanges has prompted various forms and types of undesirable development along roads immediate to the interchange. Therefore, the level of detail given to planning for interstate interchanges represents a response to the market's interest in these areas for development, not the Regional Commission's desire to see development directed there.

In this region, the interchanges are located in the towns of Bradford, Fairlee, Hartford, Hartland, Newbury, Norwich, Sharon, Randolph, Royalton and Thetford. Interchanges in Fairlee, Sharon, and Hartford (White River Junction) are considered part of an existing Regional Center or Village Settlement and are therefore not identified as separate land use areas in this Plan. The interchanges in Bradford, Newbury, Norwich, Quechee, Randolph, Royalton, and Thetford are physically separate from a Regional Center, Town Center or Village Settlement, being in some cases two or three miles away. Because land use policy affirms regional growth areas as the principal areas for service, retail, civic, and institutional uses, it is in the interest of the region for these areas to continue to serve these vital functions. Conversely, Interchange Area development, with its different focus, should not be promoted to the detriment of regional growth areas or the public investments made therein.

Increased traffic congestion and safety issues resulting from interchange developments can decrease the level of service of roadways to points below acceptable levels. One example, the Quechee interchange (I-89, Exit 1), contains acres of developable land located within a mile of the intersection of two Interstate highways. This places this interchange at a high degree of vulnerability. Local development decisions made without adequate regard to preserving mobility will degrade the functionality of the public investments. An illustration of this consequence is on Interstate 89 at Exit 20, a strip of commercial development in nearby West Lebanon, NH whose functionality has been degraded. Other typical problems associated with improper traffic management and development at interchanges include:

- (1) the creation of numerous curb cuts to access new development that are permitted incrementally on a case-by-case basis without due regard to an overall plan for the area;
- (2) the eventual existence of high traffic generators in the immediate vicinity which cause degradation of roadway intersections, the need for signalization, lower travel speeds, and extensive queuing of vehicles;

- (3) inadequate planning for pedestrian accesses between developments and loss of significant farm land or access to such land;
- (4) erosion of cultural, social, and economic values of the traditional town center or village settlement due to a dislocation or redistribution of key uses into the area; and
- (5) fragmentation of land parcels in such a manner as to preclude future access or interior roads to properties more removed from the right-of-way; and unnecessary loss of scenic qualities resulting from insensitive land development.

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

#### **Interchange Policies - General**

- 1) Land use activities and public or quasi-public investments planned for Interchange Areas, that have the effect of eroding the socio-economic vitality of downtowns, are incompatible with this Plan. High priority should be given to public investments benefiting infrastructure, housing, and transportation facilities within Designated Downtowns, Designated Village Centers, Designated Growth Centers, and other regional growth areas.
- 2) Land uses planned for interchange areas should be of a type, scale, and design that complement rather than compete with uses that exist in Designated Downtowns, Designated Village Centers, Designated Growth Centers, and other regional growth areas. Appropriate uses include highway-oriented lodging and service facilities, trucking terminals, truck-dependent manufacturing, and park-and-ride commuter lots. No use should impose a burden on the financial capacity of a town or the state to accommodate the growth caused by the project.
- 3) Any development planned for interchange development must be constructed to:
  - a) complement the design principles and standards reflected in this Plan;
  - b) promote the most appropriate land uses as determined through a locally sponsored planning process involving affected landowners, municipalities and the Regional Commission;
  - c) maintain a high standard of scenic amenities for visually sensitive areas with due regard to impacts on neighboring land uses and highway users;

- d) discourage creation or establishment of uses deemed more appropriate to regional growth areas; and
  - e) encourage planned unit developments.
- 4) Support the development of Master Plans for each of the Interchange Areas. Such Plans should be conducted locally as part of each local Planning Commission's on-going planning program in cooperation with landowners, the Regional Commission, and other affected parties. Work should focus on creating an integrated site plan and design plan that serves as a means of addressing the potential conflicts or problems noted above. Elements that the Plan should include are:
- a) access management controls;
  - b) pedestrian amenities;
  - c) parking;
  - d) energy efficiency;
  - e) utilities/public services;
  - f) outdoor lighting standards;
  - g) landscaping and screening;
  - h) signage; and
  - i) open space conservation.
- 5) The Master Plan should serve as the foundation for the identification of the highest and best use of these areas and should provide a framework for future development. Incremental and uncoordinated development inconsistent with Master Plans for each of the interchange areas is discouraged.
- 6) Development concepts that should be utilized for interchange areas include:
- a) a circulation system that is conducive to pedestrian, bicycle, and other non-vehicular travel modes;
  - b) a density or lot coverage area that is higher than surrounding rural settlement areas;
  - c) use of planned unit development concepts such as compact development that is offset by open space;
  - d) a design that incorporates public spaces and promotes social interactions;
  - e) a mixture of uses including non-residential and community facilities, and possibly residential;
  - f) central focal points or public spaces serving the entire area;
  - g) a pattern and scale of development that complements traditional patterns and uses in regional growth areas; and

- h) provision for park-and-ride commuter parking lots and travel information services.
- 7) Any new development at or near interchange areas should promote a nodal development pattern where buildings are clustered, off-street parking screened in the rear of the parcel and inter-connected to adjoining parcels where practical.
- 8) Municipalities with Interchange Areas are encouraged to promote creation and adoption of an Official Map per 24 VSA §4421 to provide a legal means of creating an interconnected network of streets, walkways, and other public facilities or amenities on land designated as interchange development areas. Concepts employed in Master Plans and the Official Map should employ traditional streetscape patterns and designs deemed compatible with existing regional growth areas.

### **Interchange Policies - Specific**

The Regional Commission recognizes that the characteristics of each of the thirteen interchange areas designated in this Plan are not identical. While all of the interchange areas serve as transfer points between the Interstate (limited access roads) and state highways (connectors to villages and outlying countryside), the physical and economic landscape for these areas are different. Some areas are largely undeveloped open spaces without public infrastructure, especially sewer or water. Other areas are situated at or near prominent vistas or scenic areas and are visually sensitive to certain types of development. Yet, other interchanges are experiencing new commercial or industrial development on what is or was farmland. Some interchanges are relatively flat and have greater potential to accommodate appropriate development compared to others that are steep or have other physical development constraints such as aquifers and wetlands. Lastly, local community planning desires and attitudes suggest that not all land use goals and policies should be universally applied. It is the finding of the Regional Commission that in order for this Plan to address each Interchange Area specifically, supplemental goals and policies have been developed for each of the interstate interchanges except for those in Fairlee, Hartford (Wilder), and Sharon because they are part of existing Village Settlements with few opportunities for significant development.

### **Bradford Interchange (I-91, Exit 16)**

Exit 16 on Interstate 91 accesses Route 25. Route 25 runs in an east/west direction commencing in Topsham at the junction of Route 302 and extending to Bradford and the Connecticut River. Route 25 serves as a major connector road across east central Vermont to New Hampshire. This two-lane road supports mainly local and regional traffic in Washington and Orange Counties. Bradford serves as an economic hub for the area. The primary access points for services and shopping are via Routes 5 and 25.

The area adjacent to the interchange consists of a mixture of land uses. Topography, soil conditions, and market forces have heavily influenced land uses. Low-lying areas adjacent to the Waits and Connecticut Rivers are subject to flooding. This has prevented structural development from occurring there. Much of the Area consists of primary agricultural soils and still is in agricultural use. The Appleton dairy farm continues to operate here, and the Carson farm was

purchased by the Upper Valley Land Trust. A portion of land on the northwest quadrant adjacent to Route 25 near the interchange serves as a public water source for Bradford Village and immediate area. Hydro-geological studies commissioned by the Bradford Water Commission have identified source protection areas near the interchange. Three management zones have been mapped with recommended land uses suggested to secure protection of this water supply.

Following the construction of the interchange in the early 1970s, land uses have changed. Some agricultural and residential uses have been slowly transformed into commercial and industrial uses. This included development of the Pierson Industrial Park, the former Upper Valley Press building (now the Bradford Community Center), an auto parts retail store, a pharmacy, a supermarket, a gas station/restaurant, and rental storage buildings. Land on the Lower Plain, east of Route 5 and south of the Village, was donated to the town by the Carson family for the Bradford Fire Station.

Presently public sewer is not available to the Lower Plain. For several years, the Town, landowners, and Bradford Community Development Corporation have considered extending the sewer system to this area of town. Members of the community have argued that extending sewer services to the Lower Plain could provide an opportunity to intensely develop the area and to give Bradford needed space for community services and industry. Local discussions on extending sewer service continue.

The land located in the immediate area of the interchange should be left in an undeveloped state. Development should be directed to the east, in and around the intersection of Routes 5 and 25, taking opportunities to make use of the available land that is located between and behind the existing development, creating a compact core that allows other lands to remain open.

### **Hartland Interchange (I-91, Exit 9)**

Exit 9 on Interstate 91 provides access to U.S. Route 5 and contains four quadrants of open land that is relatively free of natural constraints. There is no public sewer or water available at this interchange. Land conservation has taken place, or is planned, in three of the four quadrants. A Vermont Community Development Program grant was awarded to the Town of Hartland in November of 2000 to develop a master plan for the interchange following the denial of an Act 250 permit for a convenience store and gas station in the northeast quadrant. In 2001, the Upper Valley Land Trust purchased 29 acres of land in the southeast quadrant and sold it back to the town for a dollar. There is an official VTTrans commuter parking lot located along U.S. Route 5 in this quadrant and a wetland that begins east of it, running south toward the town line and meeting a brook halfway there as they drain into the Connecticut River. There is developable land located south of the conserved property, along the northbound lanes, that could be accessed by Route 5; the land is located in the towns of Hartland and Windsor.

The Upper Valley Land Trust has received funding to purchase the development and excavation rights of a seventy-six acre parcel of land in the southwest quadrant that borders on Route 5 and Rice Road. Further south in this quadrant, straddling the Hartland/Windsor town line, 285 acres of highly visible, forested hillside will be conserved with funding received from the National Scenic Byways Program. The grant was submitted to conserve this area along the Connecticut

River National Scenic Byway. This parcel is significant because of its scenic attributes and the habitats that are present along the Bashan Brook and aided by the wildlife culvert that provides passage under the interstate.

The northwest quadrant contains open, developable land along Route 5. The rest of the quadrant contains a few areas of slope of twenty percent or greater, and the Lulls Brook converges with another brook and flows under Interstate 91, toward the Connecticut River.

The town of Hartland is not a regional economic center. Limitations include a lack of municipal utilities and the town's desire to maintain a rural character. In many ways, Hartland will continue to function as a bedroom community to the Upper Valley. This Interchange Area has not been identified for large capital-intensive businesses. Such land use activities would be inconsistent with this Plan and the Hartland Town Plan. There are other areas that could provide space for small and moderate sized businesses including Hartland Four Corners, Hartland Three Corners, and North Hartland.

According to the Hartland Town Plan's Future Land Use map, the northeast quadrant has been designated for commercial development while the other three quadrants are classified as rural. As stated in the Town Plan: "Much of the land surrounding the interchange remains undeveloped pasture that serves as an important scenic resource, providing visual contrast to the highways. This variety is one important component of the rural business area character that sets it apart from, and makes it more visually interesting and pleasant, than the commercial strip development that exists at many other interchanges. The interchange is one mile from the existing Hartland Three Corners commercial district. In accordance with Vermont's so-called "Downtown Initiative", town officials should encourage businesses to locate in existing business or village centers. To accomplish this, strip-type development should be discouraged within and outside these areas." The Regional Commission concurs. Efforts to conserve land in the three quadrants designated as rural by the Hartland Town Plan should be continued. Commercial development in the northeast quadrant should be compact, sited and designed to retain the scenic nature of the landscape. Retail development, gas stations, fast food restaurants, motels, and other full-scale highway-oriented services are inconsistent with the goals and policies of the Regional Plan for this Interchange Area due to the close proximity of the Hartland Three Corners village settlement area and its traveler-oriented services.

### **Norwich Interchange (I-91, Exit 13)**

Exit 13 of Interstate 91 provides access to Main Street and U.S. Route 5 in Norwich and Route 10 in Hanover, New Hampshire. There is no municipal sewer available at this interchange, although the Hanover, New Hampshire sewer system is located across the river; municipal water is available at the interchange. Three zoning districts are present at the interchange: Village Residential, Rural Residential, and Commercial/Industrial.

The Connecticut River (state border), Ledyard Bridge, and the area known as Lewiston are located east of the interstate. The northeast quadrant contains residential development, slopes twenty percent or greater, an active rail line, and the historically industrial area of Lewiston. The southeast quadrant contains a wetland, surface water, an electrical substation, transmission lines,

slopes of twenty percent or greater, rail, and The Montshire Museum, Vermont's Museum of Science.

The northwest quadrant contains conserved land, slopes of twenty percent or greater, and residential and public uses. Four smaller brooks drain into the Bragg Brook and head toward the Connecticut River throughout the southwest quadrant. Land to the west of U.S. Route 5 has been conserved, but there are still areas of unconstrained land located west of Route 5, stretching east to the southbound lanes of the Interstate. A housing development of five units has been permitted for construction in this quadrant but possible conservation of the land is presently being considered.

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

Exit 1 of Interstate 89 accesses U.S. Route 4 and connects travelers and commerce west to Woodstock, Killington, Rutland and beyond, and east to White River Junction and Interstate 91. Route 4 is one of the few east/west highways spanning the narrower width of the state and therefore carries steady volumes of traffic. This interchange is located a mile-and-a-half from municipal sewer and water service; the residential wastewater system located to the west in Quechee is a shared leachfield system. The on- and off-ramps for the north and southbound lanes are located a half-mile apart. There are two different scenarios present at either end, with the northbound interchange leaving few opportunities for development due to the close proximity of thirty percent slopes and the Interstate.

The southbound interchange is a sprawling commercial area with access roads intersecting the on- and off-ramps. There is a proposal to develop a portion of the 135 acre parcel behind the commercial enterprises on the west side of Route 4. This land is zoned as Quechee Interstate Interchange (QII) and Rural Lands 5 (RL5) in the Town of Hartford's zoning regulation. Development around the southbound interchange must be planned based around access points that do not degrade the functionality of U.S. Route 4 or the I-89 on- and off-ramps. Stagecoach Road intersects the southbound ramps a tenth of a mile from the intersection with U.S. Route 4; it provides access to the open and undeveloped land west of the interstate. Intensive development that increases traffic volumes must not be permitted on the open lands accessed by Stagecoach Road; it would degrade the operation and safety of the Interstate and U.S. Route 4.

This interchange is not an appropriate location for a growth center. White River Junction, the Regional Center and a Vermont Designated Downtown, is located 3.5 miles to the east. Development at this interchange should be of a type that does not displace the development and investment that has occurred in the regional center. The types of land development appropriate for this interchange include residential, appropriately-scaled traveler-oriented uses, and other similar uses that are not intended to draw on regional populations.

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

The Exit 4 interchange on Interstate 89 is located in Randolph three miles from the revitalized, historic downtown and commercial district and one mile from historic Randolph Center, home of Vermont Technical College (VTC). Exit 4 accesses Route 66, a two-lane connector road that runs in an east/west direction between the Village of Randolph, Randolph Center, East Randolph and Route 14. This area is predominately open land, including farmland and woodland. The



interchange area is particularly well known for panoramic and distant scenic vistas, particularly the mountain views to the west. There are several structures at the interchange, including a gasoline/convenience store, fast food restaurant, professional offices, auto service repair garage, state highway facility, industrial/office complex, and several single family residences.

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

In 1998, the Town of Randolph received a planning grant from the State of Vermont to explore opportunities for development at the Exit 4 Interchange. A final conceptual master plan entitled *Exit 4 Engineering and Development Analysis* was prepared by Dubois and King, Inc. and the Cavendish Partnership in January 1999. Future land use scenarios were developed for each quadrant of the interchange area. The details of this assessment are outlined in the report. Key components included the following:

- a) provide space for the development of business parks with design guidelines to protect scenic values;
- b) provide open space for the conservation of wetlands, streams, steep slopes, other natural resources, and visual quality;
- c) limit or deny new curb cuts to maintain the carrying capacity of Route 66;
- d) provide space and opportunities for transitional/senior housing;
- e) provide for an improved Park and Ride commuter lot/Welcome Center; and
- f) consider land for an Agricultural/Cultural Museum perhaps to be affiliated with other uses.

Four years later, the Exit 4 Advisory Committee again studied development scenarios at the interchange, this time using 3-D visualization software, and the conclusions reinforced the 1999 findings concerning the important views at each of the four quadrants of the interchange.

Other key findings were included in the report. More comprehensive design review standards to be included under the Randolph Zoning Regulations were recommended. Prior to proceeding with any major development, the report recommended that design standards first be in place to evaluate development proposals. Selected or preferred development areas were noted during the planning process and mapped. Exclusion or avoidance areas were determined to be sensitive due to distinct area of environmental limitations or high visual resource values. Retail development was concluded as unsuitable for a combination of reasons including traffic impacts on Route 66, visual sensitivity, and conflicts with downtown businesses. Moreover, stand-alone retail development at any scale or size was found to be incompatible with the community's values.

However, there was one exception. Accessory uses of a retail nature for the business park, the agricultural museum, or similar planned uses were found acceptable.

In 2000 the Vermont Agency of Transportation (VTrans) commenced a planning study to develop long-term solutions to a park and ride facility at the interchange area. The need for a new or upgraded park and ride lot has been documented. Local meetings have been held in Randolph to gauge support. As a result of the meetings, an expansion and redesign of the existing site, in the northeast quadrant of the interchange, was preferred. The Vermont Agency of Transportation has obtained all permits and anticipates construction in 2007.

This Plan supports and endorses the efforts of the community to undertake further refinement of the planning concepts referenced in the Exit 4 planning reports. These include plans for a new park and ride facility, the possible creation of an adjunct agricultural museum, and office/industrial parks. Additionally, this Plan discourages large-scale retail development of the interchange - including shopping centers, malls, auto dealerships, and big box stores. Small-scale retail uses subordinate to primary uses and non-traditional to downtown Randolph or other designated areas may be acceptable uses subject to in-depth review and evaluation. The reuse of the former DuBois & King offices by the Vermont Resources Center and Incubator illustrates the goals of this Plan.

Any project planned for the interchange should employ high design and construction standards and not unduly impair the scenic resources of the area. New development should be sited in areas that are not highly scenic, visible, or environmentally sensitive. The Randolph Planning Commission is currently preparing amendments to the town's zoning regulations, including design review standards and a density overlay, to protect scenic and natural resources. Future development at the interchange that requires improvements to Route 66, including traffic signals and turning lanes, needs to be carefully evaluated. These should only be authorized where it is determined such a public investment will not unreasonably endanger or interfere with the function, efficiency, safety, or use of this route. New development should coordinate with existing development on shared access or retrofit access point locations to improve safety.

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

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

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

In 1999, The Town of Royalton was awarded a grant from the State of Vermont to develop a community vision and policy for the future growth of this area. The Royalton Planning Commission's goal was not to prohibit growth in the area, but to be more specific about how change should be directed. Informational meetings were held to update the public on the study and to get ideas on what the Regional Commission should focus on for future planning in this area. Following this, the Planning Commission found the following values to be important to the area:

- a) provide space for future business growth but only when it doesn't detract from Royalton's two villages;
- b) promote new development when plans are carefully laid out for safe access onto Routes 14 and 107;
- c) protect sensitive resource and scenic areas and encourage good design for new projects; and
- d) preserve the carrying capacity of Route 107 as a minor arterial road.

Given these values and an analysis of development suitability, nine future land use designations were recommended and depicted on a map. These included areas for industry, service and office type uses, residences, agriculture, and limited development. Goals and recommendations were listed to help guide the community on the highest and best uses for each sub-area. The Regional Commission accepts the findings and conclusions contained in the *Exit 3 Planning and Development Study* (September 2000) as the planning policies developed by the Town of Royalton for this area and development proposals should be compatible with this report. Additionally, the potential for sprawling strip development along Route 107 to the west of the interchange concerns the Regional Commission. Development to the west of the interchange should be designed to create small nodes, focused around existing development, that are surrounded by open space or natural areas.

#### **Thetford Interchange (I-91, Exit 14)**

Exit 14 on Interstate 91 accesses Route 113 which runs in a east/west direction connecting East Thetford (Route 5) to Thetford Hill, Thetford Center, Post Mills and beyond to West Fairlee, Vershire, and Chelsea. This interchange Area is prominently open with a few residential structures and no commercial or industrial uses. The nearest concentration of buildings is the hamlet of Thetford Hill. This historic settlement has remained largely unchanged since the opening of I-91 in the late 1960s. Thetford Hill has been identified as Village Residential Area in the Thetford Town Plan. The purpose of the area is to encourage the development of residential centers and to serve as a nucleus for future growth of the Town. The Village Residential Area extends easterly from the village center to an undeveloped area near the interchange. A portion of Thetford Hill has been selected to be included in a Preservation Overlay District under the Town Zoning Regulations. All other land within the Interchange Area is classified as Rural Residential according to the Thetford Town Plan. The purpose of this Rural Residential Area is "to maintain a low density rural character primarily ... of farms,

residences and woodlands.” This designation includes certain non-residential uses provided that the uses are relatively small and fit the nature of the terrain and character of the setting.

The Town of Thetford is not a major regional economic center. Limitations include a lack of municipal services, limited land suitable for industrial and commercial locations, and the town’s rural character. Even with increased industrial development, Thetford will continue to function primarily as a bedroom community to the Upper Valley. This interchange Area has not been identified for large capital-intensive businesses. Such land use activities would be inconsistent with this Plan and the Thetford Town Plan. There are other areas that could provide space for small and moderate sized businesses including East Thetford, Post Mills, and Thetford Center. Historically, the town’s residents have been against major development at the intersection of Interstate 91 and Vermont Route 113. Retail development, gas stations, fast food restaurants, motels, and other full-scale highway-oriented services are inconsistent with the goals and policies of the Regional Plan for this Area. Small office parks and research facilities are permissible land use activities, subject to meeting appropriate design guidelines set forth in this Plan.

This Plan strongly recommends that the Town of Thetford develop a Master Plan for this interchange; land use decisions need to make efficient use of public infrastructure investments, including roads, sewer, and water systems. This planning effort should be locally directed, and comprehensive enough to ensure that the goals and policies set forth in this section are thoroughly addressed. By doing this, evaluating the benefits and costs associated with major land developments would be more readily assured and predictable.

#### **Wells River (Newbury) Interchange (I-91, Exit 17)**

Exit 17 (Boltonville) on Interstate 91 accesses Route 302 which runs in a east/west direction commencing in Barre and extending to Wells River and beyond into the White Mountain Region of New Hampshire and the Lakes Region of Maine. Route 302 is a state designated truck route; it is capable of handling larger trucks without state issued truck permits. The Exit 17 interchange is a well-recognized stop for truckers and tourists at the P & H Truck Stop which is open twenty-four hours a day. Current traffic volumes on Route 302 are generally low and free of traffic congestion. Projections undertaken by the Regional Commission in 1999 show that traffic levels are projected to increase over the next twenty years. However, traffic congestion and the service capacity of the road and intersections should still be within acceptable ranges. What is unknown at this point is the potential impact that large-scale commercial development in Woodsville, NH will have on traffic patterns.

The area around the interchange is predominantly undeveloped consisting of a mixture of open and forestland. There are a few commercial uses along Route 302 mainly extending easterly from the interchange toward Wells River, including a restaurant and other service uses. Northeasterly of the interchange is a fully developed industrial park. Uses at this site are at a relatively low density and are not highly visible from either Route 302 or I-91. Blue Mountain High Union School is located near the interchange with a direct access onto Route 302.

Along the three mile length of the Route 302 corridor extending from Wells River Village, land suitable for intense development is very limited due to topography, proximity to water resources,

presence of protected natural areas, access limitations, and poor soils. Opportunities for more concentrated development within the Route 302 corridor becomes more prevalent in the area of Wallace Hill Road and Leighton Hill Road where the land is relatively level with open topography and better soils.

There are several scenic vistas available to travelers on I-91 and Route 302 at or near the interchange area. Scenic resources include fields, farmsteads, forestland, historic buildings, and streams. It is the policy of this Plan that future land development at the interchange be carefully planned and designed to protect and enhance these valuable resources. Development that detracts from the valued landscape or creates unsafe road conditions conflicts with this Plan's land use goals.

All uses at the interchange are dependent on onsite sewer and water supply. There are no plans to provide public water or sewer services to the interchange area by the Village or Town; the costs reported in a 1990 financial study were deemed infeasible by the Village Trustees. Future development of the area will be limited by the capacity of the land to provide onsite wastewater disposal and water systems. Uses that require large onsite disposal capacity will have difficulties obtaining wastewater disposal permits, this development is unlikely to be concentrated or dense.

Future land development should be designed and planned to fit the context, the site and the surrounding area. Projects that are incompatible with the surrounding area are discouraged and need to be redesigned so that they are not significant visual intrusions to travelers along I-91, Route 302, and town roads in the vicinity. To ensure that individual development proposals fit with the planning policies of this section, use of an expanded local site plan review process, including specific design criteria, is encouraged. State grant funds may be available to help the Town evaluate these options.

#### **White River Junction (Hartford) Interchanges (I-91, Exits 10 and 11)**

Exit 10 is the intersection of two interstate highways, I-89 and I-91. Since Exit 10 is located immediately to the south of Exit 11, these two exits will be discussed in conjunction with one another. These interchanges are both served by public sewer and water, are located in the heart of the Regional Center, and possess the most intensive development around interstate exits in the region. There are proposals to develop two parcels of open land in the immediate interchange area. The land in southeast quadrant of Exit 10 is dominated by slopes that are twenty and thirty percent or steeper but there is open land along the northbound lane of I-91 that is bordered on the south by the Kilburn Brook. This land could be accessed from the Connecticut River Road but slope and residential development separate the land from the access. Much of the land south of the Kilburn Brook is constrained by its designation as a Deer Wintering Area by the Vermont Agency of Natural Resources.

The undeveloped land in the southwest quadrant of Exit 10 is largely wooded with some twenty percent slopes present. North Hartland Road and Milisi Road could provide access to these wooded areas that are located along the southbound lane of I-91. The open land along the southbound lane of I-89 in this quadrant is constrained by surface water and wetlands located along the North Hartland Road but east of those natural constraints there is a proposal to build an aquatic fitness center. This parcel is zoned Industrial/Commercial (IC). South of Milisi Road

there are four brooks that merge into one and drain under the interstate and into the Connecticut River.

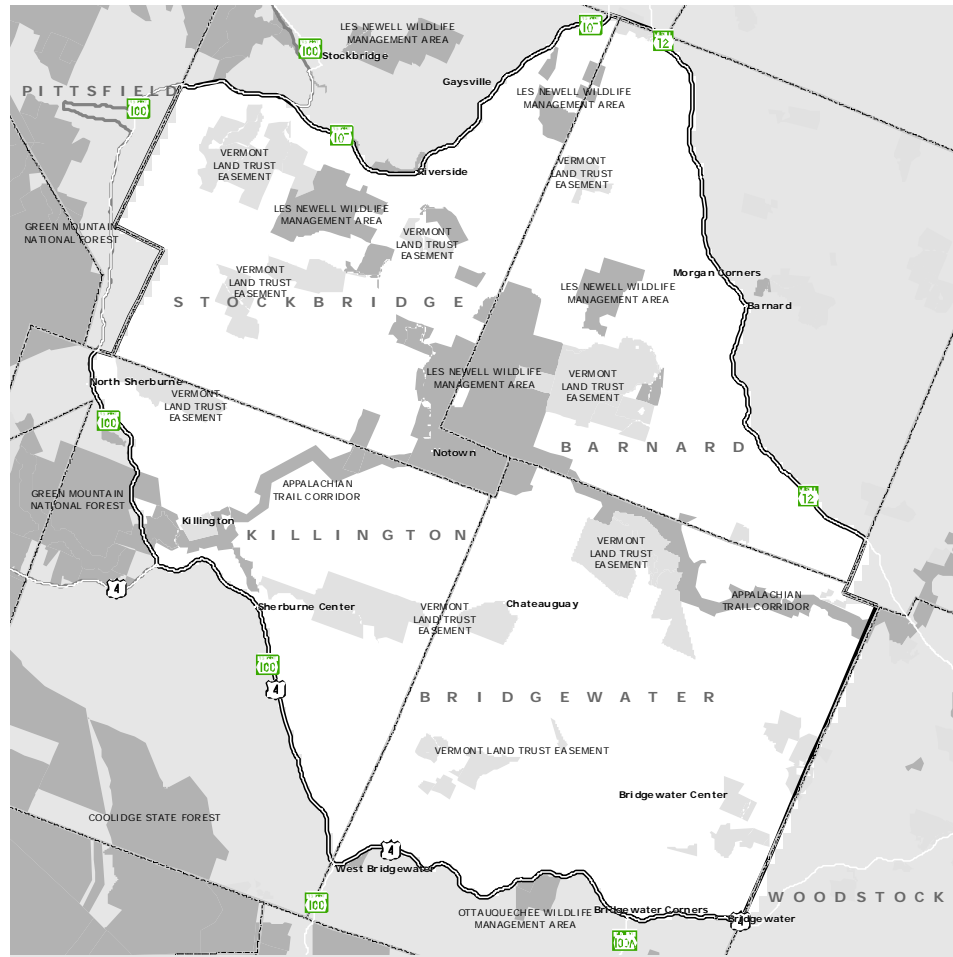
The northern two quadrants of Exit 10 are also the southern two quadrants of Exit 11. Both quadrants are nearly fully developed with the exception of some wooded land in the eastern quadrant along I-89 and some open land that is also along I-89 on the east side of North Hartland Road.

The northern two quadrants of Exit 11 are either fully developed with the Veteran's Administration Hospital, residential development and commercial enterprises, or are constrained by slopes of twenty percent or more.

#### **Chateaugay No Town Conservation Area (CNT)**

The Chateaugay No Town Conservation (CNT) Area is a remote upland wilderness area covering parts of the Towns of Barnard, Bridgewater, Stockbridge, and Killington. The predominate land use is hardwood forest. The CNT Area has historically been very rural, except for a period during the mid-1800s when development flourished for a brief period due to gold mining speculation in Bridgewater. Today, human settlement in the Area is very sparse, year round public access is practically non-existent for most areas, and public services (electric or telephone) are very limited. For the few inhabitants living here, most are dependent on providing their own power and lighting, and maintaining and plowing their own roads. Roads are relatively narrow and steep and are not designed to sustain heavy vehicles or high volumes of traffic. For the public roads that lead into the Area, none are open or passable as through-roads, providing access to the abutting towns.

With limited exception, land parcels are very large, ranging upwards to several thousand acres in size. Much of this land is owned by timber companies or families interested in using the land for wood production. While there have been numerous land title transfers in recent years the number of land subdivisions has remained relatively low. Much of this land is enrolled in Vermont's Land Use Value Appraisal Program known as "Current Use"; see the Current Use Taxation section of this Plan for more information. Under this program, qualified landowners, owning at least twenty-five contiguous acres, elect to keep their forestland in production and pay local property taxes based on its 'use' value rather than 'development' value. This program has had the effect of slowing down the development of these lands.



**Figure 5: Chateaugay No Town (CNT) Conservation Area Map**

Multiple use recreational activities are highly prevalent in this Area. Numerous seasonal hunting camps exist and there are valuable wildlife habitats including black bear, moose, bobcat, and deer. Hikers seeking a rugged wilderness experience frequent the Area at all times of the year, using old town roads and trails, and the Appalachian Trail which passes through the central section of the Area. Access to the Trail is relatively easy and the number of Trail hikers continues to increase. Snowmobiling remains a very popular sport, attracting both locals and outsiders to the Area. The Vermont Association of Snow Travelers (VAST) retains an extensive system of snowmobile trails in the Area that serve as connector routes to other trails in Windsor and Rutland Counties. Local snowmobile groups have been active in maintaining these trails and working with landowners to ensure continued use of the trails.

The entire Area has been identified by the Vermont Department of Fish and Wildlife as a bear production habitat or an area supporting high densities of cub-producing females. These production areas are contiguous to or within remote roadless forestland. The CNT Area serves as a critical link between the bear production areas south and north of Route 4. The long-term stability of black bear depends on the retention of this Area in a predominately undeveloped

state. Except for busy Route 4 which acts as an unwanted barrier to bear crossings, this Area provides a critical link for bears to move freely between the north and the south habitat areas.

In late 1997, the Chateaugay No Town Conservation Project was launched by the four towns of Bridgewater, Barnard, Killington, and Stockbridge. A locally directed project, its goals are “to foster, through locally sponsored conservation activities, the long term commitment to stewardship of exceptional forest, wildlife, and recreational lands” in the upland areas where these four towns meet. Consisting of approximately 55,000 acres, conservation planning and implementation in the Area will take years to complete.

Since 1997, a locally appointed Committee, in cooperation with the Vermont Land Trust, The Conservation Fund, the Two Rivers – Ottauquechee Regional Commission, 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 date, Project activities have included working with landowners on long-term planning and conservation of their property. Several landowners have agreed to work with the Vermont Land Trust, and other land trusts on specific plans to voluntarily conserve their land. In some cases, landowners have donated easements, relinquishing their right to develop their property and others have agreed to sell rights to the Trust. The hope of this Project is that if enough people are inspired by the prospect of conserving the Area, land will be permanently protected from development. This will enable current uses of the Area to be permanently retained in the future. In December 2001, Meadowsend Timber Inc., headquartered in New London, New Hampshire, and a large landowner with a strong conservation ethic, sold development rights to its land to the Vermont Land Trust, permanently protecting approximately 2,100 acres of land in the CNT Area, most of this land is in Bridgewater. To assist the CNT partners in the implementation of the project, both a local and a regional conservation fund has been established to provide financial resources to assist landowners interested in conservation of their property.

The goals and policies set forth below are intended to supplement the Section C Policies – For Land Use Settlement set forth above. Land use activities involving or affecting land within the CNT Area need to be evaluated using all relevant sections of this Plan.

#### **CNT Goals**

- (1) To promote and endorse voluntary efforts between landowners and conservation trusts to conserve properties that have exceptional aesthetic, historic, recreational, and natural resource values.
- (2) To maintain or enhance use of land for forestry which provides wildlife habitat as well as recreational opportunities.
- (3) To support local, regional, and state efforts to foster voluntary conservation of the Area through planning, land acquisition, conservation easements, and tax incentives.
- (4) To limit public investments by the involved communities, the State of Vermont, and other governmental agencies when these investments unnecessarily or unreasonably endanger the long-term use of the Area for forestry, wildlife, and recreational purposes.



- (5) To discourage public or private development of major access roads or through roads connecting with public highways in neighboring towns.
- (6) To advocate against public utility upgrades or extensions unless the public is clearly benefited thereby and where it is determined not to compromise the land use goals and policies for this Area.
- (7) To ensure the protection and management of surface waters in upland watersheds comprising the Area, and to ensure that they remain in their pristine or natural state and are appropriately classified and typed.

### **CNT Policies**

- (1) Given the combination of factors that make conservation of this Area a high public priority, large development projects, including major residential subdivisions and tract development, in the Area are inconsistent with this Plan. Development of non-commercial seasonal camps serving hunters, snowmobilers, and other outdoor recreational users are appropriate uses and are encouraged. Construction of conventional homes intended for permanent or seasonal occupancy with all modern amenities is not the intended use for the Area. In situations where developments of this type are being proposed, they should only be at extremely low densities. Where a landowner is proposing to undertake such a development, permanent conservation of the remaining land is encouraged as a means to ensure that future residential development will be limited on this tract.
- (2) Timber production should be the primary or dominant use in this Area. Logging operations are encouraged provided that they are in accordance with best management practices. Woodlots should be managed and harvested in ways to keep soil erosion and sedimentation of streams to a minimum.
- (3) Insofar as is reasonable, all future development should be planned and sited to promote the continued use of forestland for its intended purposes. To minimize conflicts between forestry, wildlife habitats, and recreational uses, projects should be designed with the following principles in mind:
  - (a) be relatively small in scale, not be the dominant land use on the parcel or in the immediate area;
  - (b) include or reserve a major portion of the land base for conservation or open space;
  - (c) avoid improvements or development in areas exhibiting highly scenic or sensitive landscapes and design structures to minimize disruption of the natural condition of the Area.
- (4) Ensuring continued public access into the Area for snowmobilers, hunters, hikers, and others is critical to the future use and enjoyment of this Area for sporting and recreational purposes. Town roads, legal trails, and some private roads open to the public serve as primary access routes into the Area. Loggers, sportsmen, hikers, and snowmobilers, benefit from this, as they are able access woodlots and trails readily. Public policy decisions or actions need to reflect these values.
- (5) Retention of snowmobile trails, many which go over private land and are part of the statewide VAST trail network, is a priority. Where private lands are involved, owners

should be encouraged to keep their land open for these purposes. Local sports groups and snowmobile clubs should continue to have the support and cooperation of the Towns in these efforts. Conservation plans developed for landowners in this Area should reflect, where practicable, the desire to retain this network of trails and not close or cut-off important trail routes. Where appropriate, tax or financial incentives should be employed by the Town, State, and conservation organizations to ensure that this policy objective is attainable.

- (6) Town highways and legal trails are the primary means of public access to land in the Area. Principal users of these roads are local residents, seasonal camp owners, hikers, hunters, snowmobilers, and loggers. These roads accommodate relatively few vehicles ranging from light ATVs and snowmobiles to heavy logging trucks. Town Selectboards retain jurisdiction over these roads and trails, including their maintenance, upgrading, reclassification, and discontinuance. Present and future programs or actions involving roads or trails for this area should be compatible and complement the long-term land use goals and policies of this Plan. Decisions that have the potential effect of altering the stated land use goals of the Area are discouraged.
- (7) New developments that necessitate improvements to existing transportation facilities, particularly on heavily traveled arterial and collector roads, must be designed to avoid disruption or loss of major, identified wildlife corridor crossings. Transportation enhancements projects should be pursued to mitigate driver conflicts with wildlife, including education and awareness programs along road corridors that host significant numbers of crossings. In addition, initiatives should provide for improvements to the transportation infrastructure to reduce vehicle collisions and wildlife fatalities.

#### **D. Recommendations for Action**

- (1) Within five years of adoption, the Regional Commission will, in consultation with member municipalities, neighboring regional commissions, the State of Vermont, public interest groups and property owners, re-evaluate the Land Use section of this Plan. The Regional Commission should give consideration to existing land use settlement patterns, municipal plan goals and policies, agency plans, and projected trends and needs for the region's citizens and businesses. Following completion of the study, the Regional Commission should offer amendments to this section for adoption.
- (2) The Regional Commission should continue its efforts to provide professional planning services to its member municipalities and advise public officials on the various options available to manage growth and development at the local level.
- (3) The Regional Commission will work with member towns to determine appropriate location and size for growth centers within the region.

## IV. TRANSPORTATION

### **A. Introduction**

Since 1992, the Regional Commission has managed a regional transportation planning program supported by its communities and the Vermont Agency of Transportation (VTrans). As part of state and federal government mandates, regional transportation planning was created to identify and address the transportation problems that communities share within the region. Having one regional planning effort to preserve and enhance the transportation system ensures a consistent, coordinated, and proactive response among all towns. Regional transportation planning promotes transportation as a complete system that must address the diverse mobility needs for all people. And regional transportation planning emphasizes decisions made for the greater enhancement of safety, community livability, economic development, and the preservation of the environment. These are general planning factors not typically considered by state and federal transportation agencies.

This Transportation Chapter directly identifies transportation problems and develops goals and policies for addressing those problems. This is not a comprehensive coverage of transportation, but it is a complete listing of transportation topics that can be addressed by this Regional Commission directly or through the region's local, state, federal, and private partnerships. Including this introduction, there are twenty sections that divide regional transportation into subtopics. Section T, the final section, includes a discussion of unique transportation corridors in the region and an outline of corridor specific policies and recommendations. The Regional Plan also has sections where land use, energy, and economic planning carry transportation related planning issues and recommendations. The transportation element goal is to outline policy that influences private and public planning and investment decisions within the Two Rivers-Ottauquechee region. These policies inform the Regional Commission on how to represent the region on transportation issues, and contribute to the development of transportation and planning related staff work programs.

### **B. Background**

The Regional Commission's longstanding transportation priorities are maintaining the existing transportation system and diversifying transportation choice by expanding bicycling, walking, and public transportation. These two transportation priorities have been consistently stated as the lead priorities since transportation issues could be discussed on a regional level.

#### **Improvements and Funding**

Most of the region's transportation infrastructure is operating at levels well below capacity – traffic congestion is not typically an issue. With an average of 1 to 1.5% annual traffic volume growth, traffic congestion is not anticipated to be an issue in the future.<sup>1</sup> The great frustration among citizens has been that transportation project improvements (maintenance, rehabilitation,

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<sup>1</sup> Vermont Agency of Transportation ([www.aot.state.vt.us](http://www.aot.state.vt.us)) search for Traffic Data Electronic Publications and traffic growth rates listed as rural primary and secondary.

replacement) have not kept pace with the deteriorating infrastructure. Motorists see a transportation system increasingly degrading from time and usage. This input comes from Vermont Agency of Transportation sponsored surveys and the input regional planners receive at public meetings. Transportation projects are being constructed, but Vermont's current funding structure fails to address the long term system maintenance and upkeep needs. The state and federal governments are not making the financial investments needed to maintain the region's transportation system. The state and federal government are also not addressing new transportation infrastructure or services in the instances where these capacity enhancements are warranted.

### **Regulatory Authority**

Regional transportation planning has few regulatory powers over planning and investment decisions. Vermont law ensures land use development is primarily a municipal responsibility. Regional transportation planning can provide advisory level input in development decisions that impact the transportation system. If the development is a larger project with regional significance, the Act 250 permitting process enables regional input and guidance. With transportation project investment decisions, Vermont law dictates that the state (VSA Title 19 Chapter 1) and the towns (VSA Title 19 Chapter 3) have direct control and responsibility over their respective transportation systems. The Regional Commission has no direct authority in road management. The Regional Commission serves in an advisory role when the state develops its Transportation Improvement Plan (TIP) and the towns develop their capital plans. That advisory position is held with the understanding that the towns and the state are the entities that fund the regional transportation program.

### **Neighboring Regions and States**

The decisions made by the Regional Commission and towns have impacts on adjacent regions and states. The region's transportation system has become connected to the employment and shopping centers in Rutland, Montpelier-Barre, and the greater Upper Valley bi-state regions. 2000 Census journey-to-work data show that most people work within the region (64%), but there is a significant percentage commuting into New Hampshire (21%) and Montpelier-Barre (7%)<sup>2</sup>. There are no specific totals for shopping and recreational trips, but commercial development has occurred at a far slower pace compared to adjacent regions. The assumption is residents are increasingly accessing adjacent regions for shopping and recreational trips facilitating their commercial growth. This is partially confirmed with developer traffic impact studies in adjacent regions showing significant traffic levels originating from or through the region (e.g., proposed Woodsville Wal-Mart in Woodsville, NH predicts 57% of shoppers will pass through Wells River<sup>3</sup>).

There is a need for inter-regional and bi-state cooperation as transportation projects and services increasingly connect Two Rivers-Ottawaquechee to these economic and social centers. The

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<sup>2</sup> 1990 census showed a higher number of workers staying in the region (67%). Unfortunately 1990 was the first decennial census to include nationwide journey to work data and so the region cannot examine rural transportation trends prior to 1990. This also makes it difficult to explain a 3% commuter fluctuation on two data points.

<sup>3</sup> 2006 Hayner/Swanson, Inc. Traffic Impact and Access Study – 2007 proposed Wal-Mart Superstore.

regional transportation program can coordinate planning activities with the other regional and state transportation agencies. The balance is in prioritizing local transportation needs versus the greater regional transportation issues. In numerous public settings, citizens and town officials repeatedly present clear mandates for improving local transportation and planning over creating more efficient transportation models and facilities to leave the town or the region.

### Functional Classification

A road system is organized into different categories that influence traffic operations and land use development. There are many ways transportation professionals classify roads, the most widely used standard is based on the functional characteristics. Using that system, there is a hierarchy of road types that include:

- a. **Arterials** are roads that are designed to carry large volumes of traffic for long distances. Arterials are characterized by controlled access, channelized intersections, and restricted parking. These roads usually have signals or stop signs at intersections with side streets, and function primarily to distribute traffic to and from collector streets serving all land uses.
- b. **Collectors** channel traffic from lesser traveled roads to the arterial system. Major collectors generally serve traffic between towns and communities, and minor collectors operate within a town.
- c. **Local Roads** provide access to land and generally have little or no through traffic. They are typically “neighborhood” type streets and have low traffic volumes.

The categorization for roads is only relevant in defining where the Regional Commission places greater emphasis in transportation planning. By necessity, the state and regions focus on the transportation system’s arterials and major collectors. These roads carry greater volumes of traffic over greater distances. Minor collectors and local roads are the town’s domain; these roads tend to serve limited residential traffic over shorter distances. There are three critical exceptions to this rule. The Regional Commission may support town efforts to address transportation issues on local roads because in the aggregate they are actively influencing traffic operations on arterials and major collectors. The Regional Commission may prioritize work on local roads with excessive traffic because the mismatch between infrastructure capacity and demand can lead to significant transportation and land use conflicts. The Regional Commission may get involved when it has been determined that the local roads issue is commonly shared by other towns and therefore constitutes a regional priority for local technical assistance. The third qualification is important because most towns cannot afford transportation services and have collectively pooled their resources to gain those services at the Regional Commission.

### Demographics

The region’s demographic trends, outlined in Chapter 2 (History and Development) of this Plan, will have a modest influence on transportation priorities and investment decisions. There are rural areas, such as those towns adjacent to Burlington, whose demographics have dramatically altered land use and transportation development patterns. In contrast, this region has had stable population growth and slow patterns of economic restructuring. Despite over seventy-five years of “throwing up” roads, the region still has a transportation system that evolved from an era of

high populations that intensively used the land to extract goods which were then transported to urban centers. While there are a few exceptions, the region's citizens have inherited a well-functioning transportation system that can absorb more population and traffic growth. The primary demographic concern in transportation is the region's aging population. An older population can be expected to drive less and rely more on public transportation. These services are insufficient and even minor increases in demand would overwhelm the already overburdened public transportation system.

### **C. Town Officials and Citizen Involvement**

The active involvement of town officials and citizens is critical to a transportation planning process that is responsive to the region's collective needs and priorities. A Regional Transportation Advisory Committee (TAC) was organized in 1992 and continues to meet on a regular basis. This Committee consists of locally elected officials and professional staff members. There are also members representing VTrans and other public transportation agencies. The TAC's principal role has been to work with staff, consultants, and VTrans in guiding regional and state transportation planning efforts.

The Transportation Advisory Committee's work is augmented by another five initiatives crafted to solicit town official and citizen involvement. The Orange and Windsor County Road Foreman's group meets regularly to discuss issues in local roads management. There are seasonal meetings on current topics in transportation that are open to the citizens and towns officials. There is an "Elderly and Disabled transportation partners group" that meets quarterly to discuss public transportation services. The Regional Commissioners review transportation issues as needed and support the work of the Transportation Advisory Committee. Finally, there are numerous local transportation groups that are created as needed to discuss specific transportation projects or policy issues.

Getting citizens involved in transportation is a challenging task. Transportation issues and concerns are rarely considered unless they become direct problems to the towns and/or individuals involved. The many different linkages and balances that need to be struck between transportation and issues like community and economic development are not typically acknowledged by town officials and citizens. Their interests remain focused on the single transportation project in question. Finally, the transportation profession itself has created a language of jargon, influenced by data-driven decision making models, that follow detailed project development procedures, and require voluminous amounts of administration that are not meaningful to a town official or citizen. Whether purposeful or not, the transportation profession has in large part excluded participation of the layperson.

Education and public outreach is a key element toward advising town officials and citizens about how to participate. It is unlikely the profession will change on its own, so it is important to train citizens and town officials to effectively participate. Getting town officials and citizen involvement on transportation issues is critical. Public meetings and educational workshops can keep citizens and town officials educated on the processes behind projects and policies. Getting elected officials educated on transportation funding issues will be an additional challenge.

**Goals**

- (1) Broaden citizen and town official involvement in regional transportation planning.
- (2) Provide educational opportunities for those interested in transportation planning.

**Policies**

- (1) Emphasize public involvement in all transportation work tasks. Continue to work with citizen and town official advisory groups. Strengthen citizen and town official involvement in local and state planning, policy development, and construction projects.
- (2) Sponsor educational workshops and classes for citizen volunteers and town officials. Provide elected officials with informational materials regarding transportation issues.

**D. Safety Planning and Enforcement****Improving Safety**

Improving safety is the single greatest transportation issue for the region. There are two approaches to address improving safety: prevent crashes, and mitigate their effects. Mitigating crash impacts is primarily an engineering issue that involves modifying the road to make it safer, adding road shoulders and guardrails for instance. These transportation enhancements give motorists an added level of protection. Preventing crashes is primarily a behavioral issue that involves education and enforcement. Behavioral factors that contribute to crashes include drunk driving, reckless driving, driving while distracted, speeding, and driving inexperienced. In some situations, crashes may be prevented through effective public education and enforcement. This is especially true for younger drivers who have a disproportional high crash rate. Vermont's Graduated Driver Licensing program, which is consistent with national programs, has been demonstrated to work well. Safety planning is being addressed at many different levels of government depending on the severity of the issue and the organization's abilities. Regional transportation planning can do little in some areas (e.g., distracted drivers) but can influence safety in two key strategic topics – safety audits and speed.

**Road Safety Audit**

Improving safety by mitigating crash severity is accomplished one project at a time. The road safety audit is an established technique for reviewing a particular road or intersection and proposing engineering, education, or enforcement techniques to address the safety deficiency.<sup>4</sup> A safety audit team, composed of local, regional, and state representatives investigates hazard locations and creates a set of recommendations for implementation. Safety audit projects in the region will continue and the process is being taught to other transportation groups such as the town road managers. Regionally significant development can have a safety audit of the impacted roads in an effort to address safety deficiencies before traffic volumes increase. This is particularly important with latent road deficiencies that can become real safety deficiencies when

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<sup>4</sup> Road safety audits are described in detail in the Transportation Research Board's NCHRP Synthesis 336 Road Safety Audits ([www.trb.org](http://www.trb.org)).

traffic volumes increase. There are no official high accident locations (as defined by the State of Vermont), but if that changes then those locations can receive priority for road safety audits.

### **Speed Enforcement**

Setting speed limits and facilitating effective speed enforcement is another safety planning priority. National and state data statistics<sup>5</sup> show speeding is one of the greatest contributors to crashes. Speeding is also one of the highest contributing factors for fatal crashes. A vehicle traveling a safe speed limit has more time for avoidance maneuvers and, if unavoidable, the overall crash severity is reduced. Helping towns measure vehicle speeds and set enforceable speed limits is one step toward ensuring traffic flows safely and efficiently. Using speed measurement data, law enforcement officials can more accurately enforce speed limits based on times and dates that show the greatest frequency of violations. Contemporary highway building practices and standard engineering practices for determining speed limits has led to an increase in speeds and the associated impacts. Speed limit assessments can take into account all of the ‘driver externalities’ associated with people walking, bicycling, parking, and other typical community interactions.<sup>6</sup> This is an important distinction because as drivers we tend to drive at speeds generally deemed safe for our person and vehicle, but fail to acknowledge speed impacts on other transportation modes or land uses. Road improvements that accommodate lower vehicle design speeds, especially where commercial or residential land uses are in close proximity, will improve safety. This is of particular importance in regional growth areas where high traffic speeds erode safety and desirability for walking or bicycling.

### **Goals**

- (1) Improve safety for all transportation modes using known and effective methods in transportation planning.
- (2) Educate and promote safety conscious planning for town officials and staff.

### **Policies**

- (1) Evaluate speed limits and monitor traffic speeds along town and state roads. Assist Towns in setting appropriate speed limits on local roads. Maintain a traffic counting program to inventory and assess traffic speeds on local roads.
- (2) Continue to conduct road safety audit projects. Focus safety audits on roads that have development proposals and/or are expected to support increased development. If the state declares a road or intersection a high accident location, then conduct a road safety audit and advocate for those improvements to be implemented.
- (3) Emphasize safety related projects in all transportation planning work tasks. Educate local and state transportation officials about safety related issues and concerns impacting the region. Focus on reviewing speeds on state controlled roads and providing that

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<sup>5</sup> National Highway Traffic Safety Administration’s National Center for Statistics and Analysis ([www.nhtsa.dot.gov](http://www.nhtsa.dot.gov) – click on the traffic safety link)

<sup>6</sup> This is described in detail in the Transportation Research Board’s NCHRP Report 504 Design Speed, Operating Speed, and Posted Speed Practices ([www.trb.org](http://www.trb.org)).



information to Towns and the Vermont Agency of Transportation. Work with Towns and the Vermont Agency of Transportation to review speed limits on state controlled roads that pass through regional growth areas.

- (4) Encourage transportation projects that preserve or even reduce traffic speeds on all collectors and local roads. Discourage the use of transportation facility designs that may increase traffic speeds.

## **E. Local Transportation**

### **Background**

In the region, towns control almost ninety percent of the total number of roads.<sup>7</sup> The local transportation system is a town's single largest capital asset. This asset requires significant financial investments to be made by every taxpaying resident. Roads are the connective element to the entire community and should be managed wisely and effectively. Town citizens demand that roads have a smooth riding surface, are well lit and properly marked, and that there are minimal interruptions due to maintenance and construction related activities. Transportation is the foundation for all local land use and town development, but towns struggle to manage their transportation system amidst a growing list of other local service requirements such as education, fire, police, and recreation. Managing a local transportation system by paving asphalt roads, grading gravel roads, replacing culverts, and repairing bridges places great demands on small budgets. Towns have few opportunities to look beyond their immediate needs and address the long-term transportation planning and project solutions. A town's few professional staff are strictly project focused and most, if not all, long range planning work is handled by citizen volunteers. These volunteers have made great efforts, but the increasing complexity of planning, policy, and project tasks makes it increasingly unlikely that citizens will continue to do this work alone.

### **Inventories and Capital Plans**

Based on project cost comparisons within the region, a program of early intervention using preventative maintenance has proven to be 75-85% cheaper than larger reconstruction work after significant deterioration has occurred. In order to efficiently manage the transportation system, the region's towns have increasingly come to implement management programs and systems that include inventories and capital plans. The Regional Commission has sponsored much of this work and will continue to be involved with participating towns. The inventory identifies road, culverts, and bridge conditions – the assets of a local transportation system. The capital plans list projects for routine maintenance and reconstruction based on the conditions inventory. Because town budgets can rarely support the full project costs, capital plans are helpful in articulating how state and federal transportation dollars can be used to defray those costs.

### **Local Land Use Planning**

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<sup>7</sup> As compiled by the Vermont Agency of Transportation's Official Town Highway Maps ([www.aot.state.vt.us](http://www.aot.state.vt.us) – search phrase town highway maps). This is an estimated mileage percentage which fluctuates depending on whether Class 4 road mileage is included or excluded.



*C. Wise © 2006*

**Photo 4: The Floating Bridge - Brookfield, VT**  
**A transportation facility that enhances village context and scale.**

Integrating transportation planning and land use development should be done at the local level, including more than just engineering related transportation factors. Transportation investments can be made when they are found to address economic development and community livability needs as much as daily traffic and road sufficiency ratings. Those transportation solutions can fit the context and scale to match the built and natural landscape. The regional transportation planning process can promote land use planning and regulatory development to facilitate this process.

### Goals

- (1) Promote contemporary transportation planning practices in all local planning and project programming activities. Encourage consistency and coordination in local land use and transportation planning activities.
- (2) Support asset management and capital planning practices for all local transportation infrastructure.

### Policies

- (1) Inventory transportation assets, prioritize project improvements, and develop capital plans for all towns within the region. Begin to develop a regional assessment of road, bridges, and culvert conditions.
- (2) Local transportation investments should be centered on infrastructure maintenance and repair. State transportation programs should fund proactive road maintenance practices such as crack sealing recently reconstructed roadways. Towns should maintain or reconstruct roads along their existing alignments. In cases where high traffic volume roads are re-surfaced, State policy should promote full-depth reconstruction and resist temporary improvement measures that would fail to yield long term solutions. Gravel roads should remain gravel unless marked increases in daily traffic clearly warrant a paved road upgrade. The narrow and twisting alignments of our rural backroads should be maintained as is unless extenuating safety and mobility concerns warrant upgrading.
- (3) New infrastructure capacity should be considered only when allowed by the combined local and regional land use and environmental policies and regulations. Local road connections should help preserve and enhance greater transportation system connectivity as opposed to increasing traffic onto a few arterials and major collectors.
- (4) Coordinate town plans with neighboring communities that share the same transportation corridor so land use development and transportation planning policies are mutually

supportive. Promote land use planning regulations that incorporate contemporary transportation planning standards into all Town Plans, Zoning and Subdivision regulations.

- (5) If transportation projects are proposed, work with towns to identify project priorities and help pursue state and federal transportation funding for project design and construction.

## **F. State Transportation**

### **Background**

The state controls approximately ten percent of the total road mileage in the region. While a small fraction of the total road mileage, most of the vehicle traffic is on state controlled roads. The Vermont Agency of Transportation collects traffic data along all of its roads. Averaging all traffic count locations in the region, interstate highways support approximately 17,000 trips per day, national highways carry 6,000 trips per day, and state highways carry 2,500 trips per day. With all this traffic, the state controlled transportation system of roads and bridges still meets the region's current and projected mobility needs. The one exception is U.S. Route 4 where small scale improvements such as left turn lanes and wider road shoulders could reduce traffic congestion during seasonal traffic peaks.

### **Interstates**

The region is crossed by Interstates 89 and 91 which intersect in the town of Hartford. These interstates were constructed in the 1960s and 1970s and are just now coming to their lifecycle when more significant repair is needed. Being at the crossroads of two major interstate highways that are also centrally located within the greater New England region brings great opportunity and transportation challenges. Bridge and culvert rehabilitation and paving projects along the highways have been a shared priority of the Vermont Agency of Transportation and Regional Commission. System improvements along interchanges and the connections to the major transportation arterials promote and enhance traffic safety and efficiency. Other goals, policies, and recommendations for interstates and interchanges are in Chapter 3 (Land Use).

### **State Roads**

State controlled roads travel through many of the region's growth areas – regional and town centers, village settlements, and hamlets. The Vermont Agency of Transportation is focused on preserving mobility while minimizing maintenance costs. But with the increases in traffic and speeds, the roads are eroding the quality of life in these regional growth areas. The goal for these regional growth areas is to balance the impacts of through commuting with the activities that support community life. Where necessary, the Vermont Agency of Transportation can create and maintain transportation facilities that support and even enhance these towns (e.g., Brookfield Floating bridge). Towns may also be encouraged to convert the state controlled road into a "Class 1" which is a legal designation that allows greater local control.

### **Air Service**

With the exception of the private Post Mills airport in Thetford, there are no air service options within the region. Lebanon Regional Airport is the closest airport that offers limited passenger

and freight services. National and international flights are available from Manchester, NH and Burlington, VT airports. Both airports have been increasing their operations and have become the major northern New England air facilities for this region.

### **Rail Service**

The rail industry is an important transportation mode for freight and passenger services. All indications are that limited Amtrak passenger rail service will continue with stops in Randolph and White River Junction. There are challenges for rail freight to compete with other transport modes, namely tractor trucks. Increases in rail freight service can occur as long as this is carried out in conjunction with necessary safety improvements. Rail industries can be located within the region as long as town land use policies are supportive and the necessary transportation road and bridge infrastructure exists. The Regional Commission can work with towns to consider land use and transportation investment policies that would make rail based industries a viable commercial activity. The Regional Commission has had long standing goals with which to pursue expanding rail service - preserving the existing infrastructure, expanding capacity where needed to accommodate double-stacked rail cars, and continuing the public's purchasing of privately held rail lines.

### **Goals**

- (1) Support the ongoing maintenance and upkeep of the region's existing transportation system.
- (2) Promote transportation project improvements that preserve and enhance the region's historically rural landscape while promoting economic development.
- (3) Support transportation projects that enhance regional growth areas as destinations and not as mobility corridors.

### **Policies**

- (1) Planned maintenance that prolongs the life of the existing road and bridges is the region's lead transportation priority. When needed transportation improvements go beyond maintenance, efforts should be on rehabilitation and replacement without any major modifications or improvements that could alter traffic operations.
- (2) On all new construction, transportation design speeds should be maintained or reduced with both roads and bridges maintaining their existing alignments. Geometric constraints that if removed could encourage greater volumes of traffic and/or truck traffic, should be left in place. All improvements should be made to context sensitive designs that enhance the surrounding natural and built rural landscape.
- (3) Projects that involve on-street parking, pedestrian and bicycling facilities, lighting systems, traffic calming, and landscaping are actively encouraged. Projects that are designed to remove on-street parking and crosswalks are strongly discouraged. Regional growth areas that have sufficient population concentrations (e.g., Bradford and Norwich)

are encouraged to request the state re-designate state controlled roads to the locally controlled legal designation of Class 1 road status.

- (4) The region supports the state's policy of investing greater resources for roads identified in the state's tractor truck network.<sup>8</sup>

## **G. Public Transportation**

### **Background**

The region has a number of public transportation services increasingly important to a rural transportation system. Fixed route services from the region to the employment and commercial centers allow residents to work and shop. Elderly and disabled transportation services give alternatives to people partially or completely unable to drive on their own. The Vermont Agencies of Human Services and Transportation have extensively studied public transportation usage and all projections indicate demand for the State and this region will continue to increase. This issue is increasingly a concern as the region's population ages and more citizens become dependent on public transportation. Already, one of the greatest criticisms for public transportation is that services are "too successful" and "over-subscribed" and that capacity limitations have discouraged greater ridership. The Regional Commission has consistently supported public transportation through planning, participation on committees, grant writing, and appropriating funds for marketing and planning services. The region depends on two public transportation providers - Stagecoach Transportation Services and Advance Transit. These two agencies are recognized by the State of Vermont to provide public transportation services within the Two Rivers-Ottawaquechee region.

### **Fixed Routes**

Fixed route commuter buses serve communities along the Interstate 91 and U.S. Route 5 corridor and the Interstate 89 and VT Route 14 corridor. Bradford, Randolph, Norwich, and Hartford have additional bus service within town plus connections to adjacent communities. Notably absent is a commuter bus connecting towns along U.S. Route 4 to the Upper Valley. Regionally, all public transportation services are focused on connections within the region or to the Upper Valley region. There is also an unmet need for a commuter bus service connecting the region with the Montpelier-Barre employment center.

### **Commuter Parking Facilities**

Public transportation services depend on park and rides, bus pull-offs, and parking lot designs that can accommodate larger buses. These facilities provide a safe and convenient method for picking up and dropping off bus riders. Bus pull-offs and parking lots help serve short-distance bus lines serving the developed towns in the Upper Valley. Increasing the number of park and ride lots better supports regional public transportation. In Vermont, park and ride usage is highest along interstate interchanges because of the high traffic volumes and proximity to local road systems.<sup>9</sup> These park and rides are important because they put people on buses before they

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<sup>8</sup> Vermont's Highway System Policy Plan (June 2004) provided at [www.aot.state.vt.us](http://www.aot.state.vt.us), VTrans search word HSPP.

<sup>9</sup> As evidenced by Park and Ride usage surveys conducted by the Vermont Agency of Transportation and the Regional Commissions in 1991, 1995, 2003 and 2006.

contribute to the traffic congestion found in the major employment centers. In commercial growth areas, park and rides can be combined with rest areas, tourist information centers, restaurants, and other land uses. This increases land use densities, keeps properties on local tax rolls, combines maintenance needs, and improves the overall likelihood that the park and ride will be successful.<sup>10</sup>

### **Elderly and Disabled**

Elderly and disabled transportation services are a unique asset to the transportation system and one that operates almost invisibly to most citizens. These services, whether provided by Medicaid or Elderly & Disabled funding programs, offer transportation to eligible individuals for accessing medical appointments, senior meal sites, adult day programs, and commercial service and shopping centers. While the core funding comes from state and federal programs, the region is unique in that it extends program resources by using volunteer drivers (i.e., trips provided by individuals using their own cars). The federal and state transportation programs are chronically under-funded and have become increasingly regulated by the respective transportation agencies. The Regional Commission can advocate for increased funding and resources to meet present and projected needs. The Regional Commission can also collaborate with the public transportation agencies, investing staff time to address these increasing regulations. The ironic reality has been that state and federal regulatory procedures add an unfunded administrative burden that has reduced public transportation services and curtailed volunteer contributions.

### **Goals**

- (1) Increase the availability and diversity of public transportation options for the entire region.
- (2) Support the public transportation and human service agencies charged with providing public transportation in the region by advocating for funding, presenting the societal benefits, and identifying undue regulatory burdens.

### **Policies**

- (1) Support town, human service agencies, and the regional public transportation agencies in providing more public transportation services for a greater percentage of the region. Continue assisting public transportation agencies with planning, marketing, and general coordination.
- (2) Encourage and facilitate coordination between public transportation agencies and the Vermont Agency of Transportation in the construction of park and rides. Give higher priority to park and ride projects occurring along interstate interchanges and existing bus routes.
- (3) Advocate for increased capital investments in public transportation services and facilities. Support the start of the Royalton to Montpelier I-89 north commuter bus service.

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<sup>10</sup> Based on observations of Northern New England park and rides and information provided in the American Association of State Highway and Transportation Officials' Guide for Park and Rides facilities (2004) found at [www.transportation.org](http://www.transportation.org).

Support the start of the Bridgewater to the Upper Valley U.S. Route 4 commuter bus service.

- (4) Support funding increases to meet demand in Elderly and Disabled transportation services.

## **H. Access Management**

### **Background**

Access management is a process to provide reasonable accessibility to adjacent land uses while maintaining a safe and efficient flow of traffic in terms of safety, capacity needs, and speed.<sup>11</sup> Without adequate access to the transportation system, businesses and citizens are unable to safely and conveniently reach desired destinations. Conversely, the management of the location and number of driveways on public highways is critical to maintaining traffic flow efficiency and safety. There is a relationship that demonstrates this connection – as access increases (driveways, road intersections) mobility decreases and crashes increase.

### **Regulatory Authority**

Regulatory authority for access management rests with VTTrans for state highways and towns for local roads (VSA Title 19 Chapter 11). The law grants access for abutting properties using safety as the deciding criteria. Compliance with town plans, local ordinances, and regulations related to highways and land use provides additional guidance. Under the Act 250 permitting process, prior to granting a permit for a major development or subdivision, it must be found that the traffic and land use impacts associated with these projects fit local, regional, and state access management goals and policies, do not cause unsafe conditions or congestion, endanger the public's investment in a road, or interfere with its function. A review of development and access changes must be relevant to: 1) transportation system conditions; 2) goals, objectives, and policies of the Regional Plan; and 3) contemporary access management goals and practices. The Regional Commission follows all access management strategies through Act 250 and when working with towns in plan and ordinance development.

### **Goals**

- (1) Enhance the use of access management in local, regional, and state development permitting activities.
- (2) Promote access management for all local and state transportation projects.

### **Policies**

- (1) On town roads, access design standards should be implemented for all driveways without distinction if the access is temporary or permanent. The access permitting process should encourage the use of shared driveways and/or permitting an access that may result in a future shared driveway. And the permitting of access for commercial or industrial land

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<sup>11</sup> The primary resource for this chapter comes from access management materials provided by the Vermont Agency of Transportation at [www.vtaccessmanagement.info](http://www.vtaccessmanagement.info).

uses should be purposely guided towards existing development nodes in order to preserve or create road segments that possess fewer access points. Continue to develop access management standards with Towns using the Regional Commission driveway access model ordinance. Continue working with towns to improve town plan, zoning and subdivision regulations to better promote access management. Continue working with towns to update highway and public work ordinances that more effectively emphasize access management principles.

- (2) In Act 250 developments, require connections to adjacent roads and between existing and future developments and minimize access points outside of village and town centers. On regionally managed transportation enhancement projects, ensure existing accesses are more effectively designed and managed.
- (3) On state controlled highways, cooperate with VTrans in implementing the state's access management program. Private development should have permanent landscaping and roadside enhancements to visually define access points and contribute to the road's aesthetic character. Access locations should be clustered together to promote development nodes with slower speed limits and multiple accesses along with road segments that have higher speed limits and fewer driveways. Sight distance standards will be based on actual travel speeds and not the posted speed limits. Land owners will utilize a local road access or acquire an access easement to avoid direct access to a state or national highway – particularly on the region's tractor truck highway network. Work with VTrans staff to clarify the state's administrative process so access permits follow state law and are "compatible with any Regional Plan, state agency plan or approved municipal plan." (VSA Title 19, Chapter 11).

### **I. Class 4 Roads**

As a transportation facility, Class 4 roads serve the most adventurous of vehicle operators; they are the scenic travel corridors for hikers and off-road bicyclists, and they serve as limited access to hunting and conservation lands. Public utility services or other town infrastructure, that typically accompany roads, is nearly nonexistent on Class 4 roads. Very little private development has occurred along Class 4 roads in this region. Towns have used Class 4 roads to establish land use policies that discourage development along a town's periphery. Towns have also employed Class 4 road designation to maximize the public's investment on road maintenance and snow plowing responsibilities. In areas where only seasonal homes or no homes exist, towns have re-designated a Class 3 road to Class 4 status in order to reduce maintenance obligations. Class 4 roads and right-of-way are a public resource, although the towns have no legal obligation to maintain road surface, culverts, or bridges.<sup>12</sup> Class 4 roads were created by the VTrans local road classification system which required towns to identify Class 1, 2, and 3 roads for state aid but not Class 4 roads. Since Class 4 roads were not eligible for state aid, they were not as consistently identified or mapped, although many of them are

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<sup>12</sup> The Vermont League of Cities and Towns offers legal council stating towns are responsible for culverts and bridges. This Plan, based on the input of local road managers, states a transportation opinion that maintaining bridges and culverts absent the roads does not constitute the wise application of public funds. This issue has not been formally addressed by the courts nor have law makers sought to clarify state statutes.



known to local residents. New state laws addressing “Ancient Roads” now require Class 4 roads to be mapped or they will revert to private ownership by 2015. Towns should explore the role of Class 4 roads in their land use development policies, needs for present and future traffic circulation, emergency management access, and impacts to natural and historic resources. Class 4 roads can be mapped and presented to the Vermont Agency of Transportation for inclusion on the official town highway map.

### **Goals**

- (1) Promote opportunities for towns to evaluate their Class 4 road system.
- (2) Encourage towns to utilize Class 4 roads for transportation and recreation and to guide local land use decisions.

### **Policies**

- (1) Continue to actively support Class 4 road mapping and survey projects. Work with towns to secure grant funding and technical expertise to properly inventory and map Class 4 roads.
- (2) Work with towns to develop Class 4 road use policies and to better utilize Class 4 roads and road re-designations to define and support land use development policies.

## **J. Parking Management**

Parking allows motorists access to residential, commercial, industrial, and public lands.<sup>13</sup> Parking also brings financial, environmental, and community livability costs. Parking space requirements and parking lot placement can degrade land uses by creating excessive, highly visible paved lots that are rendered unusable for anything other than parking. This is an acute challenge in regional growth areas where a concentrated land use pattern makes land a valued commodity.

National standards require parking space standards be linked to a category of land use to meet peak usage rates and maximize the motorist’s convenience. Those standards are based on a single development and do not take into account the opportunity for shared parking from adjacent land uses. Parking design standards are focused on the internal lot and not on using on-street parking that may contribute to a business district’s historic parking pattern which also contributes to traffic calming. Parking space locations can be appropriately sited for the different usage patterns. Off site parking is an encouraged practice in regional growth areas either through shared facilities or the provision of town parking lots. Land using planning and regulations can be developed to support flexible parking standards that promote on-street and shared parking solutions.

National experts agree that parking facility capacity can accommodate a majority of users, not the highest peak need. Parking facilities can take into account the development’s location and

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<sup>13</sup> The primary resource for this chapter comes from the American Planning Association’s *The High Cost of Free Parking* by Donald Shoup.

lower parking requirements if it is likely citizens would access the development using other transportation modes such as public transportation, bicycling and walking. The proximity of parking spaces can be balanced with the needs of the particular land use to include other needed amenities such as community space, sidewalks, and traffic calming. Parking spaces that have high turn-over may be closely situated, but longer term parking lots can be located further away and not use space that is better situated for other amenities.

### **Goal**

- (1) Encourage contemporary parking management standards in all land use development regulations and transportation project designs.

### **Policies**

- (1) Develop contemporary parking standards for inclusion in Town Plans, zoning and subdivision regulations. Discourage parking standards that connect land uses and square footage limits to parking space requirements. Encourage greater flexibility in design review. Support parking standards to preserve rural character outside development nodes. Support parking standards that maximize land uses within regional growth areas. Seek opportunities to promote shared parking, rear lot parking access, covered parking, and other techniques that minimize land disturbances.
- (2) Support these same parking standards when reviewing Act 250 developments.

### **K. Walking and Bicycling**

Walkers and bicyclists use the region's roads and sidewalks for recreation, getting to school, commuting, errands, and other transportation related travel activities. Walking and bicycling helps offset vehicle traffic and its related "wear and tear" to roads and bridges. In contrast to automobiles and tractor trucks, walkers and bicyclists provide great benefits to town/village residential and commercial land uses without the related safety, noise, and environmental impacts of motorized traffic.

Walking and bicycling conditions have minimally improved as the public and private sectors increasingly make accommodations to roads, sidewalks, and related facilities (e.g., bicycle racks, street lighting). In regional growth areas, walking and bicycling facilities are considered a regional priority. While walking and bicycling are local in scale, the regional priority has been to incorporate these facilities in every town. There should be a clear expectation that walking and bicycling facilities are present in every regional growth center. Particular emphasis has been given to sidewalk and bicycle lane projects that extend or connect existing facilities. Nationally, an emerging priority in walking and bicycling projects is addressing streetscaping and traffic calming initiatives. These improvements seek to increase the desirability of walking or bicycling alongside roads.

The traffic criterion under Vermont's Act 250 development review process has been important to evaluate a proposed development's vehicular traffic impacts. The region and towns have also placed a priority on evaluating the potential impacts to pedestrian and bicycle traffic.

Some of the nation's premier bicycling corridors navigate through the region. The White, Ottauquechee, and the Connecticut River valleys offer rolling hills, scenic views of the region's agricultural and natural landscapes, and beautiful quaint villages which are all very attractive to the recreating bicyclist. These bicyclists, often traveling in the summer, contribute to the region's economy. As part of the tourism industry, bicyclists help the region expand upon the busy fall and winter seasons. Transportation and land use planning can preserve and enhance bicycling conditions in the region.



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**Photo 5: Bicycling group using US Route 4.**

The Safe Routes to School program is a national initiative designed to promote walking and bicycling among school children. Improving safety is the primary program emphasis, but there are also other goals of improving physical fitness and mitigating school caused traffic impacts. The region has been supportive of federal and state initiatives that incorporate safe routes programs primarily in schools in or near the larger regional growth areas.

### Goals

- (1) Expand opportunities for walking and bicycling in the region.
- (2) Promote walking and bicycling as a viable means of transportation and recreation.

### Policies

- (1) Work with towns and VTrans to institutionalize pedestrian and bicycle accommodations in all of its planning, engineering, and construction related activities. In addition to the existing local land use regulations, develop free-standing Bicycle and Pedestrian Plans for interested towns.
- (2) Work with towns to support land use regulations that increase the density and mixed use development pattern that improves walking and bicycling conditions by shortening trips between where people live, work, and recreate.
- (3) Cooperate with private and public initiatives that seek to market walking and bicycling in towns and the region. Participate in state and local initiatives that promote bicycling and walking.

- (4) On all Act 250 developments, consider the pedestrian and bicycle traffic impacts to preserve mobility and safety. Facilities and land use controls shall be incorporated where walking and bicycling are both anticipated and desired travel options. Accommodations will involve constructing the actual facility, developing the site to accommodate the facility, participating in federal grant programs to provide the local match requirement, and/or deeding the public the rights of way to secure the land needed for facility construction. Encourage developers to develop internal walking and bicycling circulation plans as well as accommodating connections to adjacent parcels – whether developed or not.
- (5) Continue to support the Safe Routes to School program. Encourage more schools to participate in the program – especially those schools within densely settled villages or town centers.

### **L. Traffic Calming**

Traffic calming involves changing the physical design of a road and using enforcement to reduce the undesirable impacts of vehicular traffic within residential and commercial areas. When successfully employed, traffic calming can decrease cut-through traffic volumes, lower traffic speeds, and improve safety for all transportation modes. Traffic calming initiatives have to balance the needs for slower vehicles with emergency management access and road maintenance needs. Roads that are a priority for traffic calming changes should be within or adjacent to regional growth areas, schools, commercial centers, and areas designated for high density development. Safety and quality of life are the primary considerations that are considered when evaluating

the necessity for traffic calming.



*C. Wise © 2006*

**Photo 6: On street parking in regional growth areas**

A wide range of traffic calming techniques are available - installation of roundabouts at selected intersections, reduction of travel lane widths within regional growth areas, on-street parking and enhanced road lighting, bump outs and splitter islands for pedestrian crossings, and pavement markings.

Streetscaping is a method of improving the aesthetic quality of roads with landscaping and tree plantings. Trees and landscaping have been shown to be an important component of a successful traffic-calming road enhancement. The landscaping and trees help restore a sense of community to a road, often mirroring the historic look and feel of New England tree-lined streets. A better

looking road evokes a psychological reaction where motorists identify a road's character as a road supporting a community use as opposed to a highway which is just a means to connect to a destination. Projects that incorporate traffic calming and other bicycle and pedestrian enhancements can include landscaping and tree plantings.

Pavement markings are often a simple and affordable method for improving safety and encouraging lower traffic speeds. Center line and fog line markings clearly delineate travel lanes. They also serve to visually narrow lane widths which encourage motorists to decrease vehicle speeds.

### **Goal**

- (1) Mitigate motor vehicle impacts on the region's transportation system and adjacent communities.

### **Policies**

- (1) Promote local traffic calming projects for town roads that are located within regional growth areas and/or have speeding related safety concerns. Work with towns to develop road standards that promote traffic calming in private development.
- (2) Work to ensure state transportation policies accommodate traffic calming principles. Require that transportation projects follow the Vermont Agency of Transportation traffic calming guidelines. Ensure that greater amounts of traffic calming related projects are selected by the Vermont Agency of Transportation. Discourage the elimination of on-street parking for the benefit of increased traffic capacities within all regional growth areas. Develop transportation enhancement projects that advance traffic calming and landscaping techniques within areas where walking and bicycling occurs or is desirable.
- (3) Advocate state transportation agencies more actively apply pavement center line markings on state-controlled and Class 2 roadways. Support fog line markings for all Class 1 and 2 paved roads.

## **M. Scenic Preservation**

Many of the region's transportation corridors are considered scenic resources that provide direct benefits to tourism and serve to attract residential and commercial investments. These roads reflect the culture and history of the region's rural agricultural identities. The roads themselves are the region's public spaces that are enjoyed by residents and visitors in the region. In many circumstances, a motorist's perspective of the towns in the region comes primarily from their views as they travel along the transportation system.

In this region, towns have been relatively successful in protecting rural aesthetic qualities and as a consequence we have drawn many people attracted to this environment. These people may not understand the values that brought them here or the efforts it has taken to maintain the aesthetic and functional character of these roads and surrounding landscapes. As such there has been an increase of interest to preserve and promote certain transportation corridors as particularly unique in scenic character and qualities. Unfortunately, this interest is often in response to proposed development that has been viewed as a detriment to the town's scenic character.

### **National Scenic Byways Program**

The National Scenic Byways Program (Byways) is a program available to communities that desire to proactively formalize corridors by scenic and heritage qualities. The Byways program was established under federal transportation legislation in 1991 and has been reauthorized under subsequent transportation bills. Currently, the Connecticut River Scenic Byway and Route 125 Middlebury Gap are the only designated corridors in the region. Because of statewide and community interests, priority should be focused on determining the feasibility of extending these byway corridors to Interstate 89, portions of U.S. Route 4, VT Route 100, and other corridors as identified by interested communities. However, these programs operate best when they are born from grass root coalitions and not from state or regional officials. Whenever citizen groups and communities mobilize to seek scenic byway designation, the Regional Commission can aid those efforts by developing corridor management plans and implementation strategies that could help create and then market scenic byways.

Scenery preservation can also be implemented on a smaller scale. Developers should leave undeveloped land adjacent to the public right-of-way or install tree screening for commercial and residential developments so they are obscured from the road. This is particularly important along major tourism routes. This is also critical along town roads to preserve the collective aesthetics of the region's rural back road system.

A properly managed scenic road is also a safe and efficient travel corridor. Many of the practices and principles behind scenic byway management translate to good transportation system operations – preserving safety, mobility, and encouraging bicycling and walking.

### **Goals**

- (1) Preserve the aesthetic character of the region's roads and surrounding landscapes.

**Policies**

- (1) Support the designation, corridor planning, and promotion of scenic byways as identified by interested communities and local citizens.
- (2) Continue to promote the Connecticut River Scenic Byway and Route 125 Middlebury Gap.
- (3) Work with towns to ensure planning regulations accommodate development buffers and/or tree screenings along scenic roads.

**N. Development Impacts**

This region is fortunate to have a development community that has been responsible for enhancing the quality of the transportation system. Their interests in “doing no harm” has helped towns responsibly develop while preserving the safety, efficiency, and aesthetic values of the region’s transportation resources. It is in the public’s good to support development and to create the partnerships that promote the long-term success of the regional economy. As development continues, towns in this region have an obligation to foster this important relationship with private developers. If the state and federal governments continue to lack the funds to stabilize the existing transportation system and/or add new infrastructure and services, public-private partnerships will help ensure that development is successfully supported by a well functioning, multimodal transportation system.

A proposed development considers the operations and character of the existing transportation system and devises strategies to mitigate possible impacts and improve transportation conditions. If there is no public transportation, bicycle, or pedestrian facilities, then those facilities are typically considered in development proposals. Bicycle and pedestrian facilities can be included even if they only accommodate three seasons of travel. Public transportation, within regional growth areas, is considered even if there are presently no fixed route services in the immediate area. Bus pull-offs and driveway circulation patterns that accommodate buses provide present and/or future opportunities for public transportation. Most importantly, the built environment does not preclude the expansion facility upgrades. The assumption is that the continued development may increase ridership demand and allow for public transportation services to be started/expanded offsetting negative vehicle traffic impacts.

**Goals**

- (1) Develop the region while preserving the safety, efficiency, and character of the region’s transportation system.
- (2) Prevent development from defining a built environment that would create great cost and conflict should the public’s transportation system require improvements.

**Policies**

- (1) Guide development to mitigate impacts to the transportation system with improvements that fit the region’s rural context. Development that carries significant traffic related

impacts can be situated within regional growth areas where the necessary infrastructure exists. The priority is to support the land use and economic development objectives recommended in the Regional Plan and the Town Plans. Development that exceeds the capacity of the rural road transportation system is inconsistent with the policies of this Plan even if urban-scale infrastructure improvements could be made to mitigate impacts. This is particularly relevant for rural residential developments that could increase traffic volumes beyond what gravel roads can sustain necessitating undesirable and costly paving projects.

- (2) Encourage development that promotes safe and efficient multimodal accessibility for residential, commercial, and industrial uses. Develop a transportation system based on anticipated and desired multimodal demand. Road expansion projects will be considered necessary, only after all other transportation demand management and multimodal solutions have been explored and deemed insufficient to address transportation impacts.
- (3) Developers must demonstrate they have considered their plans within the context of the local and regional transportation system. Developments should provide connections to adjacent developments and other local roads, not just a single collector or arterial road. If connections to adjacent parcels are not yet possible, then the appropriate easement or development permit conditions will be required so connections can be accommodated in the future.
- (4) Regionally significant development, that shall require greater involvement from the Regional Commission, will be defined by the Act 250 development process.

### **O. Truck Traffic**

Tractor trucks play a unique role in the region's transportation system and economy. In Vermont, trucks account for ninety percent of the total flow of commodities. Trucking typically accounts for 5 to 15% of the total traffic volumes along major arterials. The trucking community is a diverse industry comprised of many different operators and there is little available information about their trip origins and destinations. Based on national and statewide tractor truck studies, it is known that truck traffic has been increasing over the past ten to twenty years and growth is expected to continue.

The State of Vermont designated a network of roads for tractor truck traffic (VSA Title 23 Chapter 13, Section 1432). In the region this includes; Interstate 89, Interstate 91, U.S. Route 4, US Route 302, and sections of U.S. Route 5, VT Route 14, and VT Route 100. These roads receive a greater priority in transportation funding. While a minority in percentage of total traffic, trucks cause the greatest amount of pavement wear on the region's arterial and major collector roads. Asphalt pavement deterioration is heavily dependent on a road's construction characteristics, pavement quality and thickness, underlying base/native soils, and environmental conditions. A fully loaded truck is equivalent to 10,000 passenger vehicles (weight increase raised to the third or fourth power). While it is difficult to evaluate broadly, these impacts appear consistent for gravel roads, culverts, and bridges.



### Posting Weight Limits

While the state has a continuing program of enforcement on state roads, there is an inconsistency for how towns post and enforce truck traffic standards. In 2007, a majority of towns were posting seasonal weight restrictions and a few selected towns had year round restrictions. The number of town roads with posted weight limits varied from three to 300. Truck weights were primarily enforced by the Vermont Department of Motor Vehicles. There were a few towns that actively weighed trucks and only one town regulated Vermont length restrictions. The inconsistency in posting and enforcing weight restrictions creates confusion among the trucking community. It also encourages truck traffic rerouting away from towns with enforcement to towns without enforcement. This creates a hardship for the more rural towns that have limited financial resources to monitor and enforce truck traffic restrictions.

### Goal

- (1) Encourage towns to address truck traffic impacts to the region's transportation system.

### Policy

- (1) Seasonal and year round weight restrictions are a responsible method to mitigate truck traffic impacts. Work with Towns to advocate greater consistency in posting roads and enforcing weight restrictions.
- (2) Promote personnel time and equipment sharing (e.g., truck scales) between towns. Allocate Transportation Planning Initiative funds to better measure tractor truck volumes on state and local roads.

## **P. Roads and Ecology**

### Background

The region's transportation system has created negative impacts to soil, water, and air quality. It is the linear nature of a road system that leads to the deterioration and fragmentation of land tracts and wildlife habitats.<sup>14</sup> Functioning ecosystems depend on large continuous land areas, roads crisscrossing the landscape serve to divide the land and disrupt the flow of these natural processes. For wildlife, bridges and culverts can discourage fish passage; roads can physically prevent the seasonal movement of amphibians; and traveling vehicles can dissuade or collide with moose, deer, and bear. Towns can now consider stream geomorphic conditions and fish passage when constructing transportation projects. For air quality, choices in fuel (e.g., gas, diesel, biodiesel, etc.) and fuel economy (i.e., miles per gallon) can result in significant changes in the production of greenhouse gases and federally regulated pollutants. And for water quality, failing culverts, deteriorating gravel roads, improper roadside ditching, and other insufficient stormwater mitigation techniques allow the discharge of polluted sediment into streams and rivers.

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<sup>14</sup> As described in *Road Ecology: Science and Solutions* (2003, Island Press) and the Transportation Research Board's NCHRP Synthesis 305 *Interaction Between Roads and Wildlife Ecology* ([www.trb.org](http://www.trb.org)).

### Mitigation

Not all impacts can be controlled, but there are mitigation strategies the Regional Commission can help implement. Funding has been the primary limiting factor. The Regional Commission can pursue funding opportunities to advance the planning and construction of projects that preserve or enhance water quality. Replacing deficient culverts and bridges carries the greatest potential for addressing water quality – designing appropriately scaled structures that can handle flood events, stormwater runoff, promote fish passage, and minimize the discharge of road sediment. These upgraded culverts and bridges, operating in greater harmony with the natural environment, will also be less likely to fail during storm events. This is a particular concern as officials from the Agencies of Natural Resources and the Agency of Transportation plan for the possibility of another storm event equivalent to the 1927 flood. This has been illustrated in recent years as adjacent regions have suffered massive infrastructure damage and loss of life during flood events.

### Stormwater Management

Transportation facilities introduce impervious surfaces that prohibit water from percolating into soils. These surfaces increase runoff that results in “non-point source” pollution impairing water quality and increasing the chances for downstream flooding. The transportation networks evolved from paths and wagon trails to gravel and paved roads, but in most instances still track along historic alignments parallel to the region’s streams, rivers, and lakes. This situation means impervious transportation surfaces have greater impacts than similarly scaled land uses set further back from waterways. The State of Vermont requires new and reconstructed transportation facilities to follow established stormwater management best practices<sup>15</sup>. Transportation facilities that can reduce impervious surfaces, accommodate onsite stormwater mitigation facilities, and provide sufficient landscaping to buffer discharges into nearby waterways are being encouraged. The towns can update stormwater ordinances (as authorized under VSA Title 23 Chapters 91 and 101) to require private construction to accommodate best practices. Where general exceptions exist for town activities, towns can enact standards that conform to the latest version of the *Vermont Better Back Roads Manual*. The regions are best able to support stormwater transportation standards by providing education opportunities to town and regional officials about the advantages and costs associated with stormwater management.

### Biodiesel Fuels

Diesel fuel powers highway equipment, town and emergency management vehicles, and school buses. Diesel releases significant volumes of air pollutants that impact the environment and the public’s health. These impacts have been reduced with fuel additives and low sulfur blends, but it still qualifies as ‘dirty diesel’ as described by transportation professionals. The use of biodiesel blends that are partially derived from vegetable oils result in far better air quality and can provide improved vehicle performance and efficiencies. The Regional Commission has invested significant time in education and outreach activities that promotes the use of biodiesel blend options. The Regional Commission can continue to advance biodiesel as a viable fuel alternative for use by towns and the Vermont Agency of Transportation.

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<sup>15</sup> More information can be found at Vermont Department of Environmental Conservation’s Water Quality Division, [www.vtwaterquality.org](http://www.vtwaterquality.org).

**Goals**

- (1) Actively mitigate all transportation caused impacts to soil, water, and air quality.
- (2) Encourage towns and the state to address roadway ecology in all their planning, maintenance, and construction related activities.

**Policies**

- (1) Continue to inventory culverts and bridges and create capital plans that give greater priority to replacement projects along important natural resource corridors. Cooperate with Vermont Better Backroads and the Vermont Agency of Natural Resources to advocate for improved culvert and bridge designs that are environmentally sensitive and less likely to be damaged by storm events.
- (2) Promote education and outreach activities that educate and advocate stormwater management practices.
- (3) Continue to promote the use of biodiesel and other alternative fueled vehicles through educational workshops and meetings.

**Q. Project Prioritization Process**

All the state's regional commissions are required to annually prioritize state transportation projects. The Regional Commissions use planning factors for project prioritizing. The input of the Regional Commission accounts for twenty percent of the overall ranking process, with VTrans providing the other eighty percent of the ranking system based on engineering related factors. Developing regional ranking criteria must be accomplished within the legislated system that requires Regional Commissions to consider project impacts on mobility and congestion; social, cultural, and economic impacts; and conformity to local and Regional Plans. The current regional ranking system was developed to meet Regional Plan priorities and was influenced by contributions from the Transportation Advisory Committee. The Regional Commission evaluates projects with the following criteria: preservation of the transportation system; improvements to safety, social, cultural, and economic priorities; and multimodalism/mobility enhancements. There have been discussions of standardizing the project evaluation process so that each region ranks projects similarly. This would effectively restrict the autonomy and self determination exercised by the various regions in the state.

**Goal**

- (1) Support the region's role in project prioritization for all state and federally funded projects.

**Policies**

- (1) The Regional Commissions must be given sufficient autonomy to emphasize the goals, policies, and recommendations articulated within its Regional Plan if rankings become standardized across the state.

- (2) There is an initiative to standardize regional rankings across the state and that can be addressed insofar as Regional Commissions are given sufficient autonomy to emphasize the goals, policies, and recommendations articulated within their Regional Plans.

## **R. Transportation Funding**

### **Federal**

Transportation funding is the most important mechanism directing planning and project development activities. Transportation funding comes from numerous combinations of the local tax base, state and federal gas tax receipts, state and federal registration fees, and private financing sources. The most significant funding for Vermont comes from the federal transportation bill, the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). The transportation bill is the most recent authorization financed through revenues in the federal highway trust fund. This fund has supported transportation since the Eisenhower highway building era, but at the federal level, there is an increasing gap between revenue and transportation needs<sup>16</sup>.

National experts predict the Highway Trust Fund will be in a deficit before the end of the SAFETEA-LU authorization period and that future authorizations will reflect a reduced national role in financing transportation. This will be a particular hardship for states like Vermont that primarily rely on federal funding. It will also be a hardship for Vermont because as a “donee state” that receives more federal funding than it contributes, funding reductions will likely lead to “donor states” working harder to address their perspective of funding inequities.

Transportation officials have stressed funding concerns over the last three transportation reauthorizations with the goal that other funding programs be established now to address projected shortfalls. At each authorization, funding amounts and the issue of “donor and donee” states has become increasingly contested. Adjusting registration fees is not as great a priority as the gas tax because registrations are not based on usage rates and are borne solely by Vermont citizens. Fuel taxes are based on fuel consumption which is a relatively accurate measure of transportation use – more driving requires greater contributions. There is also a greater opportunity for the 10-12 million tourists that enter our state every year to help compensate Vermonters for their use of roads, bridges, and other transportation infrastructure.

### **Taxes and Registration**

Transportation financing is developing into a critical debate and the region has established advocacy positions for ensuring reliable sources of revenue. It is assumed that managing our transportation infrastructure is a priority and that investments require reliable sources of revenue fairly extracted from Vermont citizens and transportation system users. Fuel taxes were last set in 1997 for gas and in 2000 for diesel at rates significantly below New England and national averages<sup>17</sup>. These taxes remain the same despite cost of living increases and recent construction

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<sup>16</sup> As reported by the National Surface Transportation Policy and Revenue Study Commission in July 2006 ([www.surfacecommission.gov](http://www.surfacecommission.gov) – click Commission meetings). Vermont is in the bottom 25% in fuel tax rates right behind Texas in the rankings.

<sup>17</sup> October 2006 Motor Fuel Tax summaries, American Petroleum Institute ([www.api.org](http://www.api.org) – click on Policy Issues).

inflation rates of 4 to 6% annually. Gas and diesel taxes are user based fees and the burden to Vermonters is defrayed by non-residents using our transportation system. Fuel taxes also create incentives for higher fuel economy vehicles and vehicle miles trip reductions that support many environmental and transportation planning objectives. Registration and other dedicated fees that were raised in 2006 can also be indexed to annual cost of living rates. Rather than the occasional rate increase, an indexed fee rate would guarantee a consistency in funding that is automatically adjusted if economic conditions for citizens improve or decline.

### **Public/Private Partnerships**

Although optimistic projections only anticipate private funds to account for five percent of total transportation project funding, there is an opportunity to increase the amount of public/private partnerships to help address needed transportation investments. The Regional Commission, working in collaboration with the towns, can seek creative partnerships with private developers to help offset transportation infrastructure costs. This may involve transportation impact fees and/or developers providing the local match for federal/state transportation projects. State policy has been evolving so that in 2007, the Vermont Agency of Transportation will require newly proposed transportation projects have innovative financing packages prior to be accepted by the Agency. This is an active acknowledgement that capital investments need more diverse funding sources.

### **Goal**

- (1) Sufficient revenues to pay for transportation system investments, including maintenance.

### **Policies**

- (1) Support creating a series of tax strategies that secure dedicated revenue levels needed to maintain the existing transportation system. Stress that Vermont fuel taxes remain consistent with other New England states and that those taxes are indexed to annual cost of living rates. Continue working with the State legislators to develop and implement taxation strategies that provide sufficient revenues to maintain the transportation system.
- (2) Transportation revenues should be used for transportation and funds allocated for general governmental services shall be actively discouraged.
- (3) Sponsor educational opportunities that help continue a local and regional dialogue for addressing anticipated shortfalls in federal funding.

## **S. Performance Measures**

The Regional Plan outlines a direction for the region's future and guides the development and implementation of the transportation work program. Goals and actions are presented on a multitude of transportation topics and this chapter describes the methods available and recommendations to implement those tasks. The transportation work program and the local technical assistance tasks must be related to the goals, policies, and recommendations of the Regional Plan. The ways in which the Regional Commission evaluates and provides input into local and regional development must adhere to the Regional Plan. The ways in which the State

continues its systematic investment into transportation system maintenance, rehabilitations, or other improvements will be guided by the Regional Plan.

### Goals

- (1) Guarantee that Regional Plan transportation topics provide guidance that is meaningful and useful to citizens and town officials in the region.
- (2) Sets Plan standards that are achievable by the staff at the Regional Commission.

### Policy

- (1) After each revision of the Regional Commission's transportation element, evaluate the policies and recommendations for action to assess Plan implementation. Subsequent Plan updates shall report on the progress of transportation policies.

## **T. Transportation Corridor Planning**

The previous transportation sections address general policies pertaining to regional transportation. This section focuses on unique transportation corridors in the region. The goal of this section is to outline corridor specific policy recommendations that augment those policies in the general transportation chapter. Each transportation corridor is briefly described with an overview, then a summary of infrastructure and traffic conditions, a review of capital projects, and finally a listing of planning and implementation priorities.

### **US Route 302**

US Route 302 is a major east-west travel corridor connecting the northern New England region from Portland, ME to Montpelier, VT. US Route 302 was originally part of the old New England interstate system that pre-dates the Eisenhower era national highway system. Of the approximately 170 mile highway there are only 8 miles that fall within the Two Rivers-Ottawquechee region in the towns of Newbury (5 miles) and Topsham (3 miles). US Route 302 is part of the Vermont's tractor truck network which means that this roadway receives a greater priority for transportation project investments. Within our region, US Route 302 crosses Interstate 91 at the Exit 17 interchange. Despite all the strategic advantages to the Two Rivers-Ottawquechee and greater North New England region, it is still a two lane road that offers scenic views of rural landscapes and the Wells and Connecticut Rivers.

There are modest traffic demands on US Route 302 with an approximate average traffic volume of 3,700 vehicles per day. The road has been evaluated by transportation engineers as being in poor condition with an average sufficiency rating of 59. Tractor truck traffic is 8% of the overall traffic volumes. Posted travel speeds along US 302 are 50 mph with the exception of 25 mph posting in Wells River Village. There have been no traffic speed counts conducted over the last 5 years.

There are land use changes and traffic increases anticipated for US Route 302. As in other parts of the region, New Hampshire land use development decisions will significantly impact traffic volumes for those road segments between the Interstate 91 interchange (the principal north-south arterial for all of the Upper Valley) and the New Hampshire state line. The Town of Newbury has designated part of US Route 302 as a highway commercial district, has established an industrial park, and continues to encourage development in Wells River Village. In the Town of Topsham, there are no

relevant land use or transportation policies. These land use designations or lack thereof make it increasingly important to preserve the safety and mobility of this roadway for the traveling public.

The US Route 302 corridor has one scheduled transportation project in the Vermont Agency of Transportation’s multi-year capital program which is:

	<b>State Project #</b>	<b>Work Description</b>
Newbury	BHF 020-2(32)	Roadway realignment at the railroad underpass.

The Plan recommends five improvement strategies along US Route 302 to promote economic development while preserving transportation safety and mobility.

- (1) Project Implementation – Support the completion of the road realignment at the railroad underpass.
- (2) Project Implementation – Identify transportation enhancement and safety projects within Wells River Village to ensure that US Route 302 better supports village life and commercial activities.
- (3) Project Implementation – Construct a park and ride for the US 302 and Interstate 91 interchange. Work to collocate the park and ride with a suitable/complimentary business.
- (4) Planning – Continue to implement access management policies for all development along US Route 302. Promote access within defined development nodes and actively discourage access along sections of highway outside of those development districts. Emphasize access management in development review from the Interstate 91 interchange to the New Hampshire state line.
- (5) Planning – Initiate a data collection program to assess traffic operations along the US Route 302 corridor. Focus traffic counts within Wells River and the interstate Interchange to monitor traffic speeds and truck traffic volumes.

**US Route 4**

US Route 4 is one of a few east-west arterials in Vermont. In this region the primarily two lane rural road parallels the Ottauquechee River valley along the old railroad alignment and winds through many sensitive natural landscapes and a number of vibrant community centers. US Route 4 is on the national highway system and Vermont’s tractor truck network so mobility and safety issues are a top priority. US Route 4 is also a Main Street for a number of villages and hamlets. The road is a gateway into Vermont, a tourism destination for experiencing the region’s rural landscapes. Many residents’ quality of life and the vitality of commercial businesses greatly depend on preserving this unique road and surrounding landscape. US Route 4 faces difficult challenges of preserving mobility, safety, and traveling efficiency while continuing to support community life and commercial activities. There are no other parallel roads or alternative travel options available and the topographical and environmental constraints would restrict all reasonably feasible roadway expansion projects. As traffic increases and land development intensifies, the region will be forced to accommodate that growth with little or no further transportation capacity improvements.

There is a 27.5 mile segment of US Route 4 in the region. US Route 4 has been consistently studied and evaluated over the last 40 years making it the most researched road in the region. US Route 4 rates low in engineering standards with an average rating of poor (sufficiency rating of 55) – this accounts for the road’s structural conditions, safety record, and generally how the highways serves the motorist (excluding walkers or bicyclists). Pavement condition evaluations rate the road from

good to poor – this accounts for just pavement and whether it is sealed and smooth or cracking and rutting. Most US Route 4 intersections are stop controls, there are no fully signalized intersections until White River Junction as US Route 4 exits the region to New Hampshire. The level of service for these intersections ranges from poor (e.g., Quechee Main Street) to excellent (e.g., Happy Valley Road in Taftsville). Less than 3 miles of the total road have adequate walking and bicycling facilities. Shoulders are non-existent in some places, other infrastructure such as culverts, short-span bridges, and guardrails are in deteriorating condition. The scale of development pressure in the Hartford-Woodstock area is the most significant in the region.

The traffic demands on US Route 4 are unparalleled in the region. In 2006, the road had an average traffic volume of 8,600 vehicles per day. Tractor truck traffic represents 5-15% percent of the overall traffic volumes. Posted travel speeds varied from 25-50 mph with motorists showing a broad range of driving habits from mostly violating (76% exceed speed limit in Quechee) to near total compliance (98% follow speed limit in Woodstock Village). Seasonal activities bring many numbers of tourists and the traffic (i.e., 10-50% above average conditions) results in significant congestion and delays around Woodstock Village, Quechee, and White River Junction. Since the 1990’s, US Route 4 has averaged 30 reported vehicle crashes per year. There are few pedestrians observed along US Route 4, walking is generally restricted to settlement areas and commercial centers. There are only 3.3 miles of sidewalk in Woodstock Village and the Quechee Gorge. Bicycling is allowed, but is also strongly recommended for alternative routes through Quechee, Woodstock, and Bridgewater. There are sections in Hartford and Bridgewater where bicyclists must use US Route 4. There are also bicycle tours and/or individual bicyclists utilizing all of US Route 4.

The US Route 4 corridor has a number of scheduled transportation projects in the Vermont Agency of Transportation’s multi-year capital program. They are:

	State Project #	Work Description
Woodstock Village	BHF 020-2(32)	Bridge Replacement
Killington –Woodstock	NH 2410 (1)S	Paving and road rehabilitation
Woodstock Village	NH 020-2(31)	Paving and road rehabilitation
Bridgewater-Woodstock	NH 020-2(33)S	Village sidewalks and road improvements
Hartford	STP VINS (1)	Turn lane addition

This Plan recommends five strategies for improving multi-modal operations and enhancing community livability along the US Route 4 corridor.

- (1) Project Implementation – Support the completion of the major transportation projects listed under the Vermont Agency of Transportation’s Capital program.
- (2) Project Implementation – Support the continued work from Vermont Agency of Transportation District forces: Remove ledge and brush along road curves to improve sight distances; Repair and replace culverts and ditching to reduce erosion and other flooding damage; Increase shoulder widths and upgrade guardrail to improve traffic safety; Address roadway sections that have the poorest engineering ratings; and provide minimal capacity enhancements such as left and right turn lanes for active intersections and commercial business driveways.
- (3) Planning – Strengthen access management guidelines to emphasize access permitting within existing development nodes while restricting access along the high speed sections of roadway. Along the sections of US Route 4 that offer high speed travel, require businesses and residents



share driveways accesses. VTrans, the Towns, and this Regional Commission should work with developers to secure easements or other rights-of-way to connect residential homes onto local roads or existing driveways. Implement access management guidelines in all Town Plans and Land Use development regulations to ensure a consistent and coordinated application of guidelines that support the Regional Plan and Vermont Agency of Transportation access management goals. Support additional access management activities through the Transportation Planning Initiative.

- (4) Project Implementation – Prior to approving major new development, upgrade the Waterman Hill Road and Quechee Main Street intersections in Quechee. These intersections are at capacity and improvements must be made to safely accommodate continued growth in Quechee Village and Quechee Lakes.
- (5) Project Implementation – Enhance historic settlement areas and improve commercial centers, minimize traffic related disturbances, and maximize facilities for on-street parking. Pursue walking, bicycling, and traffic calming enhancement projects for all villages and hamlets along US Route 4. Pursue village designation for all villages along US Route 4.

### US Route 5

US Route 5 is one of two north-south arterials in the region that runs adjacent to the Connecticut River. US Route 5 is a two lane rural road that parallels the river and offers many scenic landscapes and a number of vibrant village and town centers. US Route 5 has become part of the bi-state Scenic Byway and as such is recognized for its “unique historic, cultural, environmental, agricultural and railroading traditions and resources” (Connecticut River Scenic Byway - [www.ctrivertravel.net](http://www.ctrivertravel.net)). While US Route 5 is not included on Vermont’s tractor truck network, many logging and other commercial trucks utilize this road to avoid interstate imposed weight restrictions. US Route 5 serves as a Main Street for a significant number of town centers, villages, and hamlets. The region and the greater bi-state tourist industry rely heavily on US Route 5.

The region has a 54.1 mile segment of US Route 5 which constitutes approximately 30% of the total US Route 5 mileage in the state. The road has been evaluated by transportation engineers as being in fair condition with an average sufficiency rating of 64. There are few areas with traffic congestion and US Route 5 efficiently works in concert with Interstate 91 to provide regional north-south travel. It has often been observed that US Route 5 serves more as a ‘major collector’ with motorists coming from local roads and New Hampshire arterials and then accessing the nearest interstate interchange to continue their trips. Because of that, there are relatively low traffic volumes throughout the corridor. In 2006, the road had an average traffic volume of 3,200 vehicle trips per day. If you excluded specific road segments near interstate interchanges, within village centers, and the Hartford-Norwich urban corridor, traffic volumes decrease to an average of 2100 vehicle trips per day. These traffic volumes are well below the total traffic capacity of US Route 5. Over the last 5 years, the Regional Commission has evaluated tractor truck traffic along US Route 5 which has averaged 5-8% of the overall traffic volumes. The majority of activity is trucking wood products northbound and these vehicles traditionally carry heavier loads than other forms of trucking. Speed limits have also been monitored within the villages and town centers. In those instances, speeds are shown to average 5-15 mph above posted speed limits although more active enforcement in Hartford, Norwich, Fairlee, Bradford, and Newbury has shown to reduce speeds in those areas.

The Upper Connecticut River is a nationally renowned destination for bicyclists with US Route 5 and NH Route 10 providing excellent bicycling loops. US Route 5 is a combination of gently rolling hills and flat terrain that challenges but does not overtax a bicyclist. No official counts have been

conducted along US Route 5, but it is readily observed that the highest bicycling activity in the region occurs on these roads. The most popular routes are the Norwich – Thetford and Thetford – Fairlee sections of US Route 5 and NH Route 10.

The US Route 5 corridor has scheduled transportation projects in the Vermont Agency of Transportation’s multi-year capital program. They are:

	<b>State Project #</b>	<b>Work Description</b>
Hartland	CMG PARK(25)	Installation of a bus shelter at the park and ride and acquisition of an abutting property for future expansion.
Hartland	STP EH05(14)	Project is for design of sidewalks along US Route 5 in Hartland Three Corners.
Hartford	RS 0113(40)	Reconstruction of US5 in the area known as Tafts Flats.
Hartford	STP 0113(59)S	Construction of a roundabout on US5 and Sykes Mountain Avenue and a smaller roundabout on Sykes Mountain Avenue and Ralph Lehman Drive.
Hartford	CMG PARK(12)SC	Project scoping to determine location for an Interstate 91 park and ride facility.
Hartford-Norwich	STP 2206(1)S	Road resurfacing for US5 north of the Tafts Flat project extending into Norwich for 4.3 miles. Project also includes resurfacing Bugbee Street.
Norwich	STP EH98(21)	Sidewalk and traffic calming improvements from the Ledyard Bridge to Norwich village.

This Plan recommends five strategies in preserving US Route 5 to enhance tourism opportunities, multimodalism, and community interactions.

- (1) Project Implementation – Support the completion of the major transportation projects listed under the Vermont Agency of Transportation’s Capital program.
- (2) Project Implementation – Prioritize improvements for all US Route 5 / Interstate 91 park and ride projects. Establish park and rides and/or parking facilities in Hartford, Norwich, Fairlee, and Newbury Village. Improve park and ride facilities in Thetford. Improve and expand park and ride facilities in Bradford and Hartland.
- (3) Project Implementation – Target enhancement and traffic calming projects for bicyclists and pedestrians within all town and village centers. Ensure sidewalks and/or walking paths are provided in Hartland Three Corners, North Hartland, East Thetford, and Fairlee Village. Expand and/or improve sidewalks in Wilder, Norwich Village, Bradford, Newbury Village, and Wells River.
- (4) Planning – Advance scenic preservation activities utilizing the Transportation Planning Initiative program. Actively encourage and facilitate the implementation of scenic preservation projects that provide facilities and markets the Upper Connecticut River Valley to visitors.
- (5) Planning – Support land use policies that preserve the existing land use and transportation operations for US Route 5. Support economic development within existing villages, town centers, and development nodes. Preserve and maintain rural development patterns along the town peripheries.

**VT Route 66**

VT Route 66 is a short 7.6 mile state roadway entirely within the Town of Randolph. It is a two lane rural road accessing Interstate 89 and is the primary gateway to East Randolph, Randolph Center, Randolph Village, and adjacent towns. VT Route 66 is the geographic center of the State of Vermont and connects the Vermont Technical College to the interstate. A master plan for the interchange was completed in 1999 and its results reported in the land use section of this Regional Plan. There are a number of transportation and land use factors very encouraging and supportive of additional development along this roadway. These attributes confer a significantly unique potential and challenge to the region’s transportation system.

The average traffic volume in 2006 are estimated at 4,500 vehicle trips per day, but these numbers can double under full build out scenarios described in the Exit 4 Master Plan. The road has been evaluated by transportation engineers as being in poor condition with an average sufficiency rating of 59. Most of VT Route 66 is posted at 50 mph despite having numerous geometric and sight distance deficiencies. As a rural low traffic volume road, the alignment challenges do not create any real safety or mobility concerns. With the increased development, however, those balances can be negatively altered. As seen in other regions, it is possible that development can impair traffic operations and/or restrict the full build-out potential of a roadway. The challenge is to preserve mobility and safety while continuing to support and encourage a land use development pattern that is supported by this Regional Plan and the Randolph Town Plan. The additional challenge will be to implement transportation enhancements that protect the ‘scenic vistas’ that are also well supported in the Regional Plan and Town Plan.

VT Route 66 has one scheduled transportation project in the Vermont Agency of Transportation’s multi-year capital program which is:

	State Project #	Work Description
Randolph	CMG PARK(21)	Park and ride construction.

Beyond resurfacing projects, there are no further improvements planned or anticipated. The State of Vermont transportation plans and policies do not prioritize VT Route 66 for additional investment. The Town of Randolph has neither the authority nor the financial ability to underwrite transportation enhancements. Since there is no likelihood of additional public investments, changes to the existing land use that require transportation improvements will need to be privately funded.

This Plan recommends four strategies for ensuring that development does not degrade the safety or mobility of VT Route 66.

- (1) Project Implementation – Support the completion of the Park and Ride project listed under the Vermont Agency of Transportation’s Capital program.
- (2) Project Implementation – Advocate for continued resurfacing and proactive maintenance especially in the relatively high-traffic road segments between the Vermont Technical College and Randolph Village.
- (3) Planning – Private development should account for projected traffic growth and address existing road deficiencies that could compromise safety or mobility prior to being approved. TRORC supports implementing access management principles over other capacity type projects that would deteriorate the ‘look and feel’ of this rural highway.

- (4) Planning – Initiate a data collection program to assess traffic operations along the VT Route 66 corridor. Focus traffic counts between the Vermont Technical College and Randolph Village to monitor traffic speeds and truck traffic volumes for use in development review and setting access management standards.

### **VT Route 100**

VT Route 100 is Vermont's primary north-south highway with a 41.3 mile segment traversing the Two Rivers-Ottawaquechee region. VT Route 100 is a scenic, two lane rural road that connects Plymouth and Bridgewater, exits the region, and then continues through the 'Quintown region' as the primary access for Stockbridge, Pittsfield, Rochester, Hancock, and Granville. VT Route 100 is most notable for its scenic panoramas of rural farming and pasture lands and uninterrupted views of rivers, meadows, and mountains. VT Route 100 supports a number of transportation users as a major ski highway, travel route for tourism destinations north and south, local access, and as its own destination for traveling visitors.

There are relatively low traffic volumes throughout the corridor and rarely any observed traffic congestion. Road conditions are rated as 'fair' by transportation engineers (65 sufficiency rating). In 2006, the road had an estimated traffic volume of 2,300 vehicle trips per day which is below the total traffic carrying capacities. Tractor truck traffic volumes along VT Route 100 fluctuate from 5-11% of the overall traffic volumes. There is a great diversity of truck traffic volumes and activities. Trucks carrying lumber and a multitude of consumer products can be seen going north and south. Posted travel speeds varied from 25-35 mph within settlement areas to 40-50 mph along the peripheries of town. Speed limit data have not been collected along any section of VT Route 100.

No where else in the region is local land use and transportation policy so uniformly consistent and emphatic about preserving a state roadway. The prevailing theme is the connection that the health of VT Route 100 is closely aligned to the health of these communities. All Town Plans offer clear language that transportation improvements will be restricted to basic maintenance and resurfacing projects. There is an active opposing of any private or public transportation project or facility that erodes the road's scenic character. There is clear language for promoting safer bicycling and walking conditions throughout the corridor. And there is clear language that traffic capacities must not erode the 'Main Street' qualities necessary for village and hamlet life.

There are a number of tourism programs, books, and websites that nationally promote VT Route 100 as an 'exceptionally scenic' route through the Green Mountains. Automobile drives, motorcycle rides, and bicycling are all successfully promoted by different tourism companies, car and motorcycle groups, and other organizations. The impacts are that this roadway, frequented by visitors, has real economic value to the towns within the corridor and to the greater region and state.

The VT Route 100 corridor has scheduled transportation projects in the Vermont Agency of Transportation's multi-year capital program. They are:

	State Project #	Work Description
Stockbridge	STP 022-1(22)S	Replacement or lining of existing bridge 127 over Guernsey Brook.
Stockbridge	BRF 013-4(21)	Replacement of Bridge 130 over the White River.
Granville	BRF 013-4( )	Replacement of Bridge 155 over Meadow Brook.

The Plan recommends five strategies to preserve the highly celebrated scenic resources of VT Route 100 while maintaining traffic mobility, economic opportunity, and community life.

- (1) Project Implementation – Capacity enhancements are not acceptable and TRORC supports ongoing maintenance, resurfacing projects, and the completion of the major transportation projects listed under the Vermont Agency of Transportation’s Capital program.
- (2) Planning – Start a data collection program to better assess traffic operations along the VT Route 100 corridor. Focus traffic counts within major villages to monitor traffic speeds and truck traffic volumes. Measure bicycle and pedestrian traffic and identify suitable enhancement projects.
- (3) Planning – Using the Pittsfield 2005 Town Plan as a model, support revisions to other Plans that more consistently summarize/centralize VT Route 100 planning priorities and identify potential improvement or preservation projects.
- (4) Planning – Access management planning should be implemented to forestall or prevent the need for costly road improvements and to preserve the visual character of the road and adjacent land uses. Regional planning should take an assertive role in promoting access management in all development reviews and will work with towns to ensure adequate access management policies in their planning and development regulations.
- (5) Planning – Promote scenic preservation activities utilizing the Transportation Planning Initiative program. Actively encourage and facilitate local efforts to market VT Route 100 tourism opportunities.

### VT Route 107

VT Route 107 is a short 13.5 mile east-west state highway that falls entirely within the region. VT 107 is a two lane rural road that connects Royalton, Bethel, and Stockbridge with Routes 14, 12, 100, and Interstate 89. An east-west route secondary to US Route 4, the VT 107/100 corridor serves as access from Interstate 89 to the Rutland employment and commercial centers. A master plan for the Exit 3 interchange was completed in 2000 and its results are reported in the land use section of this Regional Plan. There are a number of transportation and land use factors that strongly support additional development. VT Route 107 has already seen considerable development in recent years and these favorable attributes promise an additional intensifying of land uses. Ensuring that development is not permitted until the infrastructure is in place is essential. A particularly unique asset in Royalton and Bethel, the road runs parallel to the New England Central rail line and with the interstate connections can readily support rail based development. The greatest regional challenge will be preserving traffic capacities while allowing development opportunities consistent with the land use policies of the Town and Regional Plans.

The average traffic volumes in 2006 were estimated at 4,300 vehicle trips per day. Road conditions are rated as ‘fair’ by transportation engineers (65 sufficiency rating) and this is one of the better constructed state highways in the region. Unlike most state highways, a significant portion of VT Route 107 has smooth traveling surfaces, adequate road shoulders, and sufficient sight distances.

Posted travel speeds along VT Route 107 are 50 mph throughout the corridor with the exception of a 25 mph posting in the Bethel Village and a 35 mph for Stockbridge Central School. In the few instances where travel speeds were recorded, motorists typically exceeded the posting by 5-10 mph. This is a particular concern within the villages and in areas where intersecting local roads have minimal sight distances. Tractor truck traffic represents 5-10% percent of the overall traffic volumes. VT Route 107 was not identified on the state’s primary truck network, although the high truck traffic volumes absent the local destinations suggest truckers continue to use the road as an alternative east-west facility. The challenge will be to better monitor trucking activity and to be more vigorous in enforcing trucking weights and safety laws. Finally transportation professionals utilize the VT Route 107 / 100 corridor to accommodate traffic rerouting plans for US Route 4 construction projects.

VT Route 107 has three transportation projects in the Vermont Agency of Transportation’s multi-year capital program which are:

	State Project #	Work Description
Bethel	BRF 022-1(14)	Replacement of Bridge 15 over the White River.
Royalton	CMG PARK(27)	Park and ride construction.
Stockbridge	BRF 022-1(20)S	Replacement of Bridge 9 over Stoney Brook.

The Plan recommends four strategies for accommodating development while maintaining the safety and efficiency of VT Route 107.

- (1) Project Implementation – Support the completion of the major transportation projects listed under the Vermont Agency of Transportation’s Capital program.
- (2) Planning – Continue to emphasize access management around the Exit 3 interchange from VT Route 14 to Bethel Village. Private development will accommodate projected traffic growth and not compromise traffic speeds, vehicle safety, or mobility.
- (3) Planning – Support the work of the Towns and the Vermont Agency of Transportation for improving local road access onto sections of VT Route 107 that have limited sight distances. Promote Town Plan language encouraging local road development to safely accommodate traffic increases at their intersections with VT Route 107.

Planning – Initiate a data collection program to assess traffic operations along the VT Route 107 corridor. Focus traffic counts between VT Route 14 and Bethel Village to monitor traffic speeds and truck traffic volumes for use in development review and setting access management standards. Pay particular attention to traffic counts within Bethel Village along Bridge 15 over the White River.

## V. AGRICULTURE AND FORESTRY

### A. Background

Agriculture and forestry define the character of Vermont and comprise major industries in the region. Unfortunately, these industries are by no means secure. The shape of Vermont agriculture and forestry is changing and the pressures for change come from both inside and outside the state. This poses difficult challenges, not just for landowners, but also for all who desire a rural lifestyle and working landscape. Unless policymakers at the federal, state and local levels, citizens, and the farming and forestry communities confront the economic problems facing the industry, the agriculture and forestry sectors will continue to erode away until the critical infrastructure can no longer be sustained; jobs will then be lost to other pursuits. More critically, the region will lose much of what it has been for over two hundred years, and purportedly still desires to be. Diversification of farming and forestry operations and the development of value-added products are two ideas that should be employed to combat the economic impacts of market fluctuations.

	<b>2004</b>	<b>1995</b>		<b>2004</b>	<b>1995</b>
Barnard	2	3	Pittsfield	0	0
Bethel	5	3	Plymouth	1	0
Bradford	6	7	Pomfret	1	3
Braintree	5	5	Randolph	26	32
Bridgewater	1	1	Rochester	1	3
Brookfield	6	14	Royalton	7	12
Chelsea	7	11	Sharon	0	2
Corinth	6	9	Stockbridge	0	1
Fairlee	4	7	Stratford	6	4
Granville	1	1	Thetford	5	no data
Hancock	0	0	Topsham	6	8
Hartford	3	no data	Tunbridge	10	15
Hartland	4	no data	Vershire	0	1
Newbury	10	15	West Fairlee	0	0
Norwich	1	no data	Woodstock	4	4
			Region	128	161+

Source: Vermont Agency of Agriculture, Dairy Inspection Reports.

### Farming Trends

The shape of Vermont's agriculture has changed. The amount of land devoted to farming has decreased steadily statewide. The number of dairy farms in Vermont during the twenty-five year period from 1970 to 1995 decreased by one-half, from 4,153 to 2,057. Yet, according to *Vermont's Agriculture: Generating Wealth from the Land* (Vermont Sustainable Agriculture Council, April 2005) dairy remains the dominant agricultural commodity in Vermont. In 2004, there were 128 active dairy farms in the region. The town of Randolph had the most active dairy farms in the region with twenty-six. The towns of Newbury and Tunbridge had the second highest numbers of active dairy farms with ten in each town. While overall farm populations

have declined, the size and production of the remaining dairy farms has increased. The number of farms and the number of acres farmed have both dropped but the number of cows has remained constant, reflecting the changing business-styles of those farms remaining.

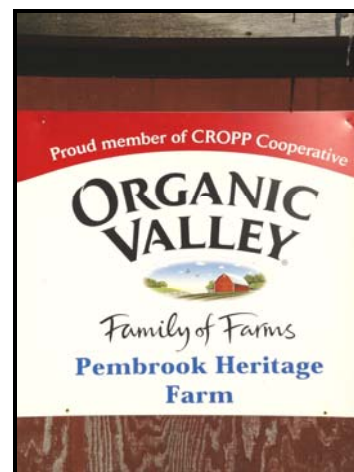


J. Colby © 2006

**Photo 8: Jersey cows at Pembroke Heritage Farm in Randolph Center**

Meanwhile, small and part-time farm pursuits directed at non-dairy products and specialty foods have increased; this trend is likely to continue as the Vermont specialty agricultural and food industry continues to grow. The 2005 report, *Vermont's Agriculture: Generating Wealth from the Land*, stated:

1. organic farming is one of the fastest growing segments in Vermont agriculture and the state is a national leader in the percentage of farms that are organic;
2. the equine industry has become an emerging growth sector throughout the state.



J. Colby © 2006

**Photo 9: A certified organic dairy**



A wide variety of other farm products including emu, veal, lamb, fruits and vegetables, honey, maple syrup, Christmas trees, and ornamental horticulture have taken up some of the losses of dairy and have kept some operations going. These and similar endeavors have begun to change the face of agriculture in the region. Currently in Vermont, the ratio of diversified farms to dairy farms is three-to-one. Grass-based livestock farms, also known as grass farmers, are also on the rise; as of January 2006, forty-one farms in the region were members of the Vermont Grass Farmers' Association. Similarly, there have been increases in the use of non-mechanized harvest practices (like grass farming) where animals harvest their own feed.



*K. Kanz © 2002*

**Photo 10: Agriculture - important to the region's landscape and economy**

### **Agricultural Land**

The region is fortunate to have some excellent soils in or available for agricultural uses. These soils occur most frequently in the low lying areas of the Connecticut and White River Valleys. The U.S. Natural Resources Conservation Service (NRCS), formerly known as the Soil Conservation Service, has mapped the region's agricultural soils and has ranked their potential for agriculture. In Vermont, these agricultural soils have been classified as primary or secondary agricultural soils. Primary agricultural soil types exhibit excellent or good potential for growing food or forage crops, are sufficiently well-drained to allow sowing and harvesting with mechanized equipment, are well supplied with plant nutrients or are highly responsive to the use of fertilizer. Average slope of the land ranges from slight to moderate.

The agricultural soil types have been mapped and listed as part of the county soil surveys and are available from the NRCS or the Regional Commission. Included in this Plan is map of agricultural soils present in the region. Soils that meet the federal definition of "prime agricultural soils" or the Vermont definition of "soils of statewide importance" are depicted.

Loss of farmland to non-agricultural uses is a matter of public concern. Land with high or good potential for agricultural uses is the easiest and cheapest land to develop, but it is a natural resource which cannot be replaced once developed.

Protection or conservation of the resource has many additional benefits. These include:

- (a) providing historical, cultural and educational links between people and the land;
- (b) providing local food products without significant transportation costs;

- (c) ensuring that the land use will have a positive fiscal impact on the community's tax base;
- (d) making positive use of floodplains;
- (e) providing streambank stabilization, reductions in erosion, water filtration through sod development, creation of buffer strips, and proper management of wet areas;
- (f) providing for groundwater recharge areas;
- (g) keeping local money in the local economy;
- (h) providing habitat for wild animals including deer, turkey, and woodcock; and
- (i) providing open space and scenic views and continuing a land use tradition characteristic of rural Vermont.

### **Land and Taxation**

Steady growth in the region's population, an economic restructuring and shift away from agriculture to the service and tourism industries have all placed economic pressures on farm owners. Largely due to residential pressures, owners of farmland most often are faced with a tax bill on land that exceeds its economic value for agriculture purposes. These high property tax bills coupled with the low prices paid in this country for commodity agricultural products like milk, population growth and in-migration, a demand for more housing and accompanying development land in general, and their own lack of retirement savings have all pushed landowners to place their land on the market.

Unless the cost of owning farmland or commercial forest land is reduced, meaning a reduction in property taxes, it becomes difficult to rationalize conventional farming and forestry pursuits. The general problem of taxation is exacerbated because towns and school districts are primarily dependent on property taxes to raise local revenues. Furthermore, any reduction in the amount of taxes received from active open land needs to be made up by non-farm, non-forest, or non-enrolled taxpayers, many of whom are unable to pay more.

### **Current Use Taxation**

For farmland conservation to be successful, the pressures posed by the market value approach to taxation must be resolved for both the landowner and municipality. One attempt to address this issue has been the Vermont Current Use Program (Program) which sets the valuations on farm and forest land based on their productivity values rather than their development values; the Program is administered by the Vermont Department of Taxes.

In 1980, the Current Use Program was established. The primary objectives of the Program have been to keep Vermont's agricultural and forest land in production, to help preserve these lands and to achieve greater equity in property taxation. While there have been legislative changes in the Program, the overall philosophy remains largely unchanged. Enrollments and the number of parcels have increased steadily and withdrawals from the Program limited, despite the inability of the State to fully fund the towns for the lost tax revenues.

Table 11(next page) shows the percentage of land in each town that was enrolled in the Current Use Program in 2003. Thirty-nine percent (39%) of the land in the region was in the Program. Towns with the largest percentages of their land in Current Use include Pomfret (58%); Braintree, Chelsea and Vershire (54%); West Fairlee (52%); and Stockbridge (50%). Towns

with the lowest percentages include Pittsfield (2%); Hancock (4%); Plymouth (13%); Hartford (15%); and Bradford (19%).

<b>Table 11: Percentage of Acres in Town that are in Current Use - 2003</b>							
	<b>% of Town in Current Use</b>	<b>Acres in Current Use</b>	<b>Total Acreage in Town</b>		<b>% of Town in Current Use</b>	<b>Acres in Current Use</b>	<b>Total Acreage in Town</b>
Barnard	41%	12,632	31,057	Pittsfield	2%	309	13,418
Bethel	43%	12,490	29,282	Plymouth	13%	4,034	31,118
Bradford	19%	3,635	19,144	Pomfret	58%	14,722	25,251
Braintree	54%	13,388	24,680	Randolph	39%	11,897	30,796
Bridgewater	39%	12,348	31,680	Rochester	33%	12,112	36,560
Brookfield	31%	8,268	26,447	Royalton	26%	6,844	26,102
Chelsea	54%	13,945	25,655	Sharon	38%	9,819	25,797
Corinth	27%	8,400	30,943	Stockbridge	50%	14,826	29,471
Fairlee	33%	4,452	13,467	Strafford	46%	12,979	28,328
Granville	35%	11,483	32,626	Thetford	42%	11,857	28,382
Hancock	4%	1,080	24,696	Topsham	31%	9,638	31,369
Hartford	15%	4,494	29,434	Tunbridge	44%	12,488	28,665
Hartland	34%	9,852	28,988	Vershire	54%	12,381	23,136
Newbury	26%	10,601	41,294	West Fairlee	52%	7,546	14,616
Norwich	40%	11,587	28,617	Woodstock	46%	13,148	28,374
				<b>Region</b>	<b>39%</b>	<b>154,600</b>	<b>401,384</b>

Source: Vermont Department of Taxes, Property Valuation & Review

Table 12 (next page) shows that over a ten year period the number of acres in the region enrolled in the Program grew from 191,337 in 1994 to 293,255 in 2003, but nearly 38,000 of those additional acres came from the addition of Hartford, Hartland, Norwich, and Thetford to the region. Since 1994 data on Current Use enrollment are no longer available for those towns, the regional growth rate in Program enrollment was calculated without them. Therefore – the number of acres enrolled in the Current Use Program increased by 34% in the region from 1994 - 2003.

Towns enrolling the largest number of acres over the ten year period included Pomfret (7,201 acres); Woodstock (5,478 acres); Barnard (4,441 acres); Strafford (4,102 acres); Bridgewater (3,998 acres); Bethel (3,234 acres); and Chelsea (3,138 acres). Conversely, the Town of Bradford had 509 acres withdrawn from the Program.

In Vermont, towns may set up their own tax stabilization contracts for farm and forest land. Although the purposes of the local tax stabilization program is similar to that of the Vermont's Current Use Program, communities are given flexibility to set conditions different from the State Program to meet local needs or conditions.

**Table 12: Current Use Acreage and Change 1994 - 2003**

	Change in Acreage		2003		1994	
	% Change	# of Acres	# of Parcels	Total Acres	# of Parcels	Total Acres
Barnard	54%	4,441	102	12,632	45	8,191
Bethel	35%	3,234	118	12,490	85	9,256
Bradford	-12%	-509	36	3,635	32	4,144
Braintree	23%	2,479	95	13,388	70	10,909
Bridgewater	48%	3,998	61	12,348	40	8,350
Brookfield	9%	697	96	8,268	81	7,571
Chelsea	29%	3,138	123	13,945	90	10,807
Corinth	42%	2,505	72	8,400	49	5,895
Fairlee	5%	209	35	4,452	31	4,243
Granville	4%	480	31	11,483	30	11,003
Hancock	21%	187	12	1,080	12	893
Hartford	NA	NA	52	4,494	NA	NA
Hartland	NA	NA	115	9,852	NA	NA
Newbury	40%	3,022	99	10,601	78	7,579
Norwich	NA	NA	125	11,587	NA	NA
Pittsfield	323%	236	6	309	1	73
Plymouth	94%	1,954	16	4,034	6	2,080
Pomfret	96%	7,201	122	14,722	48	7,521
Randolph	42%	3,538	129	11,897	87	8,359
Rochester	13%	1,428	79	12,112	58	10,684
Royalton	66%	2,722	60	6,844	28	4,122
Sharon	26%	2,008	68	9,819	48	7,811
Stockbridge	35%	3,833	57	14,826	33	10,993
Strafford	46%	4,102	122	12,979	76	8,877
Thetford	NA	NA	138	11,857	NA	NA
Topsham	26%	1,969	72	9,638	56	7,669
Tunbridge	41%	3,601	131	12,488	79	8,887
Vershire	9%	1,069	91	12,381	65	11,312
West Fairlee	17%	1,108	60	7,546	46	6,438
Woodstock	71%	5,478	137	13,148	65	7,670
Region	53%	101,918	2,460	293,255	1,339	191,337

“NA” – Data Not Available.

Source: Vermont Department of Taxes, Property Valuation & Review

### Forest Management and Taxes

The property tax is a counterproductive form of taxation for forest land, however, it remains a solid institution of local government. The tax was originally a good measure of a person's wealth, hence their ability to pay taxes. More land means more taxes to pay.

Financial returns from timber management and harvests bear a direct relationship to taxation, site characteristics, including biological and physical conditions, species, access, and the purchase price of land. The effects of property taxes on returns is compounded by the fact that the tax must be paid each year but income from timber harvests are often decades apart. The tax costs must be carried forward. This is decidedly different from most agricultural crops with annual crops producing a yearly cash flow to pay property taxes.

The Northern Forest Lands Council (1992) studied timber returns and tax impacts for Vermont forests. Using cost data, stumpage prices, and taxation scenarios, one study concluded that timber management is only profitable at low taxes per acre (\$2 per acre) and even at that level, only the better sites are profitable. Possible options to minimize the effects of high costs of timber ownership include sale of forest land for recreational use, leasing of forest land for hunting, early harvests of timber and special forest tax relief programs.

### Forestry Trends

Three primary trends have affected the region's forestland and its productivity. First, forests and farms are being increasingly "fragmented" or subdivided into small lots which threaten the economic viability of forestry. Fragmented forested areas also limit wildlife habitat which impacts the health of the forest. In 1989, Orange County ranked second in the state in the amount of land being subdivided and sold. Development pressure in the region continues to be strong, fueled by a healthy regional economy and low unemployment. If the national economy were to improve, the loss of forest land to development would increase, particularly in those areas with easy access and few natural constraints.

Funding of the Current Use Program has been identified by the Northern Forest Lands Council as vital to landowners keeping their patience, not over harvesting the forests, or opting for liquidation cutting of tracts. High taxes contribute to a low rate of return on timber sales and have prompted some conversion to non-forest uses. A second pressure is that markets for timber and wood are vulnerable to short-term fluctuations in pricing due to availability and demand. While the number of mills in the region have declined, there has been a move to new markets, one being an export demand for hardwood logs and the other a demand for pulpwood and other specialty types.



*Source: Royalton Historical Society*

**Photo 11: Raw lumber being moved by rail, 1915**

For a state mostly known for hardwood, the demand for pulp has led to better managed forests because it is generally the lower grades or poorer cuts that are being used. Third, federal and state estate and inheritance tax laws have placed family landowners into financial predicaments where they need to subdivide or develop forest land in order to cover taxes. Current tax law bases real estate values on the market value of land rather than on use value. By allowing land to be assessed on the basis of current use, family landowners are able to realize a more reasonable return on investment for long-term timber management.

Forest products continue to be a significant share of the region's manufacturing sector, although the way statistics are kept makes it hard to quantify. Overall, according to the Vermont Department of Employment and Training, jobs in the lumber and wood products industries have increased statewide. In looking at the Vermont forest products industry, it is worth noting that the industry, like agriculture, has virtually no impact in setting trends as it is a relatively small national producer.

A major long-term issue for the Vermont forest products industry is to sell the wood as a raw material, and benefit from the higher paying jobs that come from value-added wood products. The Vermont Council on Rural Development is currently funding a thorough examination of this economic sector.

### **Sustaining Agriculture and Forestry**

State, regional and local planning policy and implementation efforts should be directed at sustaining agriculture and forestry pursuits and not just conservation of the resource. This is not only because it is the best way to keep the land open, but also because agriculture and forestry are critical economic sectors in both the region and the state. Sustaining agriculture and forestry will require public and private-sector cooperation in building partnerships between industry leaders and those interested in maintaining a rural Vermont. These solutions have proven successful in Vermont and elsewhere.

Just as there are a variety of interests, there are a variety of tools than can be used to conserve these resources. Some are directed primarily at sustaining agriculture, others forestry; some are regulatory in nature, others are compensatory, and others voluntary. It is in the public interest to encourage conservation groups, landowners, local officials, educators and policymakers to utilize all of these tools.

Outlined below are principles of sustaining agriculture and forestry in the region. These principles should be followed in developing any program or position for conservation of these industries.

### **Principles of Sustaining Agriculture and Forestry**

- a) owners of farm land and forest land should receive a fair and real return on what they produce;
- b) owners of farmland and forestland should receive a fair return for what they provide to the town, region and state;
- c) owners of farmland and forestland should be given an incentive and the freedom to care for the land;
- d) whether big farms or large tracts of forest lands will be most successful is unclear. Given this, options for conserving these resources should be varied and flexible to ensure viability; and
- e) conservation of agriculture and forestry will involve a broad coalition of interests. To be successful, the industry efforts will probably need to be strengthened by efforts of tourism, rural interests, historic preservation, recreation, etc.

### **Carbon Sequestration**

Agriculture and silviculture play important roles in balancing human-produced carbon emissions. Through photosynthesis, green plants extract carbon dioxide from the air, separate the carbon atom from the oxygen atoms, return oxygen to the atmosphere and use the carbon to

make biomass in the form of roots, stems, and foliage. The amount of carbon a plant can sequester depends on a number of variables, including species and age, but it can be quite large.

According to the U.S. Department of Energy, every year in the United States and throughout the world a very large amount of carbon dioxide (on the order of 100 billion metric tons) is sequestered in biomass. An example - one large sugar maple tree is capable of removing more than 450 pounds of carbon dioxide from the atmosphere in a year. At that rate, preserving twenty-nine trees for each operating automobile in the United States would offset all U.S. automobile-related carbon dioxide emissions.

Internationally, carbon credits are being bought and sold between industries, farmers, and foresters with the exchange of credits being conducted by land trusts and brokers. Farmers and foresters are given a carbon sequestration value for their resource which is then sold to buyers in the industrial sector to be used as credits to offset the carbon dioxide generated by their processes. This biomass present in the region and state has value on the carbon market.

Vermont is one of seven states participating in the Regional Greenhouse Gas Initiative (RGGI), and it is the first and only state to have adopted regulations to implement the RGGI program. Signed into law on April 20, 2006, electrical consumers will benefit when carbon credits allocated to Vermont are sold to power plants that exceed the cap placed on greenhouse gas emissions. The allocation is managed by the Vermont Public Service Board, trading will begin in 2009.

## **B. Goals**

- (1) Encourage the conservation, wise use and management of the region's agricultural and forestry resources, to maintain its environmental integrity, and to protect its unique and fragile natural features.
- (2) Protect the region's rural agricultural character, scenic landscape, and recreational resources.
- (3) Create and maintain an environment (physical, social, regulatory, and fiscal) that encourages entrepreneurship in agricultural and forestry activities, including those which add value to the region's agricultural and forestry products.
- (4) Sustain agriculture and forestry in those areas of the region where they are predominant land uses, and where soils, and other conditions enable them to remain economically viable.
- (5) Support programs which educate citizens on principles of sustainability.
- (6) Reduce fragmentation of forest and agricultural lands.

## **C. Policies**

- (1) Where important natural features, soil conditions, or special resources including, but not limited to, agricultural and forested land are identified, clustered or peripheral development is required to protect such resources and prevent fragmentation and sprawling settlement patterns.
- (2) Agricultural and forestry practices shall maintain or enhance the diversity of ecosystems existing in the region.
- (3) Appropriately sited and designed businesses promoting the local processing, sale and distribution of native raw materials and products is encouraged. Planning and regulatory review at the state and local level should not unduly restrict the development of “home cottage” industries which complement farm and forestry.
- (4) Agricultural land and forested land form the separations between town centers, villages, and hamlets in the traditional regional settlement pattern. Tangible efforts shall be made to preserve this patchworked balance of open and forested space, to promote compact settlements through creative regional planning, municipal planning, private initiatives, purchases, leases and transfers of development rights and efficient site designs. Contiguous forest and significant agricultural areas shall remain largely in non-intensive uses unless no reasonable alternative exists to provide essential residential, commercial and industrial activities for the region's inhabitants.
- (5) The Regional Commission recognizes the serious limitations of the local fair market value tax system for farm and forest land and supports implementation of a more effective taxation method that is based on current use rather than potential use. The Regional Commission 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 Program’s use as a low-cost vehicle for speculative holding of property for future development.
- (6) The construction of utilities, roads or other physical modifications should skirt tracts of productive agricultural and forest land rather than divide them. Infrastructure improvements should be planned with attention to directing future residential, commercial and/or industrial growth.
- (7) The use of public or private funds for purchase of development rights, or fee purchase of agricultural and forest land for conservation purposes from willing landowners, is supported and should be promoted. Town officials and landowners are encouraged to work with private non-profit conservation organizations to identify options. Factors to be utilized in determining the relative conservation value of land should include:
  - evaluation of an active farm operation, a sound financial plan for returning as a viable farm unit, or an active forest management plan with history of planned harvesting;
  - the project must conform to duly adopted regional and/or municipal plans;



- the resource value of the site incorporating such factors as parcel size, soil productivity values, and accessibility;
  - threat of loss or conversion to non-farm or forestry use;
  - adequacy of existing infrastructure and public investments to serve the use;
  - location of the use relative to similar uses; and
  - adequacy of past resources management practices.
- (8) Septage, sewage sludge and any other product of municipal waste processing shall not be applied or injected upon agricultural and forest lands without consistent chemical component testing of both disposal material and receiving medium for potentially harmful substance concentrations. Applications or injections of such products should only occur according to the protocols established and agreed upon by the State of Vermont and the affected municipality for public health and environmental protection.
- (9) Farmers, loggers, and foresters must use Accepted Management Practices (AMP) and are encouraged to implement Best Management Practices (BMP) in their operations and to minimize point and non-point source pollution.
- (10) Use of streambank and shoreline buffer strips are necessary for forestry and farming activities. To reduce erosion, buffer strips can consist of certain types of cover crops as well as woody vegetation. The Natural Resource Conservation Service, Conservation Districts, Resource Conservation and Development Council and others should continue efforts to educate landowners as to the benefits of maintaining and improving streambank vegetation and to implement river-long coordinated stabilization programs. Efforts to revegetate streambanks eroded from natural or human activities are supported. Erosion control methods which use vegetation and other natural materials and which protect wildlife habitat are favored over other methods. Rip-rapping of shorelands can be used in appropriate circumstances to protect farmlands from erosion.
- (11) The Regional Commission recognizes that certain local land development or subdivisions may conflict with policies to minimize the loss of existing or potential agricultural or forest resources. Furthermore, the Regional Commission acknowledges that in certain areas agricultural or forestry uses may no longer be viable due to a variety of factors including;
- (a) the existence of or planning for roads or sewers in the immediate area which dictate that involved land should be converted to more intensive uses; and
  - (b) the presence of parcel sizes or site conditions which affirm that conservation efforts to minimize loss of the resource result in marginal public benefit.
- (12) It is the policy of the Regional Commission to minimize or mitigate the loss of these resources to development. As an alternative to conventional methods, the Regional Commission endorses use of off-site mitigation techniques to offset the loss of these resources. However, endorsement of off-site mitigation should be conditioned on finding that the project proposal is:

- (a) consistent with this Plan and the plans of affected municipalities; and
- (b) provides an equal or greater public benefit than conservation of the development site itself.

#### **D. Recommendations for Action**

- (1) The Regional Commission, as part of its on-going Technical Assistance Program, will provide planning advice and support to town Planning Commissions, Conservation Commissions, non-profit conservation organizations, and other groups interested in sustaining agriculture and forestry.
- (2) The Regional Commission will evaluate proposed developments involving primary agricultural and forest lands, and their related industries. Where appropriate, it will provide information to federal and state agencies, town boards and commissions, and other parties regarding the probable impacts these resources have on the welfare of the region.
- (3) Local land use planning activities and programs affecting agriculture and forestry should consider the following as ways to promote these industries:
  - (a) development of local plan components, including an inventory, and assessment of farm and forest lands. Although far from satisfactory, past use of the Land Evaluating and Site Assessment (LESA) method for identification of priority lands has been referenced;
  - (b) as part of local bylaws, creation of farm and forest land conservation programs, including:
    - agricultural zoning;
    - area based allocation;
    - cluster development;
    - impact fees;
    - overlay districts;
    - performance standards;
    - purchase of development rights;
    - transfer of development rights.
  - (c) utilization of the Vermont Housing and Conservation Board program (VHCB) to acquire interests or easements on significant farm and forest lands. Such easements are perpetual voluntary agreements between landowners, the State, the Town, or a conservation trust, such as the Vermont Land Trust or Upper Valley Land Trust;

- (d) setting up a town fund for conservation purposes to leverage other public funds or donations for conservation purposes. Note that farm and forest conservation may be a wise move for the long-term fiscal health of the community;
  - (e) stabilization of property taxes for farmers and timberland owners enrolled in the Current Use Program by agreeing to pay the difference that the State does not fully fund under the Program;
  - (f) purchase of lands outright by governmental agencies or conservation organizations; and
  - (g) support for local and regional marketing and value added industries to improve the economies of farm and forest operations;
  - (h) support of educational and community programs.
- (4) To promote a better understanding of the farming and forestry practices, and natural resource management in general; the industry, conservation organizations, public schools and the tourism and recreation industries should sponsor continuing educational opportunities to the public.
- (5) As a way of sustaining resources, a way of life and a landscape, the Regional Commission should monitor developments in the market for carbon credits and look for applications to benefit the region.

## VI. NATURAL RESOURCES

### Introduction

Town plans throughout the region express a universal desire to maintain the rural character of their communities while allowing appropriate, compatible development. An essential part of the rural character is the quality and quantity of natural resources of the region and the character of place they create. This character is appreciated by residents, and is a primary attraction to tourists, retirees and second home owners. The place, and the natural resources that are its foundation are therefore important economically as well as ecologically.

Most of the region is hilly with the highest portions along the western edge of the region in the spine of the Green Mountains and in central Orange County. The lower hills are predominantly covered in deciduous forest that is largely maple, while higher and northern slopes have conifers such as white pine and hemlock. Given the region's geologic formation and glaciation, it is not surprising that most of the valleys run north-south. Virtually the entire region drains south and east down these valleys to the Connecticut River. Seven rivers – the Connecticut, Ompompanoosuc, Ottauquechee, Tweed, Waits, Wells, and White – form the aquatic arteries of the region. Along the rivers, especially the Connecticut and branches of the White, valley floors are large and fertile enough to have supported centuries of agriculture.

The diversity of plant and animal life within the region are indicators of the health of the overall ecosystem to which all natural resources and human welfare are connected. Wild plants in the region provide us with a myriad of benefits. Trees alone supply us with fuel, lumber, air and water filtration, scenic beauty, and that sweet sign of spring, maple syrup. Healthy animal populations provide us with opportunities as varied as hunting, bird watching, and pest control. Clean surface waters support diverse aquatic plant and animal life and provide areas for swimming and fishing. Wetlands and large forested areas provide habitats for a variety of species native to Vermont and form a natural means of recharging groundwater for the health of the human inhabitants of the region. The air, which we take for granted, gives us one of the basic needs of life.

Due to the rural nature of the region and Vermont, the region's natural resources are in better shape than in much of the country, but vastly different than under pre-settlement conditions. The topography has changed little, but rivers have been dammed and moved aside in valleys, enormous swatches of wetlands filled, virtually all of the timber cut over at least once, and immense amounts of soil 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 almost lost. Still, we are left with fertile valleys, a returning forest, and many species of wildlife in healthy populations. If we can retain enough 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 the region.

This chapter consists of background discussion, goals, policies, and recommendations for the use and management of natural resources, including:

- groundwater resources;

- surface water resources;
- fisheries and aquatic resources;
- wetlands;
- wildlife resources;
- air quality; and
- mineral resources.

## **A. Groundwater**

### **Background**

Virtually all of the region relies upon groundwater for domestic and commercial water supply. Protecting the primary water supply of the region requires protection of the groundwater from contamination. Given the limited budgets of our communities, it is fiscally prudent to thoroughly review and prevent potential threats to ground water before they occur. Protection of groundwater requires protection of surface waters, wetlands, watersheds and recharge areas in a coordinated, ecologically sound fashion.

The groundwater that supplies public and private wells is pumped or pushed to the surface from an underground aquifer. An aquifer is an underground area of saturated sand, gravel, or fractured bedrock that is permeable enough to yield water through wells or springs. The surface area that drains into an aquifer is called a recharge area. Water tables are typically less than 10 feet below land surface, soils are thin except along valley floors, and fractured crystalline bedrock provides little in terms of filtration. Given the present level of ground water mapping in Vermont, there is little data to distinguish between the vulnerable and less than vulnerable resource.

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 storage tanks, continuing use of improper industrial floor drains, accidental fuel or chemical spills, poor agricultural practices, road salt, and failed septic systems.

Many hazardous sites have been identified, and some cleanup actions or enforcement is taking place. On sites that need public assistance to bring them back into use, these can be assessed and addressed with assistance from the state and the regional brownfields program so long as landowners provide permission. New underground storage tanks are much less prone to leaking, and sites must be tested when old tanks are removed to see if there has been contamination. The state does have a Petroleum Cleanup Fund that helps pay for any cleanup at these sites. Though still too common, existing floor drains at industrial sites and garages are being either sealed or connected to treatment or capture systems that keep contaminants out of the groundwater. Fuel spills from rail or trucks are much more likely than a spill of any toxic substance, and are generally small. Well trained and equipped road crews and fire departments are the best initial defense against a major spill becoming a groundwater nightmare.

On the more mundane side, infiltration into groundwater of pesticides or herbicides can occur, as well as nitrogen from manure. Proper use and storage of farm chemicals and manure can greatly reduce any negative effects on groundwater and limit impacts to surface water. The hundreds of

tons of salt brought into the region each year for use on winter roads is a recognized ongoing groundwater threat, though. The actual use on roads is a surface water issue. It is the salt leaching from uncovered storage piles that is a groundwater concern that Vermont and the Environmental Protection Agency are in the process of addressing. Lastly, there are failed septic systems. Many residential systems in Vermont were installed prior to regulation and have long since ceased to keep septage out of the groundwater. Some 'straight-pipe' systems where waste is directly discharged to a wetland or stream are still probably unwittingly in use. Prior to the 1990s, systems may have been properly designed but not correctly installed as the auditing of installation was very weak. Until 2002 many systems on lots over 10 acres were still exempt from regulation. With the passage of the Wastewater System and Potable Water Supply Rules in 2002 that closed the 10-acre loophole, and much more careful scrutiny of permits and installation, septic systems are becoming less and less of a source of groundwater pollution.

### Goal

- (1) Maintain or enhance the quality and quantity of ground water resources.

### Policies

- (1) Towns are encouraged to identify, monitor, and protect important local groundwater resources as part of their planning programs. Aquifers, public water supplies, and recharge areas should be mapped wherever possible in order to determine critical areas for protection of drinking water supplies.
- (2) Water withdrawal from underground sources should be carefully monitored to insure that aquifers and surface waters are not significantly depleted and that water is properly allocated. Promulgation of specific laws and regulations to control water withdrawal and to ensure minimum flows are strongly encouraged.
- (3) Land use activities which potentially threaten ground water quality and should be carefully reviewed include the following:
  - (a) Underground storage tanks for petroleum or other hazardous substances. Permits are required from the State for most underground storage tanks containing gasoline or heating oil; however, exceptions are made for fuel oil storage tanks used for on-premises heating purposes and residential tanks storing motor fuel;
  - (b) Pesticide and herbicide applications on agricultural land, golf courses, resorts, residential properties, and railroad and utility rights-of-way. Such activities may require permits from the State; and
  - (c) Junk yards and solid waste disposal sites.
- (4) Groundwater contamination from commercial/industrial uses should be remedied by the parties causing such contamination when feasible, and by assistance from regional, state, and federal sources when responsible and viable parties cannot be found.

- (5) It is the policy of the Regional Commission to permanently protect Class I groundwater. These are high quality resource areas mapped by the Agency of Natural Resources and so classified by the Secretary as currently being used or suitable for a public water supply source. In undertaking the above, regional land use policy and decision-making should limit human activities in these areas.

### **Recommendations for Action**

- (1) The Regional Commission should work with the Agency of Natural Resources and with towns to identify and map aquifers and aquifer protection areas.
- (2) Towns are encouraged to 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.
- (4) The Regional Commission should work with the Agency of Natural Resources, town officials, and others on educational outreach about the proper use of floor drains, local spill response capacity, and proper administration of septic regulations.
- (5) The Regional Commission will coordinate with the Agency of Natural Resources, other state agencies, and local officials in the assessment, cleanup and redevelopment of contaminated (brownfield) sites.

## **B. Surface Water**

### **Background**

The surface waters of the region are important resources for economic vitality and physical health. The waters of Vermont are widely regarded as higher quality than most. High surface water quality attracts users and provides a source of direct and indirect livelihood for many of the region's residents through various businesses related to sports and tourism.

The high quality and largely natural character of the surface waters are among the primary components of the quality of life deemed valuable to the region. Surface waters are integrated with ground water, land cover types and land uses and should be considered in any decisions affecting those elements.

### **Water Quality Standards, Classifications, and Typing**

The Vermont Water Quality Standards (WQS) are rules that concern surface waters throughout Vermont that have been established to achieve the goals of the Vermont Water Quality Policy as well as the objectives of the federal Clean Water Act which relate to the restoration and maintenance of the chemical, physical and biological integrity of the Nation's waters. The WQS, which are periodically updated, contain certain numeric and narrative criteria and describe the

classification and water management typing of all waters. Water quality types and classifications (A1, A2, B1, B2 and B3), as administered by the State Department of Environmental Conservation, establish water quality goals for each body of water in the state. These goals are expressed as “beneficial values and uses” or “designated uses” which are to be protected. It is important to note that the classification assigned to any specific body of water does not necessarily represent a description of the existing conditions or quality of waters, but may be a goal for improvement. A goal for lower quality than what presently exists is essentially illegal, except for minor impacts in very limited circumstances and only after a rigorous public benefit analysis.



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**Photo 12: Surface Waters - Streams**

The state’s waters (not including wetlands) are currently classified as Class A or Class B, with an overlay Waste Management Zone in Class B waters for public protection downstream of sanitary wastewater discharge points (10 VSA Chapter 47). Class A waters are managed for enjoyment of water in its natural condition, as public drinking water supplies (with disinfection and filtration) or as high quality waters which have significant ecological values. Class B waters are managed for aesthetic values, recreation on and in the water, public water supply with disinfection and filtration, high quality habitat for aquatic biota, fish and wildlife, irrigation and other agricultural uses. The Secretary of the Agency of Natural Resources may designate by permit portions of Class B waters as “Mixing Zones”, or “Waste Management Zones”, for any waste that has been properly treated to comply with federal and state effluent requirements. Within a mixing zone, or waste management zone water conditions must not create a public health hazard, must not constitute a barrier to the passage or migration of fish or result in undue adverse effect on fish, aquatic biota, or wildlife, and must not interfere with any existing use of the waters.

Most waters in the region are classified as Class B, with the exception of all surface waters above 2,500 feet elevation and a few reservoirs and sections of tributaries that have been classified as Class A and are designated as secondary sources of drinking water for the towns in which they are located. All Class B waters will be proposed for designation as B1, B2 or B3 during the basin planning process and this will be acted upon by the Secretary of ANR and the Water Resources Panel of the Natural Resources Board (formerly Water Resources Board). All waters of the State are required to be fishable and swimmable under state and federal law, and the



distinctions between A1 to B3 have to do both with the use of the water and its quality. B3 waters are the lowest legal classification, are generally below wastewater treatment plants or near dams. Nearly all of the region's surface water will be placed into either B1 or B2 in the future depending on the degree of protection desired and the actual quality.

An additional designation of Outstanding Resource Water can be decided by the Natural Resources Board. There are currently a few "outstanding" water resources in the region, including Thetford Center Falls.

In classifying the surface waters of the state, the Panel considers any adopted basin plan, existing uses, background conditions, and the degree of water quality to be obtained and maintained. The Panel, on its own motion or in response to a petition, will review an established classification to determine if it is contrary to the public interest and, if so, what classification is in the public interest.

### **Sources of Water Degradation**

Non-point pollution sources are the greatest cause of water quality impairment in rivers and streams, now that the state has completed the building of public wastewater treatment plants and largely eliminated individual straight pipes. The four most common water quality impairments caused by non-point sources are siltation, thermal modifications, pathogens, and nutrients. Other common causes of impairment to rivers and streams are habitat alterations and flow alterations. The principal sources of these impairments are agricultural runoff, streambank destabilization and erosion, removal of riparian (streamside) vegetation, flow regulations or modifications (largely due to dams and withdrawals), stormwater discharges from developed areas and highway maintenance/runoff. Specific sections of watersheds may be more affected by one of these factors than another. Known and suspected problems are often detailed in the VT DEC's basin assessments, but considerably more work is needed to identify problems in sufficient detail to undertake planning to address them.

In lakes and ponds, many recreational and development activities are also those activities that can threaten water quality. Shoreline development can cause erosion and sedimentation, failing septic systems and poor agricultural practices contribute pathogens and phosphorous, motorboats and trailers transport invasive species such as Eurasian water milfoil and zebra mussels, and intentional water level fluctuations from drawdowns harm bordering wetlands. Also, any entering rivers and streams can bring with it the above mentioned pollution.



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**Photo 13: Highway runoff, parking lot gravel, siltation and stormwater**

### **Shoreline Buffer Strips and Riparian Areas**

The maintenance and enhancement of streamside and lakeside vegetation is the easiest and most effective means of protecting the many benefits and values associated with surface waters. Setting aside strips of naturally growing grasses, shrubs, and trees is essential to the health of streams and lakes. Appropriately, vegetated shorelines contribute to maintenance of water quality and shoreline protection in the following ways:

- a) Provide bank support and stabilization;
- b) Help prevent bank undercutting and bank collapse;
- c) Provide food and shelter for fish and wildlife;
- d) Intercept, absorb, and filter out pollutants such as silt, fertilizers, toxic chemicals, and livestock wastes;
- e) Keep water temperatures cool during hot summer months when fish are susceptible to heat stress;
- f) Slow surface water runoff;
- g) Increase wildlife diversity;
- h) Reduce flood and ice damage to stream channel, and adjacent lands and structures;  
and
- i) Preserve natural character of waters.

### **Watershed Management and Basin Planning**

A watershed is all of the land that drains into a certain point. A “river basin” generally has the same meaning, except in Vermont the Water Quality Division of the Vermont Department of Environmental Conservation has actually divided the State into seventeen basin areas, determined by the watersheds of major rivers and lakes, some of which combine the watersheds

of two or more rivers that drain to different points. The State has been required by federal law to adopt basin plans for decades, and State law required that each of these plans be in place, first by 2000, then 2006, and this will likely be extended again. A basin plan was adopted for the White River in 2002 and is in preparation for Basin 14 (Wells, Waits, Stevens, Ompompanoosuc). Plans will be prepared for all of the other basins soon. These plans will expire every five years.



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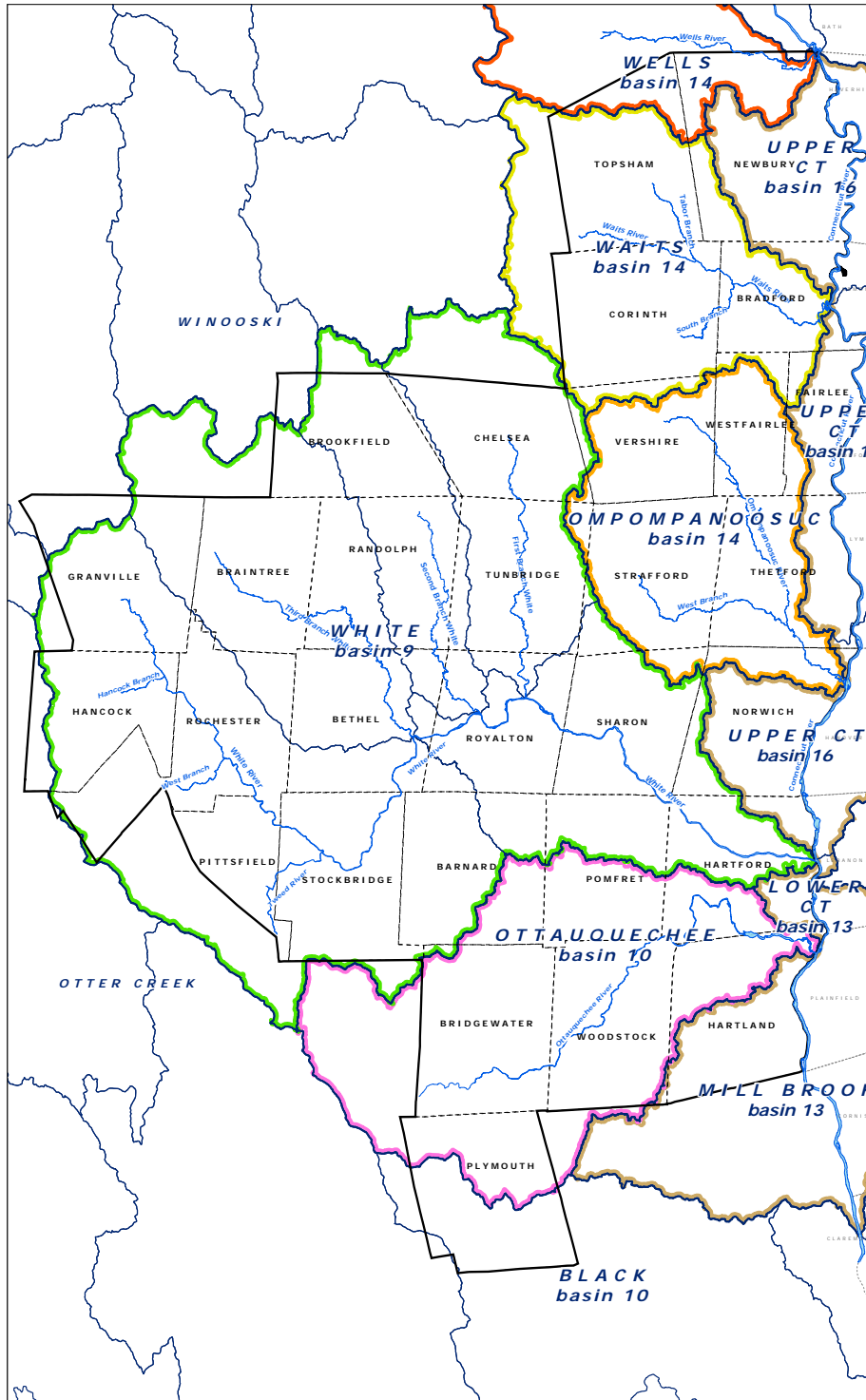
**Photo 14: Streambank vegetation during high water**

The items that basin plans must cover are laid out by the Vermont Water Quality Standards and the federal Clean Water Act. Basin plans inventory the existing and potential causes and sources of pollution that may impair their surface waters and then establish a strategy to improve or restore waters. The plans form the basis for state implementation actions and should serve to coordinate other efforts as well. In the development of plans, ANR shall seek public participation to identify and inventory problems, solutions, high quality waters, existing uses and significant resources of high public interest and shall consider approved municipal and regional plans. When necessary, the plans will identify strategies, where necessary, by which to allocate levels of pollution between various sources as well as between individual discharges, and should, to extent possible, contain specific recommendations by the Secretary of ANR regarding:

- existing uses;
- salmonid spawning or nursery areas important to the establishment or maintenance of such fisheries;
- reference conditions appropriate for specific waters;
- any recommended changes in classification and designation of waters;
- schedules and funding for remediation;
- stormwater management;
- riparian zone management;
- other measures or strategies pertaining to the enhancement and maintenance of the quality of waters within the basin.

**Figure 6: Watersheds and Basins**

Source: Vermont Agency of Natural Resources



In basins that include class B waters which have not been allocated into one or more Water Management Types (B1, B2 and B3), the basin plan shall propose these based on both the existing water quality and reasonably attainable and desired water quality management goals.

Basins in the region include the Ottauquechee (#10); the White River (#9), the Upper Connecticut (includes many smaller streams that drain to the Connecticut River from Norwich to the Canadian border, #16); Mill Brook (part of the Lower Connecticut, #13) and the Wells, Waits and Ompompanoosuc Rivers (#14). Very small portions of the Black, Otter Creek, and Winooski rivers are also in the region.

The Water Quality Division produces the State of Vermont

Water Quality Assessment (305(b) report) every two years and the State Clean Water Strategy every five years, in which priority waters are targeted for remediation or protection. In the region, several surface waters have been listed as impaired or threatened.

### Goals

- (1) Improve surface water quality and quantity for the purposes of recreation, aquatic habitat, and drinking water (where designated).
- (2) Promote a coordinated monitoring program for surface water quality and quantity that is supported at municipal, basin and regional levels as a network of natural resources.
- (3) Support and promote the use of multi-stage wastewater treatment and disposal systems; encouraging off-stream disposal of treated effluent, where possible.
- (4) Protect from risk and preserve in their natural state certain high quality waters including fragile high-altitude waters, and the ecosystems they sustain.
- (5) Encourage watershed based cooperation of towns and people that live, work, and play in the watershed in the protection and enhancement of surface water quality.

### 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 should protect these resources and serve to protect their existing and desired uses and conditions.
- (2) Within each of the basins in the region (see map 9), 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 basin as a whole;
  - 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) Efforts of public and private sectors to abate pollution in the region's rivers, streams, lakes and ponds are required. Existing water pollution problems, as identified in State of Vermont - Agency of Natural Resources Basin Plans, Water Quality Assessment (305(b) report), and the Clean Water Strategy shall be considered high priority for abatement. These problems include:
- (a) agricultural runoff;
  - (b) erosion, sedimentation, and water crossings from construction sites and other land disturbance, road and ditch runoff, streambank destabilization, impoundments, and logging;
  - (c) infestation of nuisance weeds such as Eurasian water milfoil and animals such as zebra mussels;
  - (d) failing or inadequate community and individual onsite wastewater disposal systems;
  - (e) drainage of metals from abandoned copper mines; and
  - (f) elevated temperatures, low dissolved oxygen, and physical habitat degradation from poor flow regimes.
- (4) Effluent 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 the 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 estimates; and
  - (c) to accommodate new growth and development which is part of a detailed and publicly reviewed and accepted growth management plan or designated growth center.
- (5) Pristine waters (Class A) are waters which are a) generally pure in nature with significant ecological value or b) are of high quality and used for public water supply. Pristine waters shall be protected from development and other activities which diminish their purity, natural flow or condition.
- (6) Vegetated buffer strips should be maintained in riparian zones and shoreland areas surrounding streams, 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 or property.

- (7) Commercial water withdrawal must be carefully monitored by the State and localities to insure that aquifers and surface waters are not significantly depleted.
- (8) The location, sizing and density of onsite sewage disposal facilities should be determined by the capacity of the soil and by the natural limitations of the site and underlying substrata conditions, such as depth to bedrock and seasonal high water tables.
- (9) Indirect discharges, such as off-stream disposal of treated effluents in spray fields, sand fields, or other alternative systems are encouraged over direct discharges where soil and site conditions permit.
- (10) Upland watersheds should be maintained predominantly in forest and low impact recreation use to ensure high quality of valley streams and their tributaries.
- (11) Preservation of the natural state of streams should be encouraged by the:
  - (a) protection of adjacent wetlands and natural areas;
  - (b) protection of natural scenic qualities; and
  - (c) maintenance of existing stream bank vegetation, together with wildlife habitat.
  - (d) proper classification and typing that reflects the condition of high quality waters in areas with little development
- (12) Given the statewide recreational resource value of the free flowing White River, new hydropower development on that river should not be permitted, and is discouraged elsewhere except where it can be done in a “run of the river” manner that does not create any significant impounding or dewatering of bypass reaches.
- (13) Activities that are potential sources of non-point pollution, including but not limited to agriculture and silviculture, should be conducted as follows:
  - (a) Logging practices shall follow at least the Acceptable Management Practices (AMPs) developed by the Vermont Agency of Natural Resources or other practices recognized by public agencies or professional associations. Prior to commencement of a logging operation, landowners and loggers should consult the Water Quality Handbook for logging jobs published by the Vermont Department of Forests, Parks, and Recreation or contract the County Forester for advice on erosion control.

- (b) Agricultural activities shall follow Acceptable Agricultural Practices (AAPs) for Agriculture. When feasible, farms are encouraged to follow Best Management Practices (BMPs), site-specific practices for farm management developed by the Natural Resource Conservation Service (formerly the Soil Conservation Service). They include guidelines for storage and spreading of manure, fertilizers, and pesticides; buffer strips, diversion of surface water runoff, and milkhouse waste management, among others.
- (14) All wastewater and stormwater run-off discharges into surface waters shall comply with water quality standards as administered by the Vermont Agency of Natural Resources. (24 VSA Chapter 47 and related Rules)
- (15) Graveled backroads by nature of their topography and design, if not properly maintained can contribute heavily to water pollution. Surface water run-off and sedimentation to streams and ponds from backroads has been identified as a major threat to water quality in the region. Municipalities should employ road maintenance techniques to prevent soil erosion and road surface deterioration. Towns are encouraged to utilize the procedures contained in the *Vermont Better Backroads Manual* (1995).
- (16) Land use planning and decisions should protect streamside and lakeshore soils and vegetation from physical damage by restricting access to livestock and excluding dumping, filling, and operation of construction machinery in these areas.

#### Recommendations for Action

- (1) Municipalities should review existing and proposed water quality classifications of surface waters within town boundaries, or within basins, to determine if classifications meet the uses and needs. Both the Regional Commission and the Agency of Natural Resources are available to provide support.
- (2) Municipalities are encouraged to play an active role in the basin planning process and to prepare water resources elements in municipal plans that are in compliance with state and federal laws.
  - (a) The Vermont Department of Environmental Conservation's listing of threatened and impaired waters should be targeted for immediate attention.
- (3) Towns in the region are encouraged to cooperate on a watershed-wide basis when planning for surface water quality and use.
- (4) The Regional Commission, in cooperation with the Agency of Natural Resources - Water Quality Division, Vermont Local Roads Program, and Agency of



Transportation, should advise town officials on cost-effective backroad erosion and sediment control.

- (5) The Regional Commission should be involved in watershed and basin planning efforts and encourage municipal involvement.
- (6) Unless there are overriding concerns in the local and Regional Plans, the Agency of Natural Resources shall adopt the highest possible classification and type for water bodies based on their actual condition and use.
- (7) Public and private sectors should refrain from activities that spread invasive plants such as: ill-timed roadside mowing, transporting invasive plants in ditch spoil, and the cleaning of mowing and earthmoving equipment after working in an infested area. Road maintenance personnel should be trained to recognize the invasive plants on the Vermont Noxious Weed Quarantine List and Watchlist.
- (8) The Agency of Natural Resources and local groups are encouraged to monitor water quality, and when monitoring indicates a water quality violation, to promptly locate the source of degradation when possible.
- (9) In preparation for writing any basin plans, the Agency of Natural Resources should conduct a comprehensive assessment of water quality in such basins and identify the source of any known water quality problems.

### **C. Fisheries and Aquatic Resources**

#### **Background**

The region's rivers and streams provide cold water habitat for brook, brown, and rainbow trout, long nose and black nose dace, sculpin, smallmouth bass, and several other species of fish including Atlantic Salmon, which are being reintroduced to the region's rivers through state and federal efforts. Several lakes and ponds, including Lamson Pond in Brookfield, Silver Lake in Barnard, a section of the Waits River in Bradford, Halls Lake and Harriman Pond in Newbury, and Lake Morey in Fairlee have been classed as warm water fish habitats. 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 to the same breeding areas year after year, waterways must remain open to migration.

In order for species such as the Atlantic Salmon to thrive as they once did, habitat areas must be suitable to their survival. Warm temperatures, low flow levels, and contaminants can all threaten the success of salmon restoration efforts. Protection and restoration of habitat must precede reintroduction of species in to the natural environment. Development and construction in and around rivers and streams can be harmful to fish habitat unless care is taken to prevent turbidity, sedimentation, decreased dissolved oxygen, and flow alteration.

The damming of streams to create a pond, either within a stream channel or drawing from the stream channel, can damage fish habitat by increasing water temperature, decreasing dissolved oxygen, encouraging nuisance algal growth, creating barriers to fish passage, and increasing the potential introduction of non-native species. All of these things damage the natural ecosystem of the stream and cause decreases in native fish populations.



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**Photo 15: Concrete Box Culvert**

Construction of stream crossings can also pose threats to fish habitats and migration. Sedimentation and disruption of the stream bottom during construction can degrade the water. Some types of crossings create barriers to fish passage, restricting access to spawning and refuge areas. According to the Vermont Department of Fish and Wildlife, bridges or bottomless plate arches are best for minimizing barriers to fish passage. Box culverts or “squashed” culverts that do not have sufficient size to allow sufficient streambed stones may act as a barrier to fish passage, and round culverts sized only to handle flows often act as a barrier to fish passage by constricting the stream channel and creating a stretch of high velocity water that is too fast for too long for fish to swim through.

### Goals

- (1) Assure the maintenance of water quality and quantity necessary to sustain existing aquatic communities.
- (2) Maintain or improve the natural diversity, population and migratory routes of fish.

### Policies

- (1) Intermittent and diverted flows should be enabled only upon finding that these actions assure the downstream protection of water quality and quantity for aquatic communities and stream functions, based on an analysis of need and consideration of alternatives, and compatible with local and regional planning goals and policies.
- (2) The design and construction of dams on rivers and streams is discouraged except when the public interest is clearly benefited and the following criteria are met:
  - (a) Projects operate as “run of the river”, ensuring that the natural flow regime is largely left intact;

- (b) Fish passage (where it historically occurred) and canoe portages are provided at dams. Also, recreational opportunities at hydropower facilities should be explored and developed, where appropriate; and
  - (c) Water quality and minimum flows should be maintained.
- (3) Because of threats to the natural ecosystem, the construction of ponds is discouraged, unless fed by groundwater and/or overland drainage. Discharges from ponds, if any, 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) Naturally vegetated streamside buffer strips of at least fifty (50) feet should be preserved especially in those areas that are planned for dense development in connection with existing similar development such as adjacent to, or infill of, existing downtowns or village centers.
  - (6) Proper erosion control procedures shall be applied for all construction activities and all stormwater shall be treated through natural or mechanical systems to remove nutrient and sediments and to attenuate flood flows to natural levels before any stormwater reaches streams.
  - (7) The State and towns are strongly encouraged to adopt shoreland setback regulations in accordance with the state buffer policy.
  - (8) New or replacement bridges and culverts should be adequately designed and constructed to handle stormwater, provide sediment transport, and accommodate fish and wildlife passage.

## **D. Wetlands**

### **Background**

Wetlands are a vital component in maintaining the ecological integrity of land and water. In addition, they provide an array of functions and values that support environmental health and provide benefits to humans. Benefits provided by wetlands include: flood and storm water control, maintenance of surface and ground water quality, open space and aesthetic appreciation, fish and wildlife habitat (including a large number of threatened and endangered species), ecological research and educational opportunities, and sources of nutrients for freshwater food chains. Wetlands are also important for recreational activities such as hunting, fishing, and bird watching.

Draining, filling, and development have resulted in the loss of more than thirty-five percent (35%) of Vermont’s original wetland acreage, primarily due to agricultural and large-scale development projects. At present, roughly four percent (4%) of Vermont’s lands are classified as wetlands, totaling 244,000 acres. The Vermont Wetlands Office estimates that an additional

80,000 acres of wetlands exist that have not been identified, bringing the actual total to about five or six percent of the state's land. The current rate of wetland loss in Vermont has been estimated at eight (8) 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 values associated with wetlands. Although methods exist for creating areas that have many wetland characteristics, it is not possible to replicate the intricate complexities of a wetland formed over decades or hundreds or thousands of years.

The State of Vermont defines wetlands as “those areas of the state that are inundated by surface or ground water with a frequency sufficient to support significant vegetation or aquatic life that depend on saturated or seasonally saturated soil conditions for growth and reproduction”. Such areas include but are not limited to marshes, swamps, sloughs, potholes, fens, river and lake overflows, mud flats, bogs and ponds.

The Vermont Wetlands Rules (1990) (10 VSA Chapter 37) classify all wetlands into three categories. Class 1 wetlands are those identified as “exceptional or irreplaceable in their contribution to Vermont's natural heritage.” No Class 1 wetlands have been designated in the region. Class 2 wetlands are those shown on the National Wetlands Inventory, as well as any wetlands contiguous to these mapped wetlands. Most wetlands considered as Class 2 have areas of at least three acres. Class 3 wetlands are those that have not been evaluated or are not considered by the Water Resources Panel of the Natural Resources Board (formerly Water Resources Board) to be significant.

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

In addition to state protection, the U.S. Army Corps of Engineers has the responsibility of administering Section 404 of the Clean Water Act which regulates the dredging or placing of fill into any wetland. The Environmental Protection Agency and the U.S. Fish and Wildlife Service have review authority over any Army Corps permit. Several other federal agencies, including the National Park Service and the Natural Resources Conservation Service (NRCS), administer grant programs which encourage the protection of wetlands. However, recent amendments proposed to the Clean Water Act are intended to remove many of these federal protection mechanisms.

In the region, just over one percent (1.2%) of the land area has been identified by the State of Vermont as “significant” wetlands, eligible for state protection under the Vermont Wetlands Rules. However, there are a large number of smaller wetlands that may qualify for protection. According to the Wildlife Management Institute in Washington, D.C., “ten one-acre wetlands provide habitat for many more duck pairs than does one 10-acre wetland. Small wetlands also thaw faster and provide more high-protein foods for nesting hens than larger wetlands.” They are also critical in the flight paths of migrating mallards, pintails, teals, gadwalls, and shovelers.

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

### **Wetlands Identification**

According to the Vermont Wetlands Rules, the boundary between a wetland and an upland shall be delineated by the methodology set forth in the most recent edition of the *Federal Manual for Identifying and Delineating Jurisdictional Wetlands*. This methodology employs three parameters: vegetation, soils, and hydrology. (See Section 5 of Vermont Wetland Rules for more detailed description of wetlands delineation in terms of function and vegetation.) The Rules state that the most recent edition of *The Wetland Plant List of the State of Vermont* published by the U.S. Fish and Wildlife Service shall be used to determine the frequency of vegetation occurrence in wetlands. Wetlands must serve at least one of the following functions in order to be protected by the state:

- 1) Water storage for flood water and storm runoff.
- 2) Surface and ground water protection.
- 3) Fisheries habitat.
- 4) Wildlife and migratory bird habitat.
- 5) Hydrophilic vegetation habitat.
- 6) Threatened and endangered species habitat.
- 7) Education and research in the natural sciences.
- 8) Recreational value and economic benefits.
- 9) Open space and aesthetics.
- 10) Erosion control through binding and stabilizing the soil.

In order to be protected by Criterion 1(G) of Act 250, wetlands must be listed as significant by the state. Municipalities, the Regional Commission, or other interested parties may petition the state Water Resources Panel of the Natural Resources Board (formerly Water Resources Board) to: 1) have a wetland reclassified to a higher or lower classification, 2) determine which functions make the wetland significant, 3) determine whether the size or configuration of a buffer strip associated with a significant wetland should be modified, or 4) determine the final boundaries of any significant wetland.

However, wetlands may be protected under several other sections of Act 250, including criteria dealing with water pollution (1), waste disposal (1(B)), floodways (1(D)), streams (1(E)), shorelines (1(F)), erosion control (4), natural areas and aesthetic considerations (8), wildlife habitat (8A), public investments and facilities (9A), and under local and Regional Plans. The Regional Commission recognizes the critical value of wetlands in relation to the health of the water, wildlife, and plant resources in the region and to the ecosystem as a whole. The Regional Commission supports and encourages communities to identify and inventory wetlands within the region and to adopt mechanisms for their increased protection. This information can increase the effectiveness of the state and federal regulatory process.

### Vernal Pools

Vernal pools are temporary bodies of water which usually occur in woodland depressions. They are small, usually less than one-half (1/2) acre, and vegetation is usually sparse or absent, although adjacent forest trees may shade the pool. Vernal pools provide important breeding habitat for amphibians, primarily the wood frog and Vermont's three species of "mole" salamanders, and have characteristic populations of fairy shrimp, fingernail clams, snails, water fleas, and copepods. Since these and many other species return to the same vernal pool each year to breed, destruction or alteration of vernal pools may result in the loss of local populations of some species.

Most vernal pools in Vermont are filled by spring rains and snow melt and are dry during the summer. Some pools may become filled again in the fall and contain water during the winter, while others, during wet years, may contain water year-round. Vernal pools are typically shallow (less than 3 feet deep) and can vary in size from just a few feet across to more than 150 feet in width. 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.

Vernal pools form where small depressions, swales, or kettle holes collect spring runoff or intercept seasonally high groundwater tables. Although many vernal pools are small, isolated "puddles," they are often associated with more extensive wetland systems. In Vermont, most vernal pools occur in forested habitats, but can also be found in meadows, sand flats, and river flood plains. It is estimated that each town in Vermont has at least one vernal pool.

Because of their small size and temporary nature, vernal pools are not protected under the Vermont Wetland Rules. They are a unique and vulnerable habitat area that must be identified and protected under municipal regulations.

### Fens and Bogs

Fens and bogs are two rare natural communities found in the region that are also host to several species of rare plants. Whereas bogs tend to be found in areas with an acidic substrate, fens are usually found in areas of calcareous (limy) bedrock or till. Fens tend to have a diverse flora which includes many uncommon plants such as the Showy Lady's Slipper (*Cypripedium reginae*). There are many important fens in the region and Fairlee hosts a "quaking bog." Most fens and bogs are protected under the Non-game and Natural Heritage Program, however towns are encouraged to identify and protect fens and bogs in municipal plans and bylaws.

### Goals

- (1) Identify and protect all wetlands which provide significant functions and values in such a manner as to achieve no net loss of such wetlands and their functions. In the long term, restoration and enhancement of wetlands should be pursued in order to improve the region's wetland resource.

- (2) Identify and protect critical natural communities such as vernal pools, fens, and bogs through petitioning the Water Resources Panel of the Natural Resources Board (formerly Water Resources Board) or through local zoning legislation.

### **Policies**

- (1) Significant wetlands should be protected from development by maintaining an undisturbed buffer strip of naturally vegetated upland, at least fifty (50 to 100 feet in width<sup>18</sup> (or wider according to the type of development and the wildlife species to be protected), around the edge and by preventing runoff and direct discharge into wetlands.
- (2) Vernal pools should be protected from development by establishing an overlay district that identifies vernal pools and their surrounding terrestrial amphibian habitat.

### **Recommendations for Action**

- (1) The State of Vermont should identify and map significant wetland areas not currently classified as Class 1 or 2 wetlands and petition the Water Resources Panel of the Natural Resources Board (formerly Water Resources Board) to have such areas reclassified at a higher level.
- (2) Encourage municipalities in the region to enhance zoning bylaws to protect wetlands that may not be protected under state or federal law.
- (3) Work with towns to establish a priority list of wetlands for protection and/or acquisition.
- (4) Encourage more accurate and thorough identification of wetlands areas through the use of best available data and the adoption of local wetlands regulations and updated maps by the municipalities in the region.
- (5) Encourage property tax relief to provide an incentive for the protection of designated wetlands.

## **E. Wildlife Resources**

### **Background**

Wildlife habitat is defined as 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. In addition, large mammals serve as indicators of ecosystem health, so health of one species indicates health of all. To maintain or improve the populations and diversity of these species, the habitat must be managed wisely and protected from unreasonable fragmentation and alteration. Wildlife of the region is one of the primary attractions to the area and provides many of its citizens with direct and indirect livelihoods.

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<sup>18</sup> 100 feet is a standard width recommended by the Vermont Department of Fish and Wildlife to preserve wildlife habitat. Vermont Department of Fish and Wildlife, "How to Include Fish and Wildlife Resources Into Town and Regional Planning," 1992, page 6.

And, many wildlife cannot live where there is any amount of development, no matter how seemingly unobtrusive.

Wildlife management requires controlling human activities around animals as much as management of animals around human activities. Managing for specific species is not as desirable as managing for the entire ecosystem supporting the species. Parochial wildlife management programs usually manage for one species at the expense of others while a more ecological approach is to ensure healthy habitat for all members of the food chain because they all have intrinsic value. 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 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 of twenty-five (25) acres and less, if done according to Accepted Management Practices, can provide browse for moose, deer, and bear, and can be planted with trees such as oak, whose populations have become sparse.



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**Photo 16: Migration corridors, critical for biodiversity of species like Monarch butterfly**

The following sections describe important habitat protection and management issues for birds, deer, black bear, moose, bobcat, threatened and endangered species, and natural communities. In order to maintain the diversity of species in the region, the areas, shapes, and pattern of habitat types across the region must be considered as a whole. Large tracts of contiguous, undeveloped areas containing a diversity of habitat types should be preserved wherever possible.

### **Bird Habitats**

Because of the diverse habitat types that range from the high elevation woodlands of the Green Mountain National Forest to the low grassland areas in the Connecticut River Valley, the region is host to a variety of bird species, many of which depend on unique habitat areas in the region for migration corridors, wintering areas, or breeding sites.

The Connecticut River Valley offers breeding habitat for a wide variety of birds and serves as a migration flyway for waterfowl and neo-tropical songbird species such as warblers and vireos. Many songbirds require wooded corridors for stopover sites during their annual migrations to and from the tropics. Grassland areas in the Valley are home to species such as Eastern Meadowlark, Vesper Sparrow, Savannah Sparrow, Upland Sandpiper, and Bobolink, some of which have been declining in number in recent years. Rivers in the region also provide important habitat for waterfowl such as snow geese and several varieties of ducks as well as



herons and rails. Some sections of rapidly moving water in Bridgewater have been used by bald eagles during migration, and Great Blue Heron rookeries are located in Hartland and Tunbridge.

High elevation areas (over 2,500 feet) support a unique assemblage of birds including Bicknell's Thrush, Swainson's Thrush, and Blackpoll Warblers. Cliff areas such as Eagle Rock in Vershire, the Palisades and Sawyer Mountain in Fairlee, and Vulture Mountain in Stockbridge are breeding areas for the endangered Peregrine Falcon. Wildlife biologists are well aware of the diversity of bird species in the region, however unlike deer and bear habitats, these important areas have not yet been thoroughly mapped.

Vermont occupies an important position in the conservation of North American bird populations. The diversity of Vermont's habitats, from northern hardwood and spruce/fir forests to farmlands and wetlands, support an equally diverse array of avian species. State endangered species and other species of concern have significant populations in Vermont. Conserving essential habitats for these species and others is the highest priority if we are to maintain Vermont's avian richness.

Important Bird Areas (IBAs) are sites that support significant populations of one or more species of breeding, migrating or wintering birds. IBAs can be as small as two-tenths (0.2) of an acre or as large as thousands of acres, but usually they are discrete sites that stand out from the surrounding landscape. The identification and conservation of these important sites is a vital component toward global efforts to sustain viable bird populations. In Vermont, seventeen IBAs and four IBA complexes (IBAs focusing on individual species at multiple sites) totaling more than 115 sites have been identified across the state.

According to the U.S. Fish and Wildlife Service, more than 66 million people over the age of sixteen spent over \$38.4 billion in 2001 on trips and equipment for observation, feeding and photography of wildlife in the United States. Bird watching has an underestimated and under-appreciated economic impact. The 100 people attending the New River Birding Festival in 2004 injected more than \$100,000 into the local economy of Fayetteville, West Virginia. Communities can encourage birding and ecotourism and improve their local economies. Bird watching is an important economic driver in this region, because of its unique habitat areas. The Bragdon Preserve in Woodstock is one of Vermont's IBAs. It is eighty (80) acres in size, privately owned by the Vermont Institute of Natural Science (VINS), and consists of hardwood and mixed coniferous forest, field, fen, sedge meadow, and a pond. Since 1981 more than 30,000 birds, representing over 117 species have been banded here by VINS naturalists, conservationists, researchers, volunteers and students.

## **Mammal Habitats**

### **Black Bear**

The black bear is native to Vermont and is found primarily in remote, forested habitat. An estimated 3,500 black bear live in the state; they are a particularly good indicator of remote forestland. The mountainous, forested landscape we appreciate for recreation and beauty is the stronghold of bear; these animals will only exist as long as there is habitat to support them. Minimum habitat requirements must be maintained for black bear survival: adequate food

supplies; forest blocks that meet home range needs; and connectivity to large blocks of forestland that serve as population sources. Simply conserving individual parcels of land containing critical bear foods will not ensure a future bear population. If Vermont's forested landscape continues to be fragmented into progressively smaller, discontinuous units, the bear will likely decline and ultimately may disappear.

The Vermont Department of Fish and Wildlife has mapped two types of black bear habitat areas in the state - bear production habitat and seasonal bear habitat. Bear production areas are described as "generally contiguous and remote forestland, containing critical habitats necessary to bear survival." Production areas support relatively high densities of cub-producing females. Seasonal bear habitats are "regions frequently used by bears, including some cub-producing females. These habitats often contain critical seasonal feeding area and vital travel corridors." Bear production habitat covers much of the western part of the region, throughout the towns of Granville, Hancock, Pittsfield, and Plymouth, as well as sections of Barnard, Bridgewater, Braintree, Rochester, Stockbridge and Woodstock. Seasonal bear habitat is found in the eastern part of the region, throughout the towns of Corinth, Topsham and West Fairlee, and in sections of Bradford, Fairlee, Newbury, and Vershire.

Within bear production areas there are "critical habitat areas", these are defined by Act 250 as "concentrated wildlife habitat which is identifiable and is demonstrated as being decisive to the survival of a species of wildlife at any period of its life." Critical habitat for black bears includes hard mast stands (beech and oak), wetlands, and travel corridors within the production or seasonal bear habitat areas. However, such critical habitats have not been mapped. Towns should attempt to identify critical habitat areas within the broader areas identified on the bear habitat maps and encourage landowners, foresters and developers to be sensitive to these areas in their management plans. Wherever possible, large tracts of undeveloped land should be left as such for bear survival and reproduction. Buffer zones, up to a half-mile in width, should be maintained between land development and critical habitat.

### **Deer**

Deer wintering areas provide relief from harsh climatic conditions by providing protection from deep snow, cold temperatures, and wind chill. These habitats are characterized by a high degree of softwood cover (primarily hemlock), steep slopes or areas that receive low snow accumulation, south or westerly aspects, generally moderate elevation, and low levels of human disturbance in winter.

The Vermont Department of Fish and Wildlife has been working to discover the habits and lifestyle of white-tailed deer during the past twenty years. Much of this effort has included the mapping of deer wintering areas. Overall, wintering areas have not changed significantly over time. Evidence shows that deer usually travel considerable distances to the same wintering areas. If habitat conditions are maintained, deer will utilize the same sites over for a long period of time.

Residential, commercial, or industrial development that is within or adjacent to a deer wintering areas decreases the amount of land available to deer and erodes a town's deer population, eventually decreasing the number of deer within the town.

According to Department of Fish and Wildlife maps, deer wintering areas in the region are widespread, with the largest concentrations existing in the towns of Bradford, Brookfield, Hartford, Norwich, Randolph, Royalton, Tunbridge, and West Fairlee. Towns should consider deer wintering areas and their connecting corridors in planning for management and conservation of forested areas; development should avoid such areas wherever possible. Towns should also be vigilant in identifying other areas not yet mapped.

### **Moose**

The Vermont Department of Fish and Wildlife's 1992 Moose Management Plan contained objectives to allow for controlled growth of the state's moose population in most parts of Vermont, and to monitor populations to determine when and if population regulation was necessary. The state's first moose hunt was held in 1993 and has continued annually since then. The Plan was updated in 1998, when the state's moose population was estimated at 2,000, a ten fold increase over the preceding eighteen years.

Moose use different habitats during different seasons, preferring thick, brushy habitat for concealment and food. They have a large home range, often from four to ten square miles, making habitat management specifically for moose impractical. Critical habitat areas for moose include late-winter concentration areas which include mature spruce/fir stands (older than twenty years) with nearby regenerating forests for food, wetland feeding areas, and salt licks.

Moose benefit from logging practices that create abundant browse (leaves, tender shoots, or other soft vegetation) on recently logged or burned land. However, moose rely on a balance of forest age classes, therefore widespread clear cutting could create an unfavorable balance of forest age classes and cause a decline in moose populations. While moose and deer share similar habitats in non-winter months, there is not sufficient evidence to suggest that an increase in the population of one will cause a decrease in the population of the other. There is some concern, however, that larger deer populations will increase the likelihood of moose contracting the brainworm that is carried by deer but has a deteriorating effect only on moose.

Most moose in Vermont are located in the Northeast Kingdom, however many have been sighted in the region. In order to maintain or increase the population of moose in the region, towns may prohibit or limit development in large contiguous tracts of forested land. Additionally, widespread clear cutting should be discouraged, although occasional small clear cut patches no larger than twenty-five acres can be beneficial to moose populations.

### **Bobcat**

Although once fairly common in the state, populations of bobcats and other large cats such as the legendary Catamount, were greatly diminished in the early part of the century when most of the land was cleared for agriculture. The transformation of land use over the last century from open fields to brush land and regenerating forests has expanded the habitat of the bobcat and the snowshoe hare, one of the bobcat's primary sources of food. As a result, populations of bobcat have shown an increase but development pressures continue to threaten these animals. The habitat of the bobcat is typically low to medium elevation spruce forest with the presence of

rocky outcroppings for den sites and access to forest openings that sustain rodents and other small mammals. Large ski areas such as Killington, with open slopes next to dense forest, have shown fairly healthy populations of bobcats in recent years. In the region, bobcats are known to live in the Delectable Mountain range in the Chateaugay Notown Conservation Area. Uneven age management and occasional small clear-cutting of forested areas could provide beneficial habitat for bobcat production. Deeryards and wetlands provide benefits to the habitat.

### **Bats**

Bats rely on critical bat habitats to survive. These include “hibernacula” (usually caves or mines) where they can hibernate, and summer roosting and maternity colony areas. This region hosts two significant bat hibernacula - unused mines in Strafford and Vershire. A survey of the Strafford mine shows that it’s very likely that thousands of bats hibernate there each winter. A recent winter survey of the Vershire mine also shows that it is a very significant hibernaculum. It included the greatest number of hibernating small-footed bats (122), which are listed as threatened in Vermont, and big brown bats (146) found in any Vermont cave or mine.

Bats congregate to give birth and raise young during the summer in maternity colonies. Tree cavities and trees with exfoliating bark are important to maternity colonies, but the colonies may also use buildings. Bats congregate to feed during the summer months in foraging colonies; these colonies may be small and dispersed, or may contain a large number of individuals. The bigger colonies are the most critical and often occur in the same habitats as maternity colonies. Lower elevations in the region, near rivers, provide a warm climate and an abundance of insects for bats. A recent summer netting survey of the Union Village Dam by the U.S. Army Corps of Engineers indicates the presence of little brown bats, big brown bats, northern long-eared bats, and small-footed bats. All four species were using the area for maternity colonies. Small-footed bats are known to roost in rock cracks and talus slopes; they may roost on the face of the dam. The region’s forests provide foraging habitat for this species.

It is important to protect the winter habitat of bats, particularly the Indiana bat, the only endangered bat species in Vermont. During hibernation, Indiana bats cluster together on the walls of caves and abandoned mines to conserve energy and maintain a constant humidity. If the bats are disturbed while hibernating, their energy levels may decline, weakening their condition. The Vermont Agency of Natural Resources has worked with other groups to block human access to bat hibernacula. Towns are encouraged to map any newly discovered bat hibernacula and restrict access to the caves during the winter season.

### **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 important to a healthy functioning ecosystem. Many uncommon species will disappear if not recognized and protected.

These natural resources contribute to the natural heritage and character of the region. Areas in the region with significant natural features provide recreational and educational opportunities to town residents. Species with a state status of “threatened” or “endangered” are protected by Vermont’s Endangered Species Law (10 VSA Chapter 123); a federal status of “threatened” or “endangered” is protected by the Federal Endangered Species Act (P.L. 93-205). The Vermont Department of Fish and Wildlife maintains lists of threatened or endangered plants and animals. The state also publishes a list of rare native fauna to inform naturalists, biologists, planners, developers and the general public. These animals 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.



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**Photo 17: Turtles and salamanders - integral species in the region’s ecosystem**

The Vermont Nongame and Natural Heritage Program in the Department of Fish and Wildlife, has identified and mapped special natural features or species and natural communities; there are 290 such features in the region. Several species of grassland birds including the Upland Sandpiper, and other endangered birds such as the Bald Eagle, depend on critical habitat areas in the region. In addition to animals on the list of Threatened and Endangered Species of Vermont, the Vermont Institute of Natural Science (VINS) has recognized several species, such as the wood turtle, that are in decline and may soon become endangered.

### **Mast Stands**

“Mast” is a term used by foresters and wildlife biologists to describe the fruit and seeds of trees and shrubs that is a source of food for wildlife. Hard mast, or the nuts of oak and beech, is a critically important source of food for many kinds of wildlife. The Vermont Department of Fish and Wildlife considers areas of beech or oak with a history of bear feeding use to be necessary wildlife habitat, as these stands are absolutely essential for the survival and reproduction of black bear in Vermont. While scarred beech stands signify important bear habitat, their increasing susceptibility to death and disease make mature oak stands possibly more important and reliable resources. Because of their value as timber logs, mature oak are fairly rare in the region. Since only older trees produce mast, mature oak trees are considered a critical resource to all forms of wildlife, and should be inventoried and protected.

### **Wetlands and Vernal Pools**

Wetlands and vernal pools are important feeding and breeding areas for a variety of plant and animal species (see section on Wetlands above). Certain freshwater fish species require wetlands as spawning grounds and as nursery areas for their young. Wetlands are also important for maintaining the quality of fish habitat by providing shade or discharging water from cold springs, both of which moderate surface water temperatures. Wetlands provide essential habitat for numerous wildlife species. The dense vegetation found in most wetlands provides a variety of foods and also nesting sites that are relatively safe from predators. Many species rely on wetlands for some or all of their life cycles, while for others wetlands are important for a part of their life cycle or during certain times of the year.

Wetlands provide necessary habitats for the survival of a disproportionately high percentage of the threatened and endangered species in the state. Roughly thirty-five percent (35%) of plants and twenty-one percent (21%) of animals on the threatened and endangered lists are closely associated with, or are found exclusively in, wetlands. Vernal pools are breeding grounds for many species of amphibians, including two species of salamander currently on the Vermont Threatened and Endangered Species List.

A buffer zone is essential protection both for species in the wetland and 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.

Municipalities are encouraged to map and preserve wetlands and vernal pools, especially in large areas of undeveloped land, as crucial habitat areas for a variety of native plant and animal species. State officials recommend a setback of at least 200 feet for wildlife habitat protection around wetlands and a continuous forested buffer of roughly 500 feet around vernal pools.

### **Riparian Zones**

Naturally vegetated riparian zones (vegetated buffer strips next to surface waters) are essential to good water quality. Such areas serve multiple purposes in resource conservation. As mentioned in the Water Resources section above, buffer strips next to rivers filter silt and nutrient runoff from non-point pollution sources such as agriculture and logging. Tree canopy cover also shades the water, helping to keep temperatures in a healthy range for aquatic life. Plants along the banks provide woody debris that is a food source for macro invertebrates, the start of the aquatic food chain. Riparian vegetation also holds the bank in place, reducing erosion. Riparian woodlands are also a specific habitat type that is important to many amphibian, reptile, mammal and bird species. These areas also act as important travel corridors for wildlife between large habitat areas.



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**Photo 18: Wetlands and Riparian Zones**

### **Goals**

- (1) Maintain or enhance the biodiversity and population of wildlife, including natural predators.
- (2) Restore stable populations of state and federally designated threatened or endangered wildlife and their associated habitat areas.
- (3) Allow sport and subsistence hunting in an ecologically sound manner to provide continued success of the species.

### **Policies**

- (1) Development should be designed and sited in a manner to preserve contiguous areas of active or potential wildlife habitat. Corridors connecting habitat areas for large mammals must be incorporated in plans for management and conservation of forested areas. Fragmentation of significant and necessary wildlife habitat should not be approved.
- (2) Conserve large tracts of bear habitat when possible and to adopt cluster land use concepts in zoning bylaws as a mechanism for maintaining contiguous areas of forest cover.
- (3) Large contiguous tracts of forest should be managed so as to maintain the diversity of ages and species of tree cover necessary for shelter and food supply for deer, black bear, and other large mammals, and birds.
- (4) Along waterways, developers, municipalities or private land owners must preserve or create vegetated riparian buffer zones that are consistent with state riparian buffer guidelines.

- (5) The rate of harvest of wildlife for sport or subsistence should not exceed the capacity of an area to replenish the species.
- (6) Wildlife populations and natural diversity should be maintained or enhanced.
- (7) Development, including roads and power line corridors within designated bear habitat areas should be minimized to avoid fragmentation of forest blocks and to maintain the connecting links between such blocks.
- (8) Preference should be given to developments that utilize existing road and field lines.
- (9) Large tracts of land with deer wintering areas should be protected from developments and other uses that threaten the ability of this habitat to support deer when necessary to support stable deer populations.
- (10) Critical habitat types in the region that shall be considered during development planning include, but are not limited, to the following:
  - (a) forested corridors or “greenways” used by songbirds during migration;
  - (b) grassland regions;
  - (c) cliff areas identified as potential or active nesting places for peregrine falcons;
  - (d) areas over 2,500 feet in elevation; and
  - (e) large tracts of contiguous forest land.
- (11) Landowners, foresters and developers must be sensitive to critical bear habitat areas in their management plans.
- (12) Widespread clear cutting is discouraged.
- (13) Development should not occur in wetland areas.

### **Recommendations for Action**

- (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 work to inventory wildlife species; sensitive areas including wetland, vernal pools, bogs and fens, mature oak trees; and critical habitats for birds, deer, bear, bobcat, heron, and threatened or endangered plant species.
- (2) Towns are encouraged to use mechanisms such as cluster zoning, conservation districts, transferring or purchasing of development rights, or purchasing of land containing critical habitat areas in order to maintain the integrity of large forest blocks and preserve critical habitat.
- (3) Towns should work cooperatively and seek assistance from land trusts to maintain large tracts of undeveloped habitat that cross political boundaries.



- (4) Town plans and zoning regulations should protect significant natural features and sensitive habitat areas by using setbacks and buffers, particularly for wetlands and vernal pools, before threats to these areas develop. Local officials are encouraged to work with staff from regional offices of the Vermont Department of Fish and Wildlife and wildlife biologists from VINS to assist in identifying and creating inventories of the critical habitat areas and significant natural communities in their municipalities.
- (5) Towns should attempt to identify critical bear habitat areas within the broader areas identified on Vermont bear habitat maps.
- (6) Towns should adopt zoning regulations that would discourage development near wetlands and vernal pools, and prevent development within 300 feet in conservation districts, in order to protect their functions and native biological diversity and to prevent additional loss of habitat.
- (7) Protection of wetlands, riparian areas, vernal pools, the most critical deer wintering areas, and natural grasslands should be considered in revisions to local subdivision regulations.
- (8) To protect high-quality forested riparian (river bank, stream bank or lake shore) 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.

## **F. Air Quality**

### **Background**

The air quality of Vermont and this region is a primary attraction to its inhabitants and visitors and is a major component of the quality of life and health in the area. Although air polluting industries are not a major component of our economy, automobile traffic, trans-regional pollution, illegal open burning of garbage, and wood burning activities pose some threats to air quality and should be managed wisely in the short- and long-term.

The region has and will continue to have a traditional dependence upon wood burning stoves for heating of homes and businesses. The narrow topography and tendency for thermal inversions in the cooler months in these areas can potentially cause unhealthy and undesired pollution concentrations. Federal air quality regulations require stove manufacturers to produce cleaner burning stoves. However, the longevity of older wood stoves is often several decades. These older, less efficient stoves will stay in use for many years to come and will continue to pollute. Use of newer catalytic stoves will probably be limited to new stove installations, with small rates of old stove replacement or retrofit at existing sites. The incremental rate of pollution per new stove will decrease, although the total load of particulates and gases into the airsheds of the region will likely increase with population growth.

Pollution from wood stoves has not been a serious problem for most communities in the past, but with more and more development and an increase in the percentage of new developments using wood stoves, the total volume of pollution may become severe in some areas and require management in the form of stove inspections, incentives for retrofit or replacement and stove

operation scheduling. Pollution from wood stoves can be significant. Municipalities should be planning courses of action should the problem become unacceptable. A multi-town or sub-regional approach to wood stove pollution may be the most acceptable resolution to these potential problems since airsheds do not limit themselves to political boundaries.

Because of the implementation of solid waste disposal fees, there has been an increase in illegal open burning of garbage in the region. Such activities release dioxin, toxic gases and heavy metals directly into the air. Municipalities are encouraged to adopt ordinances to control open burning at the local level.

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 and should be addressed by the state and federal government, as the region's communities may be the recipients of pollution which could affect them or their natural resources but will have little ability to deal with these issues.

With eighty-one percent of the region being forested, it hosts a unique vegetative cover which processes a large volume of carbon dioxide and regulates air temperatures. Air quality is directly influenced by tree cover and biomass transpiration and any land uses affecting the composition of the land cover of the region or sub-regions must be reviewed in relation to their cumulative and incremental impact upon air quality and the factors influencing it.

The release of carbon dioxide and other gases responsible for global warming is a local issue and is therefore the responsibility of the people of the region who produce them. Discussions about transportation, energy production, incineration, and other issues should consider the effect upon the production of such gases and the incremental impact upon the region's air quality. Increases in carbon dioxide emissions, primarily as a result of combustion of fossil fuels, are considered by many to be a leading cause of the buildup of greenhouse gases in the atmosphere. Greenhouse gases are believed to warm the atmosphere by allowing sunlight to reach the surface of the earth, but acting as an insulator that prevents some heat from escaping the earth's atmosphere. Forest growth naturally stores, or "sequesters", carbon and the carbon remains in the wood after it is processed into a product. Activities that increase the biomass accumulation in a forest or in forest products increase carbon sequestration. See the Carbon Sequestration section of this Plan for more information.

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, in effect selling another product off of their land, and thus increasing the economic viability of sustainable forest management in the Northeast.

### **Goals**

- (1) Maintain or improve air quality in local and regional airsheds.
- (2) Install and maintain a regional air quality monitoring network in cooperation with the Vermont Agency of Natural Resources.

- (3) Reduce dependence upon fossil-fueled and single-occupancy automobiles for transportation.
- (2) Reduce the transfer of pollution into the region from sites outside it.
- (5) Promote the development and use of more energy efficient devices and renewable energy resources.
- (6) Eliminate open burning of garbage by homeowners and renters.
- (7) Increase the number and size of the region's park-and-ride facilities.

**Policies**

- (1) Proposed developments must be reviewed for their direct and indirect impact upon air quality and acceptability by local and regional airshed users.
- (2) Wood burning, as a method of disposal, should be reduced; as a source of heat, wood burning should be continued.
- (3) Air pollution impact review should include visual quality in addition to contaminant concentrations over time and distance.
- (4) Options for mitigation of air pollution effects will offer timing/scheduling of emissions based on time-of-day and/or weather conditions as well as technology-based solutions of Best Practicable Technology (BPT) and Best Available Technology (BAT).
- (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.
- (6) Backyard burning of trash is illegal and local education and enforcement activities are strongly encouraged to eliminate this practice.

**Recommendations for Action**

- (1) Air quality should be monitored in the region as part of broader statewide effort so as to determine current and potential threats to air quality. Potential impact areas include village centers or other areas of traffic congestion and high elevations, where pollutants and acidic levels are potentially greater and more harmful to fragile vegetation.
- (2) Municipalities and state agencies should educate communities about the impacts of trash burning and develop more effective mechanisms to enforce laws prohibiting backyard burning of trash, including the adoption of civil ordinances.

- (3) Woody debris from site clearing or forestry operations should be chipped, landfilled in acceptable areas, or left on site instead of being burned in order to reduce pollution and to enable this material to contribute to soil formation.
- (4) The Regional Commission should be prepared to comment upon projects outside the region which may potentially impact upon air quality within the region.

## **G. Mineral Resources**

### **Background**

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

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

- (1) creation of excessive dust and noise as a result of truck traffic and operations at the site, thus denying reasonable use of neighboring properties;
- (2) degradation of the site or adjacent areas that cause aesthetically displeasing conditions in the vicinity;
- (3) undue deterioration of and traffic congestion on town and state highways; and
- (4) improper management practices which result in unnecessary soil erosion and inadequate site restoration.

The region is host to three 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. These sites are uncontrolled or abandoned places where hazardous waste is located, possibly affecting local ecosystems or people. Each mine was operated during the 19th and 20th centuries and extensive remediation is required by the U.S. Environmental Protection Agency according to CERCLA, the federal law that governs cleanup of these sites. A redevelopment study has been conducted for the Elizabeth Mine site through funding managed by the region.

### **Goals**

- (1) To enable wise utilization of mineral resources to accommodate growth and development of the region and adequate maintenance of transportation infrastructure.

- (2) To encourage extraction and processing of the resource where such activities are appropriately managed and the public interest is clearly benefited.
- (3) To encourage remediation of extraction and mining sites in the region that threaten human health or natural resources.

### **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 cause a burden to 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; and
    - (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 affects on water quality, fish and wildlife habitats, and adjacent land uses.
- (2) 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.
- (3) Extraction sites must be screened to the extent practical if topography and vegetation allow.
- (4) Commercial extraction of gravel from streams is prohibited by law, and private extraction is strongly discouraged due to the destabilizing effects it can have. All streambed extraction should only be done after careful consideration of the site by qualified professionals and in consultation with the Vermont Department of Environmental Conservation's River Management Section.
- (5) Mineral extraction and processing facilities should be planned and developed so they do not place an excessive or uneconomic burden on local and state highways and bridges.

## VII. HISTORIC, CULTURAL, ARCHEOLOGICAL AND SCENIC RESOURCES

### Introduction

Growth provides significant advantages for Vermont and the region, particularly in the creation of employment opportunities and housing. There are many examples of desirable development that have adapted very well to our historical landscapes and existing settlement patterns. The potential to create an attractive modified landscape (complementing the old with new development) exists, but change can result in landscape degradation unless cherished landscape patterns and community values are given proper consideration.

The Regional Commission accepts the fundamental assumption that many of these losses are preventable or may be significantly mitigated. The Regional Commission also acknowledges the strong desire of Vermonters to conserve the Vermont landscape while accommodating growth. This has been expressed by a long history of legislation, public policy, and local planning which addresses appropriate and legitimate standards for change. Criterion 8 of Act 250 embodies these values. The Governor's Commission on Vermont's Future (1987) expressed the belief that Vermonters were supportive of maintaining many of the values expressed above. Passage of amendments to the Municipal and Regional Planning and Development Act (1988) reaffirmed the commitment of the legislature to support a planning process which furthers these goals (24 VSA §4302(c)).

### A. Historic Resources

#### Advantages of Historic Preservation

By definition, historic preservation is the thoughtful management of the built environment, but this is such a simplistic explanation it does not reveal the importance of the historic preservation movement in the region and Vermont as a whole. The reasons for the preservation of our architectural heritage are varied. To business owners, preservation is a mechanism to maintain a community's interest and support in local economy. Community leaders and preservationists see historic preservation as a means to curb the decay of the traditional village center. The efforts taken in the villages of Bethel, Bridgewater, Randolph, Wells River and White River Junction to revitalize their business districts into functional economic centers serve as meaningful examples for this region. Nationally, many business owners have found that they can produce higher quality space for shops, offices, and housing through the adaptive reuse of existing buildings with less cost than new construction.

Preservation of historic buildings can increase the market value of property and increase tax revenues to towns, and buildings of architectural merit help shape community identity. In numerous settings throughout the region, preservation of important landmarks such as the Strafford Meeting House, Bridgewater Woolen Mill, Rochester Inn, and Corinth Meeting House have contributed to sense of place and community pride. Once work has begun in a community, other efforts follow, often heightening community betterment and identity. With little or no exception, local planning focuses on protection of rural character and open land. Preservation and revitalization encourages more private investment into the region's villages and

hamlets, helping to reduce sprawl into the countryside. Likewise, 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.

This mix of tangible and intangible benefits is why historic preservation is important to the welfare of the region. Beyond the practical and aesthetic, preservation is part of our ethic - do not throw something away if it is still useful. Instead, common sense and tradition seek to conserve, use, and improve what already exists.

And lastly, as eloquently stated by former Governor Hoff, “there’s no way you can understand the present unless you have a firm grounding in the past. Our past is part of us always, and, for Vermonters, the preservation of the unique Vermont heritage is especially important. You do that in a number of ways. We preserve our heritage through the written word, but we also preserve it in our physical surroundings, the buildings created by our forbearers. The buildings each community has are unique to that community. They represent a certain part of our past, and they can become an agent for revitalization and growth...”

**The National Register and State Survey**

Beginning in the late 1960s, the Vermont Division For Historic Preservation (Division) conducted a Historic Sites and Structures Survey for towns. Federal and state law mandate that Vermont inventory all structures and districts in the state which have historical and architectural significance. Although a building needs to be generally fifty years old, a building does not need to be an architectural landmark to qualify for inclusion in the survey; the survey includes simple homes and buildings, as well as elaborate structures.

<b>Table 13: National Historic Register Landmarks - 2006</b>	
<b>Town</b>	<b>Landmarks</b>
Plymouth	Calvin Coolidge Homestead
Strafford	Justin S. Morrill Homestead
Woodstock	George Perkins Marsh Homestead

*Source: Vermont Division for Historic Preservation*

More than 3,000 of the region’s historic structures have been inventoried by the Division; the records are on file with the Division and available in digital format. Planning commissions, local historical societies, building owners, and others interested in the details surrounding buildings of historic and architectural merit are encouraged to contact the Division. Technical assistance and grants are available to assist in the conservation of these properties.

To aid in the preservation of the most notable historic resources, Congress in 1966 created the National Register of Historic Places (Register). The Register is a federally maintained list of culturally important properties worthy of preservation. Inclusion in the Register offers a measure of protection against federally licensed or funded construction projects because federal agencies are required to consider the impact of their projects on properties included in or eligible for inclusion in the Register. Many of the buildings and structures included in the State Survey are eligible for the National Register.

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

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

**Table 14: National Historic Register Districts - 2006**

<b>Town</b>	<b>Districts</b>	<b>Town</b>	<b>Districts</b>
Bethel	Bethel Village	Newbury	West Newbury Village
Bradford	Bradford Village	Norwich	Norwich Village
Brookfield	Allis State Park	Plymouth	Coolidge State Park
Brookfield	Brookfield Village	Plymouth	Plymouth Notch Historic District
Chelsea	Chelsea Village	Randolph	Depot Square
Fairlee	Aloha Camp	Randolph	Randolph Center
Fairlee	Lanakila Camp	Royalton	South Royalton Village
Hartford	Jericho Rural	Stockbridge	Stockbridge Common
Hartford	Christian Street Rural	Strafford	Strafford Village
Hartford	Hartford Village	Thetford	Camp Billings
Hartford	Quechee Village	Thetford	Thetford Center
Hartford	West Hartford Village	Thetford	Thetford Hill
Hartford	White River Junction	Thetford	Thetford Hill State Park
Hartford	White River Junction Boundary Inc.	Tunbridge	Tunbridge Village
Hartford	Wilder Village	West Fairlee	Aloha Hive Camp
Newbury	Bayley District	West Fairlee	Camp Wyoda
Newbury	Newbury Village	Woodstock	South Woodstock Village
Newbury	Oxbow District	Woodstock	Taftsville
Newbury	South Newbury Village	Woodstock	Woodstock Village
Newbury	Wells River Village		

*Source: Vermont Division for Historic Preservation*



Table 15: Vermont Historic Districts - 2006	
Town	Districts
Barnard	Barnard Village
Barnard	East Barnard
Bethel	Bethel Mills Historic District
Bethel	East Bethel Village District
Brookfield	East Brookfield Historic District
Brookfield	West Brookfield Village
Corinth	Cookeville
Corinth	Corinth Center
Corinth	East Corinth
Fairlee	Fairlee Village
Granville	East Granville Village
Granville	Granville Village
Granville	Lower Granville Village
Hancock	Hancock Village
Hancock	Virgin Avenue Historic District
Hartland	Hartland Three Corners Historic District
Newbury	Boltonville Historic District
Newbury	Farnham - Atkinson Historic District
Pittsfield	Pittsfield Village
Plymouth	Plymouth Union
Randolph	East Randolph Village
Randolph	Lincoln/Chestnut Streets Historic District
Randolph	North Main Street Historic District
Randolph	Park/Central Streets Historic District
Randolph	Randolph Avenue Historic District
Randolph	School/Franklin/Summer Streets Historic District
Randolph	S. Main/S. Pleasant Streets Historic District
Randolph	South Randolph Village
Randolph	Weston Street Historic District
Rochester	Rochester Village Green Historic District
Royalton	Depot Square Historic District
Royalton	Foxville Historic District
Royalton	Royalton Common Historic District
Royalton	Royalton Village District
Sharon	Day Farms Historic District
Sharon	Sharon Village
Strafford	Dublin Corner Historic District
Strafford	Smith Farm Historic District
Strafford	South Strafford Historic District
Topsham	East Topsham Village
Topsham	Waits River
Tunbridge	South Tunbridge Village

Source: Vermont Division for Historic Preservation.

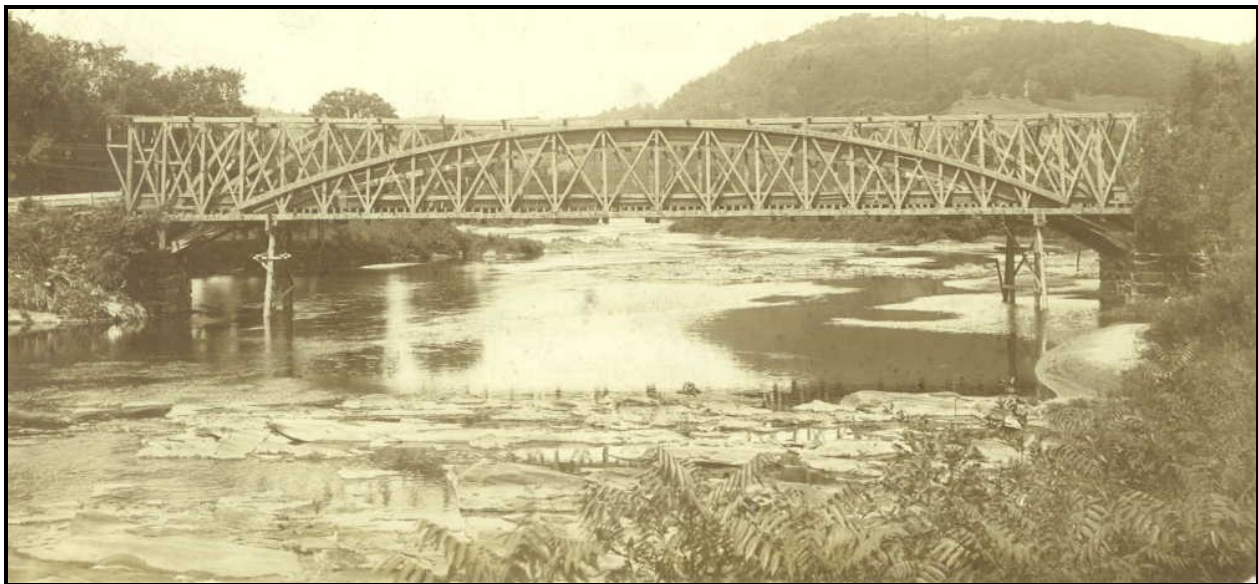


Source: Royalton Historical Society

**Photo 19: President Theodore Roosevelt visiting the region on August 30, 1902**

### Programs For Historic Preservation

Several state organizations and agencies have been actively involved in historic preservation and community development. The Preservation Trust of Vermont (Trust) is a non-profit corporation to assist in the continuing statewide effort to protect special architectural resources. The Trust works with local governments, individuals, and groups to secure and protect properties. The Division for Historic Preservation has matching grant programs for historic preservation projects for which communities and property owners are eligible. The Vermont Agency of Transportation is also engaged in historic preservation related projects. As part of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETELU), enhancement grants are available for a variety of projects including bridge rehabilitation and restoration, downtown transportation facilities, pedestrian and bike trails.



*Source: Royalton Historical Society*

**Photo 20: Covered Bridge coming down & Iron Bridge going up over the White River, 1902  
(The covered bridge was built in 1848, the iron bridge was built between 1901 – 1902.)**

To enhance downtown revitalization efforts in 1994, the Agency of Commerce and Community Development, the Preservation Trust of Vermont, and the National Main Street Center formed the Vermont Downtown Program. The Program provides technical support to communities interested in using historic preservation as an economic development tool. Nationally, such programs have been very successful. In 2000, Vermont expanded the scope of the Downtown Program to allow smaller villages to participate, known as “Village Designation”.

Yet another innovative program is the Vermont “Barn Again” program which awards matching grants on a competitive basis to farmers for maintaining historic agricultural buildings. This program is sponsored by the Division For Historic Preservation, National Trust for Historic Preservation, and Vermont Agency of Agriculture, Food and Markets.

Lastly, the Vermont Community Development Program, administered by the Department of Housing and Community Affairs, provides grant funds to communities to improve housing, create and retain employment opportunities, and improve public facilities in support of housing and economic development activities.

### **Local Historic Preservation Methods**

Under the provisions of the Vermont Municipal Planning and Development Act (24 VSA §4414) municipalities are enabled to protect areas of historic and architectural significance by designating historic districts or areas as part of local zoning bylaws. Within such areas, prior to exterior modifications to a structure or the erection of a new one, the local planning commission must first grant approval. In making such a determination, the commission must first evaluate the nature of the proposal against specific design criteria to insure that it does not impair the special character or significance of the surrounding area. Within the region, four such bylaw provisions exist and appear to be functioning well. They cover historic districts in Chelsea Village, White River Junction, South Woodstock and Woodstock Village. Throughout Vermont communities have similar provisions in effect. Interest in design review and approval for historic preservation purposes has been on the increase throughout Vermont.

Under the provisions of Act 250, Criterion 8 protects historic sites along with other resources. Before granting a permit, the District Commission or Environmental Court needs to find that the subdivision or development will not have an undue adverse affect on historic sites. Historic sites are defined as those included in the National Register of Historic Places, the State Register, or other properties deemed historically significant by the Division For Historic Preservation (10 VSA §6001(4)). In approaching such a determination, the Act 250 review process can evaluate local and Regional Plans to determine whether or not the proposed project violates a community standard intended to preserve the historic qualities of the site.

Non-regulatory approaches to historic preservation are of equal importance. Local historical societies should continue the research, documentation, education, and advocacy efforts that they have pursued in their communities. Developers should be encouraged to incorporate historic structures and important architectural details into their project planning. The adaptive reuse of old buildings that no longer serve their original function is often preferable to the destruction and replacement of those buildings. Public acquisition and use of particularly important historic buildings may be appropriate when new or expanded public facilities are needed.

### **Goals**

- (1) To preserve and to enhance the unique characteristics of historic sites or areas, where the public interest is clearly benefited thereby.
- (2) To enable and support the renovation of existing or construction of new structures when they are found to be consistent and compatible with historic character of the site or area.
- (3) To promote sensitive economic development in areas of historic value such as in town centers, villages, and hamlets.

- (4) To promote improvements to historical transportation facilities, instead of replacement.

**Policies**

- (1) Land development or subdivision within or immediately adjacent to areas or sites of historic significance should be permitted provided that efforts are taken to insure that the design of the project fits the context of the dominate character of the immediate area or environment.
- (2) Restoration or rehabilitation of historic structures, buildings, neighborhoods, or sites should be encouraged where the design does not destroy or significantly alter its distinguishing qualities, integrity or character and immediate environment.
- (3) Unnecessary destruction or removal of historic structures, buildings, or sites is discouraged.
- (4) When new buildings or structures within historic areas are proposed, they should have a design that is compatible with and sensitive to the character of the neighborhood.
- (5) Public improvements or structures such as bridge rehabilitation or replacement, street widening, roadway reconstruction, signage, utility distribution systems, and lighting should be designed to avoid unnecessary degradation of recognized historic sites or areas. Public investments of regional or statewide significance should be planned in consultation with local and state officials, as well as the Division For Historic Preservation, to encourage compatibility and consistency with their planning objectives.

**Recommendations for Action**

- (1) The Regional Commission should continue to support efforts to designate National Historic Register Districts and Sites. In so doing, the Regional Commission should coordinate with the State and affected municipalities. In accordance with Section 106 of the National Historic Preservation Act, the Regional Commission must review all federally funded projects in the region which affect register properties or places to assure that such publicly assisted projects are planned with due consideration to the resource.
- (2) The Regional Commission, as part of its Transportation Planning Program, should continue its 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. (See Transportation chapter.)
- (3) Towns are encouraged to clearly outline in their plans those resources deemed worthy of protection. Town officials can participate in the Act 250 process, thus influencing decisions affecting historic sites in their community.

## **B. Archeological Resources**

### **Background**

Archeological evidence found throughout the state colors a history of human occupation that dates back 12,000 years. Most native 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. River basins defined community and hunting territories, and provided geographic markers and access to the region. These basins are generally areas that possess suitable characteristics such as slope, exposure, topography, distance to water and access to food sources to make them likely archeological sites.

White settlers first used the rivers for access routes into the wilderness and later cleared the river banks and floodplains for agriculture during the eighteenth century. The early industrial period of the nineteenth century harnessed the rivers' power to supply local mills, water systems, tanneries, forges, and furnaces. Statewide, there are more than 370 historic sites located within a quarter-mile of a river, including historic districts, mills, and covered bridges.

The archeological record provides the only evidence of pre-European human occupation. In addition, the record can provide information about past environments, climate, and landscape changes. Although only a few archeological sites in the region have been designated on the Vermont Archeological Inventory, there are many areas whose topography and proximity to natural resources indicate a likelihood of pre-European habitation. Areas in proximity to certain prominent natural resources should be recognized as areas of archeological sensitivity. As described in the Town of Bennington's Archeological Survey, prominent resources include the following:

- (1) Current or relic water supplies — including streams, rivers, lakes, ponds, and springs. Topographic clues to relic water supplies include kettle holes and dry ravines. Long-term occupation or camp sites were always located near a water supply.
- (2) Chert or quartz outcrops — These sites were often used repeatedly on a short-term basis for extraction of materials for tool-making. The terrain of such sites is often rugged; short-term camps may be located nearby.
- (3) Rock-shelters — Often located in limestone outcroppings, these sites were often transient sites used for generations.

Most prehistoric sites are located within 300 to 500 feet from 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 permitting process 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 archeological sites may be located on private land. For areas of potential archeological significance, private landowners need to know how best to preserve important resources on their land. Since many archeological resources are located in areas such as river corridors and prime agricultural land, preservation and conscientious management of

such land will serve multiple purposes. As with any land conservation project, purchase of land and acquisition of development rights are important methods for preserving archeological sites.

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

<b>Figure 7: Predictive Factors for Locating Pre-Historic Archeological Sites</b>
▶ Near to Existing or Relic Rivers, Streams, Lakes, and Ponds
▶ Adjacent to Wetlands in Excess of One Acre
▶ Near the Confluence of Rivers and Brooks
▶ Adjacent to Falls, Rapids, and Isolated Springs
▶ Near to Knolls, Ridges, Crests, Terraces, Outcrops or other Topographic Outbreaks
▶ Near Major Floodplains or Alluvial Terraces
▶ Adjacent to Caves or Rock-shelters

*Source: Vermont Division for Historic Preservation, Environment Predictive Model, April 1995*

**Goals**

- (1) To preserve archeological resources within the region, and to promote an appreciation of their value as a vital aspect of the region’s historic and cultural past.
- (2) To better integrate comprehensive planning and land use development with archeological resource protection at the federal, state, regional and local levels.

**Policies**

- (1) Archeological resources are recognized as important links to the region’s prehistoric and historic record, and are important components of our landscape. Such known and potential resources must be protected where the public interest is clearly benefited. No land development should be permitted when it results in unnecessary loss of an archeological resource of state or federal significance.
- (2) Within archeologically sensitive areas, planning should consider the impacts a project may have on the resource. If warranted, a site inventory should be conducted as part of project planning. Projects that unduly impact these resources should be discouraged or redesigned so as to mitigate the impact. Project planners are encouraged to contact the State Archeologist for further information.
- (3) To preserve significant archeological sites, purchase of land or development rights is encouraged when such actions are compatible with local plans and this Plan. Because these sites are often farmland, floodplains, wetland margins, and other similar low-lying land, priority should be given to projects which serve multiple conservation purposes.

### Recommendations for Action

- (1) To increase public awareness of archeological resources, the Regional Commission encourages archeologists, local and regional groups, towns, and landowners to organize educational programs focused on Vermont. 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 interest groups are encouraged to develop an archeological plan for their community as part of the overall master planning program. Such a plan could contribute to an important step in planning for future development in identified areas or areas most likely to contain sites. Assistance and guidance are available from the State Archeologist within the Division for Historic Preservation.

## C. Scenic Resources

### Background and Goals

The landscape of the region is an economic asset. It represents some of the finest examples of townscapes and rural scenic character in the world. It has tangible economic value. Tourists spend money in the region because they are attracted to the scenery, values, and quality of rural life. Tourism is a significant industry in Vermont's economy.



*J. Colby © 2006*

**Photo 21: Dairy barn on the Beidler Family Farm in Randolph Center  
An illustration of “rural scenic character”.**

In Vermont, the economic value of scenic resources to tourism cannot be lightly brushed aside. The public's commitment to conservation of our visual resources can be traced to the late 1960s with the passage of Vermont's anti-billboard legislation. This legislation was strongly endorsed by the Vermont Hotel and Motel Association which recognized the direct economic relationship between land conservation and a growing tourism sector. A past Governor's Commission on the Economic Future of Vermont summarized: “we consider Vermont's environment to be the goose that lays golden eggs”. All municipal plans prepared and adopted by member towns in the region consistently stress the goal of coordinating economic development with maintenance of rural character. The Regional Commission believes it is appropriate public policy to recommend standards which, if reasonably followed, will minimize or mitigate any adverse effects of development on recognized scenic resources.

### **Patterns For Development - A Community Standard**

The inherent beauty of the region is tied to the visual relationship between buildings, the working landscape, and its mountains and river valleys. Over the past thirty years, development patterns have emerged which propagate highway strip development. Such a land use pattern will serve, amongst other factors, to destroy the transition between town village centers and the countryside. It is not in the public interest to promote or endorse such a sprawling pattern of development in this region. Continued emphasis and restructuring of municipal planning and zoning administration, that addresses the delicate balance of the landscape elements mentioned above, can effectively preserve the landscape heritage in many areas of the region. Act 250 is not the answer. It is not intended to ensure a specific pattern of development, but only to evaluate projects on an incremental case-by-case basis.

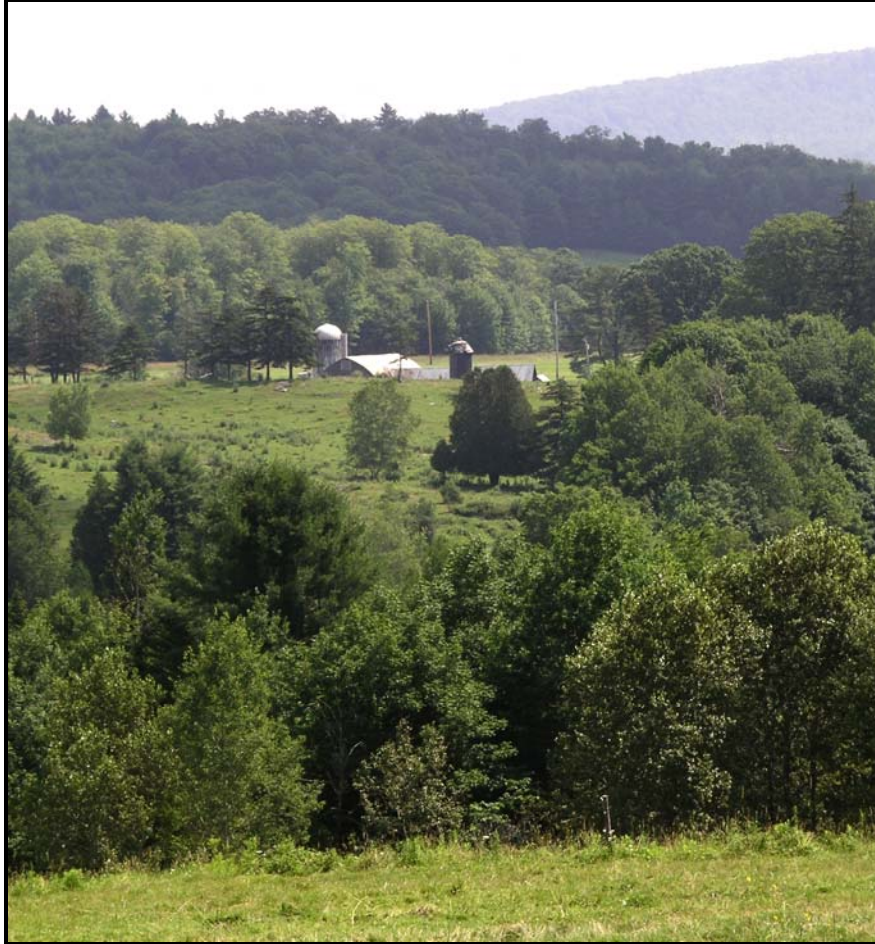
The region's landscape is also changing due to a gradual reforestation and loss of fields and meadows due to a reduction in agriculture. The resultant land use pattern is a product of economic forces which can permanently alter or pressure that landscape. The Regional Commission supports a land use planning concept which encourages a pattern of development that complements the traditional settlement pattern clearly recognized and existing in the region. Determining scenic significance and evaluating the probable impacts of land development or subdivision on the resource and the recommended measures that may be desirable to mitigate visual impacts is a complex matter. Projects which are planned in areas of scenic significance are more likely to impact the resource. It is appropriate that municipalities, the Regional Commission and other entities employ a process for evaluating impacts and to recommend design characteristics to be considered by those involved in the review and preparation of development proposals.

### **Prominent Landscapes**

The following areas are likely to be affected by projects and should be reviewed. Such areas are generally accepted as areas of scenic significance:

- (1) shorelands immediate to public lakes, rivers, or ponds;
- (2) areas immediately adjacent to scenic corridors;
- (3) prominent ridgelines, mountain tops, or excessively steep slopes that can be readily viewed from public corridors;
- (4) exceptional agricultural and historic areas, recognized as outstanding resource values;
- (5) areas within or immediately adjacent to natural areas (i.e. wetlands) designated by the State; and
- (6) areas of high scenic quality which are publicly recognized as exceptionally unique or are noted examples of the dominant characteristics of an area in the region.





*J. Colby © 2006*

**Photo 22: View from the Beidler Family Farm in Randolph Center  
An illustration of diversity, harmony, focal dominance and intactness.**

There are several kinds of scenic landscapes ranging from villages, urban centers to distant mountain views. Their relative importance is dependent on the several characteristics which make some landscapes more scenic than others. These characteristics are:

- (1) Landscape diversity - a combination of scenic elements which increases the effect, including:
  - (a) topographic variation;
  - (b) mixture of open meadows and woodlands;
  - (c) water;
  - (d) distant views; and
  - (e) mixture of vegetative types.
  
- (2) Extent of Order or Harmony in the Manmade Landscape - Landscapes that contain a sense of order or logic, such that a clear sequence of villages and surrounding rural countryside exist. The cultural landscape that is represented by sprawl becomes indistinguishable and often chaotic. Order is heavily influenced by the following:

- (a) scale of building;
  - (b) pattern of buildings; and
  - (c) architectural similarities in form, size, or other factors.
- (3) Focal Dominance - Natural or manmade landscapes that are clear and dramatic focal points are more sensitive to scenic disruption; and
- (4) Intactness/Uniqueness - Landscapes that have retained traditional patterns or forms or have absorbed modern development with minimal disruption are unique and are more likely to contribute to the scenic quality of an area.

#### **Prominent Ridgelines or Mountain Tops**

Where land development or subdivision is proposed on a prominent ridgeline or mountain top and visible from a scenic corridor, design plans should work toward the goal of retaining its prominent natural appearance. To accomplish this, structures or buildings are encouraged to locate away from the highly visible ridgeline to a lower backdrop on the hillside and structures should be partially hidden within existing wooded hillsides, where possible, and avoid excessive use of reflective glass.

#### **Highly Scenic Areas with Distant Views**

Where land development or subdivision is proposed in the foreground of a highly scenic location with distant views, design plans should work toward the goal of retaining or enhancing the view. New buildings or structures should be as unobtrusive as reasonable. To accomplish this, structures or buildings are encouraged to be designed so as to be compatible with the traditional pattern, scale, size, form, etc., and not unnecessarily block distant views from highways noted as especially scenic. Buildings or structures are encouraged to be sited in less visible areas such as at the edges of or within wooded areas rather in open meadows. Clustering of buildings or structures is encouraged to leave vistas open on the site. Design of structures which is not excessive and do not unduly compete with the existing natural or cultural focal point is encouraged.

#### **Scenic Agricultural Land**

Where land development or subdivision is proposed on highly scenic agricultural land within a scenic context, design plans should work toward the goal of retaining the overall quality of the scenic area and of minimizing loss of the agricultural potential of the land. To accomplish this, structures or buildings are encouraged not to be sprawled over the entire site, leaving areas that are unusable for agriculture. In the alternative, development or subdivisions should be planned so that structures are clustered or located in a manner that remaining land is made available for practical use as open land, cropland, or hay-land. Common access drives to properties are encouraged. Location of utilities and common access drives is encouraged on the site away from productive agricultural land and in a manner to minimize visual impact on the scenic resource.

**Scenic Areas Highly Visible from a Public Corridor**

Where land development or subdivision is proposed in scenic areas highly visible from a public corridor, design plans should work toward the goal of minimizing the adverse visual impacts often associated with large-scale box-like buildings and/or large lot parking areas. To accomplish this, structures, buildings and other site improvements should be planned so that building form, massing, and other features are compatible with dominant patterns of the area or site and in ways that reduce the apparent scale of the project on the site. Design planners are requested to break large parking areas into smaller lots with ample landscaping or screening from off-site views, and to locate the project on the less scenic areas of the site. Prominent grade changes that starkly contrast with existing or surrounding contours are discouraged.

**Built Environment with Scenic Value**

Where land development or subdivision is proposed within or adjacent to a built environment noted for its exceptional scenic value, including historic sites or areas recognized by the State of Vermont or municipalities, design plans should work toward the goal of minimizing contrast with the exceptional resource and to enhance visual quality. To accomplish this, project planners are encouraged to site buildings and structures that are compatible with the scale, massing, texture, or otherwise respect the pattern of nearby structures. Plans that promote large box-like structures which sharply contrast with existing scenic resource values are not recommended, particularly where the composition of the overall project is highly visible from public viewpoints.

**Industrial or Commercial Development in Areas of Scenic Value**

Where single purpose developments such as industrial or office parks, or shopping centers are proposed in areas of exceptional scenic value, design plans should work toward a goal which reflects the traditional settlement pattern and characteristics of the area. To accomplish this, project planners must design the site so the development does not appear to be grossly out of scale with its surroundings. It must not extend or enlarge existing patterns of development that are deemed unacceptable (e.g. strip development). Design solutions should respect location and design of the project to minimize visual intrusion on the most valuable scenic attributes of the site. They should respect the natural contours of the land, utilize, where necessary, landscaping which harmonizes with existing vegetation to create project buffers and screening of buildings, and to encourage pedestrian access and internal circulation.

**Policies**

- (1) Where development is proposed in areas of scenic value - because they possess scenic views, contain land with historic or scenic significance, or are highly visible within a scenic context, design plans must:
  - a) Maintain the prominent natural feature of the developed area;
  - 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;
  - e) Reflect traditional settlement patterns.
- (2) Certain areas immediately adjacent to major highways are examples of development sprawl. They adversely affect scenic resource values of the traveler. Generally referred to as strip development, buildings, parking lots, and signage are oriented to the automobile rather than the pedestrian. Because strip development lacks focus or orientation, it is generally considered confusing and inhospitable. Such forms of development are generally considered contrary to the preferred development pattern of this region.

In spite of the general policy that strip developments are to be discouraged and contrary to the spirit of this Plan, it is recognized that certain areas have been or will be developed or redeveloped principally for commercial or industrial uses.

To the extent feasible, project planners are encouraged to minimize the adverse effects of strip development on existing visual resources by consideration of the following design principles:

- (a) provide pedestrian and vehicular links between projects;
- (b) reduce impacts of parking areas by breaking the lots into small groups with integrated landscaping;
- (c) encourage compact and densely developed projects which utilize land efficiently;
- (d) preservation of open space, if appropriate, be of a distinct area of visual or functional importance rather than useless bits of greenery between buildings, etc.;
- (e) placement of street trees which act as buffers between traffic arteries and internal drives;
- (f) use of signage and other structures that effectively communicate the desired message or use of the site without being garish;
- (g) layout of the project site to allow for coordinated future use of the entire parcel;
- (h) reduction of apparent scale of excessively large buildings by varying the pattern, number, size, and location of structures within the site;
- (i) employ screening plans for visually objectionable features on the site, including dumps, refuse disposal sites, and building equipment; and
- (j) minimize access roads or curb cuts onto public highways and use of common access drives.

- (3) An integral scenic element of the rural countryside is the extensive network of roads which comprise town and state highway systems. These roads are often characterized by relatively narrow roadways of diverse and contrasting features in close proximity. These characteristics combined provide a unique visual experience and awareness of the landscape. With some exception for principal arterials, it is in the public interest to retain these special features. Given their unique visual experience, roads exhibiting exceptionally high scenic and cultural values, and determined to be of local or state significance should 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 which unnecessarily destroy the special characteristics of such roadways are not consistent with this Plan. Use of appropriate design standards is encouraged and should be related to highway functional classification.

#### **D. Scenic Values and Telecommunications Facilities**

##### **Background**

The Regional Commission recognizes that transmission towers are necessary telecommunications facilities, but as land uses, these towers have emerged as planning concerns. To ensure adequate transmission of signals in mountainous areas such as this region, towers and related facilities need to be confined to hilltops or high elevation points. Thus, due to their higher visibility from multiple vantage points, conflict with scenic landscapes has become an issue.

Over the years, the District Environmental Commission III, in its administration of Act 250, and some municipalities as part of their zoning review, have had to evaluate these uses. Some cases have been contentious, resulting in delays and expensive appeals. Most local plans and bylaws lack definitive policies, standards of review, or key information necessary to enable a fair and comprehensive evaluation of the impacts posed by these issues.

The Regional Commission is aware of the potential problems and opportunities associated with these uses and have devised land use policies and standards to assist in mitigating conflicts and to give constructive guidance to the industry and affected municipalities. As a result, municipalities have begun adopting telecommunications tower language in Town Plans and have adopted zoning provisions.

The Federal Communications Commission (FCC) retains jurisdiction over public airwaves and the telecommunications industry in general. Additionally, the Federal Aviation Administration (FAA) exercises control over the location and height of towers and similar structures to prevent interference with airport operations. Under Vermont law (24 VSA Chapter 117), municipalities may require that certain standards be met prior to the erection of telecommunication facilities. Local bylaws may regulate the use, dimension, location, and density of towers, however, FCC rules are preemptive of local and state law where conflicts exist. Current practice within the FCC is not to specifically regulate the location, height, or design of individual owners.

However, FCC uses the “central point doctrine” that provides for the location of transmission antenna to be at the “most central point at the highest elevation available”. Given, this rule and

others promulgated by the FCC, municipalities and the State may not be overly restrictive of or prohibit these types of facilities. In sum, the extent of local and state regulation is limited, must be reasonable, and serve the public interest.

In late 1994, the Cellular Telecommunications Industry Association requested the FCC to push state and local governments out of the siting process entirely. Additionally, bills were introduced in Congress to limit local and state authority over telecommunications. Most of these actions have been opposed by state and municipal organizations, and are viewed as unnecessary invasions of state and local control. The Regional Commission does not favor preemption and supports cooperative efforts between the industry, the State, and municipalities to plan and regulate the future build-out of the telecommunications system affecting the region. The 1996 Telecommunications Act ensures a local voice in siting decisions.

### Goal

- (1) To improve telecommunication coverage in the region.
- (2) To support the enhancement of telecommunications network when such facilities do not have significant adverse environmental, health, or aesthetic impacts.

### Policies

- (1) In order to minimize tower proliferation, it is the policy of the Regional Commission to encourage applicants to exhaust all reasonable options for sharing space on existing towers or tower sites prior to proposing new towers sites and related facilities. The principle of co-location is the favored alternative. In making such a determination on the feasibility of co-location, proposers should evaluate space available on existing towers, the tower owners ability to lease space, geographic service area requirements, mechanical or electrical incompatibilities, the comparative costs of co-location and new construction, and regulatory limitations.
- (2) One of the region's principal scenic qualities are its ridgelines and mountainsides. These areas are significant contributors to the rural character of the region. The ridges are predominately undeveloped and provide an unbroken skyline viewed from the valley floor. The use of the region's ridges for telecommunication towers and related facilities needs to be undertaken in a manner that will not unduly detract nor adversely affect these scenic values. Protection of these areas from insensitive developments are matters of public good. To minimize conflict with scenic values, co-location is the first choice, followed by an analysis that provides the least impact for the desired coverage. Facility design and construction should employ the following principles:
  - (a) use the minimal height necessary, and where feasible, be sited in areas not highly visible to the traveling public, or from residential areas, historic districts, and public use areas or outdoor recreation areas such as hiking trails and beaches;
  - (b) be located in forested areas or be sufficiently landscaped to screen the lower sections of towers and related ground fixtures from public vantage points, such as trails, roads, or water bodies;

- (c) utilize materials, architectural styles, color schemes, lighting fixtures, mass and other design elements to promote aesthetic compatibility with surrounding uses and to avoid adverse visual impacts;
  - (d) where prominent views of a site exist, be located downgrade of the ridge so as not to exceed the elevation of the immediate ridge;
  - (e) where construction of access roads, power or phone lines are involved, minimize their visibility by constructing them along the contour of the land and avoiding any open fields or meadows. This is also intended to reduce their ability to encourage secondary development;
  - (f) avoid peaks and ridges which function as regional focal points.
- (3) In planning for telecommunication facilities, consideration should be given to the environmental limitations of any given site. Impacts of the use on wildlife habitats, soil erosion, forestry and agricultural lands, and similar resources should be carefully addressed. Projects which materially impact these resources are discouraged.
- (4) For telecommunication projects situated on lands owned by the State, design plans should be compatible with current Management Plans for Public Lands adopted by the Agency of Natural Resources.
- (5) Towers, antennae, and related fixtures that fall into disuse, or are discontinued should be removed to retain the values set forth above. Local and state land use permits should incorporate such as an approval condition.
- (6) When facilities and tower configurations are dependent upon others being constructed along a corridor, then the entire string of facilities should be considered as a whole so that piece-meal permits do not preclude more amenable options.
- (7) The clearing of land associated with site development for tower and facility construction should not negatively impact the scenic views present.
- (8) Towers or facilities that are designed to resemble trees or natural features should not be placed conspicuously higher than the tree line.

## **E. Outdoor Lighting Design and Management**

### **Issues and Opportunities**

Increased development in the region in recent decades has brought about a corresponding increase in the use of outdoor lighting. These include new parking lots, brighter street lighting in our towns and villages, floodlights on commercial and industrial complexes, and lighted gas station canopies at our interchanges and along our major roads. While increased lighting can be

seen as an inevitable result of growth, there is a concern that excessive and unplanned lighting results in unwise and uneconomic energy use, contributes to “light pollution”, affects our ability to view the night landscape as well as creating an adverse impact on the character of our historic villages.

With the advent and increased use of new lighting technologies since the 1950s, commercial enterprises, industry, towns, and others have new tools to shape the nighttime environment. Many of these new lighting installations are well-designed, provide good night vision at reasonable levels and fit well into their immediate surroundings. Others do not. Problems of glare, over-lighting, light escalation, sky-glow, and energy waste have become more common.

Planning commissions, developers, and regulatory review agencies often lack information and expertise to adequately review design lighting schemes that reflect the basics and principles of good lighting design. This Section is intended to provide guidance and standards to assist policymakers in evaluating lighting issues, opportunities, and costs. It is also intended to provide communities with clear policy statements to enable them to evaluate new lighting installations located on public and private property.

Lighting is more than a functional part of the region’s infrastructure. It is a design tool that can influence and shape the night landscape in our villages and outlying areas. Choosing the 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. This results in a more efficient and compact land use pattern and sound transportation strategy for the region. Thus, functionally, good lighting design will lead to enhanced night environments.

In May, 1996, the Chittenden County Regional Planning Commission published: *Outdoor Lighting Manual For Vermont Municipalities*. The study was funded by the U.S. Department of Energy, The Vermont Department of Public Service and several of Vermont’s electric utilities. This study is a valuable resource to the region and its communities interested in managing outdoor lighting, improving lighting designs, energy conservation, and preservation of the night landscape. The suggestions and recommendations contained in the Manual form the basis of many of the design principles and issues are reflected in this Section of the Plan.

The purpose of an outdoor lighting installation should be to enhance the visibility necessary to provide lighting for a given task or need. Using a large quantity of light does not guarantee good visibility, however. Over lighting can cause glare and other problems that hinder good vision. Lighting problems arise when competing properties are illuminated at very different levels. For example, a brightly lit auto sales parking lot situated next to an adequately lit restaurant can make it look dark by comparison. Studies have shown that this leads to “competitive” lighting - more light is added to reduce the risk of not being seen. This results in more lighting equipment, and higher electric bills for businesses, and the loss of character in an area.

Excessive light levels can vary according to the use. Conventional parking lots generally need higher light levels than passive recreational parks. Using the minimal amount of light necessary to allow adequate visibility for a site decreases sky-glow and avoids escalation of light levels.



Glare is another lighting issue facing growing communities in the region. Excessive brightness makes it difficult to see. Good visibility can be accomplished with less light. Glare is caused by misdirected fixtures or unshielded lamp sources. Light that is not directed toward the ground or toward the intended surface can shine into the viewer's eyes, impairing vision causing potential safety problems.

With the advent of many new types of lamps, modern lamps come in a variety of colors depending on type and lamp intensity. Color is an issue for exterior lighting. Certain lamps color differently and can significantly change the natural color of an object or make it difficult to distinguish one color from another. Since the early 1970s energy crisis, large-volume users of electrical lighting have sought alternatives to conventional lighting. Several towns and many businesses in the region have retrofitted street lighting and parking areas to high pressure sodium fixtures (HPS). This has resulted in the orange-yellow light that significantly changes the color of the night landscape.

Sky-glow or reflected light from surfaces is visible in the night sky over towns or large commercial/industrial complexes. Sky-glow is a form of "light pollution". Sky-glow contributes to a loss of our ability to see stars and other celestial elements of our galaxy. Reducing sky-glow is a desirable objective for the region. Techniques to reduce the amount of illumination shining directly into the sky can reduce sky-glow and the overall level of lighting to be used.

Security lighting is another popular use of outdoor lighting designed to protect people and property. Interestingly, studies by lighting professionals and those in the field of security show that light itself does little to prevent crime. (See Chittenden County Regional Planning Commission "Outdoor Light Manual For Vermont Municipalities", May, 1996, pps. 19-20.) Other factors, such as gates, locks, alarm systems, and guards are far more effective means to deter crime. In spite of this, lighting can act as a deterrent to crime by psychologically increasing the chance to an offender that he or she will be seen. Therefore, good security lighting should be designed to produce good visibility. This should be accomplished with even light that is not too bright to produce glare or to create shadows.

### Goals

- (1) To preserve the nighttime ambiance and aesthetic qualities of village centers and other places by illuminating them for safety and convenience in ways that enhance the best qualities of streets, architecture, and public spaces.
- (2) To enable outdoor lighting systems that conserve energy and minimize life cycle costs.
- (3) To encourage lighting design that is creative and functional consistent with these lighting goals and policies.
- (4) To provide technical guidance and support to municipalities and others on lighting trends, needs, and opportunities.

## Policies

- (1) In developing lighting plans, observance of good design light levels and distribution should be appropriate for the proposed use of the site and compatible with the character of the neighborhood. New lighting installations should be designed to minimize glare, 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). Such information will be useful in evaluating and developing lighting schemes for particular uses and settings, but not necessarily in all situations. Additionally, project planners should give due consideration to the guidelines set forth in the “Outdoor Lighting Manual for Vermont Municipalities”. Design criteria that exceeds IESNA recommendations for outdoor lighting should be evaluated for conformity with this Plan, particularly as they may relate to the effects on the character of the area and aesthetics.
- (3) Project designers are encouraged to utilize fixtures to reduce glare. Where a light source is particularly bright compared to its background, use of cut-off or shielded fixtures to direct light downward or a reduction on the amount of light being generated is encouraged. Such a practice should utilize lighting more efficiently, minimize the amount of wasted light, and reduce energy costs.
- (4) Excessively high lighting levels for uses in rural or very low residential areas are inappropriate. Where neighborhoods are characterized by heavy traffic, larger facilities (i.e. schools, and industrial plants), or high parking turnover rates, higher lighting levels may be appropriate. Where high ambient or background lighting levels are adjacent to planned uses, such levels should be considered when evaluating light levels for new installations.
- (5) The lighting of gasoline stations and convenience stores, and some types of commercial establishments (e.g., automobile sales) have or may become lighting problems in the region. Such facilities are typically far more brightly illuminated than neighboring properties to attract attention and business. Glare is produced which hinders visibility for pedestrians and drivers on nearby highways. Lighting levels for these uses and similar uses should only be sufficient to the facilitate the activities taking place in such locations. Lighting schemes that serve as advertising or to attract attention to these uses should be discouraged. Signs or other forms of advertising should be used for these purposes. Excessive pole height and bright lighting fixtures should be prohibited.
- (6) Illuminated signs that are excessively bright, causing glare and illuminating surrounding areas are inappropriate. Large illuminated signs can be disruptive to rural areas or historic villages and should be carefully evaluated and discouraged.
- (7) Lighting designs should address the negative effects of sky-glow. Project designers should advocate for lighting plans that minimize light pollution without unduly

compromising safety, security, or utility. Methods to be considered for minimizing sky-glow are:

- directing luminaries downward toward the ground;
- using low pressure sodium lamps;
- turning lights off after hours;
- reducing illumination levels; and
- prohibiting rays of light from being emitted above 90 degrees from luminaries.

- (8) Outdoor lighting schemes should employ generally available mitigating steps to improve its harmony with its surroundings taking into consideration, among other things, the type and density of land use presently in existence, the type of topography, and whether the area has scenic value.

### **Recommendations for Action**

- (1) Public interest in outdoor lighting issues and opportunities is growing. The Regional Commission should assist local and state policymakers in evaluating lighting options. The Regional Commission should consider sponsorship of educational workshops for planning commissions, design professionals, and others to acquaint them to the principles of good lighting design.
- (2) 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 to cover lighting installations in all or parts of the Town.
- (3) Regional Commission staff should continue to work with the Vermont's public utilities and design professionals to evaluate lighting technologies and efficiencies.

## VIII. HOUSING RESOURCES

### A. Background

#### General Trends

The region enjoyed the benefits of steady economic growth over the past fifteen years, but housing development did not keep pace with the economic development that occurred. The result was a shortage in the supply of housing and escalation in housing costs and values. At the same time, the second-home market became an even larger component of the regional housing market.

Housing costs have continued to grow faster than incomes. This, coupled with the limited housing supply, has restricted first-time home-buyers from getting into the market. Today, those with housing needs include an entirely new segment of middle-income families. A new generation of starter households, municipal employees, teachers, service workers, and skilled trades people are confronted with limited housing options and high costs.

Outlined below are the key factors that affect the cost and availability of housing in this region:

1. Average prices of houses have risen at a faster rate than consumer prices and personal income. This has created an “affordability gap” in the housing market.
2. Land, as a commodity, has become a favorable investment. Land values, until recently, have increased at a much higher rate than other components of housing, including labor and materials for home construction.
3. New home purchasers’ demand for increased floor-area and other quality features have contributed to increases in sale price.
4. The changing demographics of the region have affected the supply of housing. The baby-boom generation of Vermonters, a swell of population, reached an age where home-ownership became a primary need. This increased demand for housing has contributed to the shortage in the region. Additionally, the growing trends of single-person households, and elders living in their homes longer, have affected price and availability.
5. Revision to tax codes (Tax Reform Act of 1986) made the second home market stronger. The elimination of other tax shelters for upper income earners created an incentive for second home purchases placing increased demand on housing in the region. Overall construction continued toward lucrative vacation units and away from year-round units.

One economic consequence of the housing shortage has been the increase in the average commuting time to work. While housing development has occurred in traditional centers, most of the single-family development in this region has occurred in the towns which border these centers. Land and homes are more favorably priced in outlying towns, but there are costs associated with longer commutes, clearing undeveloped land, building roads, and using private

water and septic systems. The cost of land and housing is a function of access, and travel time to key service, retail, and employment centers.

Another consequence of this emigration to the smaller outlying towns has been the impact of growth on those communities. The increase in the school-aged population, and the costs of their education, is the biggest of these impacts. According to *The Land Use - Property Tax Connection* (2002), seventy-two percent of any town's overall budget is the school budget. The result is an increase in the demand placed on educational facilities, and the additional burden placed on taxpayers to cover the costs of staffing or building larger schools, or transporting children to regional schools.

Often, these rural communities have larger residential populations which are at-or-below the median income levels; the ability of these communities to finance the impacts associated with new growth is strained. Accordingly, voters have been more inclined to support the development of second-homes/vacation-homes because they are seen as a net-gain; they contribute to the tax base without requiring many services beyond road maintenance. Several towns in the region have been assuming a disproportionately larger share of the local fiscal impacts of the region's tight housing market.

The trends associated with housing demand and growth will continue. The issues of fiscal impact will not disappear, regardless of whether housing is characterized as affordable or not. The decision facing town governments is whether they will take affirmative steps to welcome the development of affordable housing, or participate in programs that benefit Vermonters who are at risk in terms of housing but who offer valuable contributions to the ongoing life and character of the region, or not.

The measure of affordability is that an individual should not pay more than 30% of his or her total income for housing and housing-related expenses. If a resident, in a rental or owner-occupied unit, is spending more than 30% of income on housing, it is not considered affordable for that household. The disproportionate housing costs are straining all other financial decisions, long-term and short-term. Thirty percent is universally employed in housing data analysis and in financial and banking transactions, such as determining mortgage eligibility requirements.

### **Regional Housing Concepts and Fair Housing**

Low and moderate income households continue to have difficulty finding affordable housing in desirable areas, and the housing shortage throughout the Upper Valley has made the market even tighter and more expensive. Land-consumptive large-lot, single-family development, and land conservation, are taking place in many of the region's towns. Some of the region's villages have public water and sewer systems, but many of our smaller villages rely on private water supplies and septic systems. If the region is to provide for a full range of housing choice, financial and otherwise, where should the new growth occur? Town Plans should list sites that the town supports as financially and environmentally appropriate for the development of affordable housing.

All towns are responsible for providing a realistic opportunity for the construction of their share of the region's housing supply that would be affordable to people making 80% of the median

income, or less. The “fair share” housing concept originated from the Mount Laurel legal decisions. The Mount Laurel cases, decided by the New Jersey Supreme Court in 1975, concluded that a developing municipality must, by its land use regulations, make realistically possible an appropriate variety and choice of housing. A municipality cannot foreclose the opportunity of any class of people, especially low and moderate income families, to acquire housing in the municipality. Regulations must affirmatively afford that opportunity at least to the extent of the municipality’s fair share of the present and prospective need. Mount Laurel’s principal argument in support of its zoning plan limiting housing was advanced as a fiscal argument, designed to limit an increasingly heavy burden on local taxes for municipal and school costs by homeowners. While the Court was sympathetic with the need to control costs, it found that the municipality could not legitimately accomplish this end by restricting certain types of housing (i.e. mobile homes and multiple housing dwellings). [South Burlington County NAACP v. Mt. Laurel, 67 NJ 151 (1975)]

Federal law prohibits housing from being denied on the basis of race, color, national origin, religion, sex or familial status (having children). In addition to these characteristics, Vermont law extends protection and prohibits housing from being denied on the basis of sexual orientation, age, marital status or because a person receives public assistance. Where appropriate, towns should explore cooperative agreements with their neighbors and housing providers to promote a cooperative team approach to housing planning and development in the region. No single town should be burdened with the responsibility of addressing affordable housing needs alone. It is in the region’s interest to affirmatively advance the theory of fair share housing.

### **Vermont Statutory Housing Requirements**

The Vermont Municipal and Regional Planning and Development Act (24 VSA Chapter 117) places responsibilities and requirements on municipalities and regional commissions. Essentially, the Mount Laurel concept discussed above has been integrated into the Act in §4412. Exclusionary zoning practices are expressly prohibited. All housing is to be treated equally including accessory dwelling units, multi-unit residences, mobile homes, mobile home parks, modular or prefabricated housing, and residential care or group homes.

From the Act, §4382: “A plan for a municipality, . . . , and shall include the following: (10) A housing element that shall include a recommended program for addressing low and moderate income persons’ housing needs as identified by the regional planning commission pursuant to §4348a (a)(9) of this title.”

The Act was amended in 2004, further supporting the development of affordable housing. One example is the change in permit status for “accessory dwelling units”. An accessory dwelling unit is an efficiency or one-bedroom apartment that is clearly secondary to the owner-occupied residence, but it does not need to be physically attached to it. State law used to protect accessory dwelling units as allowable conditional uses in any town in the state; as of September 1, 2005, they are now protected as permitted uses anywhere in the state.

A new section was added to the Act empowering the Vermont Attorney General to investigate complaints. From §4453 – Challenges to Housing Provisions in Bylaws: “The attorney general or a designee shall investigate when there is a complaint that a bylaw or its manner of

administration violates subdivision 4412(1) of this title, relating to equal treatment of housing and adequate provision of affordable housing.” If the violations continue after being told to correct them, the court shall order the municipality to grant all requested permits and certificates of occupancy that were wrongly denied.

Another addition was the creation of powers and duties for municipal housing commissions. From §4433 - Advisory Commission and Committees: “Municipalities may at any time create one or more advisory commissions , . . . , or a combination of advisory commissions to assist the legislative body or the planning commission in preparing, adopting, and implementing the municipal plan. Subsection 4433 (5) lists the powers and duties of housing commissions. Here’s an abbreviated list:

- (a) Make an inventory and identify any gaps;
- (b) Review municipal regulations and make recommendations like increasing allowable densities to increase the possible number of affordable housing units;
- (c) Assist appropriate municipal panels and district environmental commission by providing testimony on the housing needs in town when there is a pertinent application before them;
- (d) Cooperate with the legislative body, planning commission, zoning board of adjustment, sewer or water commission, road foreman, or other organizations on affordable housing;
- (e) Collaborate with not-for-profit housing organizations, government agencies, developers, and builders in pursuing options to meet the housing needs of the local residents.

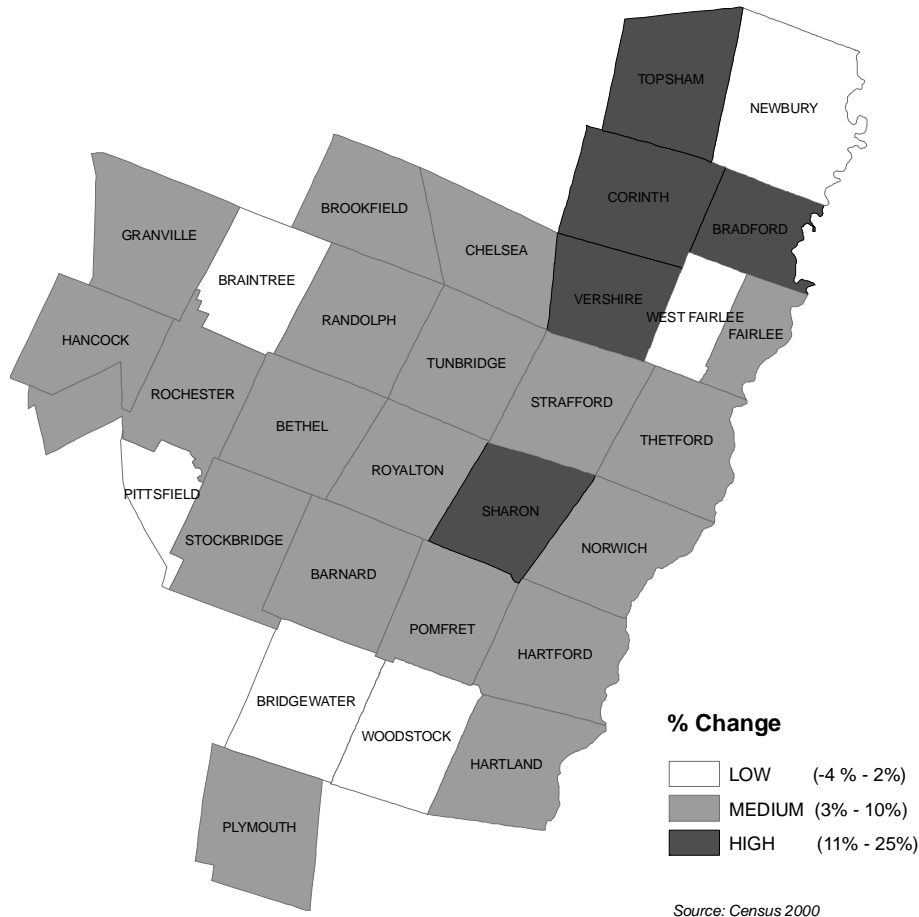
### **Upper Valley Housing Coalition**

Formed in 2001, the Upper Valley Housing Coalition is a bi-state coalition made up of the Regional Commission, Twin Pines Housing Trust, major employers, legislators, developers, lenders, local citizens, planners, and citizen planners; the Regional Commission was a founding member of the Coalition. The Coalition was formed to address the shortage of housing (especially housing affordable to the workforce), and to address the impact the development would have on the Upper Valley. The Coalition’s ultimate goal is to operate a loan fund, made up of locally-raised private capital, which would be used to assist with the costs of housing down payments, closing costs, legal fees, etc. The Endorsement Guidelines are the first in a series of tools to be put forth by the Coalition. The Guidelines describe the kind of housing development that is needed and would be an asset to the Upper Valley. <http://www.uvhc.org/downloads>

**B. Housing Characteristics**

**Number of Housing Units**

The U.S. Census defines a “housing unit” to include conventional houses, apartments, mobile homes, and rooms for occupancy. According to the 2000 Census there were 28,831 housing units in the region. There were 26,898 housing units in the region in 1990, and 21,898 units in 1980. The growth rate for the region over the 1990s was 7.2%, this was less than a third of the 22.8% growth rate experienced over the 1980s. The region gained 1,933 units over the 1990s, and 5,000 units over the 1980s. The region and state grew at nearly identical rates from 1980 through 2000, 31.7% for the region and 31.9% for the state.



**Figure 8: Percentage of Change in Housing Units from 1990 - 2000**

During the 1990s, the towns in the region experienced rates of housing growth from a high of 25% to a low of -4%. Vershire experienced the most dramatic change, a town of 302 housing units added 76 new units and experienced a growth rate of 25.2%; a quarter of their entire housing stock was built in the last decade. The following four towns experiencing the next highest rates of growth in housing units: Corinth (17.8%), Topsham (15.5%), Sharon (14.7%), and Bradford (13.2%). Both Sharon and Topsham have been in the “high growth” category in



each of the past two decades; they experienced a large amount of housing development in proportion to their existing housing stock.

	1980 Housing Units	1990 Housing Units	2000 Housing Units	Change in Units 1980 - 1990	Percentage of Change 1980 - 1990	Change in Units 1990 - 2000	Percentage of Change 1990 - 2000
Barnard	555	607	629	52	9.4%	22	3.6%
Bethel	823	888	956	65	7.9%	68	7.7%
Bradford	955	1,075	1,217	120	12.6%	142	13.2%
Braintree	507	570	567	63	12.4%	-3	-0.5%
Bridgewater	486	571	582	85	17.5%	11	1.9%
Brookfield	457	565	602	108	23.6%	37	6.5%
Chelsea	510	610	657	100	19.6%	47	7.7%
Corinth	512	618	728	106	20.7%	110	17.8%
Fairlee	460	551	575	91	19.8%	24	4.4%
Granville	201	210	218	9	4.5%	8	3.8%
Hancock	198	201	214	3	1.5%	13	6.5%
Hartford	3,483	5,026	5,502	1,543	44.3%	476	9.5%
Hartland	955	1,270	1,382	315	33.0%	112	8.8%
Newbury	977	1,132	1,153	155	15.9%	21	1.9%
Norwich	1,027	1,382	1,505	355	34.6%	123	8.9%
Pittsfield	298	401	393	103	34.6%	-8	-2.0%
Plymouth	495	736	773	241	48.7%	37	5.0%
Pomfret	404	490	544	86	21.3%	54	11.0%
Randolph	1,669	1,830	1,905	161	9.6%	75	4.1%
Rochester	662	737	768	75	11.3%	31	4.2%
Royalton	975	1,161	1,281	186	19.1%	120	10.3%
Sharon	413	578	663	165	40.0%	85	14.7%
Stockbridge	413	488	528	75	18.2%	40	8.2%
Strafford	412	494	542	82	19.9%	48	9.7%
Thetford	1,085	1,136	1,193	51	4.7%	57	5.0%
Topsham	395	504	582	109	27.6%	78	15.5%
Tunbridge	499	655	679	156	31.3%	24	3.7%
Vershire	275	302	378	27	9.8%	76	25.2%
West Fairlee	249	355	340	106	42.6%	-15	-4.2%
Woodstock	1,548	1,755	1,775	207	13.4%	20	1.1%
Region	21,898	26,898	28,831	5,000	22.8%	1,933	7.2%
Vermont	223,198	271,214	294,382	48,016	21.5%	23,168	8.5%

Source: Census 2000

Three towns experienced negative growth rates and lost housing units: West Fairlee (-4.2%), Pittsfield (-2%) and Braintree (-0.5%). Pittsfield and West Fairlee are interesting in that they experienced a high rates of growth over the 1980s (34.6% and 42.6% respectively) and a decade later they experienced net losses in housing units (8 and 15 units lost respectively).

The primary factors influencing new housing starts were the relative cost and availability of real estate, evidence of a healthy and growing economy, and the comparative ease of access to employment centers.



Source: Royalton Historical Society

**Photo 23: Homes along the White River, looking west, intersection of Routes 14 and 110**

**Housing Unit Types**

The 2000 Census for the region indicated that 21,423 units or 74 % of the total housing stock consisted of single family homes. The second most common type of housing unit was multi-family units with 3,346 units, or 12% of the regional total. The larger communities with defined centers have the largest proportions of multi-family housing units: Hartford (27.1%), Royalton (21%), Randolph (19.3%), Bradford (16%), and Bethel and Woodstock are at 12%. Duplexes, or two-family units, constitute ten percent of the housing stock in five towns: Fairlee, Hancock, Pittsfield, Royalton, and Woodstock. The towns with the largest percentages of mobile homes were: Braintree (24.5%), West Fairlee (19.5%), Sharon (18.9%), Hancock (17.2%), Topsham (16.7%), Hartland (15.6%), Corinth (13.7%), Royalton (13.4%), and Brookfield (12.3%).

**Figure 9: Types of Housing Units in the Region – 2000**

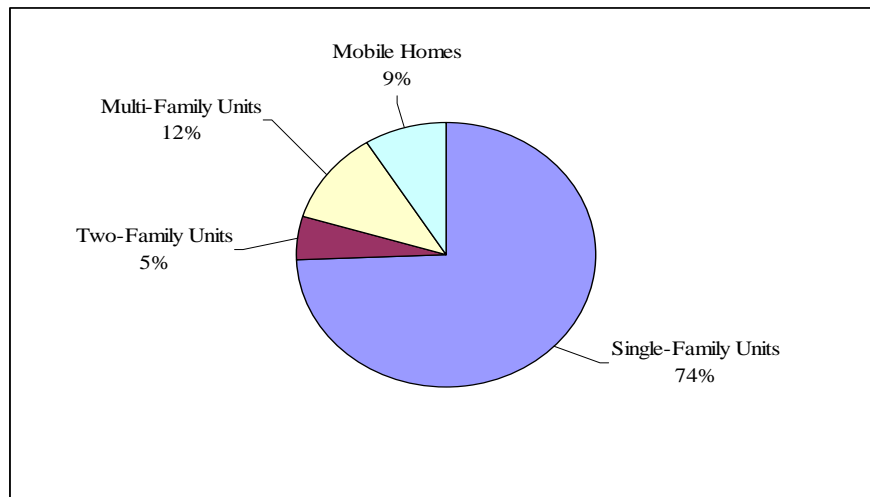


Table 17: Housing Unit Types by Town 2000

	Single Family Units	% of Single Family	Two Family Units	% of Two Family Units	Multi-family Units	% of Multi-family Units	Mobile Homes	% of Mobile Homes
Barnard	555	88.5%	16	2.6%	15	2.4%	39	6.2%
Bethel	693	72.5%	44	4.6%	114	11.9%	103	10.8%
Bradford	885	72.7%	66	5.4%	195	16.0%	71	5.8%
Braintree	401	70.7%	7	1.2%	20	3.5%	139	24.5%
Bridgewater	451	77.5%	22	3.8%	53	9.1%	56	9.6%
Brookfield	506	84.1%	10	1.7%	9	1.5%	74	12.3%
Chelsea	530	80.7%	37	5.6%	39	5.9%	48	7.3%
Corinth	606	83.2%	7	1.0%	8	1.1%	100	13.7%
Fairlee	461	79.9%	60	10.4%	44	7.6%	12	2.1%
Granville	209	90.9%	4	1.7%	3	1.3%	11	4.8%
Hancock	140	70.7%	22	11.1%	2	1.0%	34	17.2%
Hartford	3,293	59.9%	305	5.6%	1,488	27.1%	407	7.4%
Hartland	1,051	76.1%	41	3.0%	63	4.6%	215	15.6%
Newbury	943	81.8%	29	2.5%	73	6.3%	104	9.0%
Norwich	1,301	86.4%	94	6.2%	68	4.5%	36	2.4%
Pittsfield	321	80.5%	40	10.0%	30	7.5%	8	2.0%
Plymouth	637	82.1%	20	2.6%	94	12.1%	23	3.0%
Pomfret	491	90.3%	14	2.6%	23	4.2%	16	2.9%
Randolph	1,269	66.6%	116	6.1%	367	19.3%	153	8.0%
Rochester	617	80.3%	40	5.2%	66	8.6%	45	5.9%
Royalton	704	55.0%	128	10.0%	268	20.9%	172	13.4%
Sharon	487	73.5%	29	4.4%	16	2.4%	125	18.9%
Stockbridge	451	85.1%	28	5.3%	11	2.1%	35	6.6%
Strafford	488	90.0%	17	3.1%	4	0.7%	31	5.7%
Thetford	1,018	85.3%	36	3.0%	41	3.4%	95	8.0%
Topsham	481	82.6%	4	0.7%	0	0.0%	97	16.7%
Tunbridge	578	85.3%	19	2.8%	2	0.3%	77	11.4%
Vershire	297	78.4%	15	4.0%	24	6.3%	43	11.3%
West Fairlee	250	74.0%	22	6.5%	0	0.0%	66	19.5%
Woodstock	1,309	73.7%	170	9.6%	206	11.6%	86	4.8%
Region	21,423	74.3%	1,462	5.1%	3,346	11.6%	2,521	8.7%
Vermont	203,309	69.1%	21,180	7.2%	46,588	15.8%	22,631	7.7%

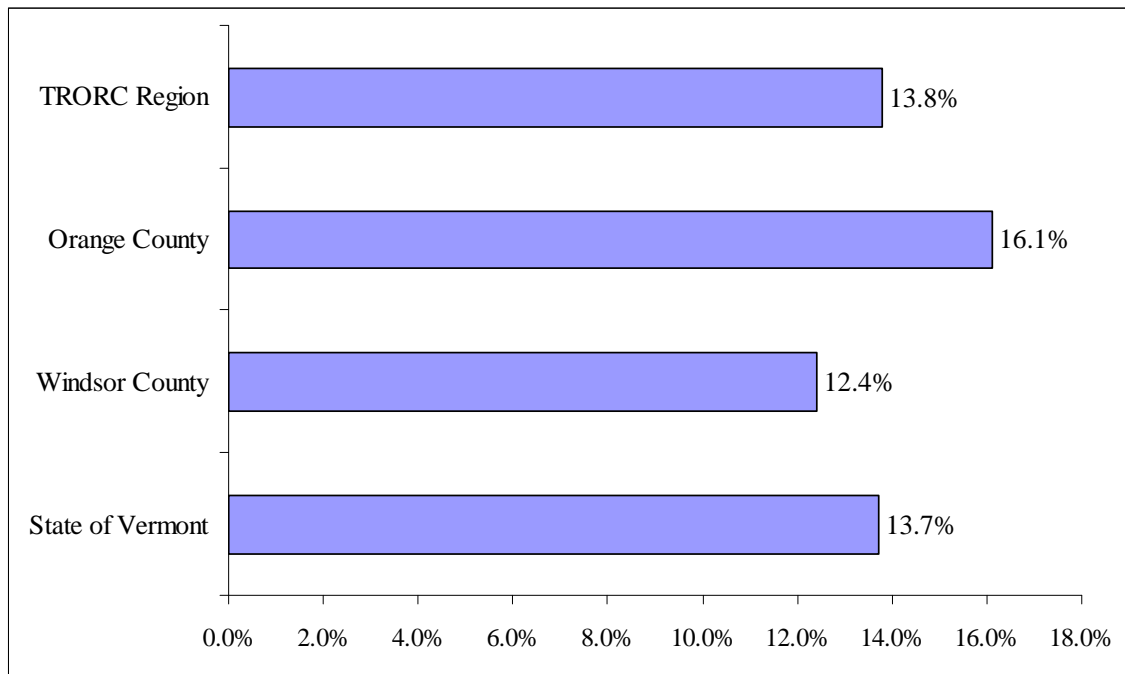
Source: Census 2000

### Housing Age

Census 2000 shows that 13.8% of the region's housing stock was built in the 1990s, this is nearly identical to the State's percentage of 13.7%. Three towns experienced much higher than average rates of housing construction over the last decade: Plymouth at 25% and Bridgewater and Newbury at 22% each. Three towns experienced below average rates of construction in the

1990s: Woodstock had 130 units built (7.3%), Granville had 18 units built (7.8%), and Pittsfield had 32 units built (8%). Granville and Pittsfield are remote communities, reached neither quickly nor easily which explains their slow growth. Woodstock, conversely, can be reached quickly and easily but ownership of land in Woodstock has long been a sound investment and this has resulted in large land holdings with ever increasing values. Buying land or housing in Woodstock requires financial assets which are not available to the majority of the region’s population, and this has contributed to the slow growth in Woodstock.

The greatest percentage of residences in this region were built prior to 1939; the region’s slowest growth era was 1940-1960. The town-level data for construction rates in the 1990s are in Table 20 - Housing Affordability, Median Value, and 1990s Construction.



Source: Census 2000

**Figure 10: Percentage of Total Housing Stock Built in the 1990s**

**Housing Occupancy**

The region had a surplus of housing entering the 1990s. That surplus has been replaced by a shortage and vacancy rate numbers from the 2000 Census illustrate the point. This is a region with a strong second-home and seasonal-home housing market. To interpret the vacancy rate numbers we must extract just the rate that applies to primary residences, and not allow the vacancy rate to be skewed by seasonal residences. In 1990 the vacancy rate for the region’s primary residences, (those having year-round occupation), was 6.6%, in 2000 it dropped to 4%. A vacancy rate at or below 3% is considered to be a “functional zero”, at that point there are no vacant units because within the 3% of units that may be available, obstacles like sub-standard conditions keep the units from being inhabited.

Vacancy rates in the Upper Valley are some of the lowest in the state. Steady job growth and a shortage of housing development, especially housing that is affordable to middle incomes, have given us a very tight housing market. The lowest vacancy rates in the region were in these seven towns: Barnard (1.7%), Strafford (2.2%), Hartford (2.6%), Braintree and Hancock (2.8%), Sharon (2.9%), and Pittsfield (3.1%). Vacancy rates this low were a new development in Hartford, Sharon and Strafford, but the other towns had had low vacancy rates in the previous decade. The highest vacancy rates were in: Bradford (8.4%), Vershire (7.9%), Fairlee (6.6%), and Woodstock (5.1%). Proximity to work and affordability play a role in maintaining the above-average percentages of vacant housing in these towns.

Vacant seasonal units are a measure of the secondary housing market. Over the past decade the number of vacant seasonal units decreased in nearly every town. This is an indication of the increasing trend in the region for camps to become year-round residences, and for second-homes to become primary residences.

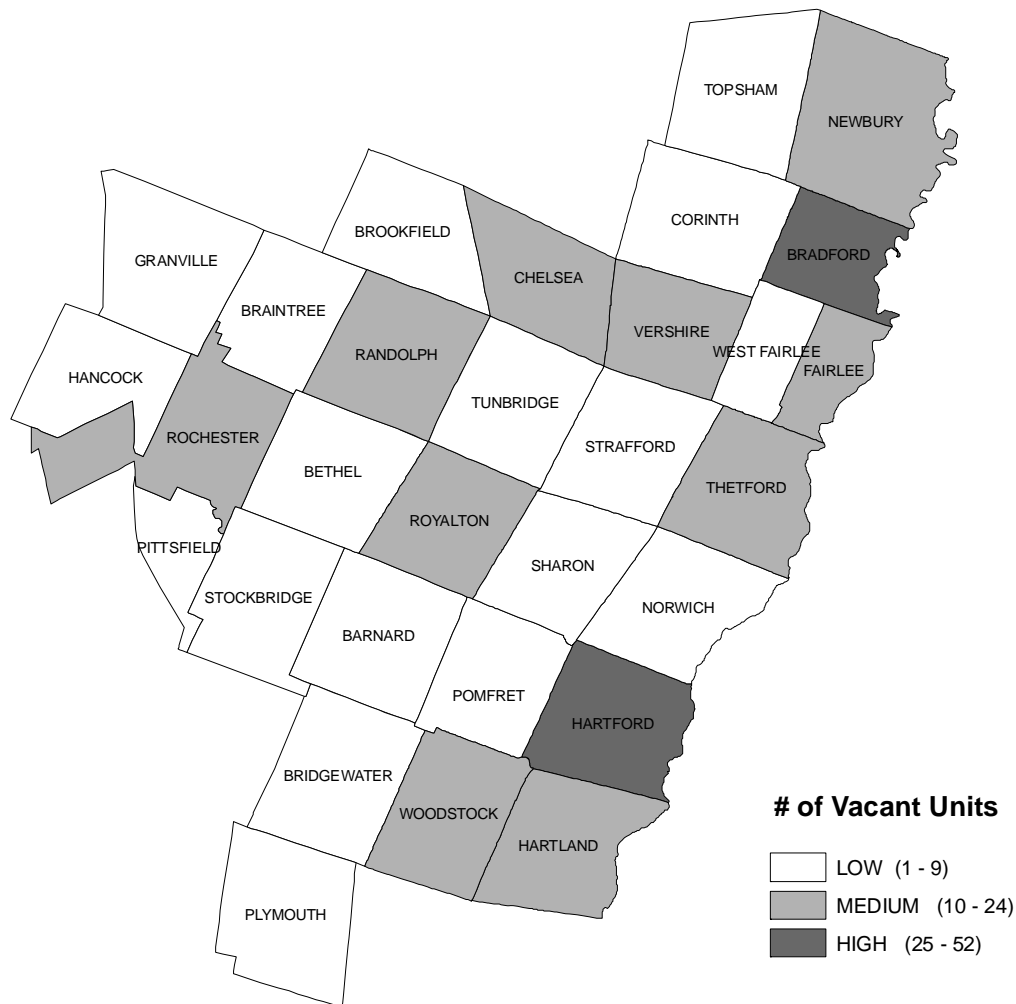


Figure 11: Number of Vacant Housing Units for Rent in 1999

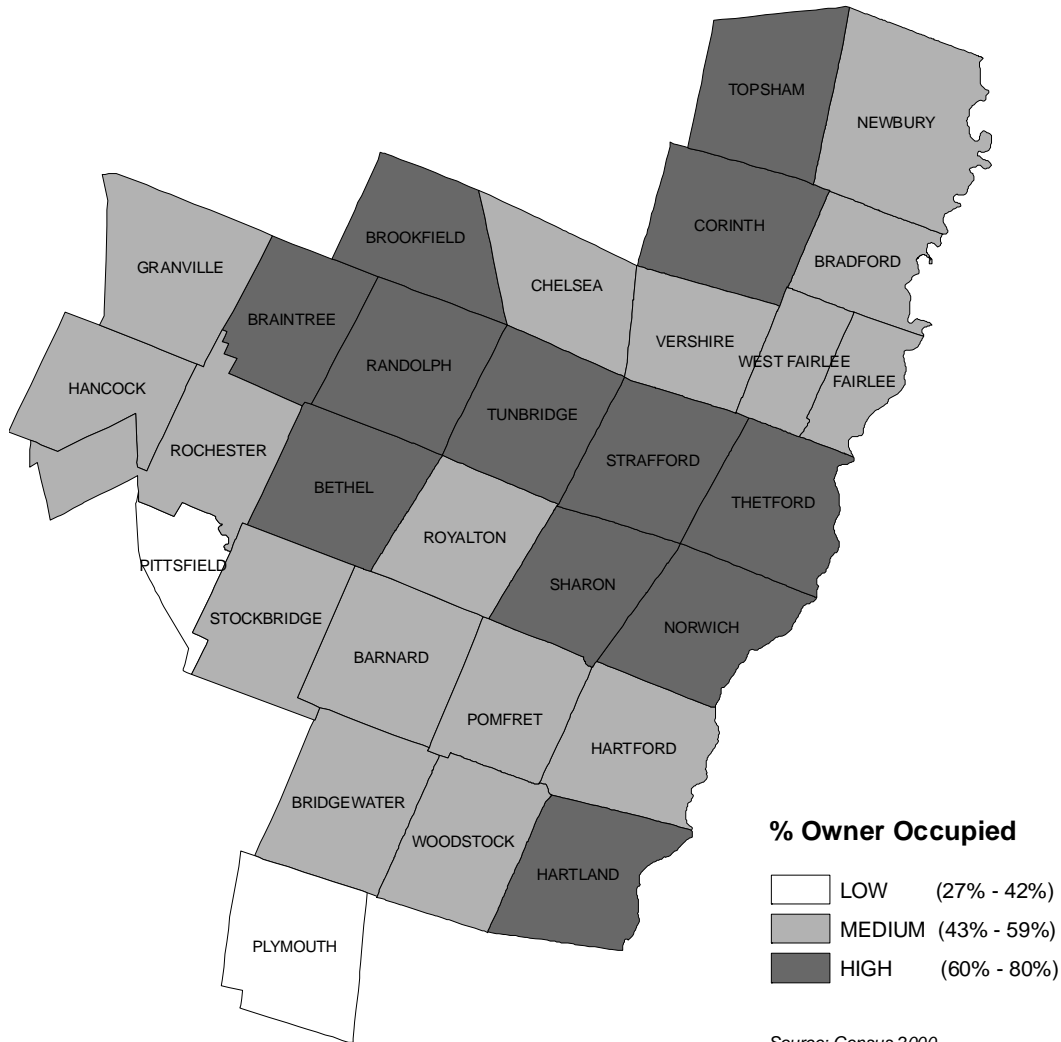
	1990			2000		
	Vacancy Rate for Primary Residences	Vacancy Rate for Total Units	# of Vacant Seasonal Units	Vacancy Rate for Primary Residences	Vacancy Rate for Total Units	# of Vacant Seasonal Units
Barnard	4.3%	45.5%	250	1.7%	39.1%	235
Bethel	5.1%	19.7%	130	3.6%	14.5%	105
Bradford	7.3%	15.6%	89	8.4%	15.5%	87
Braintree	4.4%	21.4%	97	2.8%	15.0%	69
Bridgewater	9.1%	40.1%	177	4.6%	32.1%	160
Brookfield	8.5%	30.6%	125	3.5%	21.1%	106
Chelsea	9.3%	29.7%	124	5.0%	24.7%	129
Corinth	4.5%	32.7%	174	4.4%	26.5%	161
Fairlee	5.4%	37.0%	174	6.6%	31.3%	142
Granville	3.3%	46.2%	90	4.6%	41.7%	81
Hancock	3.5%	32.3%	58	2.8%	23.4%	44
Hartford	6.7%	23.9%	862	2.6%	17.9%	839
Hartland	6.1%	12.4%	80	3.4%	8.1%	65
Newbury	5.5%	32.3%	304	5.6%	29.2%	272
Norwich	6.8%	13.5%	93	4.9%	9.2%	65
Pittsfield	4.7%	58.9%	217	3.1%	51.7%	191
Plymouth	3.3%	73.2%	515	2.6%	67.5%	502
Pomfret	4.1%	30.6%	130	3.5%	25.7%	121
Randolph	7.0%	12.0%	92	3.7%	7.1%	65
Rochester	5.8%	36.5%	226	3.6%	33.5%	229
Royalton	8.3%	15.9%	89	4.6%	9.8%	67
Sharon	7.1%	20.1%	75	2.9%	16.6%	91
Stockbridge	6.1%	50.2%	215	3.6%	46.8%	228
Strafford	8.7%	32.8%	119	2.2%	22.5%	110
Thetford	4.8%	17.2%	141	3.7%	13.5%	117
Topsham	7.5%	33.9%	133	3.8%	27.7%	139
Tunbridge	6.7%	35.3%	187	4.7%	24.4%	134
Vershire	5.0%	33.4%	86	7.9%	31.0%	87
West Fairlee	6.5%	34.6%	100	5.0%	18.2%	45
Woodstock	10.3%	26.0%	275	5.1%	21.8%	297
Region	6.6%	26.8%	5,427	4.0%	21.3%	4,983
Vermont	5.6%	22.3%	45,405	3.6%	18.3%	43,060

Source: Census 2000

### Housing Tenure

The 2000 Census figures on housing tenure reveal the relationship between owner-occupied housing units and renter-occupied units. Between 1990 and 2000 the region's housing stock became even more invested in owner-occupied units. In 1990, 72.2% of the region's housing stock was owner-occupied, this grew to be 73.5% in 2000. Nearly three-quarters of the region's housing units are occupied by their owners. Nine towns have 83% or more of their housing

stock in owner-occupied housing: Stockbridge (88.3%), Topsham (86.9%), Corinth (86%), Plymouth (85.7%), Braintree (84.4%), Brookfield (84%), Strafford (83.8%), Barnard (83.6%), and Hartland (82.6%). All but three of these towns, (Braintree, Hartland and Topsham), also had the highest percentages of growth in owner-occupied units.



**Figure 12: Percentage of Owner Occupied Housing Stock in 1999**

The construction of rental units has not kept pace with the construction of homeownership units in the region. Seven towns saw losses in their supply of rental housing: Stockbridge (-38.9%), Plymouth (-14.3%), Thetford (-10.4%), Pittsfield (-5.9%), Norwich (-5.8%), Woodstock (-4.9%) and Hartland (-0.5%). Property rental in a community is often the step before homeownership in that community. High percentages of owner-occupied units and decreasing supplies of rental units make transition from rental to ownership difficult in this region. Six towns experienced the most significant increases in rental units: Sharon (54.4%), West Fairlee (47.2%), Vershire (39.5%), Tunbridge (37%), Royalton (28.7%) and Brookfield (26.7%). The presence of the

Vermont Law School can explain part of the increases in Brookfield, Royalton, Sharon and Tunbridge.

<b>Table 19: Housing Tenure &amp; Change by Town 1990-2000</b>						
	1990		2000		Change	
	% Owner Occupied	% Renter Occupied	% Owner Occupied	% Renter Occupied	% Change in Units Owned 1990 - 2000	% Change in Units Rented 1990 - 2000
Barnard	83.5%	16.5%	83.6%	16.4%	19.4%	18.9%
Bethel	73.4%	26.6%	71.5%	28.5%	11.7%	22.6%
Bradford	70.6%	29.4%	69.8%	30.2%	12.2%	16.1%
Braintree	86.2%	13.8%	84.4%	15.6%	5.4%	21.0%
Bridgewater	72.5%	27.5%	73.4%	26.6%	16.0%	10.5%
Brookfield	84.7%	15.3%	84.0%	16.0%	20.2%	26.7%
Chelsea	76.7%	23.3%	75.2%	24.8%	13.1%	23.0%
Corinth	84.6%	15.4%	86.0%	14.0%	30.7%	17.2%
Fairlee	67.2%	32.8%	69.6%	30.4%	18.5%	6.2%
Granville	73.6%	26.4%	75.6%	24.4%	18.5%	6.9%
Hancock	75.0%	25.0%	75.0%	25.0%	13.9%	13.9%
Hartford	63.1%	36.9%	66.6%	33.4%	24.3%	6.9%
Hartland	80.1%	19.9%	82.6%	17.4%	17.7%	-0.5%
Newbury	76.9%	23.1%	74.8%	25.2%	6.3%	19.8%
Norwich	71.2%	28.8%	76.3%	23.7%	22.6%	-5.8%
Pittsfield	70.3%	29.7%	74.7%	25.3%	17.4%	-5.9%
Plymouth	79.2%	20.8%	85.7%	14.3%	34.4%	-14.3%
Pomfret	75.5%	24.5%	76.5%	23.5%	17.9%	11.8%
Randolph	68.2%	31.8%	70.4%	29.6%	13.4%	2.3%
Rochester	69.2%	30.8%	71.8%	28.2%	13.3%	0.0%
Royalton	60.8%	39.2%	57.3%	42.7%	11.6%	28.7%
Sharon	80.2%	19.8%	74.9%	25.1%	13.4%	54.4%
Stockbridge	78.7%	21.3%	88.3%	11.7%	24.6%	-38.9%
Strafford	82.0%	18.0%	83.8%	16.2%	28.5%	13.3%
Thetford	75.6%	24.4%	80.0%	20.0%	16.2%	-10.4%
Topsham	86.9%	13.1%	86.9%	13.1%	17.3%	17.0%
Tunbridge	82.8%	17.2%	80.5%	19.5%	17.7%	37.0%
Vershire	80.9%	19.1%	79.7%	20.3%	29.2%	39.5%
West Fairlee	77.4%	22.6%	71.9%	28.1%	10.5%	47.2%
Woodstock	65.4%	34.6%	69.2%	30.8%	13.1%	-4.9%
Region	72.0%	28.0%	73.5%	26.5%	17.5%	8.7%
Vermont	69.0%	31.0%	70.6%	29.4%	16.8%	8.5%

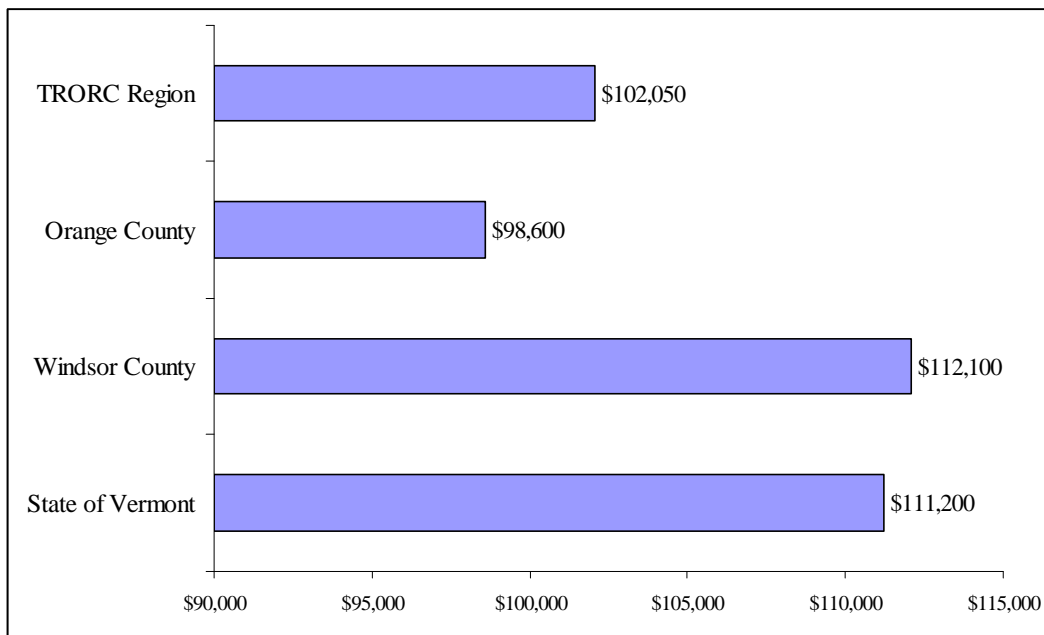
Source: Census 2000



**Housing Values**

The median value of owner-occupied housing units in Vermont increased by 17% over the 1990s. The median value of the region’s housing stock grew by 15% over the 1990s with six towns experiencing the region’s largest appreciations in home values: Tunbridge and Pomfret (49%), Strafford (38%), Brookfield (36%), Plymouth (34%) and Norwich (33%).

The region’s highest median home value in 1999 was \$253,100 in Norwich. This was \$59,300 higher than the second highest value, that of Pomfret with a median home value of \$193,800. The region’s median home value was \$102,050, and the median for Vermont was \$111,200. The three lowest median housing values were in: Granville (\$81,800), Vershire (\$76,400), and Topsham (\$79,700). Although Granville and Vershire have two of the lowest median housing values, they also have large percentages of renters paying 30% or more on their housing: Granville (31.8%) and Vershire (35.9%). A household that spends more than thirty percent of its income on housing is considered to be living unaffordably; spending such a large percentage of income on housing has repercussions throughout the economy.



Source: Census 2000

**Figure 13: Comparison of Median Home Values - 2000**

**Housing Affordability**

The Census Bureau collected a new piece of information in the 2000 Census: “Housing Costs as a Percentage of Income”. The standard measure of “affordability” is that a household shouldn’t pay more than 30% of its income on housing. Listed in the table below are the percentages of households in the region that live unaffordably, they pay 30% or more for their housing costs be they rental or ownership. The highest percentages of renters paying more than 30% of their income on housing were in Plymouth (53%), Royalton (48%), Chelsea and Bradford (43%), Sharon (41%), and Bridgewater, Tunbridge and Woodstock (39%). The highest percentages of home owners paying more than 30% of their income on housing were in Norwich (35%),

Vershire (31%), and Bridgewater, Chelsea, Pomfret and Randolph (30%), and Corinth (29%). The smallest percentages of households living unaffordably were homeowners in Topsham (11%), Granville (15%), and Braintree (18%).

	30% or more for Owners Costs	30% or more for Renters Costs	Total Units	2000 Median Value	Units Built in the 1990s	% of Units Built in the '90s
Barnard	26.3%	33.3%	629	\$151,200	64	10.2%
Bethel	26.4%	37.6%	956	\$94,300	104	10.9%
Bradford	27.5%	42.4%	1,217	\$96,000	178	14.6%
Braintree	17.4%	27.0%	567	\$85,700	92	16.2%
Bridgewater	29.9%	39.5%	582	\$108,000	82	14.1%
Brookfield	19.6%	17.9%	602	\$115,900	111	18.4%
Chelsea	29.3%	42.6%	657	\$94,800	80	12.2%
Corinth	28.7%	26.4%	728	\$90,100	136	18.7%
Fairlee	21.4%	29.2%	577	\$130,000	66	11.4%
Granville	14.9%	31.8%	230	\$81,800	18	7.8%
Hancock	26.0%	25.0%	198	\$87,100	22	11.1%
Hartford	21.1%	36.0%	5,502	\$115,200	751	13.7%
Hartland	21.5%	33.3%	1,382	\$130,300	185	13.4%
Newbury	22.5%	21.0%	1,153	\$97,900	250	21.7%
Norwich	34.6%	36.5%	1,505	\$253,100	235	15.6%
Pittsfield	18.4%	26.5%	399	\$128,100	32	8.0%
Plymouth	22.4%	52.6%	776	\$157,500	193	24.9%
Pomfret	29.4%	28.8%	544	\$193,800	74	13.6%
Randolph	30.1%	25.7%	1,905	\$97,500	217	11.4%
Rochester	22.5%	35.6%	768	\$98,200	68	8.9%
Royalton	18.7%	47.9%	1,281	\$98,700	126	9.8%
Sharon	17.7%	41.0%	663	\$103,600	111	16.7%
Stockbridge	18.1%	37.5%	530	\$100,500	45	8.5%
Strafford	26.2%	21.3%	542	\$152,200	92	17.0%
Thetford	21.2%	27.8%	1,193	\$139,600	172	14.4%
Topsham	10.7%	17.4%	582	\$79,700	102	17.5%
Tunbridge	16.5%	39.0%	678	\$112,100	128	18.9%
Vershire	30.7%	35.9%	379	\$76,400	58	15.3%
West Fairlee	16.9%	29.2%	338	\$95,500	59	17.5%
Woodstock	25.6%	39.1%	1,775	\$190,400	130	7.3%
Region	23.8%	35.2%	28,838	\$102,050	3,981	13.8%
Vermont	23.1%	37.5%	294,382	\$111,200	40,196	13.7%

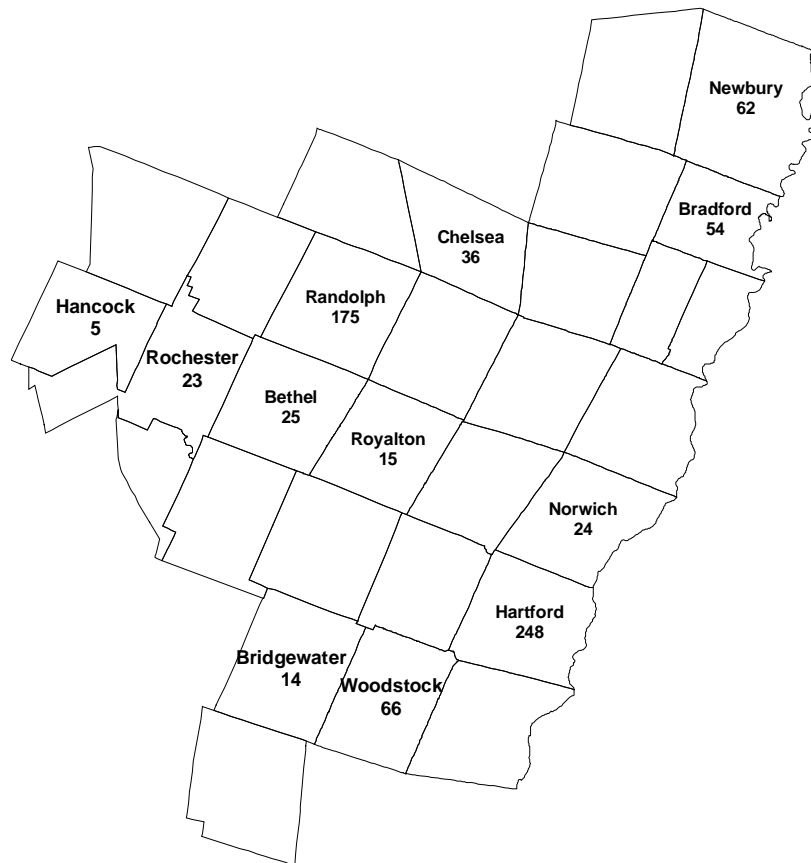
Source: Census 2000

**Status of Existing Programs in the Region**

There are two basic approaches to reducing housing costs for low and moderate income families, the elderly and other groups. The first involves interest subsidies which reduce interest on mortgages to a level well below market interest, thus reducing total costs required to cover home ownership or rental costs. The second approach involves direct subsidies through either a housing authority, private developer, or tenant, to cover the difference between 30% of a tenant’s income and rent.

Examples of this approach are the Section 8 Public Housing, and Fannie-Mae Rental Assistance Programs. These subsidies may be either project-based (tied to a specific development) or tenant-based (tied to an eligible tenant). In some cases, both approaches are combined into one project where rental housing is involved. In these situations, the owner/developer secures below-market interest financing from a federal or state program and provides housing units to tenants who have been pre-qualified to receive a subsidy in housing rents.

The Vermont State Housing Authority (VSHA) was created by the Legislature in 1968 to improve housing opportunities for families of low and moderate incomes. As a non-profit organization, the VSHA manages rental housing, provides rental subsidies, and works toward rehabilitation and development of affordable housing. It manages a variety of programs, many of which involve housing in the region.



**Figure 14: Geographic Distribution of VSHA Housing in the Region - 2004**

The increase in public housing units in the region has not come from existing developments becoming larger by adding units, the growth has come from rehabilitation, or from the siting and construction of new housing units. Twelve out of the thirty towns in the region have some publicly assisted housing, the eighteen towns listed below do not:

Barnard	Corinth	Hartland	Pomfret	Strafford	Tunbridge
Braintree	Fairlee	Pittsfield	Sharon	Thetford	Vershire
Brookfield	Granville	Plymouth	Stockbridge	Topsham	W. Fairlee

Table 21 contains a list of developments in the region in 2005. This is a summary of publicly assisted housing developments that subsidize rents through programs from the U.S. Department of Housing and Urban Development (HUD) Section 8 Rental Assistance Program and Section 202 Housing Program for the Elderly, and the U.S. Department of Agriculture Rural Development 515 Loan Program. There were a total of 693 affordable rental units in the region in 2005 (units that were financed in some part with Federal money and require proof of income eligibility), and 471 of those units also involved the use of various rental assistance programs.

The Vermont Housing Finance Agency (VHFA), organized in 1974 to address the shortage of mortgage money available from conventional lending sources, has served to assist low and moderate income Vermonters with housing finance needs. As of June 30, 2002, the VHFA has provided home ownership assistance to over 24,000 Vermonters, and rental assistance for nearly 6,000 affordable rental units. Most of the VHFA’s programs are conducted in cooperation with Vermont’s mortgage lending institutions. Regionally, as of June 30, 2002, VHFA has financed nearly 2,500 homes in Windsor and Orange Counties, and nearly 700 rental units. Use of VHFA programs has been consistent over past years and this trend is expected to continue given that no dramatic shifts in income or residential real estate markets are projected.

After analyzing the poverty and housing statistics for this region it is clear that there is a need for local and regional non-profit housing organizations to develop more publicly-assisted or affordably priced housing. Presently, six towns have no publicly assisted housing, yet they have high poverty rates and large percentages of households who are spending too much on housing costs: Fairlee, Granville, Plymouth, Strafford, Topsham, and Vershire. They represent opportunities to build the first assisted housing projects that will serve these communities. Public investment could also be targeted toward the towns that already have some assisted housing, yet still have high poverty rates: Bethel, Bradford, Bridgewater, Chelsea, Newbury, and Royalton.

HUD finances the Vermont Community Development Program (VCDP). The communities listed below qualify as having met HUD’s test of “Area Wide Benefit”. Qualifying for Area Wide Benefit means that VCDP projects proposed in these towns do not have to prove they will benefit low to moderate income populations, it is presumed. Based on the percentage of low and moderate income (LMI) residents in the community from the 2000 Census, the following towns and villages meet Area Wide Benefit: Bradford Village (54.8%); Chelsea (51.3%); Corinth (57.5%); Granville (57.6%); Wells River Village (56.9%).

<b>Table 21: VSHA Subsidized Rental Housing Developments - 2005</b>		
Town or Village	Housing Development	# of Units
Bethel:	Bethel - Depot Apartments (I and II)	25
Bradford:	Bradford - Colonial Village	21
	Bradford - Bradford Village Apartments	21
Bridgewater:	Bridgewater - Mill Village	14
Chelsea:	Chelsea - Chelsea Court	24
	Chelsea - Hillside Homes	12
Hancock:	Hancock - Mountain View Apartments	5
Hartford:	Hartford - Anna Pluhar House	3
	Hartford - The Briars	24
	Hartford - Colodny Building	8
	Hartford - Hillcrest Manor	9
	Hartford - School Street	8
	Quechee - Quechee Pines	9
	Quechee - Quechee Sunrise	22
	White River Junction - Gates St. Elderly	14
	White River Junction - Graystone Village	34
	White River Junction - Northwoods One and Two	28
	White River Junction - Overlook Housing	13
	White River Junction - Prospect Street	7
	White River Junction - Windsor Hollow	27
	Wilder - Brookview Apartments	34
	Wilder - Hollow Drive	18
Newbury and the Village of Wells River:	Newbury - Montebello Hill Apartments	15
	Village of Wells River - Baldwin Block	7
	Village of Wells River - Spear House	3
	Village of Wells River - Spear House Apartments	15
	Village of Wells River - Wells River Housing	22
Norwich:	Norwich Senior Housing	24
Randolph:	Randolph - Branchwood Apartments	12
	Randolph - Joslyn House	19
	Randolph - Prospect-Forest Homes	9
	Randolph - Randolph Circle	20
	Randolph - Randolph House	48
	Randolph - Red Lion Inn	20
	Randolph - Safe Haven	6
	Randolph - Sass Apartments	16
	Randolph - South Pleasant Street Apt	8
Randolph - The Pleasant St. Group Home	5	
Rochester:	Rochester - Brookside Apartments	6
	Rochester - Park House	17
Royalton:	Royalton - Brightwood House	15
Woodstock:	Woodstock - Mellishwood (I and II)	26
Region		693

Source: Vermont State Housing Authority

### **C. Housing Needs and Planning Implications**

#### **Upper Valley Housing Needs Analysis Summary 2002**

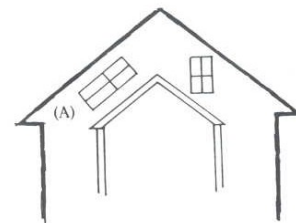
Following are excerpts from a housing needs summary that provides the most current analysis of the Upper Valley's housing market. The *Upper Valley Housing Needs Report* was produced by Applied Economic Research, Inc. in 2002. The analysis is broken into labor market areas (LMA): these excerpts are taken from the analysis of the Hartford/Lebanon Labor Market Area which includes seventeen of the region's thirty towns:

“Meeting the region's (Hartford/Lebanon LMA) housing needs during the next decade will require a sharply higher level of housing production, particularly of rental units. In the absence of higher production, the current housing affordability crunch, which is particularly burdensome on working class families, will continue. Alternatively, supportable job growth and expansion of the non-residential tax base will be half the pace of the 1990s, if the region continues to produce housing at the pace of the last decade. The area's current problems of : (1) restricted labor force availability, (2) a housing shortage, and (3) a housing affordability crunch, will continue in the absence of higher production levels. Most of the vacant units in the area have been absorbed and seasonal housing, which did contribute to the supply during the past decade (through the conversion process), is becoming too expensive for working class households.”

- “Economic forecasts anticipate that, in the absence of constraints imposed by housing, the area will add about the same number of jobs during the next decade as during the past decade.”;
- “Our (AER's) forecast reveals the need for 5,600 new housing units in the Hartford/Lebanon Labor Market Area during the next decade, in contrast to the 2,800 units added during the past decade.”;
- “Meeting the Hartford/Lebanon Labor Market Area's rental housing needs will be especially difficult. During the next decade, AER's forecast points to the need for 1,800 new rental units, in contrast to a net loss of 64 rental units in the 1990s.”;
- “The current affordability crunch is unusually difficult for moderate-income households. A typical teacher or police/fire officer earning \$30,000 can afford a \$75,000 home. This is in contrast to a median home price of about \$170,000 in the Lebanon Labor Market Area.”;
- “As is typically the case in a tight housing market, low-income households have few options and have to make major compromises in their housing selection.”

#### **Drawing 5: Resourceful Design Element**

The “lazy window” (A) uses a standard window in an unconventional solution.



Source: Vermont Townscape © 1987

## **Housing Role of the Regional Commission**

### **Act 250 and Local Appeals process**

- Don't compromise Act 250's protective powers in order to encourage housing development, but support changes in the Act which would create incentives and requirements for the inclusion of affordable housing development in economic development proposals.
- Advocate for the maintenance of reasonable appeals processes, local and statewide.

### **Local Technical Assistance**

- Mitigate and manage growth, do not encourage it at the expense of quality of life.
- Continue our traditional role of assisting towns with zoning and planning.
- Encourage ordinance, bylaw, and plan language which allows multi-family housing development, inclusionary zoning, mixed uses, and planned unit developments (PUD).
- Work with towns to understand the Federal Fair Housing Law, its implications, and how to comply with it.
- Assist towns in maximizing the adaptive reuse of abandoned or underutilized buildings for housing.
- Support the rehabilitation of defunct second and third floors above downtown commercial spaces.
- Support the development of elder housing and in turn maximize the use of the residences which are vacated by elders.
- Encourage sustainable development; development which is properly scaled to the ability of the community to support it.
- Encourage compact development and infill near existing centers, discourage sprawl.
- Encourage the protection of biodiversity, discourage the fragmentation of habitats.
- Work with towns to designate growth centers.
- Assist towns with public sewer and water improvement projects as requested.

### **Regional Planning**

- Work with adjacent regional commissions to understand our neighbors' growth pressures and plan to mitigate the impacts that they may have on the region.
- Support the work of the existing housing trusts which serve the region, where there is a need for housing and the project is in accordance with our priorities.
- Plan dynamically, understanding that the choices we make on each regional issue, (transportation, economic development, basin planning, etc), impacts the supply and cost of housing.

### **Statewide Initiatives**

- Represent the Regional Commission's position on the housing issue to the Vermont State Legislature.
- Support the Public Awareness Campaign of the Vermont Housing and Finance Agency.
- Work with the Vermont Department of Housing and Community Affairs to facilitate the education of our towns on the Federal Fair Housing Law.

**D. Goals**

- (1) To promote sufficient availability of decent and affordable primary housing for residents of the region, thus complying with Vermont state legislative mandates and the directives of existing legal trends.
- (2) To encourage innovative planning, design, and construction of primary housing which minimizes its costs, energy consumption, and environmental impacts.
- (3) To promote preservation of the existing housing stock, particularly in the regional growth areas of the region.
- (4) To stimulate the coordination between public and private agencies involved with planning, financing, and development of affordable housing.

**E. Policies**

- (1) Given the high costs of replacement for housing units which are lost to demolition, conversion to commercial uses, or market rate rentals, high priority should be given to preservation of affordable housing already in existence. Development projects that result in substantial losses of subsidized or below market rentals, or loss of supply of affordable single family homes should be discouraged.
- (2) Mobile homes serve as a source of lower cost housing for the region. Mobile home parks are being eliminated from the affordable housing stock in some cases due to resale values which reflect the development potential of the land rather than the property as a mobile home park. Perpetuation and development of mobile home parks to meet the need for housing in communities are encouraged, subject to equitable town planning requirements. The Regional Commission accepts use of public funds, in the form of loans or grants, to enable mobile home parks to remain affordable over the long-term.
- (3) Use of public funds (in the form of grants, loans, or subsidies) is necessary to preserve or maintain access to affordable housing. Use of public funds should be encouraged when these investments result in developments which are affordable on a permanent basis or at a minimum period of thirty years. Publicly assisted projects that are short-term should be discouraged and given the lowest priority for public funding.
- (4) The Regional Commission encourages all municipalities to evaluate their role in the region's housing stock, assessing their capacity to grow, and identifying suitable locations for growth. Municipalities are encouraged to work with neighboring towns, the Regional Commission, and the Twin Pines Housing Trust to develop regional solutions to the demand for affordable housing.
- (5) Concentration of affordable housing exclusively into selected areas, or the establishment of unreasonably low densities in rural areas leading to an undue concentration of



affordable housing in village or hamlet centers, is discouraged. Mixed income housing projects are the highest priority for location within the region provided such an arrangement furthers a public purpose. Affirmative strategies or incentives to promote mixed income housing are endorsed by this Plan.

- (6) Housing assistance funds should be allocated on the basis of local housing or fair share needs as determined by town plans. Where local plans have not adequately addressed current and prospective needs, regional needs assessments (when available and current) should be the basis on which agencies allocate such funds.
- (7) Innovative and technical improvements in housing design, construction, and rehabilitation are encouraged. Publicly assisted housing projects must be designed with sensitivity toward the predominant characteristics of the site or area. New home construction and uses should be reasonably compatible with adjacent or adjoining uses. Architectural styles and patterns of new construction or rehabilitation that are responsive to traditional building characteristics and land use are endorsed by this Plan.
- (8) The location of housing should be planned to complement existing or planned growth centers, and to complement the housing goals and policies of towns and the region.
- (9) Multi-unit housing that is within or adjacent to regional growth areas with adequate public sewer and water service, or in areas of soils suited for onsite wastewater technology, is endorsed by this Plan.
- (10) The location of vacation housing, related amenities, and land uses should be planned with due respect to the physical limitations of the site, distance to existing or planned commercial and service centers, and land use goals and policies as expressed in town or Regional Plans. Housing that is scattered and not related to such plans is discouraged.
- (11) The development of accessory apartments, or the conversion of larger homes into multiple family structures for congregate housing for the elderly or other special needs groups is endorsed by this Plan.
- (12) Because a lack of sewer and water services is a major constraint to the development of affordable housing, sewer and water allocation formulas or ordinances administered by utilities or like entities must give due consideration to balancing the need for affordable housing with other land uses.
- (13) Inclusion of provisions for planned unit development (PUD), cluster development, and other innovative concepts in municipal plans, zoning, and subdivision regulations is endorsed by this Plan.
- (14) New housing projects must be designed and located to minimize the additional financial burden on municipalities and taxpayers. Housing development with access from Class 4 roads, on steep slopes, or in remote areas that place a financial burden on municipalities are not endorsed by this Plan.

**F. Recommendations for Action**

- (1) The Regional Commission will continue to assist non-profit housing organizations in the development of affordable housing projects when such efforts are consistent with the policies of the Plan.
- (2) The Regional Commission will continue to provide professional assistance to member municipalities in the identification of need and implementation of local housing assistance programs.
- (3) Community leaders within the Regional Commission should work with state housing agencies, non-profit organizations, and lending institutions to insure the availability of loan or grant funds for Vermonters to purchase, acquire, or improve their primary homes.
- (4) Towns within the region should actively cooperate with local and regional non-profit housing trusts to develop and preserve new and existing housing with mechanisms to assure the perpetual affordability of that housing.
- (5) Community leaders, housing advocates and the Regional Commission must work to retain Vermont's innovative publicly financed home mortgage lending and housing assistance programs. The region's low and moderate income families, disabled individuals, and the elderly are enabled to secure affordable housing through these programs.

## **IX. UTILITIES, FACILITIES and TECHNOLOGY**

### **A. Background**

A major goal of both Act 200 and Act 250 is to avoid scattered development. Nationwide, increases in population indicate that in the future an ever-increasing number of people will migrate from urban areas to the country, searching for peaceful, rural surroundings. In the face of this trend, preserving Vermont's rural character will continue to be a challenge.

Consequences of piecemeal development include: the loss of control by rural governments of the land within their boundaries, an increase in the cost of services that exceeds the increased real estate tax base, increased negative social interactions between newcomers and natives, and an increase in land values such that natives and younger families may no longer be able to afford their own homes.

Symptoms of sprawl include: a difficulty in recognizing where the town center ends and the countryside begins, loss of farmland and lands of rural nature, and cluttered strip developments of houses, stores, service stations, and fast food restaurants.

The current distribution and quality of utilities and facilities is an indication of the region's ability to absorb and effectively locate future growth. Publicly owned sewer and water treatment facilities serve customers in areas of concentrated growth, disposing of waste and providing water for consumption and sanitation. Extensive services are provided by state, county, and municipal police; volunteer and professional fire workers; and ambulance/rescue squads. Health care services and social services work to reinforce an individual's ongoing health and quality of life, also providing community educational services. Education systems serve children and parents by encouraging a child's intellectual ability and helping the child receive a base level of skill so that he is able to join the work force and be a productive and self-sufficient adult. Libraries in the region provide a source of ongoing education in a vast number of areas to individuals of all ages. Libraries are community centers and educational outlets for history, literature, and creativity.

### **B. Wastewater Systems**

The proper treatment of septic waste is essential to a safe healthy, environment. Today, we do a better job treating waste than ever before. Treatment plants built in the 1960s and 1970s have reduced the toxicity of effluent reaching our streams. Improved onsite septic system technology, environmental regulation, and monitoring have had a beneficial impact on our environment. There is, however, much room for improvement. The volume of waste treatment by-products, namely septic and sludge, grows with population. Disposal of these substances poses its own unique set of problems and issues. Combined sewer and stormwater systems are still releasing raw sewage to receiving waters during heavy rains. In addition, there remain, in spite of new laws, many unregulated or "grandfathered" onsite systems polluting our environment.

As our population grows, proper sanitary disposal will become even more critical. More waste will mean more contaminants, pathogens, and by-products, and increased population density

means more people can be affected. As a result, it is important that present residents provide for the safe and efficient treatment of sewage for current and future residents. Below is an inventory of municipal wastewater treatment facilities and systems within the region. The Vermont Agency of Natural Resources evaluates system performance when a facility begins to operate at eighty percent of its design capacity.

### Public Systems

Table 22: Public Wastewater Treatment Facilities – 2006					
	Design Capacity	Present Use - Annual Average Flow	Future Flows - Committed	Uncommitted Flows - Available Capacity	Annual Average Flow %
( reported in gallons per day )					
Bethel	115,000	65,892	965	48,143	57%
Bradford	137,000	70,750	0	66,250	52%
Bridgewater	43,000	9,975	900	32,125	23%
Chelsea	55,000	28,908	1,480	24,612	53%
Hartford - Quechee	300,000	202,750	85,267	11,983	68%
Hartford - White River Junction	1,215,000	1,027,667	136,859	50,474	85%
Newbury - Wells River (Woodsville, NH)	333,000	228,000	(unknown)	105,000	68%
Randolph	400,000	226,500	55,841	117,659	57%
Rochester (septic tank and leachfields)	30,000	12,263	4,894	12,843	41%
Royalton	70,000	44,273	1,935	23,793	63%
Woodstock	450,000	238,000	23,719	188,281	53%
Woodstock - South Woodstock	50,000	11,033	2,700	36,267	22%
Woodstock - Taftsville	10,000	2,925	0	7,075	29%

Source: ANR Wastewater Division.

#### Bethel

Bethel's wastewater system was constructed in 1987 and serves primarily the village area. The system consists of a secondary level treatment plant employing oxidation canals and ultra-violet disinfection methodology. Residential use accounts for about 70% of the daily average. Maximum capacity for treatment is 115,000 gallons/day, with average daily flows being approximately 66,000 gallons per day.

#### Bradford

Bradford's publicly run wastewater facility treats approximately 70,750 gallons per day. The system is designed for an average maximum daily capacity of 137,000 gallons per day. The sewer commissioners would eventually like to extend the sewage lines in order to serve areas in the Lower Plain but have thus far been restricted by bond vote defeats. During 1995, approximately 3,300 feet of new line was placed along North Pleasant Street, and 1,150 feet of new line was placed on High Street to replace existing pipes.

#### Bridgewater

Bridgewater's wastewater system was constructed in 1979. It serves the Bridgewater village area and a portion of the Town of Woodstock. This rotating biological disc secondary treatment facility has a design capacity of 43,000 gallons per day. The system is functioning at approximately 23% of its capacity, processing nearly 10,000 gallons/day of effluent. Development within the service area is encouraged due to the availability of this uncommitted capacity.

### **Chelsea**

The municipal wastewater system for Chelsea first went on line in June of 1975 to serve the village area along Route 110. The only major modification since this time was the installation of a dechlorination system in 1991 and a clarifier in 2006. Design capacity for the system is 55,000 gallons per day. Average daily use consumes 53% of capacity or roughly 30,000 gallons per day.

### **Hartford Village, White River Junction, and Wilder**

The North Elm Street Wastewater Treatment Plant serves the sewer areas of Hartford Village, White River Junction and Wilder. The plant has been in operation since March 1978 and was improved in 1981 with a new aeration system. In June of 1990 another upgrade was completed at the White River Junction Plant at the cost of roughly \$3,000,000. This improvement increased the capacity from 970,000 gallons per day to 1,215,000 gallons per day. The plant is currently operating at 85% of its capacity.

### **Quechee**

Owned by the Town of Hartford since 1998, the Quechee Plant provides tertiary treatment with a design flow of 300,000 gallons per day. The plant is currently operating at 68% of its capacity. The plant has proven to be very efficient, as evidenced by the quality of the effluent that is produced.

### **Randolph**

Randolph's publicly owned wastewater system was constructed in 1973. The system serves Randolph Center, Vermont Technical College, the Route 66 corridor and the Randolph Village area. The system was designed to treat 400,000 gallons per day and is currently operating at 57% of its capacity with 226,500 gallons being treated and 55,841 in reserve. Past attempts have been made to keep stormwater run-off from entering the sewerage system. In 1996, the Town replaced the leachate tank with a larger tank, to accommodate leachate from the landfill. When funds become available, the sewage treatment plant is planned to undergo a complete upgrade.

### **Rochester**

In 1972 Rochester installed a municipal system using a septic tank and leachfield design. The system includes subsurface disposal sites, one which was completely renovated in 1983. Site #3 (southwest of the elementary school) was updated by adding two leachfields. A program was started in 1990 to replace some of the sewer lines which were originally built at the turn of the century. Rochester received funding from the USDA Rural Development Program to install a new leachfield in 2003. The system was designed to treat 30,000 gallons per day and is

currently operating at 41% of its capacity with 12,263 gallons being treated and 4,894 gallons per day in reserve.

### **Royalton**

Royalton's public wastewater system was installed in 1978. It serves most of South Royalton village. The design flow for the system has a maximum capacity of 70,000 gallons per day. Current and committed flows equal roughly 46,000 gallons per day or 63% of capacity. New development, as well as older structures within the village which are not currently serviced by the system, may present the need to someday expand the existing system to include the entire village of South Royalton.

### **South Woodstock**

The South Woodstock wastewater system was constructed in 1965 and is owned and operated by the Town of Woodstock. The system has a capacity of 50,000 gallons per day and is currently treating 11,033 gallons per day with 2,700 gallons committed for future use, this results in only 22% of the plant's capacity is being presently utilized.

### **Taftsville**

Taftsville's publicly run wastewater facility was installed in 1973. The capacity for this small plant is 10,000 gallons per day. The plant is currently treating 2,925 gallons per day which results in only 29% of the plant's capacity being presently utilized.

### **Wells River**

This publicly run wastewater system was improved and expanded in 1983. The original system was installed in the late 1800s. The system runs from gravity flow where the sewage is collected at an ejector station and then pumped across the Connecticut River to Woodsville, New Hampshire for treatment. Wells River owns 23% of the Woodsville treatment plant and therefore can pump 160,000 gallons per day to the plant for treatment if necessary. Currently, Wells River is sending about 40,000 gallons per day to Woodsville for treatment. No improvements or additions to the system are likely in the immediate future. In the current system, any facility located within 200 feet of a sewer line is serviced. All residences are connected to the system except those where there was the possibility of polluting the river. The Wells River sewerage system is separate from the storm sewer system.

### **Woodstock**

Woodstock's publicly run wastewater facility was constructed in 1965 and upgraded in 1983 from 250,000 gallons per day to 450,000 gallons per day. The system serves the villages of Woodstock and West Woodstock as well as portions of Route 4 east of Woodstock village. The plant is currently operating at 53% of its capacity with 238,000 gallons being treated daily and 23,719 gallons on reserve.

### **Wastewater Systems – Private**

In addition to municipal sewage systems, towns within the region are highly dependent upon onsite wastewater sewage disposal. Onsite septic systems require suitable soils and site

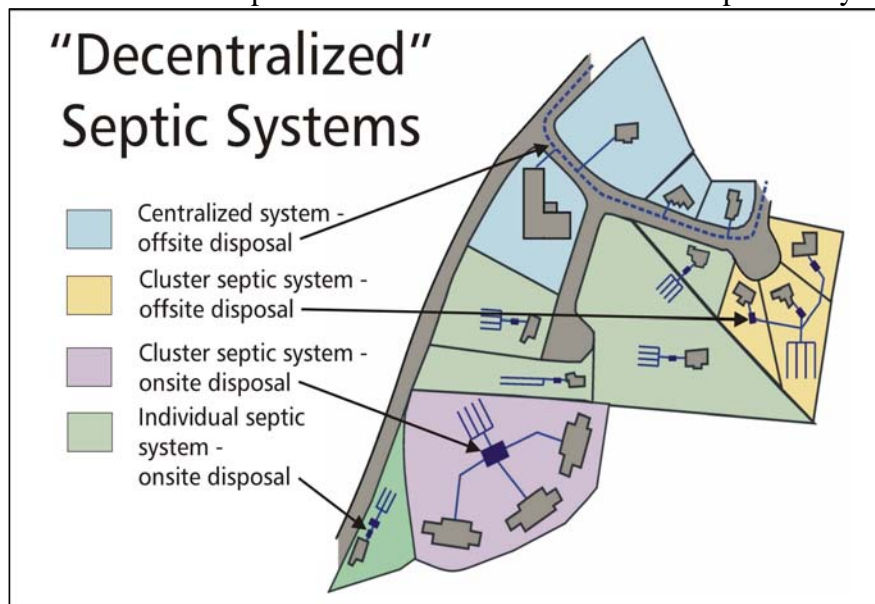
characteristics to enable the effective treatment and disposal of wastes. Where soils are impermeable, too permeable, shallow, wet, or on steep slopes, conventional septic systems are problematic and potentially hazardous; non-sewered areas displaying these site limitations are not recommended for development.

Restricting such areas, however, intensifies development pressure on those soils which can accommodate septic systems. Unfortunately, the most suitable soils are a part of prime agricultural land. Clustered subdivisions with community septic systems help overcome site limitations and simultaneously protect resource lands.

Source: Stone Environmental, Inc.

**Figure 15: Residential Wastewater Treatment Options**

In 1993, a Vermont onsite wastewater task force was organized to evaluate the effectiveness of existing approaches to managing onsite wastewater treatment and disposal in Vermont. In 1995, the Committee completed an extensive statewide municipal survey and recommended changes



for current laws and rules; the recommendations are summarized in a report titled *The Management of Individual Onsite Sewage Systems in Vermont*, dated January, 1995.)

Following is a list of issues that were identified in the report:

- about one third of all facilities are constructed without any review;
- there is a high

malfunction and failure rate when systems are improperly sited, designed, installed, or operated;

- a lack of understanding and education by local reviewers, installers, and homeowners on the function and use of systems;
- duplicative and conflicting approval processes required as a result of local and state jurisdiction over the same project.

In 2002, changes to VSA 10 Chapter 64 (Potable Water Supply and Wastewater Permit) were signed in to law. Beginning on July 1, 2007, local wastewater ordinances will be superseded by state rules (Wastewater System and Potable Water Supply Rules) and their technical standards will be applied statewide. Municipalities may elect to administer the new rules locally, but local ordinances will not be allowed to restrict use of the new minimum site conditions. No site may be improved by the construction of wastewater system unless the site meets one of the following

three sets of requirements. This excerpt only illustrates the new requirements for sites, landowners and system designers must consult the complete set of Rules.

### **Prescriptive Approach**

- (a) There shall be at least 24” of naturally occurring soil with a percolation rate of 120 min/inch or less over bedrock.
- (b) There shall be at least 24” of naturally occurring soil with a percolation rate of 120 min/inch or less above the seasonal high water table.
- (c) The maximum ground slope shall not exceed 30% for wastewater systems on subdivided lots in existence before 6/14/02. The maximum ground slope shall not exceed 20% for wastewater systems on lots that are subdivided on or after 6/14/02. The maximum ground slope shall not exceed 30% for replacement wastewater systems no matter when the lot was created.

### **Enhanced Prescriptive Approach**

- (a) There shall be at least 18” of naturally occurring soil with a percolation rate of 120 min/inch or less over bedrock.
- (b) The site must have at least 12”, or the thickness of the “A” soil horizon plus 4”, whichever is greater, of naturally occurring soil above the seasonal high water table. Sites with less than 18” of naturally occurring soil above the seasonal high water table must lower the water table as described below:
  - (i) A site may be approved without pre-testing of the drain when a designer prepares a plan incorporating drainage of the site and asserts that the drainage will lower the seasonal high water table to provide at least 18” of permeable soil below the surface of the naturally occurring soil, and the Secretary agrees with the designer’s assertion; or
  - (ii) if the Secretary does not agree, the designer may demonstrate through construction of a drainage system and the performance of groundwater monitoring in accordance with §1-506, that the seasonal high water table is lowered to at least 18” below the surface of the naturally occurring soil.
- (c) The ground slope is at least 3% but does not exceed either 30% (for wastewater systems on subdivided lots in existence before 6/14/02 and replacement systems on lots created at any point in time) or 20% (for wastewater systems on lots that are subdivided on or after 6/14/02).
- (d) The linear loading rate is not more than 2 gal/day/ft.
- (e) The approvable site conditions must continue at least 25’ downhill from the system or the toe of any fill used as part of a system.

### **Performance Based Approach**

- (a) There shall be at least 18” of naturally occurring soil above bedrock.
- (b) Sites that do not meet the above requirements for prescriptive designs or enhanced prescriptive designs for depth to seasonal high water table may demonstrate compliance with the rules, based on a detailed and site specific analysis.
- (c) The maximum ground slope shall not exceed 20% for wastewater systems that are on lots subdivided on or after 6/14/02. For systems built on other lots, including



replacement systems, the maximum ground slope shall not exceed 30%, unless the Secretary has granted a specific approval to exceed 30%.

- (d) A site specific approval to construct a wastewater system on a subdivided lot in existence before 6/14/02 with a ground slope exceeding 30% in the area of the wastewater system may be granted by the Secretary upon a request from a designer that:
  - (i) provides specific instructions on the method of construction;
  - (ii) Explains how the stability of the site will be maintained during and after construction with specific attention to erosion control; and
  - (iii) Provides site-specific guidance as needed for safe construction.

**C. Water Supply Systems**

Water is among the most basic of human needs. A clean and plentiful supply is essential to our very survival. We need water in our homes to cook, clean, drink, and flush waste. Water is critical to our ability to fight potentially destructive fires. Our farms, businesses, and industries depend on a plentiful water supply for their operations as well.

The Agency of Natural Resources regulates water systems to protect the public health by assuring safe, affordable drinking water and to implement and enforce the provisions of the Federal Safe Drinking Water Act. Public community water systems are defined by the Vermont Agency of Natural Resources, Department of Environmental Conservation, Water Supply Division under the Environmental Protection Rules, Chapter 21 Water Supply Rules. Those systems which have at least ten (10) service connections used by year-round residents or regularly serve at least twenty five (25) year-round residents are considered public community water systems.

**Public Community Water Systems**

The table below lists the Public Community Water Systems that served residential users in the region in 2005. Smaller public community water systems that serve schools, camping areas, rest areas, businesses, condominium developments or mobile home parks are not included in this list. The information was compiled from Sanitary Survey reports filed with the Agency of Natural Resources by the operators of the facilities.

<b>Table 23: Public Community Water Systems - Region - 2005</b>				
	Number of Connections	Average Day Demand (gpd)	Maximum Day Demand (gpd)	Date of Sanitary Survey

Bethel Water Department	346	250,000	500,000	8/6/1998
Bradford Water System	551	250,000	450,000	11/4/2003
Chelsea Water System	140	26,254	67,500	7/18/2001
East Thetford Water Company	37	3,695	5,105	11/23/2004
Fairlee Town Water	284	115,500	150,000	1/27/2004
Hartford Water Department	2,600	727,413	1,454,826	8/27/2003
Newbury Village, Incorporated	180	44,000	60,000	7/16/1998
Norwich Fire District	333	87,837	164,800	4/29/2004
Quechee Central (Hartford)	720	153,280	181,712	12/15/2004
Randolph Center Water System	66	54,762	92,441	3/2/2004
Randolph Village	1,000	227,000	325,000	3/19/2004
Rochester Water System	180	32,195	64,390	9/25/2003
Royalton Fire District	250	10,500	21,000	5/27/2004
Thetford Water Co-op Incorporated	40	5,500	7,050	8/25/2000
Wells River Water System (Newbury)	130	35,000	38,000	7/16/1998
Woodstock Aqueduct Company	672	351,220	434,563	9/24/2003

*Source: ANR Water Supply Division.*

### **Bethel**

The Bethel water system was privately owned until 1948 when it was purchased by the Town. Groundwater serves as the source of supply and is obtained from two gravel packed wells. Combined capacity is 420 gallons/minute which produces 604,800 gallons/day. The system is served by two 250,000 gallon reservoirs. The areas surrounding the system's two gravel packed wells encompass suspected recharge areas which have been identified as Aquifer Protection Areas by the Vermont Agency of Natural Resources. Land uses within these areas are carefully evaluated and monitored. According to the 1998 Sanitary Survey the system has 346 service connections, an average daily demand of 250,000 gallons/day, and a maximum daily demand of 500,000 gallons/day.

### **Bradford**

Bradford's water source originates from two gravel packed wells which feed a 500,000 gallon storage reservoir. Water is pumped from these wells, services a small residential area, and then enters the reservoir where it serves the rest of the customers. Future plans call for a direct line to the reservoir from this small residential area; this would eliminate any residential use before the water reaches the reservoir and give the chlorine time for treatment before residential use. According to the 2003 Sanitary Survey the system has 551 service connections, an average daily demand of 250,000 gallons per day, and a maximum daily demand of 450,000 gallons/day.

### **Chelsea**

The Chelsea Water System is managed by the Chelsea Water Commission; it serves the village area of Chelsea. Most of the water supply is for single family residents, but also provides water for approximately 16 business and light industry customers. According to the 2001 Sanitary Survey the system has 140 service connections, an average daily demand of 26,254 gallons per day, and a maximum daily demand of 67,500 gallons/day. A In 1995, the water distribution

system was upgraded to meet current engineering requirements and standards. This upgrade included installation of new pipes, fire hydrants, meters, and the replacement of sidewalks. A 240,000 gallon enclosed reservoir was also built to improve flows and water supply. More recently the Town has been working to locate a new well with greater flow capacity.

### **East Thetford**

According to the 2004 Sanitary Survey the system has 37 service connections, an average daily demand of 3,695 gallons per day, and a maximum daily demand of 5,105 gallons/day. A new well was provided for the water company in 1990 by the Vermont Agency of Transportation whose salt shed (which was upgradient of the original water source) may have been leaching sodium into the water. The new well is on top of Cobble Hill on land owned by Vaughan Farms. This well has a large capacity and could easily serve more residences.

### **Fairlee**

The Fairlee village area is served in part by a municipally owned water system, which was completely rebuilt in 1946, with periodic updates to the present. Water is transported from a reservoir off Bald Top Road to the village area well site and pump house, where the water is then treated. In 1973-1974, improvements were made which included a gravel packed well (town well) with a maximum capacity of 900 gallons/minute with a 300 gallon/minute turbine pump. According to the 2004 Sanitary Survey the system has 284 service connections, an average daily demand of 115,500 gallons per day, and a maximum daily demand of 150,000 gallons/day.

### **Hartford Village, White River Junction, and Wilder**

The Hartford Village area and West Lebanon were once served by the same private water system, with storage at the Boston Lot Reservoir. In 1947, the Town of Hartford bought the entire system and then sold the West Lebanon portion of it to the West Lebanon Fire District. To this day, the Hartford and West Lebanon systems are linked by a main which runs across the Connecticut River on the Route 4 bridge; in emergency situations, the valve is opened to pipe water to the community in need. In 1950, a gravel-packed well was installed in Wilder. Water is pumped from Wilder and stored in both a 1.5 million gallon tank located near the Veteran's Administration Hospital and in the 1 million gallon water storage tank located in Wilder. Water is gravity-fed in all but the Campbell Street area. According to the 2003 Sanitary Survey the system has 2,600 service connections, an average daily demand of 727,413 gallons per day, and a maximum daily demand of 1,454,826 gallons/day. The Town of Hartford completed a search for an additional water source to ensure that an adequate supply of water would continue to be available; a test well was installed at a site in Wilder. Development of a source protection plan was completed in 2000.

### **Newbury**

Newbury Village has a publicly owned water system which basically serves the entire village area. The distribution system was installed in 1915 and uses the original lines. The only modifications made have been the replacement and upgrading of some hydrants. The original water source was from a reservoir which is now only used when water supply is low. The current water source consists of an infiltration gallery which supplies a newly installed 350,000 gallon water storage tank. According to the 1998 Sanitary Survey the system has 180 service

connections, an average daily demand of 44,000 gallons per day, and a maximum daily demand of 60,000 gallons/day.

### **Norwich**

The Norwich Fire District operates a public water system that serves the District; it encompasses the historic village center and some outlying areas. A well rehabilitation program in 1988 resulted in substantial water capacity. The water service area has undergone only minor geographic increases in the past; the last major expansion in the water service area was to include McKeima Road. More recent expansions have been incremental in nature, adding on only one or two buildings at a time. According to the 2004 Sanitary Survey the system has 333 service connections, an average daily demand of 87,837 gallons per day, and a maximum daily demand of 164,800 gallons/day.

### **Quechee**

Since 1979, the Hartford Water Department has maintained and operated the Quechee system; it was turned over to the Town of Hartford in 1998. The system serves Quechee Lakes users and non-Quechee Lakes users. It includes a gravel packed well located near Lake Pinneo and four reservoirs holding 10,000, 30,000, 40,000, and 120,000 gallons. According to the 2004 Sanitary Survey the system has 720 service connections, an average daily demand of 153,280 gallons per day, and a maximum daily demand of 181,712 gallons/day. Expansions and improvements to the system follow the Quechee Lakes Master Plan. Expansion of the water line across Quechee Gorge along Route 4 occurred in 2002. Additional development will require completing a hydraulic loop connection at U.S. Route 4 and River Street.

### **Randolph Center**

The source of the Randolph Center Fire District water supply comes from a spring and the Penny Brook. Two wells act as emergency back up to the surface water supplies. According to the 2004 Sanitary Survey the system has 66 service connections, an average daily demand of 54,762 gallons per day, and a maximum daily demand of 92,441 gallons/day. The system is capable of storing 250,000 gallons.

### **Randolph Village**

Two reservoirs provide a total of 2.5 million gallons of storage for the Randolph Village system. According to the 2004 Sanitary Survey the system has 1,000 service connections, an average daily demand of 227,000 gallons per day, and a maximum daily demand of 325,000 gallons/day.

### **Rochester**

The current well site was rebuilt in 1982, renovations included a new driven well, a new 300,000 gallon reservoir, new 8 and 12 inch pipes, new fire hydrants, and in 1989, the addition of water meters. These renovations have improved the water quality and fire fighting capabilities within the village area. The Town also owns spring rights to property located in Middle Hollow.

According to the 2003 Sanitary Survey the system has 180 service connections, an average daily demand of 32,195 gallons per day, and a maximum daily demand of 64,390 gallons/day.

### **Royalton**

South Royalton's public water system was first installed in the 1860s; since then sections of pipe have been replaced and additions have been made to lines. One significant addition was a line crossing the White River, serving houses at the intersection of Routes 14 and 110. The reservoir east of Interstate 89 is no longer in use since it is on the downhill side of highway and is susceptible to contamination; a new reservoir, uphill and west of the interstate, is in use. Further development in this area may lead to the need for additional community water sources.

According to the 2004 Sanitary Survey the system has 250 service connections, an average daily demand of 10,500 gallons per day, and a maximum demand of 21,000 gallons/day.

### **Thetford**

The Thetford Water Cooperative, Inc. draws water from four dug wells, approximately 16 feet deep, located on Cooperative land on Houghton Hill Road. Two of the wells yield clean, clear water while the other wells are high in iron or manganese; the wells with high iron or manganese are used only when water levels are low in the other wells. Water is pumped to a reservoir located on the State Forest land and the system is gravity fed from the reservoir. The water is chlorinated and there are plans for future fluoridation. According to the 2000 Sanitary Survey the system has 40 service connections, an average daily demand of 5,500 gallons per day, and a maximum demand of 7,050 gallons/day. The Cooperative is cautious when considering expansion or additional hook-ups because of water quality. If the Cooperative should decide to expand their service, another well without a high iron content will have to be developed.

### **Wells River**

Wells River's publicly run water system was installed in 1907 and there have been no major improvements since that time. The water originates from an artesian well and is pumped uphill to a 265,000 gallon storage reservoir. The system supplies the entire village with the exception of the outermost houses on Terrace Road and those along Route 302 West past the former paper mill. According to the 1998 Sanitary Survey the system has 130 service connections, an average daily demand of 35,000 gallons per day, and a maximum demand of 38,000 gallons/day.

### **Woodstock**

This system is owned and operated by the Woodstock Aqueduct Company, a privately owned utility. The system serves Woodstock Village with some extensions reaching beyond the Village boundary. The system was originally constructed to serve the Village in 1868 and was supplied by reservoirs in West Woodstock. Current water supply is mainly from a deep well north of the Village on Route 12 with a million gallon storage tank off the Cox District Road. There are two reservoirs which are maintained for fire protection and emergency domestic backup. According to the 2003 Sanitary Survey the system has 672 service connections, an average daily demand of 351,220 gallons per day, and a maximum daily demand of 434,563 gallons/day.

### **Drinking Water Systems - Private**

The vast majority of the region's residential and non-residential uses are serviced by individual water supply systems. Most of these systems are located outside of the village centers in rural areas where population densities are relatively low. These systems are privately owned; many date to the early 1900s and were constructed well in advance of current permitting requirements or standards.

As a result of the early construction of private water systems, the status and nature of these systems is not well documented. Some systems were installed in areas where encroaching development may now threaten water quality. Water quality testing results suggest that wells and springs in developing areas have been contaminated by nearby road salt and storage areas, parking lot runoff, failed septic systems and other contaminants. Furthermore, records indicate that some wells have been pumped at rates that exceed aquifer recharge capacity, resulting in yields that fall short of demand.

Vermont's Water Supply Rules and Environmental Protection Rules, promulgated by the Water Supply Division of the Agency of Natural Resources, establish minimum standards for non-public wells. Some of these non-public wells are subject to Agency permits. These standards include isolation distances from pollution sources, construction standards, monitoring standards, and recording of location and yields.

### **D. Solid Waste**

Thirty years ago, rats, flies, and fires plagued Vermont's 200 "burning" dumps. In 1968, a state law was passed that required municipalities to provide for proper waste disposal. At the same time, Vermont passed the Bottle Bill, thereby assuming the environmental lead by reducing litter and encouraging recycling. In the 1970s and 1980s the adverse environmental and health effects of land disposal became clear. In the late 1980s, Vermonters again found themselves in need of a new generation of solid waste facilities. Existing landfills and dumps were slated to close within the next few years; while new landfills were difficult to site and plan. At the same time, an increase in population and the attitude of an affluent "throw-away" society led to the creation of ever increasing amounts of solid waste. This waste was generated in the face of steadily increasing disposal charges.

Act 78, Vermont's solid waste law, was adopted in 1987. The 1987 Solid Waste Act challenges Vermont communities to develop management plans that conform to the following hierarchy of goals: source and waste reduction, reuse, recycling, and when all other options have been exhausted, disposal. Other priorities mentioned in the Act include reducing the volume of solid waste disposed of in Vermont landfills, and successfully siting new, lined, land disposal facilities. The Act leaves much of the responsibility for solid waste management to local authorities.

The Act states that "decisions shall be made at the most local level commensurate with their impact." (24 VSA Chapter 117 §4302(b)(2)) This language supports the policy of promoting individual responsibility and innovation, thereby encouraging local solutions for wastes generated. Although the local communities are given a great deal of authority under the Statute,

district (municipal and regional) solid waste plans must conform to the State Solid Waste Plan, and be compatible with the Regional Plan. They must demonstrate what solid waste facilities and programs will be established, and where facilities will be located in the region.

The Solid Waste Act places duties upon regional planning commissions. As of June 1990, each regional commission must have adopted a solid waste management plan which is in conformance with the State Solid Waste Management Plan. Regional Plans must be prepared according to a time line. Each regional commission must demonstrate that the Plan is 1) comprehensive; 2) jointly prepared, with government, private sector, and citizen involvement; and 3) will result in a management system for the region that is capable of meeting both short term and long term needs. At the minimum, Regional Plans must address institutional responsibilities, waste reduction, recycling, processing, and land disposal.

When one thinks of "solid waste", one likely thinks of what lies in the trash basket underneath the kitchen sink. However, "solid waste" may encompass a great deal more than what immediately comes to mind. The Waste Management Statute, which accompanies the 1987 Solid Waste Act, defines "solid waste" as "any discarded garbage, refuse, septage, sludge from a waste water treatment plant, water supply plant or pollution control facility and other discarded material including solid, liquid, semi-solid, or contained gaseous materials resulting from industrial, commercial, mining, or agricultural operation and from community activities ...". (10 VSA §6602(2))

#### **Local or District-Based Solid Waste Planning**

All Vermont municipalities, either individually or as part of a solid waste district or an inter-municipal association, are required by Vermont law to adopt a Solid Waste Implementation Plan (SWIP). The SWIP documents town or district waste management facilities and articulates how solid waste will be managed over the next five years. In addition, the Vermont Agency of Natural Resources (ANR), is required to prepare and maintain a State Solid Waste Plan, establishing statewide solid waste management goals for the entire state. All SWIPs must be in compliance or consistent with these state goals. Effective November 2001, the Agency revised the State Plan. In response to this, SWIPs approved under the 1989 Vermont Solid Waste Management Plan before May 2003 need to be revised to conform to the updated State Plan.

Towns and districts are required to submit plans to the Agency for "pre-approval" prior to local adoption. No town or district may adopt a SWIP unless two publicly noticed hearings, giving the public the opportunity to provide input, precede the action. Vermont law directs ANR to revise its State Plan as least once every five years. SWIPs need to be prepared and submitted to ANR with this time frame in mind.

In addition to being in conformance with the State Plan, all SWIPs must be in accordance with any municipal or Regional Plan, prepared and adopted pursuant to 24 VSA Chapter 117. Towns and districts need to demonstrate that the provisions of these plans match the goals and policies of the SWIP. The elements of a SWIP must meet Agency planning requirements, discuss waste diversion plans, household hazardous waste, biosolids, and septage management, waste facility siting criteria, and include a public participation component. All towns or districts for this region are encouraged to contact the Regional Commission offices regarding their current

planning activities and to seek a determination that their SWIP revisions meet overall goals and policies of this Plan.

Lastly, state law provides for Agency certification of any waste management facility, prior to construction or operation of that facility, be it privately or publicly operated or owned. This includes town transfer facilities and recycling centers. In addition to meeting economic and environmental threshold requirements, no facility may be approved unless it is first determined to be in compliance with the local or district SWIP where it is proposed to be located, except facilities handling biosolids or sludge. As such, this Plan encourages the region's towns and districts to carefully evaluate long-term waste management options to make sure that all facilities planned for their area match their SWIP.



*K. Geiger © 2001*

**Photo 24: Solid waste mismanagement - old tires, junk cars, and surface water**

### **Status of Current Solid Waste Planning**

Given that SWIPs were required to be updated and submitted for approval to ANR prior to May 2003, most towns and districts within the region are currently in the process of revising their SWIP. Most SWIPs are currently under review at the Agency, awaiting pre-approval; no SWIPs in the region have been pre-approved as of August of 2006.

Outlined below are summaries of planning and operational activities for all towns, or districts covering this region. This information should only be used for preliminary assessment of on going and planned activities. Persons or entities seeking detailed information are encouraged to contact the town or district directly.

### **Central Vermont Solid Waste Management District (CV)**

The Towns of Bradford, Chelsea, Strafford, and Tunbridge are members of the Central Vermont Solid Waste Management District (CVSWMD). The District contracts for disposal of waste at the Waste USA landfill in Coventry or the WSI, Inc. landfill in Moretown. These are the only two lined landfills presently existing in Vermont. Other wastes, including tires, are processed outside of the state. The District has no immediate plans to develop its own landfill, as it believes that there is sufficient capacity in existing or planned facilities here in Vermont or in nearby states.

One priority of the District is to develop means to hold disposal costs stable. In this regard, the District has commenced review of alternatives to reduce the volume of waste entering landfills.



The District provides recycling and household hazardous waste disposal services for residences and businesses. These services are contracted out with private vendors. The Towns of Bradford, Chelsea, Strafford and Tunbridge do not provide municipal curbside pick-up services. These services are provided privately. However, local transfer facilities are available to these communities. The District has a District Solid Waste Plan and a SWIP under review at the Agency. Their most recent SWIP was adopted on July 29, 2005.

### **Corinth**

The Town of Corinth is in the process of updating its Solid Waste Management Plan with the assistance of Casella Waste Management Services which has an operating contract with the Town. The Town owns a certified waste transfer facility which is available for residents to drop off of recyclables and mixed solid waste. Casella Waste Management Services provides curbside pick-up for residents. Most mixed solid waste is trucked to a lined landfill in Bethlehem, New Hampshire. Present management plans are expected to remain unchanged in the near future.

### **Fairlee**

The Town of Fairlee first developed a SWIP in 2002 – 2003, as it did not have a previously approved plan. More recently, they updated their SWIP and received approval from ANR on July 13, 2006. Casella currently handles all waste generated in town and transports both refuse and recyclables to certified facilities that it operates in Vermont and New Hampshire. The Town maintains a transfer facility at its former landfill off Route 5.

### **Greater Upper Valley Solid Waste Management District (GUV)**

The Greater Upper Valley Solid Waste District includes ten towns in this region: Bridgewater, Hartland, Norwich, Pomfret, Sharon, Strafford, Thetford, Vershire, West Fairlee and Woodstock. This District adopted its first Solid Waste Implementation Plan in the early 1990s. It has been amended several times since its initial approval. On August 21, 2006, the District received approval from ANR for its most recently amended SWIP.

Projects to be undertaken by the District over the next couple of years include:

- a. Continue programs to address illegal disposal and backyard burning, computer and electronics recycling, waste reduction and diversion, waste-related education, household hazardous waste reduction and proper management, unit-based pricing, and long-range planning;
- b. Develop or plan for development of the permitted landfill site in North Hartland, including development of a new access to Route 5 using a bridge that would cross over Interstate 91;
- c. Work closely with member towns and the Regional Commission to ensure that the updated SWIP goals and policies match well with Chapter 117 and town and Regional Plans addressing solid waste.

Presently, the Lebanon City Landfill provides lined disposal capacity for mixed solid waste for all towns in the District. The District is allowed access to this facility as a “tenant at will” and has no guarantee for long-term access to this site. Because of this uncertainty, the District has identified the North Hartland site as a contingency plan in the event that Lebanon landfill becomes unavailable or unaffordable. The District site received certification from the Vermont Department of Environmental Conservation in 1996 and renewed the certification in 2003 for another five years. The site received Act 250 permits in 2004. This site is estimated to provide capacity for disposal of District waste for at least 50 years.

Construction and demolition (C&D) materials are currently disposed at the Hartford C&D processing center through an agreement by the District with the Town of Hartford. The District has no plans to develop or operate its own C&D facility or contract with another operator unless its agreement with Hartford expires. Detailed information about the organization and operation of the District can be obtained from District Offices in North Hartland or by calling 296-3688.

### **Hartford**

Initially covered by the Greater Upper Valley Solid Waste Management District (GUVSWMD) solid waste implementation plan, Hartford withdrew from the District in 1995. With the assistance of their regional planning commission, Hartford developed a new solid waste implementation plan in 1996 which was adopted by the Board of Selectmen and approved by ANR on January 28, 1997.

As of January 1, 1993, all municipal solid waste in Vermont had to be disposed of in lined landfills. The Hartford landfill did not meet the requirements to be lined, necessitating that municipal solid waste be transported out of the area. The waste currently is hauled to a lined landfill in Lebanon, New Hampshire by a private hauler. Residential solid waste can be brought to the transfer station by Hartford residents, and is accepted from residents of GUVSWMD towns. Commercial solid waste from Hartford and GUVSWMD communities is accepted in loads not greater than 1½ cubic yards. Many residents contract with a private hauler directly instead of bringing trash to the transfer station.

The Hartford Community Center for Recycling and Waste Management (transfer station) is located on nineteen acres of land on U.S. Route 5 South. The facility comprises a recycling building and intermediate processing center, the Good Buy Store where reusable items are dropped off and sold for a minimal charge, the education building, the household hazardous waste building, transfer station, and a certified construction and demolition debris landfill. The buildings have a total of 9,412 square feet. The curbside recycling program, started in 1991, greatly increased the amount of recyclables that were returned to the recycling facility. When all materials are counted, including old vehicles, household hazardous waste, and sludge, an estimated thirty-one percent (31%) of the solid waste generated in Hartford is either recycled or reused.

### **Newbury**

The Town of Newbury currently operates a transfer station located in Newbury Village. All wastes are then transferred to approved facilities owned and operated by Casella Waste

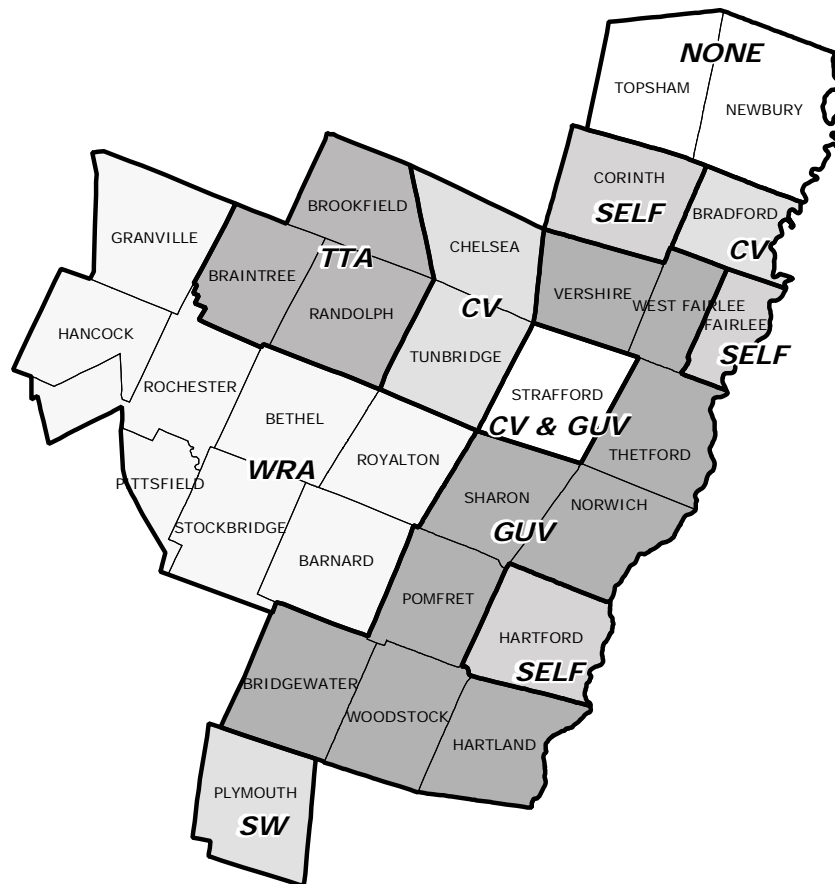
Management Services. Mixed solid waste is hauled presently to Casella's landfill in Coventry, Vermont. All wastes are picked up by private haulers or handled individually by homeowners or businesses. The Town, in cooperation with Woodsville, NH, conducts a recycling program which has been approved by the Solid Waste Division. Household hazardous waste collection is conducted at least annually, with town financial assistance, in cooperation with the Central Vermont Solid Waste Management District. The Town does not have an approved SWIP, nor is one under consideration by ANR at this time.

### **Plymouth**

The Town of Plymouth is served by the Southern Windsor/Windham County Solid Waste Management District. Their SWIP was approved by ANR on June 30, 1993.

### **Tri-Town Agreement (TTA)**

The Tri-Town Agreement covers the three towns of Braintree, Brookfield, and Randolph. The Selectboards of these towns jointly entered into a cooperative solid waste planning and management agreement in the early 1990s and the Agreement is still effective today. As part of the Agreement, the towns have a management contract with Casella Waste Management Services to operate a transfer station at the former landfill site off Beanville Road in Randolph. All mixed solid waste, recyclable materials and hazardous wastes are dropped off here and then transferred to certified facilities by Casella. Costs for the operation of the facility are covered by disposal fees and the three towns. None of the towns provide municipal waste collection services. The Agreement had its first SWIP approved by ANR on February 24, 1994 with an amended SWIP approved on January 26, 1998.



Source: Vermont Agency of Natural Resources

**Figure 16: Solid waste planning alliances and SWIP status for the Region**

**Topsham**

The Town of Topsham does not have an approved SWIP, nor is one under consideration by ANR at this time. The Selectboard currently contracts with Casella Waste Management Services for disposal services. The Town provides a transfer station in East Topsham that is operated by Casella. The facility handles both mixed solid waste and recyclables. In addition, Casella provides household hazardous waste disposal services to the Town at its facility in East Montpelier.

**White River Solid Waste Alliance (WRA)**

The Alliance includes the Towns of Barnard, Bethel, Granville, Hancock, Pittsfield, Rochester, Royalton, and Stockbridge. The Alliance had its first SWIP approved on November 30, 1992, with an amended SWIP approved on August 28, 2003. The Alliance’s organizational structure is through inter-municipal contracts. Alliance facilities serve as an aggregation point for all mixed solid waste, household hazardous waste, and recyclables which are hauled to designated processing facilities or disposal sites. Bio-solids or septage management are handled individually by each of the towns according to ANR rules.

A primary objective of the Alliance is to maximize the amount of recycling and to keep the majority of materials free of any disposal fees. The Town of Bethel provides administrative services on behalf of the Alliance members and coordinates with the Selectboards of the involved towns, as needed.

**Table 24: Certified Solid Waste Facilities in Region or Neighboring Town – March 2006**

<u>Name of Facility</u>	<u>Location</u>	<u>Applicant</u>
Balla Machree Farms, Inc.	Royalton	Joshua Powers, Jr.
Bethel/Royalton Transfer Station	Royalton	Bethel/Royalton
Bradford Recycling Depot	Bradford	CVSWMD
Bridgewater Landfill (Closed)	Bridgewater	Bridgewater Town
Bridgewater Wastewater Treatment Facility	Bridgewater	Bridgewater Town
Chelsea Recycling Depot	Chelsea	CVSWMD
Chelsea Transfer Station	Chelsea	Chelsea Town
Compost Facility	Hartland	VT Compost Co.
Corinth Recycling Facility	Corinth	Corinth Town
GUVSWD Landfill/Transfer* (*permitted, but not yet developed.)	N. Hartland	GUVSWD
Hammer Farm	Vershire	VT Compost Co.
Hartford C&D Landfill/Transfer	Hartford	Hartford Town
Lemax Farm Compost Facility	N. Hartland	VT Compost Co.
Northeast Waste Services Recycling	Hartford	Northeast Waste
Norwich Transfer Station	Norwich	Norwich Town
Randolph Lined Landfill/Transfer	Randolph	Randolph Town
Strafford Recycling Depot	Strafford	Strafford Town
Thetford Recycling Center	Thetford	Thetford Town
Tunbridge Transfer Station	Tunbridge	Tunbridge Town
Twin State Sand & Gravel Stump Dump	N. Hartland	TSS&G
Upper Valley Landfill (Closed)	Thetford	UVRLC
Vershire Recycling Center	Vershire	Vershire Town
Woodstock Recycling & Refuse Corp.	Woodstock	WRRRC
Woodstock Wastewater Treatment Facility	Villages of Woodstock and Taftsville	Woodstock Town

## **E. Recreation Inventory**

### **Background**

Vermont has many recreational opportunities available to its residents and visitors. These range from organized, structured prospects at state and federal parks, as well as more informal opportunities in municipal parks and forests. Recreational opportunities attract tourists, second homeowners, and retirees to the region and contribute to the quality of life. The region's recreational resources include elements of the built environment like historic towns and buildings, museums and theatres, and the natural environment which includes scenic views, rivers, lakes, mountains, and forest lands that offer public and private access for hunting and fishing, hiking, mountain biking, skiing, snowmobiling, and use of all-terrain vehicles (ATVs). Access to private lands is also available through agreements brokered by groups such as VAST and other local groups. As pressure on private lands increase and more private land is posted,

the need for publicly owned land for recreation is critical. Public recreational lands and resources should maximize their utility by providing for multiple uses.

### **Vermont Outdoor Recreation Plan 2005-2009**

The Statewide Comprehensive Outdoor Recreation Plan (SCORP) was completed in December of 2005 by the Department of Forest, Parks and Recreation. Below are eight findings from the Plan that the region and its towns should be aware of as they move forward in planning for recreational opportunities.

1. Increasing Participation

The increasing popularity of and participation in outdoor recreation activities have created enormous demands that, in most situations, have outpaced efforts to make improvements.

2. Social Changes

Some social and demographic changes are contributing to the need for changes in outdoor recreation opportunities made available in Vermont.

3. Limited Financial Resources

State support for managing recreation and public lands has not kept pace with land acquisition and public demand for recreation, and there is no prospect of it doing so in the near future.

4. Use of Private Lands

Privately-owned lands represent about eight-five percent of Vermont's land base. Given the insufficient state resources for acquisition and management of recreational opportunities and the increasing demand for these services, more efforts should be made to assure access to private lands.

5. Local Community Resources

The number of outdoor recreation participation days that occurs at the local level likely exceeds the numbers at the state and federal levels. More resources are needed to assist local communities in meeting their outdoor recreation needs.

6. Performance Indicators

Vermont outdoor recreation providers need to develop performance indicators or numbers to help measure progress in resolving outdoor recreation issues. At a minimum, some coordinated staff and volunteer resources need to be directed toward this purpose.

7. Balance between Demand for Use and Resource Conservation

A balance is needed between the demand for outdoor recreational opportunities and conservation of the natural resources which support these activities. Protection of lands along rivers and lakeshores is needed to provide scenic views, maintain water quality, offer diverse recreational opportunities, and conserve wildlife habitat.

## 8. Recreation Connections to Energy and Physical Fitness

Outdoor recreation is connected to energy and physical fitness concerns in a number of ways.

### **Public Recreational Opportunities**

The region has one national park - the Marsh Billings Rockefeller National Historic Park in Woodstock. Associated with the Park is the privately owned Billings Farm and Museum which offers farm educational programs. The region is also fortunate to have access to the Green Mountain National Forest in the Quintown valley and along the Appalachian Trail and Long Trail corridors. Additionally, recreation opportunities are available at the U.S. Army Corps of Engineer Sites along the Ompompanoosuc River at Union Village and the Ottauquechee River at North Hartland Lake.

Several state parks can be found in the region including the Calvin Coolidge Historic Site in Plymouth, the Quechee Gorge State Park and Theron Boyd State Historic Site in Hartford, the Allis and Ainsworth State Parks in Brookfield, Thetford Hill State Park and the Granville Reservation State Park. The Department of Forest, Parks and Recreation and the Department of Fish and Wildlife's several state forests, wildlife management areas and lake or river access points offer additional recreational opportunities.

Many towns throughout the region also have town forests that are available for recreation; these forests also offer unique educational opportunities for local school children and residents about forestry and landscape practices. Nineteen towns in the region have town forests: Barnard, Bethel, Bradford, Brookfield, Chelsea, Fairlee, Hancock, Hartford, Hartland, Newbury, Norwich, Plymouth, Pomfret, Randolph, Rochester, Royalton, Strafford, Thetford, and Woodstock. Currently, there are public and private statewide initiatives studying and encouraging town forest development and use; West Fairlee is in the process of developing a town forest.

Several towns also offer town recreation programs through their recreation departments. These may include ski programs in conjunction with local schools in the winter, camp and track & field programs in the summer, as well as various events year round. These recreation departments may also manage a modest network of town parks.

Many towns also have excellent trail networks linked to their road network and portions of these networks include Class 4 roads. Users should check with the town to see if there is a road or trail map available. Town selectboards have the authority to develop a policy that regulates use and maintenance of town trails and Class 4 roads and several towns have developed policies for these public rights-of-way (ROWs) based on the users' needs. Users should contact the town and request copies of their policies.

### **Public Access to Aquatic Recreation**

The region's rivers and lakes offer opportunities for swimming, fishing, and boating, all of which require public access areas for parking or boat launching. Scenic waterfalls, cascades, and gorges are also destinations of tourists and recreators. There is a need for access areas to water resources in the region. In addition, there is a need for management of public access resources in a manner that will make them safe and attractive for human use as well as of a quality that will sustain fish and wildlife. See the Surface Water, and Fisheries and Aquatic Resources sections of this Plan, for more information.

### **Historic and Cultural Resources**

According to the Vermont Department of Tourism and Marketing, winter tourism brings in approximately thirty percent of the state's tourism activity, while antique shopping, theater and art exhibits, festivals, historic site visitations, foliage viewing and outdoor recreation make up nearly seventy percent of annual tourist activity. Cultural heritage in particular is drawing substantial attention. According to the Department, requests for information on historic sites more than doubled in 1994. Cultural heritage resources include the scenic qualities inherent in village centers and hamlets, many of which have maintained the look and feel of 19th century Vermont. Historic resources and town centers that offer museums, shopping, and eating establishments may attract bicycle and pedestrian traffic. Towns in the region should determine to what extent they want town centers to be destinations for tourism and whether or not the facilities are available to accommodate additional traffic safely and effectively.

### **Private Recreational Opportunities**

Many of the outdoor recreational resources in the region rely on the traditional willingness of landowners to allow access to private land. According to the 1993 Vermont Recreation Plan, it is estimated that approximately eighty-five percent of recreational activities in Vermont occur on private land. As the population increases in the state, so does the pressure on private land. With increased use, more landowners experience vandalism, littering, and disregard for private property. Such negative impacts result in the posting of land and closing of trails. For private lands to continue to be used, landowners must feel secure in the protection of their traditional rights and land uses, and incentives for landowners to keep their land open are needed.

Several large private landowners allow access to their land. Three notable examples include the owners of the Wilder Dam facility in Hartford and its associated Kilowatt Park, the Quechee Gorge Dam in Hartford, and the Montshire Museum lands in Norwich. Other private facilities such as local ski areas and golf courses provide recreation opportunities year round. Users to all facilities, public or private, must respect the facilities. Users should get permission when appropriate from the landowner or local access club.

Facilities in the region include the ski centers of Bear Creek, Killington, Middlebury Bowl, Northeast Slopes, Nordic Centers, Quechee, Suicide Six; the Quechee Club; golf courses and exercise/fitness clubs.



### **ATVs (All-Terrain Vehicles) and Environmental Considerations**

All-terrain vehicles (ATVs) provide for unique opportunities to experience nature, and at the same time, they provide opportunities to damage the critical ecostructures present in remote and sensitive areas.

## **F. Health Care Services**

### **Primary Care**

There are many health care facilities serving the region, offering a broad range of services from maternity and pediatrics, to walk-in clinical services. Gifford Medical Center, located in Randolph, serves twelve towns within the region of its thirteen-town primary service area. The hospital has a total of 52 beds and 11 bassinets and is designated as critical access hospital. The inpatient admission total for 2005 was 1,633 individuals and the Gifford Birthing Center performed 304 deliveries. It has several satellite clinics and these include Chelsea Health Center, the Rochester Health Center, the Sharon Health Center, and the Gifford Family Health Center in Royalton near Bethel.

The Ottauquechee Health Center in Woodstock is a larger clinic that serves the Woodstock area and is part of the Mt. Ascutney Hospital. The South Royalton Health Center, the Valley Health Center in East Corinth and the Wells River Clinic in Newbury are three smaller clinics that serve their immediate area.

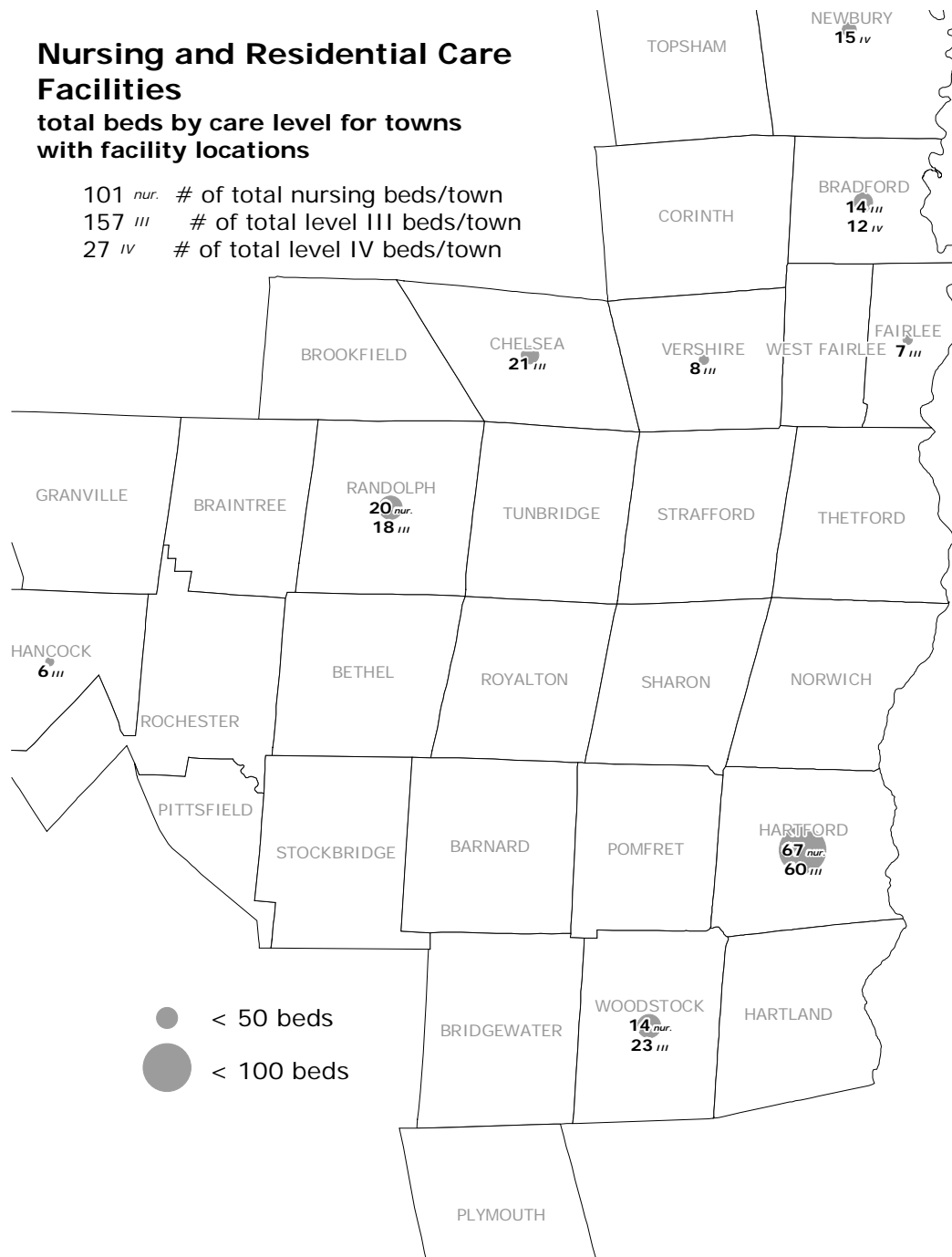
The Veterans' Administration Medical Center (VAMC) in Hartford is the largest hospital in the region. The VAMC serves as the host site for three National VA Centers: the Executive Division of the National Center for Post Traumatic Stress Disorder (NC-PTSD), Hub Site for the National Quality Scholars Program and Field Office of the National Center for Patient Safety. The Medical Center is a 60-bed, acute care facility that provides a full range of primary, secondary, and specialty care. Inpatient beds include 43 medical/surgical beds, 7 intensive care unit (ICU) beds, and 10 psychiatry beds. In addition, four state-of-the-art Operating Room Suites, and six Post Anesthesia Recovery beds support VAMC's active surgery program.

Although located outside the region, the Dartmouth-Hitchcock Medical Center of Lebanon, New Hampshire provides comprehensive health care to many of the region's residents. The Medical Center is affiliated with Dartmouth College Medical School. It offers 396 beds, and complete health care including a Children's Hospital, a Community Health Center, Psychiatric Care Associates, and the Norris Cotton Cancer Center.

Other health care facilities located outside the region but used by people within the region include Central Vermont Hospital in Berlin, Rutland Regional Medical Center in Rutland, the Fletcher Allen Health Care Center in Burlington, the Cottage Hospital in Woodsville, New Hampshire, and the Alice Peck Day Memorial Hospital in Lebanon, New Hampshire.

Historically, health care services have been more limited than they are today. Large hospitals are beginning to offer a broader spectrum of programs to take care of every aspect of the physical and psychological well being of area residents. Services that focus on providing for

contemporary needs and reinforcing current values are becoming more prevalent. Area health care facilities are beginning to take a more holistic view of the human individual.



Source: Vermont Department of Aging & Independent Living

Figure 17: Nursing and Residential Care Facilities

### **Nursing and Residential Care**

According to Governor's 2006 *State of the State* address, Vermont has the second oldest population in the nation and within twenty-five years the number of retirees will double. Planning for these retirees' health care needs must be a priority. The region currently has a very modest network of nursing and residential care facilities. Hartford, Randolph and Woodstock have approximately 101 nursing beds available at several facilities; this number represents a loss of sixty-nine beds with the closing of the facility in Bradford. Those three towns (as well as Chelsea, Fairlee, Hancock, Newbury and Vershire) offer approximately 151 residential care beds. Of those 151 beds, approximately eighty-five percent have part-time nursing care and the remaining fifteen percent offer residential care only.

### **Future Needs**

According to a needs assessment survey conducted by the United Way of the Upper Valley, some very real needs and planning implications for adequate care remain within the region. Citizens within the United Way service region cited alcohol abuse, affordable medical care, affordable dental care, drug abuse, and child abuse as the top five human service needs.

The Regional Commission recognizes the need for access to adequate and comprehensive services to enhance human well-being, to all residents within the region. Given the rising costs of comprehensive health services, and the erosion of federal and state financial subsidies for health care services, the Regional Commission supports the need to make use of existing health care facilities both within and outside the area in an efficient manner. At the very least, all residents need to have access to primary health care. (According to the Bureau of Primary Health Care, "primary health care" includes General Practice, Family Practice, Internal Medicine, Pediatrics, and OB/GYN resources.) Ensuring access to primary health care facilities for all residents at affordable costs should be a priority in the years to come. With the aging of Vermont's population, planning for nursing, residential and hospice care is becoming equally relevant.

### **G. Educational Facilities**

As we approach the end of the final decade of the 20th century, the public mission of our educational system becomes more relevant to the region's citizens. Access to a system of quality education is required to achieve social and economic goals. Three fundamental economic changes are necessary to achieve equal opportunity to prosper. One is that aggregate wealth must be increased to improve financial security. Second, the wealth of the State must be spread into more rural and remote areas where incomes are well below state medians. Third, financial and geographical barriers to post-secondary education need to be eliminated.

Sustained regional and economic development will be impossible in the region unless financial and geographic access to education is affordable and geographically convenient. Without a well-educated work force, the region, like the rest of Vermont, will be unable to compete with other states for well-paying jobs.

Throughout the late 1980s and 1990s, recessions emphasized the relationship between economic development and an educated work force. Economic restructuring has resulted in a shift away from jobs in manufacturing to service sector employment. Many of these new jobs are at lower wage levels. Personal income levels increase with gains in educational attainment. The earning gap between college graduates and high school graduates remains significant, with college graduates earning seventy percent more. Poverty decreases with educational attainment.

### **Elementary and Secondary Schools**

Sound planning for educational facilities and programs is necessary to support the social, economic, and cultural welfare of a community. A quality education provides the foundation for a child's productive future, enabling the child to make positive contributions to business, civic affairs, and family life.

Quality educational facilities are expensive investments to construct and maintain. Schools require careful and diligent long-range planning by school officials, administrators, and citizens. Overall state aid to local and regional districts has declined, placing even greater burdens on towns to fund school costs through property taxes. Starting in March, 1995, the State Capital Construction Aid Program, administered by the Vermont Department of Education, was available only to school districts with local voter approved construction projects. Despite many attempts by the Vermont General Assembly and Executive Branch to reform property tax/school aid, Vermont has been unable to adopt a reform package that provides relief from high property taxes, as experienced in many towns.

All public schools are governed by a district school board elected by the voters of their respective municipalities; administrative support to the district board is received from supervisory unions. In 2003/2004 there were a total of forty-seven educational facilities within, or serving, the region. Total enrollments amounted to approximately 9,905, covering grades K through 12 and special programs. Some school districts and municipalities accept, on a year-to-year basis, tuition paying students from neighboring communities that do not provide elementary or secondary education, or lack adequate facilities. See Table 25 below, which depicts individual school facilities and enrollment totals for the 2003/2004 school year.

Throughout the 1980s and 1990s, school enrollments experienced slow to moderate growth, but this trend has reversed in recent years. Declining enrollments have brought staffing, programmatic, and financial planning challenges to schools throughout the region. If this trend continues, schools and municipalities will have to make the decision whether to down-size their staffs and programs, or investigate the idea of regional schools.

### **Vermont Technical College**

In 1962, the Vermont School of Agriculture and the Vermont Agricultural and Technical Institute merged to form Vermont Technical College (VTC). VTC is part of the five-member Vermont State Colleges System. Located in Randolph Center, the 600 acre college consists of thirty-one buildings and supports a current enrollment of roughly 700 students.

**Table 25: Schools and Enrollments 2003 – 2004**

	School Name	Total	K - 6	7 – 12
Barnard	Barnard Central School	57	57	0
Bethel	Bethel Elementary School	143	143	0
Bethel	Whitcomb Jr/Sr High School	179	0	179
Bradford	Bradford Elementary School	247	247	0
Bradford	Oxbox UHSD #30	497	0	497
Bradford	River Bend Career & Tech +	225	0	225
Braintree	Braintree School	112	112	0
Bridgewater	Bridgewater Village School	60	60	0
Brookfield	Brookfield School	113	113	0
Chelsea	Chelsea Elem. High School	236	76	160
Chelsea	Brookhaven Learning School *	18 K-8 <sup>2</sup>	-	-
Chelsea	Wellspring School *	38 K-8 <sup>2</sup>	-	-
Corinth	Waits River Valley USD	279	196	83
Fairlee	Samuel Morey Elementary	153	153	0
Granville	Granville Village School	10	10	0
Hancock	Hancock Village School	24	24	0
Hartford	Dothan Brook School	292	292	0
Hartford	Hartford High School	804	0	804
Hartford	Hartford Mem. Middle School	388	116	272
Hartford	Ottauquechee School	276	276	0
Hartford	White River School	168	168	0
Hartford	Mid Vermont Christian School	163 K-12 <sup>2</sup>	-	-
Hartland	Hartland Elementary School	383	271	112
Newbury	Newbury Elementary School	157	157	0
Newbury	Blue Mountain USD #21	442	228	214
Newbury	Newbury Christian School *	45 K-12 <sup>2</sup>	-	-
Norwich	Marion W. Cross School	308	308	0
Plymouth	Plymouth Elementary School	18	18	0
Pomfret	Pomfret School	96	96	0
Randolph	Randolph Schools	343	343	0
Randolph	Randolph UHSD #2	584	0	584
Randolph	Randolph Technical Career Center	200	0	200
Randolph	Justin Morgan Christian School *	17 K-8 <sup>2</sup>		
Rochester	Rochester Elem/High School	252	109	143
Royalton	S. Royalton Elem/High School	505	169	336
Sharon	Sharon Academy *	85	0	85
Sharon	Sharon Elementary School	130	130	0
Stockbridge	Stockbridge Central School	63	63	0
Strafford	Newton Elementary School	109	73	36
Thetford	Thetford Academy *	385	0	385
Thetford	Thetford Elementary School	226	226	0
Tunbridge	Tunbridge Central School	132	97	35
Vershire	Mt. School of Milton Academy *	45 <sup>2</sup>	0	45
West Fairlee	Westshire Elementary School	102	102	0
Woodstock	Woodstock Elem. School	195	195	0
Woodstock	Woodstock SR. UHSD #4	440	0	440
Woodstock	Woodstock Union Middle School	206	0	206
Region		9,905	4,628	5,041

\* Independent School

+ Higher Education Facility

*Source: Vermont Department of Education - Public School Enrollment Across Grade For School Year 2003-2004.**Source<sup>2</sup>: Vermont Department of Education Independent Schools Program.*

Vermont Technical College offers both two and four year programs in engineering technology, architectural and building technology, agribusiness, and computer technology. Most students are primarily from Vermont and other New England states. VTC retains an excellent placement record for its graduates, many of which find employment within the region. VTC also maintains a Center for Business and Industry (CBI) which provides outreach programs and services to business and industry clients.

### **Vermont Law School**

Founded in 1970, Vermont Law School (VLS) offers legal education to approximately 450 students throughout the United States and internationally. Located in the village of South Royalton, the school offers three advanced degrees: Master of Studies in Environmental Law (M.S.E.L.), Master of Laws in Environmental Law (L.L.M.), and Juris Doctor (J.D.). VLS is a private institution and includes the Environmental Law Center, which oversees the M.S.E.L. and L.L.M. program and offers education on the issues and values underlying environmental law and policy. Additionally, the Center provides training opportunities for mid-career professionals and serves the region by conducting extensive programs on current environmental issues.

VLS is the home of the South Royalton Legal Clinic, where second and third year law students work under the supervision of professors and practicing attorneys, offering legal services to low-income clients. Also, the Environmental Law Center operates the Environmental Law Clinic, where students gain experience by working on actual environmental law cases under the auspices of professors and attorneys.

### **Community College of Vermont**

The Community College of Vermont has no campus. Services are delivered through a network of twelve site offices around Vermont. The College is part of the Vermont State College system, and it provides degree and non-degree programs to over 9,000 students statewide. The CCV has a facility in Wilder; other sites close to the region include Montpelier, Rutland, St. Johnsbury, and Springfield.

### **Other Institutions**

Although not located within the region, the following nearby institutions serve the region's residents:

- Champlain College-- Burlington
- College for Lifelong Learning – Lebanon, NH
- Dartmouth College-- Hanover, NH
- Lebanon College – Lebanon, NH
- Middlebury College—Middlebury
- New Hampshire Technical College – Claremont, NH
- Norwich University-- Northfield
- St. Michael's College—Winooski
- University of Vermont-- Burlington
- Vermont State Colleges-- Castleton, Johnson, Lyndon
- Woodbury College—Montpelier

## **H. Information Technology**

### **Introduction**

Information Technology (Voice and Data Telecommunications, Broadband Internet) has become increasingly important to the economic needs of residents and businesses in the region. Telecommunications infrastructure and services are key elements in supporting the present and future economy in Vermont.

Advancements in technology and the availability of powerful, yet relatively inexpensive equipment have allowed the development of an “Internet Economy”. Telecommunications reduce demand for travel thereby creating new opportunities for the relocation and growth of decentralized business operations. Businesses are now able to use broadband internet and telecommunications infrastructure to conduct the types of business that were previously unfeasible in a rural state. The Vermont Telecommunications Plan (VTP) cites that this “Internet Economy” was responsible for a major increase of the U.S. Gross Domestic Product (GDP) in the late 1990s, jumping from a growth rate of 2.4 percent per year to 4.1 percent per year.

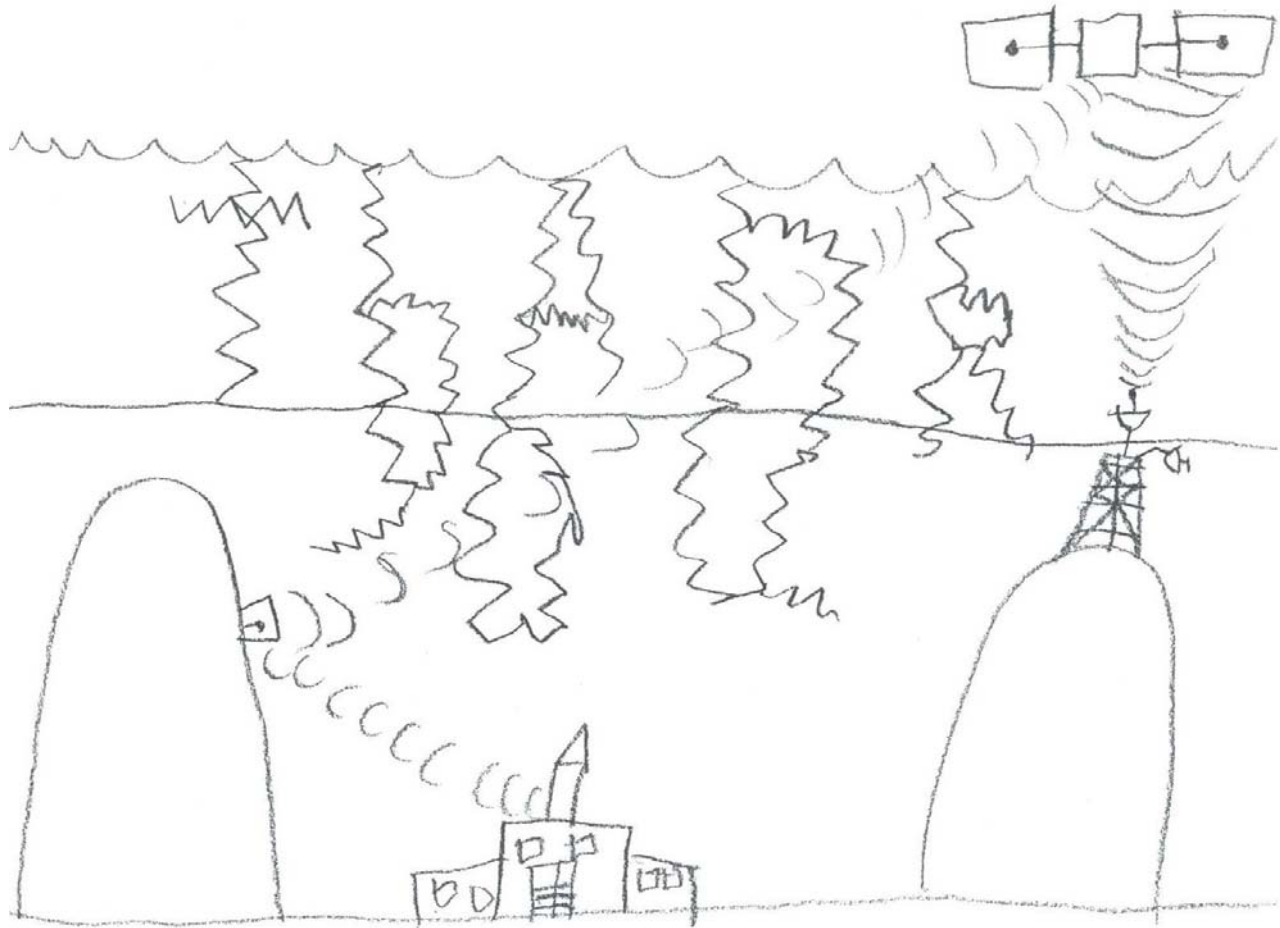
“Four major sectors drive Vermont’s economy: (i) manufacturing, (ii) hospitality and tourism, (iii) education and health care, and (iv) agriculture and natural resource-based production. All of these sectors depend more and more on high-speed, reliable telecommunications service. Manufacturing in the United States is increasingly dependent on information technology and business-to-business networking that enhances productivity and enables American products to compete against cheap labor in a global marketplace. Broadband telecommunications fills a dual role for hospitality and tourism, providing a key marketing channel as well as an important amenity for travelers. Good wireless service is now considered vital by many travelers. Increasingly sophisticated communication over distance is ever more a mode of delivery for education and health care. Even agricultural and natural resource producers rely on modern telecommunications to access markets, suppliers, and information.” (VTP)

With the increasing economic dependence of this technology, it is clear that Vermont, and the region, must continue to keep pace with advancements in technology to remain a desirable place to do business in the U.S.

### **Landline Communications**

Landline communications (the traditional, wired connections that most people have in their homes) have been the backbone of United States communication activities for decades. Even as wireless communications revolutionize the way people keep in touch, landlines continues to provide critical functions. Without the capabilities of landlines, our country would not have the tools to evenly distribute power across the nation. Emergency services depend on landlines for the “traceability” of 911 information. The medical industry depends on landlines for linking health care providers and networks of information.

Over ninety-seven percent of all households have access to traditional landline telephone services. The region is served primarily by Verizon, which is Vermont's largest telecommunications company. Additional coverage is provided by the Topsham Telephone company and VTel.



Source: Bridgewater Elementary School, 2001

**Drawing 6: A Third Grader's View of Telecommunications**

### Wireless Telecommunications

Nationwide, cellular phones have become a common tool for both public and private use. Although wireless telecommunication was used as early as the 1950s, its largest growth has been in the past 15 years. According to the International Telecommunications Union, "from just 11 million subscribers in 1990, the number of mobile cellular subscribers exceeded 1.1 billion by the end of 2002, an annual average growth rate of 47 per cent compared to just seven per cent for fixed telephone line subscribers. There are now more mobile than fixed telephone subscribers around the world."



As of 2004, five cellular companies were operating in Vermont: Cellular One, Bell Atlantic Mobile, U.S. Cellular, Sprint PCS and Nextel.

There has been concern about the proliferation of cell phone towers throughout Vermont. Tower height and the number of towers for wireless services has been a matter of public controversy in recent years. In a poll conducted as part of the Vermont Telecommunications Plan, 45.6% of Vermont residents indicated a preference toward a larger number of short towers, compared to 38.9% who favored fewer larger towers and 16.7% who wanted neither option.

In the region, a careful balance between those concerned with the impacts of cell towers and those who demand improved infrastructure needs to be considered. State statute prohibits the exclusion of cell towers in towns through zoning or other bylaws, but rigorous regulations can have the effect of zoning towers out.

### **Internet Services**

The internet has become a useful tool for business in Vermont. Manufacturing is dependent on information technology and business-to-business networking. Broadband internet connectivity fills a dual role for hospitality and tourism, providing a key marketing channel as well as an important amenity for travelers. In Vermont between 1999 and 2002, there was a 40% increase in businesses making business-to-business transactions over the internet.

In recent years, Vermont has consistently ranked slightly ahead of the national average in both computer ownership and internet service subscription. In a poll conducted in 2003, the Vermont Telecommunications Plan notes that 66% of Vermont residents have internet access at home. Additionally, 76% of all businesses maintain an internet connection, and 55% maintain a web site. When asked when individuals last used the internet, two-thirds indicated that they had used the internet at least once in the past week.

Options for Internet access include:

- Landline dial-up
- Cable
- Digital Subscriber Line (DSL)
- Satellite
- Wireless

While access to the internet is available to Vermont residents virtually everywhere, broadband access is more limited. According to the Vermont Telecommunications Plan, in Orange County, 42% of the total population (28,226) have access to DSL or Cable. In Windsor County, out of the 57,418 residents, 62% have access to DSL or Cable. Access to these broadband forms of internet is limited primarily to village centers and some major corridors such as Route 4.

The newest technology to enter the region is wireless internet. Remote access wireless (or wi-fi) is commonly used either in the home or office, or as a service provided by a business such as a coffee house or internet café. Wi-fi technology has advanced and is now able to operate on a

much larger scale. Throughout Vermont, small companies are developing fixed wireless internet systems that make high-speed internet access possible in the most remote areas of a town or region. These Wireless Internet Service Providers (WISPs) may offer the best potential to get high-speed internet access to the entire region. WISPs in the region include Finowen, WaveComm and New ISP.

### **Library Facilities**

These are times of tremendous change at all levels of society. Citizens of the region need information to make decisions and to solve problems associated with living in a complex society. Public libraries play an important role in providing materials to inform, challenge, and inspire the region's residents.

Public libraries and the services they provide are changing too, partly to meet the changing needs of users and also because of developments in technology and the availability of information. Statewide use of national on-line databases and the Internet by libraries has increased dramatically in the past few years. According to the Vermont Department of Libraries, the demand for electronic information services has come from rural and remote areas of the state. This presents a challenge to the region's libraries to find ways to ensure that all citizens have access to books, information, and worldwide resources, that is similar to the access opportunities at urban libraries. The onslaught of information technology and the number of new formats coupled with the vast number of books available will promote increased resource sharing among the region's libraries. This is likely to remain a priority of this decade and beyond. The Vermont Department of Libraries programs and services to local and regional libraries will be key factors in advancing coordination and services from the region's public library system.

The following table depicts the location, name, and relative size of local public libraries within the region. Except for Topsham and Braintree, all of the region's municipalities have some type of library facilities available to the public. As might be anticipated, the level and availability of library services varies greatly depending upon the needs of each community.

In 1971, the Vermont Department of Libraries, in cooperation with libraries statewide, developed baseline standards considered essential to providing community-oriented public library services in Vermont. While the standards are not mandatory, they are considered aids for improving library services. Four essential services, deemed relevant to support the quality of libraries, include: public service, public access, inter-library cooperation, and community involvement. The last column of the table tells whether or not the libraries meet the state standards of quality.

		<b>Number of Volumes</b>	<b>Circulation per Year</b>	<b>Hours Open</b>	<b>Meets State Standards</b>
Barnard	Charles B. Danforth	5,000	NA	5	No
Bethel	Bethel Public	NA	NA	15	No
Bradford	Bradford	NA	NA	30	Yes
Bridgewater	Bridgewater Community	NA	NA	6	Yes
Brookfield	Brookfield Free Public	6,080	6,242	14	Yes
Chelsea	Chelsea Public	NA	11,309	20	Yes
Corinth	Blake Memorial	13,479	14,223	20	Yes
Fairlee	Fairlee Public	12,563	9,525	24	Yes
Granville	Granville Public	NA	NA	NA	No
Hancock	Hancock Public	3,020	1,680	14	Yes
Hartford	Hartford	8,118	8,813	34	Yes
Hartford	Quechee	21,102	29,923	52	Yes
Hartford	West Hartford	8,898	2,872	23	Yes
Hartland	Hartland Public	17,255	21,204	35	Yes
Newbury/ Wells River	Baldwin Memorial	11,913	13,335	20	Yes
Newbury	Tenney Memorial	11,107	7,076	15	Yes
Norwich	Norwich Public	23,995	55,369	45	Yes
Pittsfield	Roger Clark Memorial	NA	NA	NA	No
Plymouth	Tyson	3,000	NA	0	No
Pomfret	Abbott Memorial	5,400	4,469	22	Yes
Randolph	Kimball Public	25,737	43,115	36	Yes
Rochester	Rochester Public	16,249	16,589	18	Yes
Royalton	Royalton Memorial	9,724	17,032	28	Yes
Sharon	Baxter Memorial	5,160	1,460	10	No
Stockbridge	Belcher Memorial	3,451	1,519	14	No
Strafford	Morrill Memorial	7,850	7,752	20	Yes
Thetford	Latham Memorial	11,707	13,626	25	Yes
Thetford/ Post Mills	George Peabody	6,375	1,284	10	Yes
Tunbridge	Tunbridge Public	9,278	10,312	19	Yes
Vershire	Vershire Community	NA	NA	NA	No
West Fairlee	West Fairlee Free Public	NA	NA	5	No
Woodstock	Norman Williams Public	44,846	58,509	48	Yes

“NA” – Data Not Available.

Source: Vermont Department of Libraries, 2005.

In addition to the regional public libraries mentioned above, residents of the region have access to college and institutional libraries. These include:

- Dartmouth College: Baker Library—Hanover, NH
- University of Vermont: Bailey/Howe Library—Burlington, VT
- Vermont Law School Library-- South Royalton, VT
- Vermont Regional Library—Berlin, VT

- Vermont State Library—Montpelier, VT
- Vermont Technical College Library-- Randolph Center, VT

### **I. Goals**

- (1) To encourage public investments in governmental and public utility facilities, services, and lands which support existing and future development within the regional center, town centers, village settlements, and hamlet areas, or other designated and planned regional growth areas.
- (2) To avoid unnecessary or unreasonable disruption or endangerment of agricultural and other conservation areas, by discouraging the location of principal public utilities and facilities in rural areas.
- (3) To foster a partnership between public investment planning and implementation activities and the private sector, in a manner which advances the goals and policies set forth in this Plan.
- (4) To ensure that the expansion or construction of new facilities and utilities do not impose an undue financial burden on governmental resources and taxpayers.
- (5) To promote effective, efficient, and accessible public services, including schools, health care facilities and libraries.
- (6) To support innovative and stable sources of public facility funding to supplement traditional funding resources which have become limited or are no longer available.

### **Recreation Goals**

- (7) To ensure that access, management, and information regarding outdoor recreational opportunities are available to meet the needs of residents, tourists, and the natural environment.
- (8) To develop greenways that provide corridors for wildlife habitat as well as recreational areas for hiking, biking, and cross-country skiing.
- (9) To maintain the tradition of public access with permission to private land that is important to the quality of life, the economy, and sense of community in the region.
- (10) To ensure that the roadways and town centers are safe for bicycle and pedestrian traffic.
- (11) To promote recreation and a healthy natural environment as regional assets, and to plan development in a way that will ensure that those assets are sustainable.

### **Solid Waste Goals**

- (12) Continue to reduce the amount to solid waste generated.

- (13) Support the reuse and recycling of materials taken from the waste stream.
- (14) Maintain a program to process waste or reduce volumes before disposal, including household hazardous wastes.
- (15) Ensure that remaining waste is disposed of in lined landfills in an environmentally sound manner.
- (16) Support the concept that waste generators bear the full cost of proper waste disposal.
- (17) Recognize that the private sector serves as the primary vendor for waste management services while recognizing that local governments and the District bear the responsibility to provide such services when it is in the public interest to do so.
- (18) Work to ensure that the public has full opportunities to comment on public solid waste planning and implementation decisions.

**Information Technology Goals**

- (19) To enable new economic opportunities through the use of landline telecommunications technology and maximize existing infrastructure.
- (20) To support the State of Vermont in its maintenance of a Statewide Telecommunications Plan.
- (21) To enable new economic opportunities through the use of wireless telecommunications technology.
- (22) To support the enhancement of the wireless telecommunications network when such facilities do not have significant adverse environmental, health, or aesthetic impacts.
- (23) To make high-speed internet access available to all areas in the region.
- (24) To support the enhancement of the broadband internet network when such facilities do not have significant adverse environmental, health, or aesthetic impacts.

**J. Policies**

- (1) The scale, type, and design of major public utilities and facilities should be undertaken so as to complement the future land use settlement patterns recommended in this Plan and relevant municipal plans. Public investments in municipal, regional, and state facilities should be located within existing or planned regional growth areas.
- (2) Controversial public facilities, such as solid waste disposal facilities, correctional facilities and wastewater treatment facilities, should be situated in an area where they best serve their purpose and have the fewest negative impacts.
- (3) The Regional Commission supports proposals to upgrade and improve existing public water supplies and wastewater treatment facilities. Water and sewer lines should be extended only to those areas where future development is being encouraged as identified by growth center designations in local plans and in this Plan. Proposals which promote sprawl and strip development and scattered land uses are not compatible with this Plan.
- (4) The Regional Commission encourages the location of community water supplies and wastewater treatment facilities in regional growth areas, and cluster housing projects in rural areas.
- (5) Land development within existing or planned wellhead protection areas which pose reasonable threat of contamination to public water supplies is not compatible with this Plan.
- (6) The Regional Commission supports water conservation measures to reduce demand for water and to promote the life and efficiency of water and sewer facilities.
- (7) The Regional Commission encourages installation of community wastewater treatment facilities or water supply systems in areas of concentrated settlement where conventional onsite septic systems have failed or are marginally inadequate.
- (8) The Regional Commission supports the acquisition of future public and quasi-public utility sites, properties, or interests, when public actions advance the goals and policies of this Plan and relevant local plans.
- (9) New land development shall be prohibited where it is found that the necessary supportive governmental facilities and public utility services are unavailable or have not been planned for as part of a capital budget program to be available concurrently with impacts, or when new development places an excessive or uneconomic demand on such services. To mitigate or prevent any such unreasonable burdens, the use of permit conditions, impact fees, exactions, and similar methods can be used.
- (10) The construction of primary educational facilities, health care facilities, emergency facilities, post offices, libraries, and other public facilities shall occur in or within close proximity to existing or planned regional growth areas, so as to maximize their

convenience and accessibility to people, infrastructure, and to contribute to the vitality of communities.

### **Recreation Policies**

- (11) The maintenance and development of recreation trail networks (e.g. Appalachian and Long Trails, regional and state snowmobile networks, and cross-country ski trails) are encouraged. In planning for development within or immediately adjacent to these recreational amenities, design plans must work toward separation of these alternative travel modes from vehicular traffic and other competing or incompatible land uses. New development and land subdivisions which are insensitive or materially diminish the enjoyment or continued use of these recreational uses shall be discouraged.
- (12) Consistent with property rights, ownership and management practices which maintain or enhance public access to and uses of recreational amenities on privately held land are encouraged.
- (13) 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.
- (14) The Regional Commission encourages planning and construction of recreational opportunities on sites of public utilities or public works facilities (e.g. incorporation of trail networks into public utility corridor planning) to achieve more efficient and productive use of these lands.
- (15) Roadways and village centers that are heavily used by bicycles and pedestrians must incorporate planning for sidewalks, bike lanes, or separate bike paths to promote safety and enjoyment of such activities and provide for alternative modes.
- (16) The Regional Commission supports the development of multi-purpose trails using abandoned railroad beds, Class 4 roads, and other public rights-of-way.
- (17) The Regional Commission encourages federal, state, and local acquisition of land and facilities well-suited for outdoor recreation, provided that adequate financial and management arrangements are made with involved local governments.

### **Information Technology Policies**

- (18) Actively participate in the Act 250 review process on wireless telecommunications facilities proposed for the region to promote additional coverage in an acceptable manner.
- (19) Continue to assist towns in the creation of Telecommunications Bylaws that allow for the siting of cell towers without having a significant adverse environmental, health, or aesthetic impact.

- (20) To actively support public and private initiatives to expand or improve high-speed internet access throughout the region including the Vermont Public Service Board's requiring deployment from private telecomm firms.
- (21) To seek opportunities and programs that will help fund the expansion of wireless internet access in the region.

#### **K. Recommendations for Action**

- (1) On invitation of member municipalities, sewer, and water districts, the Regional Commission will assist communities to identify wastewater and water supply needs, plans for upgrading, and funding sources, all intended to increase capacity, reliability, and affordability of systems.
- (2) The Regional Commission shall 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.
- (3) The Regional Commission shall assist communities with capital improvement plans and budgets that complement local plans and this Plan.
- (4) The Regional Commission will work with economic development agencies to increase broadband access in the region.
- (5) ATV enthusiasts should look to the Vermont Association of Snow Travelers (VAST) for examples of management of members and development of trail systems.
- (6) Municipalities should adopt ATV policies.

#### **Recreation Recommendations**

- (7) The state, towns, region, and non-profit groups are encouraged to:
  - (a) develop mechanisms for allowing public use of private property with appropriate maintenance support;
  - (b) develop educational materials for landowners regarding liability issues involved in recreational use of private land, work for legislative reform on landowner liability;
  - (c) inventory and map trails on public and private lands according to use, i.e. hiking, Nordic skiing, mountain biking, horseback riding, snowmobiles. Provide educational materials for users regarding proper use of trails and access areas; and
  - (d) promote feasibility study of amending the Current Use Program to include a "recreational" or "open space" category which could include protection of wetlands and wildlife areas.



- (8) The Regional Commission encourages towns that have not already established Conservation Commissions to do so. According to state law, a conservation commission can assist the planning commission with natural resources issues, inventory the town's natural, historic, and cultural resources; receive gifts of land for conservation purposes, and encourage public understanding of local natural resources. The following towns in the region have active conservation commissions: Barnard, Bethel, Bradford, Hartford, Hartland, Newbury, Norwich, Pomfret, Randolph, Royalton, Sharon, Strafford, Thetford, Vershire, West Fairlee, and Woodstock.
- (9) The Regional Commission should help towns develop highway policies that address recreation needs.

## **X. EMERGENCY MANAGEMENT**

### **A. Background**

The impact of expected, but unpredictable natural and human-caused events to the region can be reduced through proper emergency management. Emergency management is generally broken down into four areas: preparedness, response, recovery and mitigation.

Preparedness includes emergency personnel acquiring suitable equipment, and conducting training and exercises. Preparedness is also a responsibility of residents, business and government. Simple preparedness measures, like having disaster supplies on hand, installing smoke detectors, and knowing basic first aid will all help to lessen the impact of a disaster. Preparing emergency plans is also a preparedness activity.

Response is the initial emergency response to save life and property during and immediately after the disaster, and is initiated by local emergency crews and then followed up by outside forces if necessary. Response operations are greatly enhanced by proper preparedness. Most emergencies of any scale will require towns to work together, and often to work with state or federal agencies. Practicing with all of these partners before an actual emergency is critical to smooth emergency operations.

Recovery is the more long-term process of putting life back to normal, and includes many state and federal agencies, especially the Federal Emergency Management Agency (FEMA) in large disasters. As events like Hurricane Katrina showed, recovery can take a long time and is hindered if a disaster is severe or widespread. Recovery also involves much less state and federal assistance than is commonly thought, so the best strategy is to avoid disaster-prone behavior in the first place.

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.

### **B. Emergency Services**

#### **Police**

The primary law enforcement for most of the region is the Vermont State Police. Two State Police regional barracks are located within the region. State Police from the Royalton (formerly Bethel) Station serve eastern central Vermont, and the force from the Bradford Station serves eight of the region's municipalities located in the northern part of Orange County. Pittsfield is served from the Rutland Station; Hancock and Granville are served from the Middlebury Station. State Police service contracts are available for municipalities that desire to augment their police force, and a few towns or villages (currently Newbury, Wells River Village, and Hartland) have this in place. Although rarely used, State Police are also available to a town under contract to

provide services at special events, such as holiday parades and agricultural fairs. State Police force 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 other large law enforcement agencies in the region are the Sheriff's departments that cover county areas. The bulk of the region is covered by the Windsor and Orange County Sheriffs, with Pittsfield served by Rutland County, and Hancock and Granville by Addison County. Though Sheriff's departments have the full abilities to do law enforcement, they have minimal funding outside of town contracts. Many towns in the region contract with their Sheriffs, especially for traffic enforcement.

Several towns or villages in the region have taken the step of creating a paid local police department, but most towns do not have any police. These towns have constables, who are elected, and may or may not have any law enforcement training. In some towns the constable is close to being a full-time police officer while in others it is largely a ceremonial position.



*K. Geiger © 2004*

**Photo 25: Tunbridge Fire Department at the World's Fair**

## Fire

The region is served by a network of thirty-two local fire departments. All towns have at least one fire department, with the exception of Braintree, which contracts for this service. Only one town, Hartford, has a full-time paid department. The other departments are volunteer, most of which are independent fire associations that receive part of their funding from their respective municipalities. Although there is a variety of service arrangements, local governments have the responsibility to provide fire protection services.

All of the region's fire departments are members, formally or informally, of at least one Mutual Aid System, which provide back-up assistance from neighboring member companies when necessary. Towns bordering the Connecticut River often are involved in mutual aid with nearby New Hampshire towns.

Despite the resourcefulness of many departments, and federal equipment grants in recent years, many departments struggle with the costs of providing fire protection. Insurance and vehicle costs are large. However, the greatest difficulty facing departments tends to be attracting enough volunteers, and in having members that are in town during the day for daytime calls.

## Ambulance and Rescue

Ambulance and FAST squad services provide emergency medical services (EMS) to the region and are regulated by the Vermont Department of Health, which coordinates and licenses quality services throughout the state. All EMS services operate under one of thirteen emergency medical service districts. Nearly all of the nineteen EMS services in the region are in Districts #8 and #9. Most services are volunteer-based and serve a single town. Lack of volunteers, particularly for daytime coverage, is a pressing problem. The high cost of equipment and the amount of time needed to meet licensing standards has been cited as another problem. 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 contract EMS for several towns. Air ambulance is provided to the region through Dartmouth Hitchcock Advanced Response Team (DHART) and their two helicopters.



*K. Geiger © 2001*

**Photo 26: Bradford FAST Squad and Fire Department**

### State and Local Emergency Management

Vermont's state emergency management duties are performed by the Division of Emergency Management within the Department of Public Safety. Vermont Emergency Management, or VEM as it is known, 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 would also coordinate the several state agencies under the State Emergency Operations Plan, as well as serve as the primary point of public information in a widespread event.

Local emergency management in the region has largely rested with fire departments, since they are present in nearly every town and have emergency vehicles and radios. However, there has been a general increase in awareness over the past several years that there are a wide variety of hazards in which, like floods, the fire department's response role may be limited. Most towns had no emergency plans until the last decade, and now many towns have plans and have designated an Emergency Management Coordinator or Director to help get local planning done and coordinate the many local players that may be needed in preparedness activities. Selectboards are also increasingly realizing that they have an important role in managing many types of emergencies, and are subsequently attending training sessions in such subjects as Incident Command System or taking part in emergency exercises.

### Local Emergency Planning Committees (LEPCs)

Every area in the nation is covered by a LEPC. In Vermont, LEPCs are regional entities with local representatives from emergency services, government and industry. LEPC #12, [www.LEPC12.org](http://www.LEPC12.org), covers all of the towns in the region except for Norwich, Hartford and Hartland; they are part of LEPC#3. LEPCs are organizations whose responsibilities are established by Vermont and federal law to help provide emergency planning for responding to chemical accidents, and to work with local government emergency services, VEM, and the managers of facilities with hazardous chemicals on facility emergency plans. Though LEPCs' statutory responsibilities are largely related to hazardous materials, they take an All-Hazards approach to emergency planning. Currently, the LEPC meetings provide a good venue for cross-discipline dialog, various trainings, and a chance for different agencies to meet before having to work together in an emergency.



*K. Geiger © 2006*

**Photo 27: Meeting of LEPC #12 at White River Valley Ambulance**

### C. Hazards Assessment

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 is usually done through a Hazards Inventory and Risk Assessment (HIRA), 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?

It is important that we learn from the past in order to avoid the same disasters and their outcomes. Disasters that have occurred within the region itself give us very good information about what types of disasters we can expect and what they might cause. Looking at what disasters have occurred in the state, surrounding states, and even the nation can also give us a good idea of less common events that still might affect the region. In conducting the regional hazards assessment, potential hazards were ranked based on available information on their frequency and estimates of potential severity. The frequency at which one can expect a type of disaster to occur affects how much priority is placed on preparing for and mitigating that type of event, since any community only has limited resources and cannot prepare for all types of events, no matter how remote. For this plan, hazard frequency was classed as follows:

<i>Rare</i>	May never have occurred, annual probability of 1/100 or more.
<i>Unlikely</i>	Has occurred, has annual probability of 1/25-100.
<i>Unusual</i>	Has occurred in the area and has an annual probability of 1/10-25.
<i>Frequent</i>	Occurs often, although in varying degrees, annual probability of 1/2 or greater.

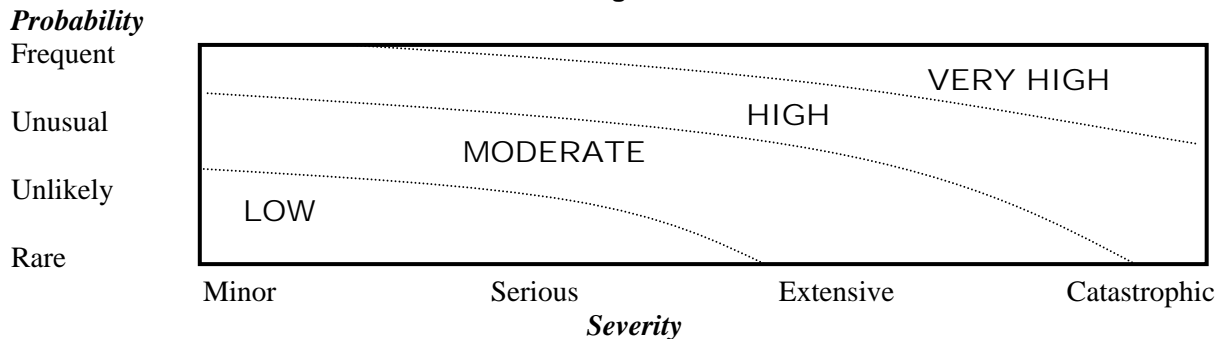
Each hazard was also assigned a level of severity. These are designated as follows:

<i>Minor</i>	Minor injuries or illness, <10% of properties damaged, minimal disruption of quality of life, within local ability to handle.
<i>Serious</i>	Limited major injuries or illness that do not permanently disable, 10-25% of properties damaged, shutdown of critical facilities for more than a week, mutual aid systems activated and state resources needed, possible federal resources needed.
<i>Extensive</i>	Multiple severe injuries or illness, few fatalities, 25-50% of properties damaged, critical facilities shut down for >14 days, state resources activated, federal resources needed.
<i>Catastrophic</i>	Multiple fatalities, widespread injuries, >50% of properties damaged, critical facilities shut down for >30 days, state and federal resources needed.

The product of the combination of hazard frequency and severity creates a risk for each type of hazard. Risk is very important, because it is the sense of risk that motivates people to take action to avoid the risk and prepare for what cannot be feasibly avoided. However, the sense of risk should be an informed one, not driven by hysteria or popular misconceptions. As you will see from the graphic below, in determining what level of risk to assign, the likelihood of an event is rated slightly stronger than its severity. Consequently, a frequent but minor event is a high risk, while a rare yet catastrophic event is only rated a moderate to high risk. This is because these

frequent events are more well known, can be anticipated with greater accuracy and can be mitigated against with less resources. Luckily, we live in state that has no very high risks.

Figure 18: Level of Risk



**Discussion by Hazard Type**

Fifteen types of hazard were reviewed and ranked by risk to the region through a HIRA process. This information is summarized below and can be found in more detail in the Regional Pre-Disaster Mitigation Plan. Copious Internet links about each hazard can also be found at the Emergency Management section of the Commission’s website, [www.trorc.org](http://www.trorc.org)

The greatest risk to the region and the state is from flooding. Flooding has hit the region in the past and it will again in the future. The past flooding has been of two types – rain and/or snowmelt events that are more widespread in nature and cause flooding in the major rivers’ floodplains, and localized flash flooding caused by unusually large rainstorms over a small area. Both kinds of events can be worsened by ice or debris dams and the failure of infrastructure (especially culverts), private dams and beaver dams. Recent studies have shown that the majority of flood damages in Vermont are occurring along upland streams outside of mapped flood hazard areas, as well as along road drainage systems that fail to convey the amount of water they are receiving.

The second greatest risk to the region is from structural fire. Vermont has one of the highest per capita death rates from fire in the nation. This is in fact the deadliest form of disaster throughout the state, and much of this is preventable. Although there have been requirements for smoke detectors in rental housing for over twenty years, and requirements for smoke detectors in new single family dwellings since 1994, most fatal fires occur in buildings with no working smoke alarms. Less frequent than the individual fires are the major downtown fires that can destroy town centers. Villages with a traditional downtown commercial district are at risk because many towns do not have or require fire suppression systems (sprinklers). A fire in an unprotected downtown can be devastating.

“Technological hazards” and winter storms are moderate to high risks in the region. Technological hazards are those unintentional hazards created by man-made substances, facilities or actions that threaten people or property. This includes train derailments, airplane crashes, vehicle crashes, hazardous materials spills or leaks, explosions, dam failure, and structure collapse. Among these, hazardous materials incidents, primarily involving petroleum

products, are the most common. These events are difficult to predict, but they will certainly threaten parts of the region again. The most memorable, and luckily not injurious, of these events was a rail car propane explosion in Fairlee in the 1970s.

Winter storms are a regular occurrence in Vermont. However, severe winter storms can cause serious damage, including collapse of buildings due to overloading with snow or ice, brutal wind chills, and power outages due to downed trees and power lines. People can be at risk of freezing in extended power outages, and extreme snow or ice can close transportation systems, jeopardizing any stranded persons that are in danger of freezing or needing medical assistance. With the exception of the January 1998 ice storm (which was thought to be a 200-500 year event), Vermont has not experienced a severe winter storm recently, but severe events have and will occur. The October 2005 early snow event downed trees and power lines in higher elevations in the region.

Other hazards that are moderate risks to the region include hurricanes/tropical storms, and the more common severe thunderstorms, which can be associated with lightning, high winds, hail and tornadoes. Hailstorms generally occur about twice a year in Vermont, and a small tornado is almost an annual occurrence. Tornadoes are less common than hail storms and high winds, but they have occurred throughout Vermont.

Low to moderate risks that were evaluated included: terrorism and civil hazards, disease, droughts and wildfire, global warming, earthquakes, extreme temperatures, landslides, shortages/outages and invasive species/infestations.

Thankfully, terrorism and civil hazards are unlikely occurrences in Vermont. These hazards include actions that people intentionally do to threaten lives and property. They may range from a single person on a shooting rampage, to the organized use of chemical, biological, explosive or radioactive weapons. The prime concern in this area is someone with a weapon in a school.

Contagious diseases, especially a pandemic, are similar to terrorism and civil hazards, in that they are unlikely but could have very serious results, making them a moderate risk. It is anticipated that a more serious strain of the usual flu will occur some year and that vaccines would not be ready before it arrived in Vermont.

Even though the region is blessed with rivers and lakes and has flooding as a likely disaster, the opposite situation, a drought, has occurred and will again. Several severe droughts have been recorded during the last century. Between 1964 and 1966, there was a protracted drought, rated severe in 1964 and worsening to extreme in 1965 and 1966. Another severe drought occurred in 1999-2001, causing many in the region to drill new wells and the state to declare a temporary burning ban. Wildfire is only a concern during these dry spells, especially in early spring and fall.

Global warming is not a traditional disaster type, as it is slowly going to occur over decades, and the severity of its effects are difficult to anticipate, as it has not happened to us before. However, it is occurring and the predicted changes will be disturbing. If climate change occurs as projected, it will lead to many changes, including the introduction of new species and possibly



terminating our maple sugaring season. Vermont's climate may shift closer to something like Tennessee's over the next century.

Surprising as it is to some, Vermont is classified as an area with "moderate" seismic activity. Dozens of earthquakes have been centered in Vermont, with the two strongest recorded quakes measuring a magnitude 4.1 on the Richter scale centered in Swanton and Middlebury. The most recent quake to rattle Vermont was a 5.1 centered in the Adirondacks that occurred on April 20, 2002 and caused minor damage in northwestern Vermont. A study conducted by the Vermont State Geologist's office, estimated damage by town for the region based on the estimated 500-year quakes that could occur from the six closest anticipated. In general, the eastern and western edges of the region have greater risks and would have damage in the millions if such an unlikely quake occurred.

Another unlikely event is extreme cold or heat. Extreme cold, especially when the ground is not insulated by snow, can freeze water lines, overburden power and heating systems, hamper transportation and directly threaten individuals exposed to weather with frostbite and hypothermia. Extreme heat can overload power and cooling systems, buckle rail lines, wither crops and threaten people with heat exhaustion and stroke. Recent heat waves in the United States and worldwide have caused this hazard to be a concern to some areas, but luckily, Vermont still has a climate where extreme heat is unlikely.

Vermont actually has a relatively high danger due to landslides. Though this type of disaster rarely results in injury, it can destabilize roads and threaten structures. Landslides can be caused by seismic events, manmade or natural changes to groundwater flow that cause liquefaction, removal of vegetation, and manmade or natural undercutting of steep banks. A major slide in Jeffersonville, Vermont demonstrated that we are vulnerable to this type of event. In the region, slides along the White River and Gilead Brook have threatened roads and buildings.

Shortages of power, fuel, food and water are likely to be temporary and the indirect result of a localized disaster creating disruption in transportation and supply systems or of a widespread weather event. Increased sheltering capacity in the region would help address this issue if needed.

Infestations by native insects can ruin crops. While most of Vermont does not have to deal with these occurrences, a historical invasion of "worms" occurred in 1770. These "worms" were most likely the "army worms" (actually a type of caterpillar) that caused over \$8 million dollars in damage to the 2001 hay crop in Vermont. Some farmers lost up to 90% of that year's hay crop and in some places entire hay fields were eaten in one night. Invasive plants and animals, from Eurasian milfoil to zebra mussels cause millions more in damage in Vermont annually. Invasive species do not generally pose a direct health threat, but they are capable of altering ecosystems, damaging fields and forests, clogging waterways, and even causing transportation or air systems to not function properly. Still, infestations and invasive species represent only low risk as they do not generally threaten life and property.

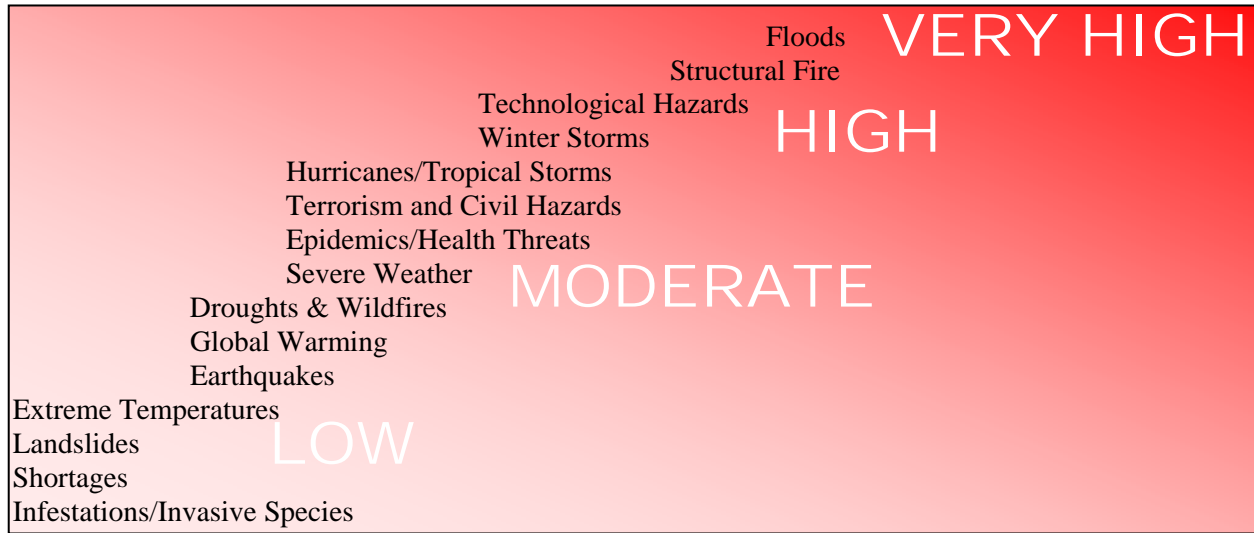


Figure 19: Summary of Hazards and Their Risks

**D. Preparedness, Response and Recovery**

Because the Regional Commission is not a response agency, but rather a planning agency, it is appropriate that we focus attention on the mitigation phase and lessening the risks our residents will face through building communities that are resistant to disasters. This is also proper planning, as we should attempt to eliminate or minimize the effects of disaster first. However, we are also connected somewhat to the preparedness, response and recovery phases.

**Preparedness**

Preparedness covers those actions that individuals, businesses and communities take in order to prepare themselves for the effects of a disaster before it happens. The more prepared we all are, at all levels, for disasters, the less the loss of life and damage to property will be when a disaster occurs, and the quicker our communities will bounce back. A well-prepared citizenry that can fend for itself somewhat during disasters enables limited emergency responders to focus on the truly immediate threats to life and property. Such preparedness can also avoid personal financial disasters that would have rippled throughout the community.

A disaster can affect not just our private lives, but can also ruin businesses and their employees’ livelihood. If such a tragedy happens to many businesses or a large and critical one, it can also cripple local economies. While businesses can do their part to support their communities and employees in their own preparedness efforts, businesses can and should take actions that will help them weather the strain a disaster can deliver.

Governmental agencies and other quasi-public organizations that perform important governmental functions must also take care of themselves during an emergency, as well as perform their functions of assisting their constituents. This includes the standard emergency response agencies such as police, fire and medical services, but it also includes sewer and water, health inspectors, and elected officials.

### Response and Recovery

Response is the immediate effort by emergency response agencies and the general public during and after a disaster to save lives and property. Proper equipment, training and coordination among responder agencies, and a well-educated and resilient general public, will make response activities more effective when they are needed. Besides the neighborly acts of people assisting each other in times of disaster, most response activities are carried out by our local response agencies, then state and federal resources may be called in during severe and extended disasters.

There are a wide variety of programs and organizations to help people, businesses and governments recover from disasters. It is important to understand that none of these programs is intended to return everything to its pre-disaster state, but they can help the public and private sectors to not be overwhelmed by the effects of a disaster. Recovery will be least painful where mitigation and preparedness steps have already reduced the extent of damage and fast response has limited the toll on lives and property. Recovery efforts will be helped by having well-practiced regional coordination in place prior to the disaster so that towns can help each other and so that the local/state/federal administrative issues are handled smoothly. Thorough and prompt documentation of losses, good media outreach communicating the assistance that is available, and the interim provision of basic services will all enable communities to recover as fast and fully as possible.



*K. Geiger © 2006*

**Photo 28: Hurricane Katrina relief supplies being gathered at Hartford's Emergency Services Building**

### **E. Mitigation**

Over time, the Federal Emergency Management Agency (FEMA) has come to recognize that it is less expensive to prevent disasters than to repeatedly repair damage after a disaster has struck. This change in thinking has led FEMA to direct funding to communities that seek to address hazards before they strike. Hazard mitigation is not preparedness or response emergency planning – it is planning that tries to reduce the potential damage and risk before disasters occur within a community.

Mitigation actions should be the cornerstone of emergency management. Who would not rather that a disaster be avoided, than responded to? Actions can be simple educational efforts, such as awareness campaigns about smoke detectors; smarter land use regulations that lessen risky behavior in unstable or flood prone areas; or actual construction projects tied to a rational vulnerability assessment.

To begin this process, the region developed a Pre-Disaster Mitigation (PDM) Plan for the TRORC area, and annexes for each town. This regional PDM plan includes the hazards inventory mentioned earlier and recommended state, regional, and local actions to lessen the future damages we face. Many of the concepts of mitigation have been included in the Regional Plan, since how and where we develop has important implications for how vulnerable we are to predictable disasters.

### **F. Goals**

- (1) To reduce the loss of life and injury resulting from all hazards.
- (2) To lessen financial losses and property damage incurred by municipalities, businesses and private citizens due to disasters.

### **G. Recommendations for Action**

- (1) Emergency responders in the region should be properly trained and equipped to respond to anticipated disasters.
- (2) Critical local and regional emergency and governmental facilities should be built and located to be disaster resistant and able to continue to function during disasters.
- (3) Response plans should reflect an all-hazards approach and be coordinated between towns, the state and federal levels.
- (4) Exercises should be conducted to ensure that response plans are workable.
- (5) Emergency communications systems should be able to collocate on planned telecommunications facilities in order to increase radio or other coverage while lessening the need for more towers.

- (6) New development should incorporate disaster resistant design in its infrastructure. Development that would be at risk, or puts others at increased risk, of flooding, fire, or other hazards should mitigate this risk as much as practical. Mitigation actions should:
  - a) seek to avoid impacts of a hazard first, then reduce impacts that cannot be reasonably avoided;
  - b) recognize the connections between land use, development siting, drainage systems, building standards, and road design and maintenance and the effects of disasters on the region;
  - c) be sympathetic to the natural and human resources of the area;
  - d) be part of a larger systematic effort at disaster reduction; and
  - e) seek to permanently avoid damages when feasible.
- (7) Efforts to educate individuals and families to prepare disaster kit and disaster plans are encouraged.
- (8) Warning systems, including more precise and widespread use of the National Weather Service's Emergency Alert System, are encouraged at the state and federal levels.
- (9) Individuals should have disaster kits ready in their homes and vehicles. They should have a plan as to what to do and where to go during foreseeable emergencies, and they should stay alert to bulletins during times of heightened danger, such as a flood warning.
- (10) All communities should have an up-to-date Rapid Response Plan on file with Vermont Emergency Management.
- (11) The Regional Commission should continue to work cooperatively with local emergency response organizations and LEPCs to help improve emergency planning
- (12) The federal and state governments should increase funding for preparedness and mitigation planning and actions at the local level in order to reduce escalating response and recovery costs.
- (13) Agencies or organizations expected to respond in a unified manner should train together.

## **XI. ENERGY**

### **A. Introduction**

The Vermont Municipal and Regional Planning and Development Act (24 VSA Chapter 117) stipulates that the Regional Plan shall have the purpose of guiding development in such a fashion that it shall:

- Reduce wastes of energy which result from either excessive congestion or excessive scattering of population;<sup>19</sup>
- Promote efficient and economic utilization of energy;<sup>20</sup>
- Promote the conservation of the supply of energy;<sup>21</sup>
- Promote the reasonable use of energy resources.<sup>22</sup>

To accomplish this purpose, the Regional Plan must contain an energy element, which may include an analysis of energy resources, needs, scarcities, costs and problems within the region, a statement of policy on the conservation of energy and the development of renewable energy resources, and a statement of policy on patterns and densities of land use and control devices likely to result in conservation of energy.

The policies and programs in this chapter are intended to act as a guide for future development and to serve as a tool to clearly outline how energy development and generation should occur in this region. It is also intended to ensure that the Two Rivers-Ottawaquechee Region maintains a safe, efficient energy system which encourages energy conservation and the generation of renewable resources in a manner that does not negatively impact the rural nature of our communities.

### **B. Background**

Concern about the sustainability of our nation's dependence on foreign oil has grown greatly since the oil crisis of the mid-1970's. In the mid-2000's the price of oil based fuels experienced a dramatic rise, which highlighted the tenuous position that oil dependency has put the nation in. As prices of oil-related fuels rise, everyday activities such as home heating and travel by car become increasingly burdensome for our communities. While the Regional Commission recognizes that energy supply and demand are directly influenced by economic forces at the state, federal, and international levels, the manner in which our Region plans for future growth, and where it chooses to get energy from, will have an important impact on global energy resources.

Theories such as the Hubbert Peak Theory (a.k.a. Peak Oil), suggest that at some point – perhaps sooner than later – the worldwide consumption of oil will outpace the existing supply. Although

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<sup>19</sup>§4347(2)

<sup>20</sup>§4347(3)

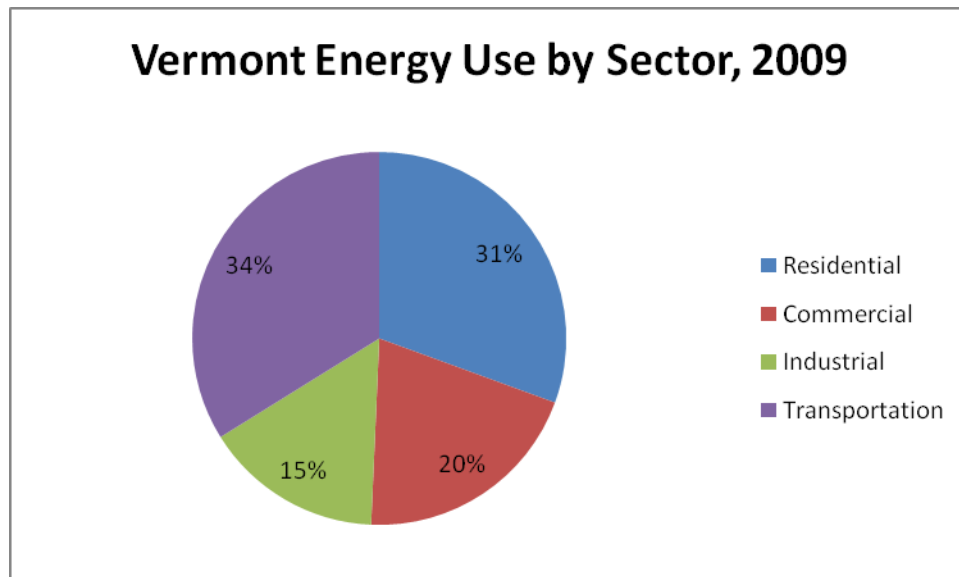
<sup>21</sup>§4347(4)

<sup>22</sup>§4347(5)

new technologies may enable energy providers to extract oil from locations that were previously impossible to reach, there is most likely a finite amount of oil available. Many of these more extreme methods of energy extraction have the potential to create negative impacts on our environment. Given the predictions of Peak Oil, the Two Rivers-Ottawaquechee Region, like the rest of the world, should prepare for a very different future, one that focuses on sustainability. Declining oil production and increasingly worrisome signs of climate change underscore the need for good planning and active discussion about energy alternatives. It is in consideration of this, that the Regional Commission supports the principles of energy conservation, environmental stewardship, and energy independence.

### **C. Statewide and Regional Energy Trends**

According to the 2011 Vermont Comprehensive Energy Plan, energy demand grew at a 1.8% rate of growth from 1990 to 1999, but has been close to 0% for the past 10 years. The likely combination of state energy efficiency programs and the 2007–09 recession impacted energy demand across most end-use sectors. The 2010 American Community Survey indicates that the major heating fuels consumed in Vermont are oil (47%), electric (5%), wood (15%) and LPG and gas (30%).

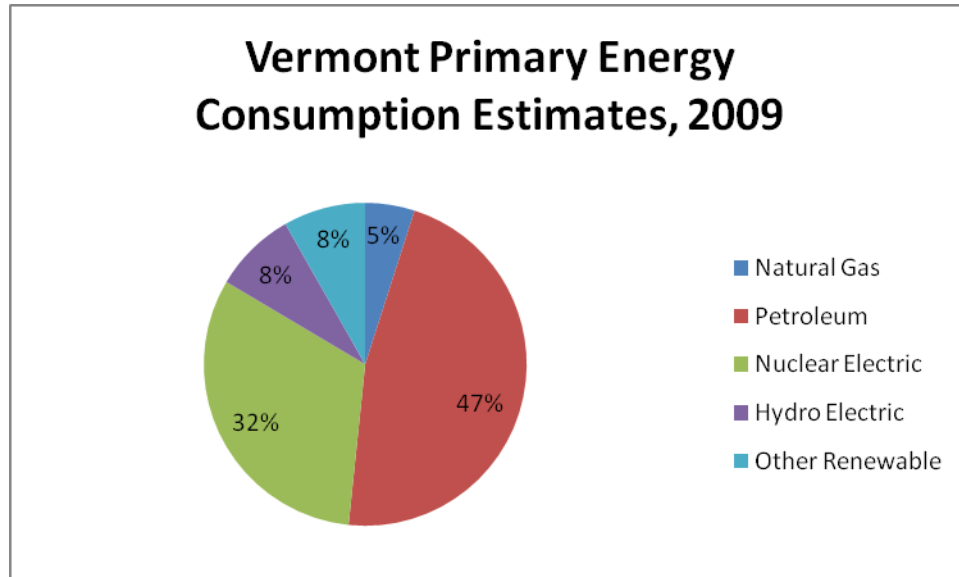


**Figure 20: Source - US Energy Information Administration, 2009**

In terms of per capita energy consumption for residential and transportation purposes, the North East is about the same as the rest of the U.S. In Vermont, almost 80% of residential energy is dedicated to space heating and domestic hot water, while approximately 34% of the state's total energy usage goes toward transportation.

Of the energy dedicated to transportation, over 50% is used to fuel private cars for residents (as opposed to being used for public transit, road maintenance, or another public purpose). This reinforces the need for clear policy that guides land use in such a fashion that it does not continue to encourage auto-centric development.

#### D. Current Energy Sources



**Figure 21: US Energy Information Administration, 2009**

#### **Fossil Fuels**

The Two Rivers-Ottawaquechee Region, like Vermont, depends primarily on fossil fuels for energy production and transportation. As shown in the figure above, fossil fuels (most of which is used in transportation) account for more than 50% of all energy consumed in Vermont. Nearly 50% of the oil consumed in the U.S. is imported. Our economic system is so closely tied to the availability of fossil fuels that even modest price increases can lead to inflation, a slowdown in economic growth, and monetary instability. These instabilities have a much broader impact than just our economic system. Fluctuation in the price of fossil fuels can impact our communities at the municipal and residential level as well. Increasing fuel costs make it more expensive for communities to provide services and maintain facilities. Rising costs can make it challenging for residents to heat their homes. The price and availability of food is also impacted by changes in fuel costs.

But these consequences of intensive fossil fuel use are only part of the story. The combustion of fossil fuels has been determined to be the largest contributor of atmospheric "greenhouse gases" (primarily carbon dioxide). There is consensus in the scientific community that continued accumulation of greenhouse gases within the earth's atmosphere will lead to a warming of the atmosphere, or "greenhouse effect." Such warming causes severe coastal flooding and unpredictable climate shifts, threatening the viability of the earth's most significant urban and agricultural centers. Vermont has experienced an increase in the number of severe weather events. In 2011 there were four federally declared disaster events, more than had ever occurred in a single year. If, indeed, climate instability and climate change are linked as many feel is the case, it is essential that we decrease our reliance on fossil fuels in an attempt to reverse or at least halt future damage to our atmosphere.



## **Nuclear Energy**

Vermont Yankee Nuclear Power Station has been generating electricity since 1971. The age of the facility has begun to manifest itself in terms of plant instability. Between 2009-2010, the Vermont Department of Health identified several ground water monitoring wells at the facility that contained tritium. This finding indicated an unintended release of radioactive material, and it means that other radioisotopes may have contaminated the environment. At the same time, Vermont Yankee's license to operate was due to expire in March of 2012. This license extension request has been quite contentious, due in part to the previously mentioned tritium leaks, but also because the generation of electricity via nuclear fission remains controversial.

A properly maintained nuclear power facility can, to some extent, represent a cleaner form of energy production than fossil fuels. However, the mining, processing and disposal of nuclear material continues to raise questions. Nuclear generated electricity produces various long-lived radioactive wastes which are highly toxic and require extraordinary precautions for safe storage. Existing technology does not assure safe disposal. The industry has not completely resolved safety issues regarding the decommissioning of nuclear power plants.

## **Renewable Energy**

Vermont can successfully claim that a substantial amount of the power used statewide comes from renewable sources when compared to other states. Although the majority of Vermont's renewable energy is generated through Hydro-Quebec (see below), some hydroelectric power is generated in Vermont. Additional sources of renewable energy include several utility owned commercial-scale wind and landfill methane projects and utility-scale solar facilities.

### **E. Electrical Generation**

While Vermont is fortunate to have two large electricity generators that utilize fuels that are considered less harmful in terms of greenhouse gas emissions, the Regional Commission believes that we must continue to strive toward energy independence as a primary element of this energy plan. To do so we must consider a wide range of potential benefits and impacts on our region and utilize this analysis to create a plan for the future.

### **Regional Impacts of Energy Generation**

Regional electrical generation has the potential to be a boon to our communities, through the generation of jobs as well as adding to the tax base. While larger-scale facilities will generate more energy, and would have a more substantial impact on the economy, they would likewise have more potential negative impacts. Construction of new large-capacity generators (such as combined-cycle natural gas plants, nuclear generators, and coal generators) creates significant risks, due in part to large capital expenses necessary to begin construction, environmental impacts of large-scale construction, and the likely need for significant upgrades to transmission facilities to efficiently move the power.

For the Two Rivers-Ottawaquechee Region, a smaller-scale and more sustainable approach to electrical generation is more appropriate. Instead of large scale energy generation facilities, smaller-scale systems, such as the combined-cycle combustion turbines that used for district heating are more appropriate. These systems could offset otherwise needed transmission infrastructure upgrades, reduce reliance on oil for heating, and providing moderately priced energy to parts of Vermont. Small-scale generation facilities may be more expensive to implement than larger systems due to scale, but they are lower impact, have lower emissions, offer long-term affordability, and should provide our region with energy security and stability. Additionally, these facilities will provide direct employment opportunities to our region. While there are potential opportunities for gas-powered small-scale generation facilities, the Regional Commission believes that in order to reduce our reliance on fossil fuels, we must focus on energy generation that is sustainable. It is a priority of this plan that new energy generation facilities that are proposed within the Two Rivers-Ottawaquechee Region be renewable in nature. We believe that there are opportunities for generation through wind, solar and biomass, each of which has its own unique impact and potential.

Renewable energy generation in our region is generally encouraged by the plan. However, in order to protect our natural, scenic and historic resources while encouraging renewable energy development, a statewide inventory of areas that would be suitable for renewable energy generation should be developed. This inventory should consider which areas are considered too sensitive for this type of development.

### Wind Energy Generation

<b>Total Acres of Land with Wind Energy Potential</b>		
Residential (30 Meter)	256989	Acres
Small-Commercial (50 Meter)	55731	Acres
Large-Commercial (70 Meter)	21599	Acres

**Figure 22: Vermont Energy Atlas, 2011**

As is indicated by the chart above, wind power generation has some potential in our region, as such, it is reasonable to assume that there will be proposals to site wind turbines in upland areas of this region. Wind turbines rely on wind speed and power density to generate energy. A site's wind power potential is expressed in classes, Class 1 being the lowest and Class 7 being the highest. Areas rated as Class 4 or higher are suitable for utility-scale power generation. Areas in the region that have areas of Class 4 wind power or higher exist in Barnard, Braintree, Bridgewater, Granville, Hancock, Pittsfield, Plymouth, Rochester and Stockbridge. For more information, see Potential Wind Development Area data (classes 1-7) at <http://www.vtenergyatlas.com>. Topography and wind patterns in the TRORC region is most suited for residential-scale wind energy generation. These smaller facilities are suited to providing power to a few residences at most, but they have the advantage of having a fairly limited impact on the environment in which they are located.

Most of the high elevation land (above 2,500 feet) which offers the best conditions for commercial wind energy generation in the region is public land, owned by the National Forest Service (Green Mountain National Forest) or apart of the Appalachian Trail. Federal land policies are not specific regarding wind generation facilities and do not provide policies on the placement of facilities on public lands. The development of site criteria to address environmental and community concerns is encouraged. Through a consensus building process, all stakeholders will have a better understanding of the issues surrounding these new land uses. This is particularly important to industry providers and regulatory agencies as it will make the process of getting a project underway more predictable.

In December of 2004, the Vermont Agency of Natural Resource (ANR) released its policy on the development of wind generation facilities on state owned lands. From the Wind Energy and Other Renewable Energy Development on ANR Lands policy: “While the development of such facilities at appropriate sites may well become a desirable and even necessary part of Vermont’s energy future, the Agency believes that large-scale renewable energy development on ANR lands such as commercial wind farms would be incompatible with the uses of and contrary to purposes for which ANR acquired these lands. Therefore, such uses are not allowed on ANR lands. Temporary wind measurement towers and other exploratory uses that are designed to evaluate the potential for future large-scale renewable energy development on ANR lands are also not allowed.”

While the benefits of wind power are substantial, the location of utility scaled wind energy turbines and associated facilities can adversely interfere with scenic, natural and historic resources. Past versions of this plan have focused primarily on the aesthetic impact of these facilities, but it is fair to say that in order to encourage the development of renewable energy, we may have to accept a reasonable amount of impact to the scenic quality of the region. That said, our primary concern with these facilities is the impact on our region’s natural environment. Because much of the area in which even small utility-scale systems would be built is currently undeveloped, careful consideration to the impact on natural and wildlife communities must be taken into consideration. Wind generation facilities need to be carefully sited so they don’t destroy or significantly imperil necessary wildlife habitat blocks, migratory bird patterns, or wildlife corridors. Wind turbines, power lines, access roads, and other components of a generating system have been known to disrupt the physical and ecological relationships of habitats. Approvals or permits for this use should not be awarded unless evidence clearly establishes that habitats will not experience an undue adverse impact.

### **Biomass & Biogas Energy Generation**

The term ‘biomass’ refers to biologically-based feedstocks (that is, algae, food or vegetable wastes, grass, wood, methane, and much more). Biomass can be converted into an energy source to fuel vehicles (e.g. biodiesel), heat homes, or even generate electricity. According to the 2011 Vermont Comprehensive Energy Plan, those using wood for primary heating consumed about 5.4 cords in 2007–08, while those using wood as a supplementary source used 2.25 cords. In that same year, Vermont households burned about 20,155 tons of wood pellets, with primary-heat-source consumers burning 3.8 tons and supplementary-heat-source consumers burning 1.2 tons

for the season. There are a very limited number of biomass energy generation facilities in the TRORC region. Those that are in use generally supply heat to schools.

Commercial biomass energy generation facilities should be located close to available biofuels to reduce transportation impacts and costs. A biomass power plant would require a great deal of space to accommodate the various stages of collection and conversion of the mass into fuel before burning it to produce electricity. Water can also pose a problem as biomass facilities require large quantities to handle the recycling process of waste materials. Materials would have to be transported to and from the facility, so truck traffic should be a consideration in selecting a site. Additionally, before a biomass energy generation facility is located in the TRORC region, developers should prove that their proposed project will not negatively impact the rural character of the community or the local road system.

Agriculture has the potential to become a net generator of energy through biomass as well. Raising of crops for biofuels is one of the more productive and environmentally safe methods of agricultural energy generation. Methane digestion, where the methane from manure is used to power a turbine is another potential way farms can generate power. However, these facilities are generally only effective when utilized by a large scale farm.

### **Combined Heat and Power**

Combined Heat and Power (also known as cogeneration) utilizes a heating system or energy generator to simultaneously generate both electricity and useful heat. Cogeneration was common during the industrial era before national scale-power distribution when industries that generated their own power used exhaust steam for process heating. Large office and apartment buildings and stores commonly generated their own power and used waste steam for building heat.

The TRORC Region has no combined heat and power systems at present, but several communities have investigated the concept. CHP is generally most appropriate for larger communities with a substantial amount of municipal infrastructure and a cohesive downtown core, such as the villages of White River Junction and Randolph. The primary barrier to creating CHP systems is financial as it is complex process to implement. The Regional Planning Commission supports local efforts to develop combined heat and power energy systems.

### **Hydro Energy Generation**

A substantial amount of Vermont's current energy system is generated through hydropower by Hydro-Quebec, but it does have a number of smaller facilities. In the TRORC region there are currently eleven operating hydropower facilities, which generate approximately 188,188 MWh of power on a yearly basis. There are two main forms of hydropower: run-of-river which uses the natural flow of water to generate power and facilities that store water behind an impoundment. Run-of-river systems rely on seasonal rainfall and runoff to produce power, resulting in periods of low production. Impounding water behind a dam allows for control of the water flow, resulting in consistent electric production.

While most of the best sites for large-scale hydropower energy generation in Vermont have already been developed, there are thirty-three sites in the TRORC region that are considered “in-service”, meaning that they are not actively producing power, but have the basic infrastructure to do so. Many of these sites are existing dams. Retrofitting these existing sites presents the most effective means of adding potential hydropower while keeping environmental impacts low. Hydroelectric development necessitates balancing priorities. While the benefits of generating electricity from local renewable resources are evident, they are not without associated costs. The power output from a given stream must be moderated by environmental considerations. A minimum stream flow, adequate to support aquatic life forms, needs to be maintained and impoundments need to be designed with water quality, land use, and recreation considerations in mind.

Hydropower generating facilities are regulated by the Federal Energy Regulatory Commission and stringent federal water quality standards. As a result, the regulatory process for hydro facilities is extensive and time consuming. Further, streams are public trust resources and the potential impacts of hydro projects warrant significant consideration. Any hydropower development within the Two Rivers-Ottawaquechee Region must not result in an undue adverse impact to riverine ecosystems and water quality.

### **Solar Energy Generation**

Solar energy has potential for providing clean, reliable, and safe energy, even in Vermont's climate. Most areas in Vermont have the potential for some solar energy production, at least at the residential scale. In the TRORC region, if all potential opportunities to develop solar energy production were taken advantage of, the region could generate roughly 41,366,479 kWh of power.

**Passive Heating and Lighting** – Good building and site design are essential to taking advantage of the sun's energy through passive methods. Communities that wish to encourage use of solar in this fashion can utilize zoning bylaws and subdivision regulations to require the appropriate placement of buildings, landscaping and building design.

**Water Heating** – Solar water heating is the most common form of residential-scale solar use in Vermont. Solar systems are not regulated at the state level (with the exception of historic preservation review) and are subject to local regulations. State statute forbids the creation of land use regulations that prohibit renewable energy generation, but towns should take care not to implement regulations that make the utilization of solar water heating a challenge.

**Electricity Generation** – Decreasing costs of equipment have made solar electric generation systems more prevalent. Solar systems are no longer utilized exclusively by “off-grid” buildings. The advent of net-metering allows buildings to be connected to the grid while utilizing renewable energy. Systems that are net-metered are overseen by the Public Service Board and are not required to get a local permit.

There have been several commercial-scale solar electricity generation facilities proposed in the TRORC region, although none have been built to-date. Because of the nature of solar arrays,

they are in some ways more desirable than wind towers. This is primarily due to the fact that they do not need to be located on high ground and are therefore less visually prominent. In addition, these facilities can be located in areas that are less rural in nature, requiring fewer access roads and reducing impact on wild lands. However, that is not to say that they do not also have potential for negative environmental impacts. If not properly sited, large facilities can impact soil and water resources as well as typical natural resources such as wildlife habitat and corridors. Considerations also have to be given to public safety. Because photovoltaic collectors are reflective, they have the potential to create harsh and blinding lights that could be a hazard to nearby buildings or road traffic.

It should be noted that there is a growing movement to site commercial-scale solar energy generation facilities on farms. The “solar farm” has the advantage of producing its energy on site, for a business that is by its very nature, energy intensive. It also provides the farm with an additional stream of income (selling energy back to the energy provider). While this concept has merit, any commercial-scale solar energy facilities that are located on farms need to be sited so as to maximize the availability of prime agricultural soils for continued agricultural use. The Regional Plan is likely to be supportive of small commercial-scale systems in the region if they are sited in such a fashion that they avoid negative environmental impacts and ensure public safety (particularly in relation to roads). We believe that there are existing locations, such as former industrial sites and brownfields locations that would make excellent locations for solar energy generation.

## **F. Permitting Considerations**

Energy generation in Vermont is subject to a number of different permitting requirements, most of which are limited to state level permitting. On the municipal level, state statute protects residential renewable energy generation systems from regulations that will prohibit their development.

### **Section 248**

Distributed power generation facilities, such as hydropower dams, fossil fuel plants as well as wind power or solar systems owned by utilities, are subject to review and approval by the Vermont Public Service Board (30 VSA §248). Under this law, prior to the construction of a generation facility, the Board must issue a Certificate of Public Good. A Section 248 review addresses environmental, economic, and social impacts associated with a particular project, similar to Act 250. In making its determination, the Board must give due consideration to the recommendations of municipal and regional planning commissions and their respective plans. Accordingly, it is appropriate that this Plan address these land uses and provide guidance to town officials, regulators, and utilities.

For all energy generation facilities, the following policies shall apply:

1. **Preferred Locations:** New generation and transmission facilities shall be sited in locations that reinforce the region’s traditional patterns of growth, of compact downtown and village centers surrounded by a rural countryside, including farm and forest land.

2. **Prohibited Locations:** Because of their distinctive natural, historic or scenic value, energy facility development shall be excluded from the following areas:
  - Floodways shown on FEMA Flood Insurance Rate Maps (except as required for hydro facilities)
  - Fluvial erosion hazard areas shown on Fluvial Erosion Hazard Area maps (except as required for hydro facilities)
  - Wetlands as indicated on Vermont State Wetlands Inventory maps or identified through site analysis.
  - Rare, threatened or endangered species habitat or communities.
3. **Significant Areas:** All new generation, transmission, and distribution facilities shall be sited and designed to avoid or, if no other reasonable alternative exists, to otherwise minimize and mitigate adverse impacts to the following:
  - Historic districts, landmarks, sites and structures listed, or eligible for listing, on state or national registers.
  - Public parks and recreation areas, including state and municipal parks, forests and trail networks.
  - 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.
  - Necessary wildlife habitat identified by the state or through analysis, including core habitat areas, migration and travel corridors.
4. **Natural Resource Protection:** New generation and transmission facilities must be sited to avoid the fragmentation of, and undue adverse impacts to the town's working landscape, including large tracts of undeveloped forestland and core forest habitat areas, open farm land, and primary agricultural soils mapped by the US Natural Resource Conservation Service.
5. **Protection of Wildlife:** Designers must gather information about natural and wildlife habitats that exist in the project area and take measures to avoid any undue adverse impact on the resource. Consideration shall be given to the effects of the project on: natural communities, wildlife residing in the area and their migratory routes; the impacts of human activities at or near habitat areas; and any loss of vegetative cover or food sources for critical habitats.
6. **Site Selection:** Site selection should not be limited to generation facilities alone; other elements of the facility need to be considered as well. These include access roads, site clearing, onsite power lines, substations, lighting, and off-site power lines. Development

of these elements shall be done in such a way as to minimize any negative impacts. Unnecessary site clearing and highly visible roadways can have greater visual impacts than the energy generation facility itself. In planning for facilities, designers should take steps to mitigate their impact on natural, scenic and historic resources and improve the harmony with their surroundings.

### **Act 250**

Act 250 requires that the "best available technology" for energy efficiency and recovery be used in construction. In its review of development proposals, Act 250 applies a life cycle cost test to determine the "appropriate level" of energy efficiency. The appropriate level requires the developer to invest in energy efficiency up to the economic break-even point for a particular structure, occupant, and usage pattern. This standard allows for flexibility in design without sacrificing the energy efficiency of specific measures. In addition to the "best available technology" requirement, commercial developments under Act 250 are required to adhere to the rules set forth in Vermont's Commercial Building Energy Standards (CBES).

The scope of Act 250's energy requirement is not broad enough to effectively ensure that development will be energy efficient or will conserve energy as is intended under state statute. We continue to maintain that Act 250 should also consider greenhouse gas emissions as a waste that must be minimized, that private utility services be required to make reasonable efforts to incorporate onsite generation from renewable resources and that the location of development must also be determined to minimize transportation energy use through location adjacent to employment or housing, downtowns or village centers or along transit lines.

### **Local Permitting**

The Vermont Municipal and Regional Planning and Development Act (24 VSA Chapter 117) does not allow communities to impose land use regulation that prohibits or has the effect of prohibiting the installation of solar collectors or other renewable energy devices. It also prohibits communities from regulating the height of renewable energy systems such as windtowers provided that they are small in scale. However, statute does enable Vermont's municipalities to adopt regulatory bylaws to implementing the energy provisions contained in their town plan. Zoning bylaws and subdivision regulations are the most commonly used bylaws. Each affords the opportunity to promote energy efficient development at the local level.

Zoning bylaws control the type and density of development. It is imperative that communities recognize the connection between land use, transportation and energy and seek to create zoning ordinances and subdivision regulations that encourage energy efficiency and conservation. Encouraging high density and diverse uses in and around existing built-up areas will lead to more compact settlement patterns, thereby minimizing travel requirements. At the same time, zoning bylaws must be flexible enough to recognize and allow for the emergence of technological advancements which encourage decreased use of fossil fuels, such as increased use of solar and wind power.

Local zoning bylaws may also permit the creation of planned unit developments (PUDs). PUDs are a grouping of mixed use or residential structures, pre-planned and developed on a single



parcel of land. The setback frontage and density requirements of the zoning district may be varied, to allow creative and energy efficient design (i.e. east-west orientation of roads to encourage southern exposure of structures, solar access protection, use of land forms or vegetation for wind breaks, and attached structures), and to encourage the construction of energy efficient buildings.

Subdivision regulations are one of the most effective tools for encouraging energy efficiency and conservation. Subdivision regulations, like PUDs, involve town review (through the Planning Commission, Zoning Board of Adjustment or Development Review Board) in the design process. Because subdivision regulations govern the creation of new building lots, as well as the provision of access and other facilities and services to those lots, a community can impose requirements that a developer site their building to maximize solar gain. Likewise, subdivision can require that landscaping be utilized to reduce thermal loss.

### **G. Energy Efficiency & Conservation**

Energy efficiency and conservation are the highest priorities of the TRORC Region. In general, these elements are the most cost effective method of reducing energy use. It is always less expensive to reduce consumption than to produce energy. But, there are barriers that prevent home owners and businesses from making energy efficiency investments and participating in existing programs. High upfront costs, split incentives, poor understanding of benefits, a lack of information about efficiency and poorly timed home improvements all present challenges to improving energy efficiency.

Improving existing structures and building new structures with a vision toward increased energy efficiency is a critical way to promote energy conservation and lessen or postpone the need for costly sources of additional energy. Enhanced energy efficiency in buildings and structures can lessen the amount of income that our region spends on energy costs, decrease per capita consumption of non-renewable sources of energy, and decrease the emission of both acid rain precursors and greenhouse gases. Reducing the consumption of costly, imported forms of energy and increasing the use of renewable emission-free energy can reduce reliance on global markets, stimulating local economies.

Much of Vermont's building stock is old, and many of these buildings are considered historic and are either listed on or eligible for listing on the State and National Registers of Historic Places. According to the 2011 Vermont Comprehensive Energy Plan, more than 40% of Vermonters live in historic buildings, of which there are more than 30,000 in Vermont. Approximately 76,800 homes (30% of the total number of homes in Vermont) were constructed before 1940<sup>23</sup>.

There are a wide range of programs designed to reduce costs for home energy efficiency improvements, many of which are organized by Efficiency Vermont. Efficiency Vermont is Vermont's statewide energy efficiency utility, which is funded by an energy efficiency charge on a consumer's electric bill; it is managed by the Vermont Energy Investment Corporation (VEIC),

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<sup>23</sup> 2011 Vermont Comprehensive Energy Plan, p.162

an independent non-profit energy services organization that is under contract to the Vermont Public Service Board. Efficiency Vermont helps Vermonters reduce energy costs by making their homes and businesses energy-efficient. It provides technical assistance and financial incentives to help Vermonters identify and pay for cost-effective approaches to energy-efficient building design, construction, renovation, equipment, lighting and appliances. The Regional Commission supports statewide, regional and local efforts to provide educational outreach to communities to better educate homeowners as to what resources are available to them for energy efficiency improvements.

New residential development in the State of Vermont is required to comply with Vermont Residential Building Energy Standards (RBES). Commercial development is subject to similar (but more effectively enforced) code regulations. Some examples of the types of development the RBES applies to include:

- Detached one- and two-family dwellings.
- Multi-family and other residential buildings three stories or fewer in height.
- Additions, alterations, renovations and repairs.
- Factory-built modular homes (not including mobile homes)

In order to comply with the RBES, a home, as built, must meet all of the Basic Requirements and the Performance Requirements for one of several possible compliance methods. If the home meets the technical requirement of the RBES, a Vermont Residential Building Energy Standards Certificate must be completed, filed with the Town Clerk of the community and posted in the home. If a home required by law to meet the Residential Building Energy Standard does not comply, a homeowner may seek damages in court. It includes heating and cooling systems as well. Unfortunately, the program lacks a mechanism that enforces the proper filing of the required certificate. Without having a way to penalize contractors who do not file these reports, there is no way to ensure compliance with the RBES. Communities who wish to take a role in guaranteeing compliance with this program can do so by requiring proof of filing as part of a certificate of occupancy through their zoning ordinance.

#### **H. Municipal Energy Efficiency and Conservation**

Municipalities expend a substantial amount of their yearly budgets on energy related costs, primarily for heating and transportation. When the price of fuel rises, costs rise, which forces the community to either raise taxes or cut services. In the event that fuel costs were to double in the future, municipalities could be dramatically impacted. Efficiency and conservation at the municipal level can have a broad impact and will benefit the community as a whole. Some of the opportunities for energy efficiency and conservation at the municipal level include:

- Tracking energy expenses by building.
- Conducting energy audits on municipal buildings.
- Creating municipal policies that reduce energy use (such as an energy efficient purchasing policy.)

State statute enables communities to form an Energy Committee, which is a volunteer board that focuses on energy issues. An Energy Committee can assist the Planning Commission with developing good energy policy. It can also be responsible for auditing and tracking energy expenses in order to recommend energy efficiency improvements for municipal buildings.

### Capital Budget and Program

Given the potential expense of energy efficiency improvements, it is essential to wisely budget town funding to cover these costs. State statute enables communities to create a Capital Budget and Program for the purposes of planning and investing in long-range capital planning. Although most communities have some form of capital account where they save money, many do not have a true Capital Budget and Program. A capital budget outlines the capital projects that are to be undertaken in the coming fiscal years over a five-year period. It includes estimated costs and a proposed method of financing those costs. Also outlined in the Program is an indication of priority of need and the order in which these investments will be made. Any Capital Budget and Program must be consistent with the Town Plan and shall include an analysis of what effect capital investments might have on the operating costs of the community.

When planning for routine major facilities investments, such as roof replacements, foundation repairs, etc., it is important to also consider making energy efficiency improvements at the same time. The cost to replace or renovate a community facility will only be slightly higher if energy efficiency improvements are done at the same time, rather than on their own.

### Municipal Incentives

Communities can also consider offering incentives to residents that encourage energy efficient improvements. Vermont enacted legislation in May 2009 (Act 45) that authorizes local governments to create Clean Energy Assessment districts. Once created, municipalities can offer financing to property owners for renewable energy and energy-efficiency projects. Eligible

#### Under Vermont Statute, “Smart Growth Principles” mean growth that:

- Maintains the historic development pattern of village and urban centers separated by rural countryside.
- Develops compact mixed-use centers at a scale appropriate for the community and the region.
- Enables choice in modes of transportation.
- Protects the state’s important environmental, natural and historic features, including natural areas, water quality, scenic resources, and historic sites and districts.
- Serves to strengthen agricultural and forest industries and minimizes conflicts of development with these industries.
- Balances growth with the availability of economic and efficient public utilities and services.
- Supports a diversity of viable businesses in downtowns and villages.
- Provides for housing that meets the needs of a diversity of social and income groups in each community.
- Reflects a settlement pattern that, at full build-out, is not characterized by:
  - Scattered development located outside of compact urban 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 into lands located outside compact village and urban centers;
  - Linear development along well-traveled roads and highways that lacks depth, as

projects include the installation of solar water and space heating, photovoltaic panels (PV), and biomass heating, small wind, and micro-hydroelectric systems. Property-Assessed Clean Energy (PACE) financing effectively allows property owners to borrow money to pay for energy improvements. The amount borrowed is typically repaid via a special assessment on the property over a period of up to 20 years; if the property owner wishes to sell the parcel before fully repaying the obligation, then the obligation is transferred to the new property owner at the time of sale.

### **I. Energy and Land Use**

There is a clear connection between the way we choose to develop land and how much energy is used. Our desire to maintain a rural landscape and to live within that landscape has the negative impact of requiring a greater need for transportation and for the extension of services in rural areas.

The first goal of Title 24, Chapter 117, §4302(c) is to “plan development so as to maintain the historic settlement pattern of compact village and urban centers separated by rural countryside.” This goal, if properly implemented should help us achieve greater energy efficiency and conservation if we utilize the principles of Smart Growth in the creating of land use policy. Denser development should be directed toward villages and downtowns, or into designated growth areas immediately adjacent to them. Development within this core area should be mixed use and multiple modes of transportation should be considered including pedestrian and bicycle. The types of uses most appropriate for compact urban centers focus on high-density residential, commercial and civic uses. Governmental facilities, such as post offices, town offices, town halls, etc. should be located within these compact urban centers, the only exception being facilities such as town garages and landfills which are more appropriate in other locations. In more rural areas, density should be more disperse and should take advantage of existing roads whenever possible. Because transportation is such a substantial portion of local and regional energy use, it is in the interest of communities to encourage any new developments that are proposed to locate adjacent to existing roads. In particular dense residential developments should be located within or adjacent to existing village centers or within designated growth areas. Commercial development that requires trucking and freight handling should only locate on roads which can effectively handle the size of vehicle needed.

### **J. Energy and Transportation**

It is important to recognize the clear connection between land use patterns, transportation and energy use. Most communities encourage the development of residences in rural areas, and these are in fact coveted locations to develop because of the aesthetics that make Vermont special. However, this rural development requires most of our population to drive to reach schools, work and services.

All land use planning and development should consider multi-modal transportation, including pedestrian and bicycle travel. The location of large developments should be designed to minimize transportation energy use through location adjacent to employment or housing, downtowns or village centers or along transit lines.

Regional public transit in Vermont is a challenge due to the rural nature of our state, but the TRORC region is fortunate to have several public transit providers (for more information see the Regional Plan chapter on Transportation). The availability of public transit is a key element of reducing our transportation energy use, and the Regional Commission remains very supportive of our public transit providers.

The Regional Commission also supports Transportation Demand Management programs and facilities, which reduce reliance on the single-occupancy vehicles. These programs include ride-sharing, car-pooling and greater use of transit service and bike and pedestrian options. In 2010 we conducted a regional park and ride needs assessment. Park-and-ride facilities, if located in areas served by public transit, can increase public transit ridership. The region has eleven park and ride lots, eight of which have public transit connections. It is estimated that in utilizing the regional park and ride system, commuters will have annually reduced a total of 20,430,800 total annual vehicles miles traveled, saving 3,630,800 pounds of CO<sub>2</sub> each year and saving an estimated \$588,919 in annual commuting costs. Despite having eleven existing park and ride facilities in our region, we believe it is important to continuously build upon and expand the region's network, and continue to support efforts that work toward that goal.

#### **K. Energy Assurance Planning**

The dramatic rise in fuel costs in the late 2000's brought concerns about the stability of our national energy system to the forefront. Dependence on foreign fuels puts the nation in a position of weakness, unable to control prices and maintain fuel supplies. This lack of control highlights the fragility of our dependence on foreign fuel, particularly petroleum. Because Vermont has no refining capacity and no crude oil reserves, this creates distinct challenges in the event of a petroleum emergency.

If the costs of petroleum were to, for example, double in cost, municipalities would be challenged to continue to offer services and taxpayers would be forced to absorb those rising costs. This, coupled with the impact such fuel cost price changes would have on the private sector could spell disaster for any part of the United States. Additional concerns lie in our ability to maintain our existing energy distribution systems in the event of a severe hazard event. The State of Vermont has seen an increase in the number of declared disasters over the past decade. In 2011, Tropical Storm Irene isolated a number of communities, keeping them from available fuel sources.

Fuel disruptions can wreak havoc on our transportation systems, economies and the provision of services. Municipalities should engage in comprehensive, integrated energy assurance planning that is designed to mitigate and enable timely response to the consequences of energy supply disruption whether through shortages created by cost or by hazard events. Municipal Hazard Mitigation Plans should include an element that specifically addresses fuel shortages. To ensure that there is a comprehensive approach to energy assurance planning, municipalities should assess impacts to the local supply and distribution system in the event of a fuel shortage. This plan should include a clear set of non-mandatory and mandatory fuel conservation measures. These measures are designed to alleviate supply shortages or disruptions and potentially prevent

a more serious crisis. For more extreme events, communities should be prepared to implement a fuel allocation program that ensures that any available fuel will be distributed to priority areas of need, such as emergency response and health care providers.

#### **L. Goals**

1. To promote the construction of energy efficient homes and buildings to lessen or postpone the need for costly sources of additional energy.
2. To increase the opportunities for using public transportation facilities where they exist and to increase ridership in areas already serviced by public transportation.
3. To increase awareness and use of energy conservation practices through educational efforts.
4. To foster the principles of Smart Growth by encouraging patterns of land use and development that use energy most efficiently.
5. To encourage the development of renewable energy generation that is sustainable and protects our natural and rural landscape.

#### **M. Policies**

1. To actively support partnerships, strategies, and state and federal legislation that will ensure the affordable, reliable and sustainable production and delivery of electrical power to the region, in conformance with regional and municipal goals and objectives.
2. The Regional Commission will participate in long-range utility planning and development to ensure that local energy, resource conservation and development objectives are identified and considered in future utility development.
3. To participate in the Public Service Board's review of new and expanded generation and transmission facilities to ensure that local energy, resource conservation and development objectives are identified and considered in future utility development.
4. To work in cooperation with state and local agencies, emergency service providers, regional suppliers and municipalities to develop local emergency contingency plans that ensure access to critical energy supplies and measures to reduce nonessential energy consumption in the event of an abrupt energy shortage.
5. The Regional Commission supports the PACE program and other similar statewide programs designed to make energy efficiency improvements more affordable and more likely to be implemented.

6. The Regional Commission supports statewide, regional and local efforts to provide educational outreach to communities to better educate homeowners as to what resources are available to them for energy efficiency improvements.
7. Prior to the construction of additional or upgraded transmission or distribution lines or related facilities, utilities must demonstrate that such public investments are justified to improve efficiency and is not inconsistent with the goal to increase energy conservation for the consumer. In the consideration of the public benefit resulting from such investments, full consideration of the associated external costs must be reflected in any decision. Prior to the acceptance or acknowledgment of any new energy source or facility development affecting the region, full community and technical review is required to enable objective analysis of the positive and negative economic, social, aesthetic, and environmental impacts associated with the project.
8. New generation and transmission facilities must be sited to avoid the fragmentation of, and undue adverse impacts to the town's working landscape, including large tracts of undeveloped forestland and core forest habitat areas, open farm land, and primary agricultural soils mapped by the US Natural Resource Conservation Service.
9. Properly planned and constructed expansions and efficiency improvements to existing hydropower generators and transmission facilities are required where such investments clearly benefit the residents of the region and are in accord with goals and policies of this Plan.
10. Where development and construction of electric power generation facilities are proposed for public use, design plans must consider placement of such facilities in locations where environmental impact is minimal or reasonable measures have been employed to mitigate adverse impacts.
11. The Regional Plan requires transportation practices that promote energy efficiency. This includes the following initiatives:
  - a) Invest in bicycling and walking facilities within settlement and commercial growth centers, and invest in bicycle and walking facilities that connect settlement and commercial growth centers.
  - b) Continue investment in public transportation and rideshare programs to reduce the region's dependency on single-occupancy vehicle trips.
  - c) Construct more park-and-ride commuter parking lots at Interstate interchanges and within our settlement and commercial growth centers.
  - d) Support transportation facility design enhancements that better accommodate multimodalism on the region's existing roads and bridges.
  - e) Require large-scale private land use development to invest in transportation infrastructure and services that promote multimodalism or provide the necessary right-of-way to allow public investment in those facilities.

12. Capital investments of public utilities and services are encouraged within built-up centers to support the high intensities of use.
13. Where it is demonstrated that the costs of providing energy services and facilities clearly is outweighed by a public benefit to the areas or region and the land use settlement patterns resulting from the development or subdivisions are in conformance with this Plan and relevant local plans, such services and facilities should be permitted.
14. No new dams or major improvements to existing dams are supported without full consideration of its social, economic, and environmental impacts, the appropriate local plan, and this Regional Plan. Future hydroelectric power development must occur within these guidelines:
  - a) run-of-the river projects are preferred over projects which require impoundments with low or minimum flows;
  - b) recreation and fisheries are top priorities for river uses and should not be significantly diminished by hydropower development. Provisions should be made for fish passage and canoe portages. Also, recreational opportunities at hydropower facilities should be explored and developed where appropriate; and
  - c) water quality and minimum flows must be maintained.
15. New developments that are proposed under Act 250 must include measures to reduce energy consumption through site and building design, materials selection and the use of energy-efficient lighting, heating, venting and air conditioning systems.
16. The Regional Commission supports the development and use of renewable energy resources – including but not limited to wind, solar, biomass, micro hydro and cogeneration – at a scale that is sustainable, that enhances energy system capacity and security, that promotes cleaner, more affordable energy technologies, that increases the energy options available locally, and that avoids undue adverse impacts of energy development on the local community and environment.

## **N. Recommendations for Action**

1. The Regional Planning Commission should contribute to the creation of a statewide inventory of areas that would be suitable for renewable energy generation.
2. The Regional Commission should work with state legislators to craft new language in Act 250 that will require Act 250 to consider greenhouse gas emissions as a waste that must be minimized, that private utility services be required to make reasonable efforts to incorporate onsite generation from renewable resources and that the location of



development must also be determined to minimize transportation energy use through location adjacent to employment or housing, downtowns or village centers or along transit lines.

3. The Regional Commission should continue to provide support and outreach to municipal energy committees.
4. Local planning commissions, Selectboards, citizens, and members of the energy industry should work cooperatively to identify ways to reduce the cost of energy to consumers, and to promote efficiency in energy use and conservation.
5. Local planning commissions should employ, as part of the review and approval process, all practical energy conservation measures to maximize energy efficiency in siting, design, and construction. Standards recommended by the Department of Public Service may serve as a basis for the development of such conservation measures.
6. Continuing support should be given to wind and solar energy research and development in the region, as sustainable and emission-free sources of energy.

## **XII. ECONOMIC DEVELOPMENT**

### **A. Comprehensive Economic Development Strategy (CEDS)**

A Comprehensive Economic Development Strategy (CEDS) is a comprehensive economic plan designed to diversify and strengthen regional economies. A CEDS is required by the U.S. Department of Commerce Economic Development Administration (EDA) for areas to be eligible for planning and construction funds.<sup>24</sup>

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 industry concerned about the economic development of a region.

In January 2000, a CEDS planning process for this region began in coordination with two neighboring regional planning commissions, and two regional development corporations serving this part of the state.<sup>25</sup> This effort resulted in the East Central Vermont CEDS Area.

The first CEDS for this area was written in 2001, followed by a substantial update in 2005, and a thorough rewrite in 2011; this enables planning and construction funding eligibility for the 40-town CEDS area.

The 2011 CEDS process used an analysis of economic conditions completed for the area by economists, Kavet, Rockler and Associates. The timing of this CEDS analysis provided the opportunity to inform this Regional Plan with the most current economic information available for our specific region.

### **B. Current Status of the Region's Economy**

The region's economy is a reflection of historical patterns of development and recent economic trends both local and statewide. Regional occupations are diversified, capturing the professional, technical, service, manufacturing, and agricultural sectors. As a consequence, the region's economy is not dominated by a single business type. The region's diverse business mix currently affords a reasonably good match between jobs and population.

Job growth in the Upper Valley Region has been modest and unemployment in the region has been relatively low. While low unemployment rates have their positive attributes, there are negative ones as well. Low unemployment can be regarded as a barrier for businesses looking to expand or locate; because there may be concern that not enough skilled and available workers exist in the area.

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<sup>24</sup>Two Rivers-Ottawaquechee Regional Commission (TRORC), the Southern Windsor County Regional Planning Commission (SWCRPC), Green Mountain Economic Development Corporation (GMEDC), and the Springfield Regional Development Corporation (SRDC)

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Portions of the regional economy face favorable work conditions and offer attractive opportunities, while in others, low wage rates and weak income growth exists. This appears to push people into lower level employment or into the job market when they may not otherwise choose it. Wage rates have been growing, but still lag slightly behind the state as a whole. The economic challenge for the region is to increase real wages and job quality. It is in the region's long-term economic interest to foster a business climate that will encourage the growth of businesses appropriately scaled to their communities and which provide high-paying, high satisfaction jobs.

The land itself reflects many changes. The number of farms has increased marginally; however the amount of farmland and the number of people employed in agriculture, silviculture and other natural resource-dependent occupations has declined. Today's land uses show more of a trend toward subdivision of agricultural and forest land, resulting in single or multiple home development geared toward middle and upper income buyers.

### **C. How Towns View Themselves Economically**

The region is a rural region within a rural state. The towns of the region have developed in different ways economically. Their town plans reflect their similarities, differences, and interdependence. Some towns regard themselves as economic centers, others celebrate their remoteness.

The fact that several towns, such as Barnard, Bridgewater, Granville, and Tunbridge, are able to list and individually describe most commercial enterprises within their borders in two or three sentences illustrates a low level of development. These plans state that they would like increased commercial activity so long as it did not adversely affect their rural character, natural resources, or local services. But, for the most part, they do not propose specific policies which would help guide growth or protect special attributes. Corinth regards their very act of adopting a town plan as "a step toward protecting the town against adverse development and use." Chelsea's Plan is an exception, as it suggests actions that could be taken to focus traffic-generating industrial activity in specific locations.

Tunbridge's approach is to leave it to the State and Act 250 specifically to protect the town from development which would "detract from the 'essential rural character' of the community." The Plan includes guidelines specifically designed to be applied in Act 250 hearings. The town does not have zoning but encourages all developers to follow these guidelines.

Bridgewater's Town Plan looks to the good intentions of developers to protect its valued assets. An open letter to developers appended to the Plan expresses the hope that in "choosing to develop in the Town of Bridgewater we ask that you consider carefully ... the values of small town life ... the visual beauty of farms and open spaces ... churches, old homes and stores centrally located in hamlet and village ... and make it your aim to enhance rather than detract from these values."

Some towns have remained rural because they are remote. These are the towns which are least accessible by road from existing centers of development. While it's possible that outward growth

pressures from economic centers could reach the farthest corners of the region, it is unlikely to be substantial in any way without increased access to technology. In the meantime, home based and small scale businesses that process local products in towns that have access to transportation and/or high-speed internet will be most likely to succeed. Clearly the economic future of these towns depends largely on forces outside of their direct control.

On the “developed” end of the spectrum, several towns define themselves as economic hubs and are seeking suitable locations for growth by encouraging diversification (Woodstock and Bradford). Others such as Randolph and Hartford want to accommodate growth and increase their roles as regional employment, shopping and service centers through improving infrastructure and services.

Review of local plans has revealed several common themes or values related to economic growth. These are:

- a desirability for home and small-scale businesses;
- the relative importance of promoting agriculture and forestry to provide rural characters;
- the fact that property tax revenues and burden are key economic development factors; and
- the need to consider the “quality of life” as an economic value.

#### **D. A Vision for the Region’s Economy**

The Regional Commission recognizes that the region has a number of unique characteristics that provide the opportunity for a high quality of life. Like other parts of Vermont, it is blessed with a display of mountains, lakes, open fields, and villages. It has a small number of people in rural settings, a clean environment, and access to a variety of natural resource based activities. 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. Many residents fortunate enough to take advantage of this quality of life are committed to extending the same opportunities to others seeking to live in the region.

The child care industry contributes to the regional economy as a business and employer in its own right, and as a service industry that provides crucial support to employers and employees. A supply of child care services and facilities allow parents in the regional economy to work.

#### **Guiding Principles**

- (1) Foster a healthy business climate for the region, characterized by cooperation between the public and private sectors which will nurture a diverse and sustainable economy.
- (2) Promote economic, environmental and community development as opportunities-that must be interrelated as three equally valuable public goals.
- (3) Strive to ensure job opportunities are available to all the region’s citizens without degradation of our community and natural environment.
- (4) Strive to ensure an adequate supply of child care services and facilities are available.

**E. Goals**

- (1) To create a system of accessible public education and workforce training opportunities.
- (2) To foster job growth which attains full employment in all sectors of the region's working population appropriately scaled to the community.
- (3) To improve incomes of the region's residents so as to attain an average wage or a per capita earning level greater than the national average.
- (4) To attract a diverse and sustainable business environment while maintaining the region's unique quality of life and historic development patterns.
- (5) To coordinate cost-effective state, regional and local economic assistance and community development programs.
- (6) Promote agriculture and forestry to preserve and provide rural landscape.
- (7) To provide an exceptional telecommunications system that supports the interests of both current and future businesses and residents.
- (8) An energy policy that is fair, predictable and competitive.
- (9) Foster a predictable, streamlined regulatory system that ensures environmental protection.
- (10) Ensure competitive, broad, and stable state and local tax policies.
- (11) To create a regional network of well trained, educated, child care providers and facilities that fulfills the needs of families and employers.
- (12) To create a public infrastructure system that meets economic development needs while enhancing quality of life goals.

**Policies**

- (1) Improve the region's public infrastructure to support and sustain a viable economy and environment.
- (2) Create and retain a workforce that aligns with the strategic needs of our region's current and future employers and meets the region's economic demands.
- (3) Encourage and promote land use that enhances the value of our region's unique natural resources, integrating economic growth with our working landscape.
- (4) Improve the region's capacity to stimulate and sustain economic development and investment.
- (5) Promote sufficient availability of adequate safe and workforce primary housing for residents of the Region, including those with special needs.
- (6) Support initiatives to develop child care facilities where a need has been proven and the location conforms with this Regional Plan.

**F. Recommendations for Action**

- (1) Streamline the regulatory system at the state level; coordinate permitting between local and state levels;
- (2) Advocate for reform to the use value appraisal program to ensure penalties are sufficient to deter easy removal from program;
- (3) Continue advocating for overall property tax reform to promote equity and to make business investment in the state and towns competitive;

- (4) Develop a stronger financing/funding mechanism for business entrepreneurship (VEDA, SIB, CDBG, Revolving Loans);
- (5) Promote tourism through a stronger marketing program with Travel and Tourism, Chambers of Commerce and others;
- (6) Promote the economic importance of historic preservation, downtown development and cultural/heritage tourism;
- (7) Investigate revision of Vermont's Off-Premise Sign Law and prevent the proliferation of off-premise signs along roadways;
- (8) Work with industry leaders and educators to advance employment training for businesses;
- (9) Advocate for energy rate structure reform if it does not unduly shift burdens to residential rate payers;
- (10) Ensure that transportation and other capital investment projects are located in areas most appropriate for economic development (downtowns and villages, growth centers, office parks, etc.);
- (11) Work with public, private and non-profit sectors to increase availability of broadband internet;
- (12) Work with the Vermont state agencies, regional and local development groups, trade associations, Chamber of Commerce organizations, and other groups to integrate land use planning with economic planning and development programs;
- (13) Work with member towns to address identified needs for child care facilities or services.
- (14) Identify publicly owned buildings throughout the region; evaluate and prioritize their suitability to serve as child care facilities after considering Vermont regulations.
- (15) Work toward universal broadband access across all areas of our region.

## XIII. PLAN IMPLEMENTATION

### A. Determination of Substantial Regional Impact

Larger developments, although only involving lands in one town, may affect the character of growth and development or impact infrastructure in adjacent towns. Depending upon the characteristics of the development, the impact on neighboring towns can be so significant that it constitutes a “substantial regional impact”.

For example, an industrial park or commercial complex located in one town may result in increased employment opportunities for the area, thus stimulating the demand for housing in neighboring towns. A resort complex which 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 which determine the relative impact of growth in an area. 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.

The eight specific criteria that qualify a development as resulting in substantial regional impact are outlined below:

- (1) A development which modifies existing regional settlement patterns by:
  - (a) shifting activity away from an existing “regional growth area” (as defined in the Land Use Chapter of this Plan) to a major new area of regional growth; or
  - (b) locating in an area which does not presently contain development of similar type or scale; or
  - (c) resulting in activities currently served or planned for by development elsewhere in the region.
- (2) A development that significantly affects existing capacity of regional public facilities by:
  - (a) contributing to a reduction in the peak hour Level of Service (LOS) from D to E or from E to F; or
  - (b) contributing five percent or more to the peak hour Level of Service (LOS) D on a regionally significant local or State highway in or immediately adjacent to regional growth areas or LOS C on regionally significant local or State highways in rural areas; or
  - (c) contributing five percent or more to the annual volume or tonnage of solid waste for disposal at a regional disposal facility; or

- (d) necessitating substantive capital improvements, such as widening or signalization of regionally significant (Class II) local or State highways; or
  - (e) demanding five percent or more electrical energy during peak hours from facilities serving the immediate area; or
  - (f) necessitating substantive capital improvements such as the extension, upgrading or enlargement to regional electrical transmission lines; or
  - (g) utilizing five percent or more unallocated student reserve capacity for any given year from any regional school facility serving the project.
- (3) A development which may place substantial demands on the region's economy, or on a major sector of the economy by:
- (a) increasing the cost or availability of affordable housing in municipalities immediate to the project site; or
  - (b) increasing the cost or availability of energy for users in the region immediate to the project site; or
  - (c) having an impact on the tax rates of major employment centers or growth centers in the region; or
  - (d) generating new employment equal to or greater than 1% of the region's existing employment level; or
  - (e) drawing employees from towns outside the town in which the development is proposed.
- (4) A development which endangers the perpetuation or appreciation of regionally significant natural or cultural features, including, but not limited to: necessary wildlife habitats, fragile areas, public water supply watersheds, aquifer protection areas, historic and scenic resources, and national landmarks.
- (5) A development which impairs the continued function of significant regional facilities, including, but not limited to, Interstate highway systems, waterways, educational institutions, hospitals, recreational facilities, bridges, dams, airports and trails.
- (6) A development exceeding the following thresholds:
- (a) residential construction where the total proposed housing units exceeds five percent of the total housing count of the host town; or



- (b) commercial or industrial construction involving a proposed project, whether phased or not, of 20,000 square feet or more of gross floor area; or
  - (c) construction of large regional public, private or non-profit facilities or utilities within one mile of a municipal boundary.
- (7) A development which by reason of size, type, timing, or location 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.
- (8) A development or series of developments:
- (a) located within a limited geographic area;
  - (b) under the control of a single applicant; and
  - (c) developed and planned incrementally over a relatively short period of time, the impacts of which may result in environmental, economic or social conditions substantially different than their respective parts.
- (9) A new or expanded generating or transmission facility, electrical or other, located within one or more municipalities or requiring Public Service Board approval under 30 V.S.A. § 248.

### **B. Cumulative Development Impacts - Findings**

The cumulative impacts of growth from development within a geographic area can result in overall conditions that are more detrimental than the sum of their incremental parts. That is, they have a synergistic effect, rather than an additive effect. Traditional approaches to planning and development review processes are often weak or ineffective in controlling or evaluating cumulative development impacts. The cumulative effects of development tend to be different than other forms of development. This is principally because implementation of large development plans or projects in increments precludes evaluation of the total impact of all development when completed.

For example, a large scale, 200 lot residential subdivision may be presented for review in ten 20-lot increments. The entire subdivision may have a significant impact on ground water supplies in the area. However, as presented, each piece of the total has no identifiable impact. Regardless, as the development segments are completed over time, it becomes increasingly difficult to remedy the problems identified.

Large scale development which occurs in increments may result in an inability of a municipality or region to adequately provide facilities or services when they are needed. Take the example of a major recreational facility, (i.e. ski area) announcing plans for expansion. The project is reviewed and granted permits. Over the next several years related satellite developments,

including vacation homes, and commercial establishments are built. Eventually, the municipality or region finds that its roads and schools or other infrastructure services are strained. Traffic congestion occurs on local or state highways, necessitating substantial capital improvements to relieve the problem. Because of an inability or failure to anticipate the relationships of one project to another as each part of the plan was presented, the burden for the costs to upgrade these facilities or services becomes heavy.

In sum, development which proceeds incrementally has a high potential for ultimately failing to meet the goals of this Plan, the Vermont Municipal Planning and Development Act (24 VSA Chapter 117), and Act 250 (10 VSA Chapter 151). It is not in the interest of the region, therefore, to endorse or promote methods of incremental development review that inadequately evaluate the cumulative impacts of growth within an area.

### **C. Implementation of Cumulative Development Impact Assessment**

The Regional Commission has found that cumulative development can produce environmental, social, and economic impacts that are contrary to purposes of sound and coordinated comprehensive planning and the goals of this Plan. Furthermore, review of developments on an incremental basis may present applicants with problems, such as uncertainty about assessments on later stages of related projects or the imposition of conditions to correct situations only partially caused by the actions of a particular applicant.

The Regional Commission firmly supports and recognizes use of cumulative development assessment techniques or processes for the following purposes:

- (1) to enable orderly growth within the context of the total development in an area;
- (2) to enable development contributing to an adverse or unreasonable condition to be assessed in accordance with its respective contribution to the problem; and
- (3) to remove uncertainty in the outcome of the planning and review process for both the applicant and the affected parties.

To utilize the beneficial effect of cumulative development impact assessment as provided for in the Act 250 review process, the Regional Commission supports the following approaches to the extent authorized by administrative or statutory law:

- (1) Master Plans and Umbrella Permits - a permit procedure requiring receipt of an application for a complex or extended project in its entirety to enable comprehensive review of its overall impacts. This permit procedure ~~would~~ allow the District Commission or Environmental Court to grant limited authority to the applicant to undertake certain phases of the project in the context of the overall project (Land Use Panel Rule 21); and
- (2) Uniform Conditions on Permits - a process where a District Environmental Commission establishes special review procedures and conditions for any and all projects proposed

within a limited geographic area to enable monitoring of permit conditions where more than one developer is involved. Such a procedure provides for more equitable development of solutions to problems (i.e. apportionment of costs of infrastructure improvements by applying them to more than one developer).

#### **D. Implementation Mechanisms**

Adoption of this Plan will be most valuable if accompanied by a program of implementation. 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) municipal planning;
- (2) State Agency plans and capital programs;
- (3) coordination with regional entities;
- (4) State and national legislative policy processes; and
- (5) public participation and coordination.

##### **1. Municipal Planning**

The Planning and Development Act enables towns to establish planning programs to meet local needs (24 VSA Chapter 117). If a municipality chooses to conduct a planning program, it must follow the statutory requirements in the Act. Section 4302 of the Act sets forth an intent to establish a planning process that will further specific goals. All thirty member towns in the region have planning programs and planning commissions appointed by the Selectboard. Most towns have plans in existence which address most or all of the goals in the Act. Although the planning goals set forth in the Act may not be relevant locally, the Regional Commission believes that all towns should carefully evaluate each of the goals in the Act prior to determining whether or not the goal is appropriate.

Regulatory and non-regulatory implementation tools 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, 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.

##### **(a) Bylaws**

Implementation of the goals expressed as part of the municipal plan can be accomplished through a variety of ways, including bylaws adopted by the towns. Vermont law enables several kinds of bylaws, including zoning, site plan, subdivision regulations, unified development, official map, impact fees, phasing, transfer of development rights, and special or freestanding bylaws (24 VSA Subchapter 7). However, prior to having any land use bylaw, the municipality must have a municipal plan. Also, any bylaw in effect must have the purpose of implementing the Plan and must be in accord with the policies of the Plan (24 VSA Chapter 117 §4401). Since municipal plans are updated every five years, municipalities are required to update their bylaws in a timely manner to reflect those changes.

**(b) Capital Budgeting and Programming**

Capital budgeting and programming is also a means of directing local public investments over a five year period to implement community needs as expressed in the Plan. The capital budget and program establishes an order of priority for major capital expenditures and sets forth a means of financing the investments. By having a capital budget and program, municipalities can:

- (1) encourage growth and development at a pace which is consistent with its ability to provide services; and
- (2) direct change or improvements to public infrastructure and utilities in accordance with the goals and policies set forth in the municipal plan.

**(c) 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). The impact fee would require payment by the developer to the town a sum of money to cover the costs of the capital project attributable to the expenses.

While a few towns in Vermont have established impact fees, no community in the region has advanced its local planning and has the development activity to enable it to clearly establish the cost of facilities and the relative impact development places on public services. Nevertheless, the Regional Commission believes that the larger towns in the region will soon begin to evaluate their options for impact fees, particularly when the rate of development in these towns begin to exceed average levels.

**2. Private Sector Conservation and Development**

While optional, the existence of local planning bylaws enables municipalities to regulate land use within their borders. The land developer or conservationist is primary to the implementation of the Plan. The scale, size, type, and timing of growth on the landscape stands as tangible evidence of Plan implementation. Non-regulatory implementation tools for land conservation include purchase of development rights and coordinated purchase of properties to preserve land that has a clear value to the community. The Vermont Housing and Conservation Board maintains funding for farmland preservation, historic property projects and land conservation efforts.

**3. State Agency Plans and Capital Programs**

State Agency planning processes and capital expenditure programs provides an excellent opportunity for the region's member governments to exercise more control over their future and to improve coordination between various State agencies and local government.

As the quality of planning continues to increase at all levels, the ability to promote consistency and coordination will increase concurrently.

#### **4. Coordination with Regional Entities**

The Regional Commission recognizes the function and purpose of regional entities existing in the region. Vermont law enables the creation of inter-municipal cooperative agreements, compacts, districts, and contracts by municipalities (24 VSA Chapter 121). Under the provision of this law, towns cooperatively organize to undertake a particular kind of project or service with other towns of similar or like needs. Given the complexity and economic costs associated with the provision of a required public service by municipalities, such as solid waste disposal and public education, the creation of special purpose units of government within the region is likely to continue.

The Regional Commission 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.

Several state and regional non-profit corporations or organizations exist or 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. The Regional Commission intends to coordinate with these corporations, to the extent practical, to promote the implementation of this Plan.

#### **5. State Legislative Policy Processes**

In order to improve coordination and management of future growth and development in the region, planning and decision-making processes between local and State jurisdictions needs to be enhanced.

The Regional Commission is available and will, to the extent practical, provide the expertise necessary to inform policy makers of possible deficiencies or inadequacies in existing State laws on programs affecting land use and development in this region.

#### **6. Public Participation and Coordination**

In order to implement the Plan through any or all of the above mechanisms, local officials, Agency administrators, policy makers, other governmental organizations, 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 which coordinate daily with the Regional Commission but the general public as to the Plan policies and its implementation is essential. Plan implementation without public input is destined to fail. A deliberate effort to involve the public in all aspects of the Plan implementation process is essential. Education of the public on the overall values of multiple town planning for an area will continue to be an on-going function of the Regional Commission as it seeks to implement this Plan with others. Specific means of assessing public input will include:

- (1) newsletters and press releases;
- (2) Regional Commission website;

- (3) social media;
- (4) public forums;
- (5) opinion surveys and questionnaires;
- (6) media announcements and coordination; and
- (7) Regional Commission education.

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.

## **XIV. RELATIONSHIP OF REGIONAL PLAN TO NEIGHBORING AND AGENCY PLANS**

### **A. Regional Plans of Adjoining Commissions**

Outlined below are the five Regional Commissions which adjoin the Two Rivers - Ottauquechee Region and the respective dates of adoption or amendment of their Regional Plans.

- (1) Southern Windsor County Regional Planning Commission 6/2009;
- (2) Rutland Regional Planning Commission 4/2008;
- (3) Addison County Regional Planning Commission 5/2008;
- (4) Northeastern Vermont Development Association, Inc. 8/2006; and
- (5) Central Vermont Regional Planning Commission 9/2008.

Each of the above regional commission plans will expire eight years from date of adoption, unless readopted or amended. Each plan has been revised or amended purposely to be consistent with the planning goals.

It is the intent of this Regional Commission to consult and coordinate with neighboring regional commissions as their planning processes mature. The Regional Commission staff has briefly reviewed the plans of neighboring regional commissions and does not find any potential conflicts with this Plan. Close coordination with the Upper Valley Lake Sunapee Regional Planning Commission is critical and is ongoing.

### **B. Municipal Plans within the Region**

There are thirty member municipalities which comprise the region. All municipalities have duly appointed planning commissions generally 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 budget and programs exist for approximately two-thirds of the municipalities comprising the region.

In conducting a formal review of these municipal plans, the Regional Commission was charged with determining whether these plans:

- (1) are consistent with the goals in 24 VSA §4302;
- (2) are compatible with the Regional Plan;
- (3) are compatible with approved plans of other municipalities in the region; and
- (4) contain the elements of a Plan as required by law.

The Regional Commission was organized by its member communities to serve the interests of its members and the citizens of the region. Primary responsibilities include providing technical and legal assistance in the preparation and maintenance of plans and related implementation activities. Experience has indicated that these services are valuable resources to local planning efforts. Professional assistance has and will continue to provide the Regional Commission members and the general public with opportunities to more fully integrate planning goals, policies, and practices to minimize development conflicts.

To the extent feasible, this Plan has been developed to reflect the general planning goals and policies expressed in plans of its 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.



## XV. DEFINITIONS

**Accepted Management Practices (AMP)** - Methods of activity generally approved by regulatory authorities and practitioners as acceptable and common to that type of operation. AMPs may not be the best methods, but are acceptable. Agriculture has AMPs typically documented in agency regulations. Other industries may also have AMPs, documented in regulation or not. Professional associations often list AMPs or similarly named methods of conduct for their members.

**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.

**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.

**Archaeological 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.

**Aquifer Protection Area (APA)** - The surface and subsurface area contributing significantly to the surface and/or subsurface recharge and maintenance of an aquifer. APAs can often include

upland watersheds of surface waters contributing significantly to the maintenance and operation of aquifers below the surface or downstream.

**Assimilative Capacity Study** - Scientifically valid research documenting the physical, cultural, economic, ecological or other characteristics and of an area or site and that area's or site's ability to host different changes to its characteristics before significant alterations in its function or character are created.

**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.

**Best Practical Technology (BPT)** - Methods and products for design, operation, maintenance, retrofit and function of activities which will result in the best reduction of undesired byproducts or effects within the practical means of the owners/operators while providing a practical cost/benefit ratio. For example, removing ninety-eight percent of a pollutant from a waste stream may be practical, but removing the last two percent may be impractical for the cost required and the relatively insignificant gain in cleanliness.

EXAMPLES: Woodstove operation schedule rotations, catalytic converter retrofits for woodstoves versus mandatory stove upgrades, artificial wetland pretreatment of agricultural runoff versus onsite treatment plant investment or storage/hauling.

**Build-out** - An estimate of the projected population, employment, traffic, utilities, and types/sizes of land uses in a project area or other designated area in accordance with the current zoning and other applicable regulations.

**Capital Improvements Program (CIP)** - A proposed timetable or schedule of all future capital improvements to be carried out during a specific period and listed in order of priority, together with cost estimates and the anticipated means of financing each project.

**Class A and B Waters** - Class A waters are managed for enjoyment of water in its natural condition, as public drinking water supplies (with disinfection and filtration) or as high quality waters which have significant ecological values. Class B waters are managed for aesthetic

values, recreation on and in the water, public water supply with disinfection and filtration, high quality habitat for aquatic biota, fish and wildlife, irrigation and other agricultural uses. The Secretary of the Agency of Natural Resources may designate by permit portions of Class B waters as “Mixing Zones”, or “Waste Management Zones”, for any waste that has been properly treated to comply with federal and state effluent requirements.

**Cluster** - A development design technique that concentrates building in specific areas on the site to allow the remaining land to be used for recreation, common open space, and preservation of environmentally sensitive features.

**Cultural Facilities** - Establishments such as museums, art galleries, botanical and zoological gardens of a historic, educational or cultural interest which are not operated commercially.

**Designated Growth Centers** - As defined by Act 183 – *An Act Relating To Creation of Designated Growth Centers and Downtown Tax Credit Program*.

**Environmentally Significant Wetland** - Those wetlands designated by the Vermont Water Resources Panel as "Significant Wetlands", and those other wetlands designated as "significant" according to the wetlands designation rules are included in this category. As of February 23, 1990 the Water Resources Panel classified wetlands into three (3) groups. Classes 1 and 2 are "Significant Wetlands." Most of those wetlands designated on the National Wetlands Inventory (NWI) Maps are identified as Class 2 wetlands. Those wetlands contiguous to the mapped NWI wetlands are also included as Class 2 wetlands. Any wetland meeting the minimum criteria for significance established by the Water Resources Panel or a Town may be included in this category.

**Expansion Areas** - Land that extends the cohesive core of Regional Growth Areas or Designated Downtowns, Villages, or Growth Centers, with or without the presence of municipal sewer or water service. The land should be adjacent, as defined in 24 VSA §2791, to the cohesive core.

**Fixed Route Service** - A transportation service that travels along a predetermined route, with known stops, according to an established time schedule.

**Floodplain** - Floodplains are those areas likely to be flooded once every one hundred years ("the 100-year flood zone") or have a one percent chance of being flooded per year as minimally determined by the Federal Emergency Management Agency (FEMA) or better sources.

**Floodway** - The floodway is that area of a stream channel and its surrounding floodplain areas that must be kept clear to hold the 100-year flooding event floodwaters without substantial increases in the flood height. Any flood height increase of more than one foot is substantial. Floodways are determined by the Federal Emergency Management Agency (FEMA) or better sources.

**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.

**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 A:** 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.

**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.

**New Town Center** - as defined in 24 VSA §2791(11): the area planned for, or developing as, a community's central business district. Composed of compact, pedestrian-friendly, multistory, and mixed use development that is characteristic of a traditional downtown and supported by planned or existing urban infrastructure, including curbed streets with sidewalks and on-street parking, stormwater treatment, sanitary sewers and public water supply.

**Open Space** - Any parcel or area of land or water essentially unimproved and set aside, dedicated, designated or reserved for public or private use or enjoyment, or for the use and enjoyment of owners and occupants of land adjoining or neighboring such open space.

**Peak Hour** - As it is used in describing traffic volumes, it represents the hour of a twenty-four hour period in which the highest traffic volumes occur on a segment of roadway or at an intersection.

**Passive Outdoor Recreation** - Leisure time activities which use an outdoor public or private space that are not dependent upon structural facilities such as swimming pools, ball courts, etc.

**Planned Unit Development (PUD)** - Planned unit development is a design approach that balances intensive settlement with open land. Also known as “clustered housing”, developments can be designed to conserve energy; depending on the nature of construction, savings can be accrued on construction costs. PUDs facilitate efficient provision of municipal services such as fire protection, school transportation, 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.

**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.

**Regional Growth Area** - As used in this plan, regional growth areas include the Regional Center, Town Centers, Village Settlements, Hamlet Areas, Designated Growth Centers, Designated Downtowns, and Designated Village Centers.

**Regionally Significant Transportation Facilities** - Any facility primarily designed to rapidly and efficiently transport goods and passengers between towns and/or regions.

**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:
  - (i) scattered development located outside of compact urban and village centers that is excessively land consumptive;

- (ii) development that limits transportation options, especially for pedestrians;
- (iii) the fragmentation of farm and forest land;
- (iv) 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;
- (v) linear development along well-traveled roads and highways that lacks depth, as measured from the highway.

**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.

**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.

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

**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.

**Unnatural Conversion** - Man-made successional changes in physical or biologic communities such as logging, development, mining, reduction of habitat continuity or composition or other actions altering the natural process of ecological change normally occurring in an area.

## Appendix A - Vermont Affordable Housing Programs

### (1) Regional:

- (a) Addison County Community Action Group  
1-802-388-3608
- (b) Addison County Community Trust  
1-802-388-9080
- (c) Central Vermont Community Action Council  
1-800-639-1053      [www.cvcac.org](http://www.cvcac.org)
- (d) Central Vermont Community Land Trust  
1-802-476-4493      [www.cvclt.org](http://www.cvclt.org)
- (e) Rutland County Community Land Trust  
1-802-775-3139
- (f) Southeastern Vermont Community Action  
1-800-722-4575      [www.sevca.org](http://www.sevca.org)
- (g) Twin Pines Housing Trust  
1-802-291-7000      [www.twinpineshousingtrust.com](http://www.twinpineshousingtrust.com)
- (h) Upper Valley Habitat For Humanity  
1-802-295-1854      [www.uppervalleyhabitat.org](http://www.uppervalleyhabitat.org)
- (i) Upper Valley Housing Coalition (advocacy)  
1-802-291-9100      [www.uvhc.org](http://www.uvhc.org)

### (2) State:

- (a) Housing Awareness Campaign (advocacy)  
1-802-652-3449      [www.housingawareness.org](http://www.housingawareness.org)
- (b) Housing Vermont  
1-802-863-8424      [www.hvt.org](http://www.hvt.org)
- (c) Vermont Community Loan Fund  
1-802-223-1448      [www.vclf.org](http://www.vclf.org)
- (d) Vermont Department of Housing and Community Affairs  
1-800-622-4553      [www.dhca.state.vt.us](http://www.dhca.state.vt.us)
- (e) Vermont Energy Investment Corporation  
1-800-639-6069      [www.veic.org](http://www.veic.org)
- (f) Vermont Housing and Conservation Board  
1-802-828-3250      [www.vhcb.org](http://www.vhcb.org)
- (g) Vermont Housing Finance Agency  
1-800-339-5866      [www.vhfa.org](http://www.vhfa.org)
- (h) Vermont State Housing Authority  
1-802-828-3295      [www.vsha.org](http://www.vsha.org)

### (3) Federal:

- (a) USDA Rural Development  
1-802-828-6080      [www.rurdev.usda.gov/vt](http://www.rurdev.usda.gov/vt)



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## Appendix B – MAPS

The following maps are included as part of this Plan:

1. **2002 Generalized Land Cover**
2. **Regional Development Pattern**
3. **Historic, Downtown & Village Districts**
4. **Future Land Use Areas**
5. **Soils Ratings for Onsite Septic Suitability**
6. **Prime, Statewide and Local Agricultural Soils**
7. **Significant Natural Resources**
8. **Topographic Constraints**
9. **Watershed Basins and Dams**
10. **NPDES, Superfund, Impaired Waters, and Surface Water Classifications**
11. **Source Protection Areas and Sewer & Water Systems**
12. **Regionally Significant Transportation Facilities**
13. **Governmental and Educational Facilities**
14. **Health Care Facilities**
15. **Telecommunications Facilities, Electrical Utilities and Electric Lines**

Official copies of these maps are on file with the Regional Commission at its offices and are available to the public for review. Color copies, reproductions of various sizes, and digital data, are available upon request and at cost.