Southern Windsor County Regional Planning Commission

2009 REGIONAL PLAN
Volume 1 of 2

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View from Studio *©Gary Milek*

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SOUTHERN WINDSOR COUNTY
REGIONAL PLANNING COMMISSION

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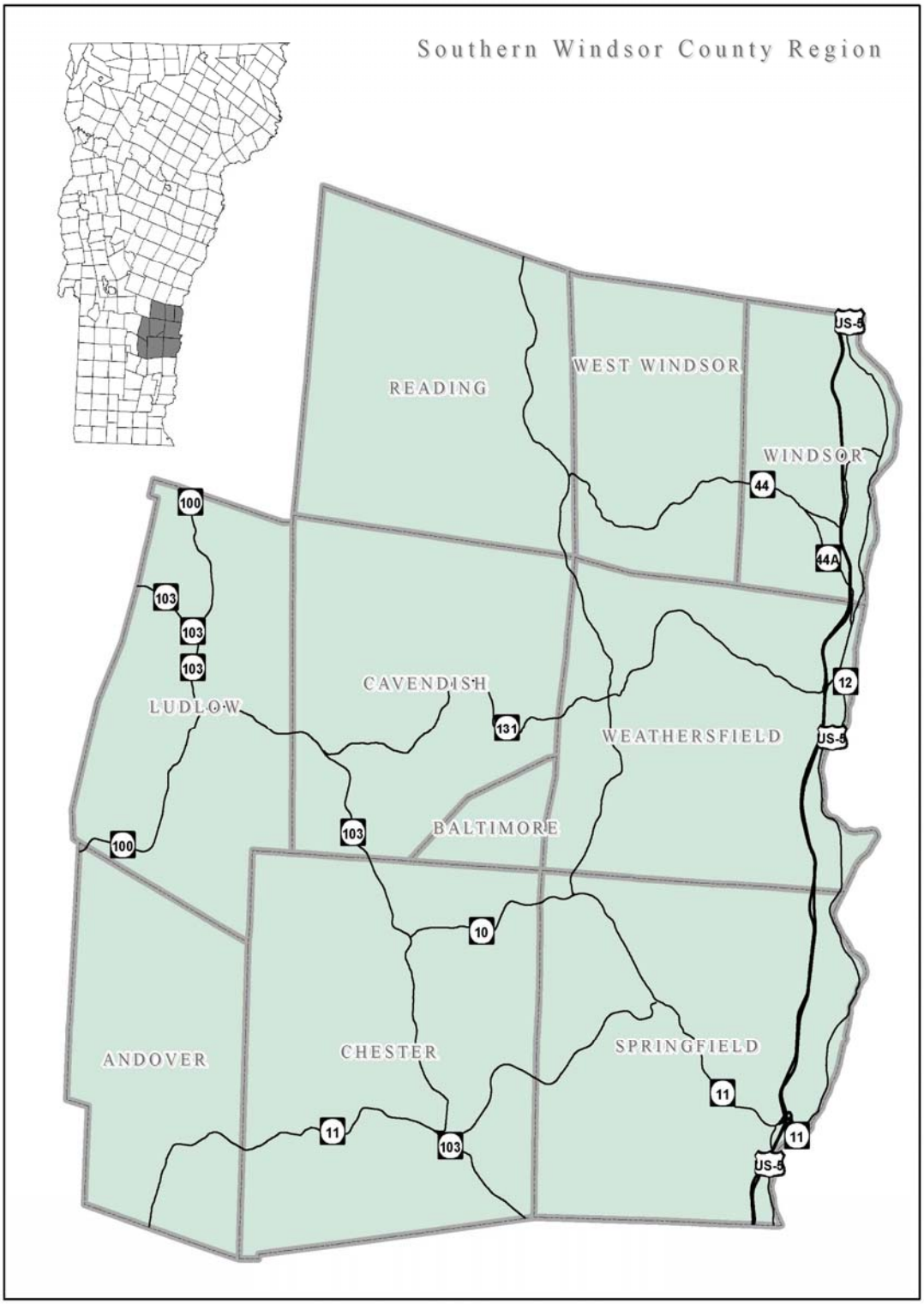
Southern Windsor County Region
READING
WEST WINDSOR
WINDSOR
LUDLOW
CAVENDISH
WEATHERSFIELD
BALTIMORE
ANDOVER
CHESTER
SPRINGFIELD
US-5
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I. INTRODUCTION

A. Background of the Commission

The Southern Windsor Regional Planning Commission (RPC) was established in 1966, as the Southern Windsor County Regional Planning and Development Commission, through the action of its constituent towns. The original eight member towns were not contiguous and it wasn't until 1970 that the RPC began receiving state and federal funds. Currently, the RPC's activities and programs are governed by a ten-person Board of Commissioners; each appointed by the legislative body of his or her member town, with assistance from up to three "at-large" Commissioners as appointed by the Board of Commissioners. In addition, the Board has the responsibility of hiring staff to carry out the goals and policies of the Regional Planning Commission.

The RPC also has the authority to establish advisory committees to address specific regional issues. Currently, the Commission has two such committees, the Brownfields Steering Committee and Transportation Advisory Committee (TAC). Representation on the Transportation Advisory Committee consists of one representative from each community, an ex-officio representative of the Agency of Transportation and provision for two "at-large" members. The primary mission of the Transportation Advisory Committee is to develop and evaluate transportation policy and recommendations as they relate to the Regional Transportation Plan and the Regional Plan.

The primary intent of the RPC and its advisory committees has always been to assist with and advocate for the planning and development activities of its member towns. The RPC exists primarily to provide technical assistance to its member towns; assist in mediating inter-jurisdictional planning and development issues that arise between member communities; facilitate discussion and understanding between local and state entities; develop plans, policies, strategies, and procedures for addressing issues that are regional in scope; assist communities with downtown revitalization and community development projects; annually compile, review, and prioritize regional transportation improvement projects for submission to the Agency of Transportation; and to serve as an information resource for member towns and residents.

B. Statutory Authority

The RPC is authorized pursuant to the duties and optional powers listed in the Vermont Municipal Planning and Development Act (herein referred to as "the Act") [24 V.S.A. §4345]. The RPC is required to adopt a regional plan in accordance with the Act [24 V.S.A §4348]. Volume 1 and 2 of the Regional Plan are adopted together as one document.

C. The Regional Plan

The purpose of the Regional Plan, in accordance with the Act [24 V.S.A §4347], is to create a vision for coordinated growth and development in the Region in accordance with existing and future needs and resources. The Regional Plan is advisory in nature, purpose, and

effect. However, there are a limited number of areas where the Plan can have regulatory implications as discussed below. The Regional Plan is also used to support a host of grant applications including Community Development Block Grants and housing or farmland conservation applications to the Vermont Housing and Conservation Trust Fund.

The Regional Plan guides the RPC in evaluating public and private actions affecting the Region's communities and is the foundation for the RPC's annual work program. The Regional Plan also serves as the Region's basic planning manual and should be used as a guide by the Region's towns in the local planning process.

Because of the inherent interrelationship of all aspects of the Regional Plan, the policies in any section are not to be considered in isolation, but rather in conjunction with all other sections and chapters of the Regional Plan. Each section of the Regional Plan includes statements designed to guide the growth and development of the Region. These guiding statements are defined later in this chapter to help the reader understand the context in which they are used.

The format of the Regional Plan is intended to include all plan elements as required by law (24 VSA § 4348a). Volume 2 of the Regional Plan consists of the Regional Transportation Plan, which serves as both the statutorily required transportation element and the requirements of the RPC's Transportation Planning Initiative with the Vermont Agency of Transportation. Volume 1 includes all other required elements of the Regional Plan. Each chapter in Volume 1 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 implementation of the Regional Plan.

D. Use of the Plan in Regulatory Proceedings

The Regional Plan has a regulatory role under three state review processes:

- Act 250/District Environmental Commission Hearings (10 V.S.A., Chapter 151);
- Public Good Determination Hearings for electric generation or transmission facilities (30 V.S.A. §248, or "Section 248")
- Solid waste facility certification (10 V.S.A. §6605).

Major developments are reviewed for conformance with any duly adopted local or regional plan under Act 250 or Section 248. If, however, a conflict exists between the local and regional plans, the regional plan will be given effect over the municipal plan if a proposed development has a "substantial regional impact." See the Implementation Chapter for a definition of substantial regional impact.

The RPC works closely with its member towns in order to ensure that municipal plans are not in conflict with the regional plan. This synergistic relationship attempts to recognize potential concerns with Act 250 and Section 248 applications prior to their submission. In addition, the Land Use Panel of the Natural Resources Board that oversees the Act 250 process narrowly interprets "conflict" as only existing when one plan allows the project but

the other does not. In addition, state statutes require compatibility between regional and municipal plans

1. Act 250

In the spring of 1970, the Vermont Legislature passed the Land Use and Development Act (Act 250) in order to address growth in the 1960s resulting from the opening of I-89 and I-91, development of the IBM facility in Essex Junction, and expansion of ski tourism in Vermont. Act 250 (10 V.S.A., Chapter 151) establishes a state land use permitting process in order to protect the environment.

The law created nine District Environmental Commissions, consisting of three members appointed by the Governor, to review large-scale development projects and subdivisions using 10 criteria that address environment, aesthetic and community impacts. The District Environmental Commissions have jurisdiction over any project that encompasses more than 10 acres, or more than 1 acre for towns that do not have permanent zoning and subdivision bylaws. (See **Table 1.1** for a listing of one- and ten-acre towns.) The law also applies to any development project with more than 10 housing units or housing lots; and may also apply for construction proposed above 2,500 feet of elevation.

Table 1.1 – One- and Ten-Acre Towns for Act 250 Jurisdiction

1-Acre Towns:	**10-Acre Towns:**
Cavendish	Andover
Reading	Baltimore
West Windsor	Chester
	Ludlow
	Springfield
	Weathersfield
	Windsor

Source: VT Natural Resources Board (December 21, 2007).

Act 250 also created the Vermont Environmental Court to review appeals coming from District Commission rulings.

The Act 250 process allows for the review and comment on all eligible applications by municipal governments, local and regional planning commissions, the state of Vermont, along with other interested parties. Before a proposed development receives approval it must meet the ten criteria set forth in 10 V.S.A. §6086, which are summarized below:

1. Water and Air Pollution – Will not result in undue water or air pollution. Including the following considerations:

   1(A) Headwaters – Will not reduce the quality of surface- or ground-waters in sensitive areas, such as small drainage basins, high-elevation areas, watersheds of public water supplies and aquifer recharge areas;

1(B) Waste Disposal – Will meet state standards for waste disposal, including wastewater and stormwater; and must not involve the injection of waste materials or any harmful or toxic substances into groundwater or wells;

1(C) Water Conservation – Must use and maintain the best available water conservation technology as practicable;

1(D) Floodways – Will not endanger the public health, safety and welfare during flooding. In floodway areas, proposals will not restrict or divert the flow of flood waters. In floodway fringe areas, proposals will not significantly increase the peak discharge of rivers or streams;

1(E) Streams – Proposals along streams or rivers must maintain the natural condition of streams if feasible, and will not endanger the public health, safety and welfare;

1(F) Shorelines – Any proposal along pond or river shorelines must show development in these areas is necessary, maintain the natural condition of the shoreline, and must not diminish public access to public waters; and

1(G) Wetlands – Will not violate the Vermont Water Resources Board rules protecting significant wetlands.

2. Water Supply – Has sufficient water available for the foreseeable needs of the subdivision or development.

3. Impact on Existing Water Supplies – Will not unreasonably burden any existing water supply, if one is utilized.

4. Soil Erosion – Will not cause unreasonable soil erosion or reduce the capacity of the land to hold water.

5. Traffic – Will not cause unreasonably dangerous or congested conditions with respect to highways or other means of transportation.

6. Educational Services – Will not create an unreasonable burden on the educational facilities of the municipality.

7. Municipal or Government Services – Will not create an unreasonable burden on the local government in providing municipal and governmental services.

8. Scenic, Natural Beauty, Aesthetics, Natural Areas and Historic Sites – Will not have an undue adverse effect on aesthetics, scenic beauty, historic sites or natural areas, and

8(A) Wildlife Habitat and Endangered Species – Will not destroy or significantly imperil necessary wildlife habitat or any endangered species.

9. Conformance with a capability and development plan – Will conform with a capability and development plan, and land use plan if adopted, including the following considerations:

   9(A) Impact of Growth – The impact the project will not have an undue burden on the town or region:

   9(B) Primary Agricultural Soils – Does not significantly reduce the agricultural potential of soils rated by the Natural Resource Conservation Service of the U.S. Department of Agriculture as prime, statewide or local importance;

   9(C) Productive Forest Soils - Will not significantly reduce the potential of productive forest soils as defined in 10 V.S.A. §6001;

   9(D) Earth Resources – Will not prevent or significantly interfere with subsequent earth extraction activities;

   9(E) Extraction of Earth Resources – Will not unduly impact the environment or surrounding land uses, and require planning for site reclamation;

   9(F) Energy Conservation – Will reflect the principles of energy conservation and incorporate the best available energy conservation technologies;

   9(G) Private Utility Services – Must show that adequate legal and financial mechanisms are in place for private utilities, such as roads or wastewater facilities, when the proposal utilizes private utilities;

   9(H) Costs of Scattered Developments – Costs for public service and facilities required to serve a proposal that is not within or adjacent to a settlement area or village must not exceed the tax revenue and other public benefits generated by the development or subdivision;

   9(J) Public Utility Services – Will not place an unreasonable burden on public utility services, such as electricity;

   9(K) Development Affecting Public Investments – Will not unnecessarily or unreasonably endanger public or quasi-public investments in adjacent government and utility facilities, services and lands; and

   9(L) Rural Growth Areas – Proposals in rural areas will be designed to economize on the cost of roads, utilities and land usage in order to protect municipalities from undue financial burdens.

10. Local and Regional Plans – Is in conformance with any local or regional plan or capital budget and program.

2. Section 248

The development and construction of electrical generation facilities, electrical transmission facilities, and some gas pipelines are regulated by the Public Service Board created by the Vermont Legislature under (30 V.S.A. §248). The Public Service Board has been granted partial judicial power to conduct hearings and issue decisions. The Board consists of three members, appointed by the Governor, serving staggered terms. Prior to undertaking a proposed project, an involved party must receive a "Certificate of Public Good" from the Board.

Under the Section 248 review process, projects are evaluated to determine if they serve the general public good. Pursuant to 30 V.S.A. §248(b), criteria to receive a Certificate of Public Good include:

- Orderly development of the Region with due consideration of Town and Regional Plans;
- Need for present and future demand;
- System stability and reliability;
- Economic benefit;
- Undue adverse impacts on aesthetics, historic sites, air and water purity, natural environment, public health and safety, and Act 250 Criteria 1-8 and 9(K);
- Consistent with company's approved least cost integrated plan;
- Consistent with the VT Department of Public Service's electric energy plan; and
- Does not affect designated outstanding resources waters.

Projects subject to Section 248 review, including net-metered private wind turbines, are exempt from local regulations. However, the impacted municipality and regional planning commission may participate as interveners in the proceedings.

3. Solid Waste Facility Certification

All towns, whether in a solid waste district or not, must adopt a Solid Waste Implementation Plan, which must be in conformance with the Regional Plan in accordance with 24 V.S.A., Chapter 61, §2202(a). The certification process for solid waste facilities will consider if the SWIP is in conformance with the town and regional plans (10 V.S.A., Chapter 159, §6605).

E. Goals, Policies, and Recommendations Defined

The needs of a growing population, the events and consequences that lead to a declining population, and the health of the environment and economy all require the attention of regional and local planning commissions. The goals and policies listed below are general overriding statements of the desired principles that should guide the growth and development of the Region and protect the natural and built environment. The goal and policy statements should be taken within the context of the information and analysis contained in the chapters which follow.

Goals *- Broad statements of what the Region ultimately wants to achieve. Goals reflect realistic intentions regarding a particular resource. They are not placed within a specific time frame. Specific goals are developed for each section of this Plan.*

Policies *- Agreed-upon courses of action to be followed to achieve the goals. Policies contain the principles or standards that guide the choices of implementation measures used to reach the Plan's goals.*

Recommendations *- Suggestions for specific actions to be carried out to reach the stated goals and policies.*

The following Regional Goals and Policies are consistent with the Vermont Planning Goals established by statute (24 V.S.A. §4302):

REGIONAL GOALS

1. To achieve a reasonable balance between protection of natural resources and growth in a way that maximizes the potential for both.

2. To assist all member communities in developing effective town plans and implementation documents.

3. To foster a spirit of communication and cooperation between all member communities, and with other governmental entities, and to act as a mediator when disputes arise.

4. To support the efforts of local member governments and serve as a bridge between local and state planning efforts.

5. To provide opportunity for citizen participation at all stages of the planning process.

6. To identify housing needs throughout the Region and to encourage the development and rehabilitation of housing that will meet the needs of all regional residents regardless of social characteristics or income.

7. To preserve the historical settlement patterns and rural character of the Region and to maintain the integrity of its villages.

8. To create and maintain efficient public facilities and services, including but not limited to child care, adequate to meet existing and foreseeable future needs.

9. To provide educational and vocational opportunities that will allow all residents to make the most of their abilities.

10. To develop an economic environment that will support the continuation of traditional land use activities, including sustainable agriculture, forestry, manufacturing, and commerce at scales consistent with the existing land use patterns of the Region.

11. To develop a transportation system that balances the needs of safety, convenience, cost, energy efficiency, environmental protection, economic growth, and recreation.

12. To further the Vermont Planning Goals found in (24 V.S.A. §4302).

REGIONAL POLICIES

1. All inhabitants and wildlife should be provided with a healthy living environment through improvement and maintenance of the air, water, and soil quality.

2. Natural resource use that ensures the protection of sufficient renewable resources for future generations and provides for reasonable economic return should be supported.

3. Irreplaceable natural and fragile areas, outstanding water resources, rare and endangered species and their habitats, and significant scenic features should be protected and preserved.

4. Regionally significant natural, cultural, and archeological features, and historic sites and buildings should be protected and preserved.

5. Cooperation and coordination among member towns is encouraged in planning for growth and development, to enable an evaluation of the potential for regional and interjurisdictional impacts.

6. All appropriate agencies should cooperate in the development and maintenance of a safe and efficient regional transportation system that meets the vehicular and pedestrian needs of all residents with minimum impact to the Region's environmental and aesthetic qualities.

7. Environmentally benign or beneficial economic development that will provide desirable jobs for regional residents, reduce unemployment, improve per capita income, and maintain the character of the Region should be promoted.

8. Energy efficiency and conservation, the development of renewable resources, and the use of alternative energy sources are encouraged.

9. The manufacturing and marketing of local value-added agricultural and/or forest products is encouraged.

10. The provision and enhancement of recreational opportunities for all residents, and promotion of tourism-related economic development that furthers the goals of this Plan should be encouraged.

11. The protection of significant agricultural and forested land, through incentives and measures which discourage the subdivision or fragmentation of large parcels of such land is encouraged.

12. Efficient infrastructure adequate to support economic or other growth should be created prior to development.

13. Land use and development patterns that are consistent with the long- range goals and policies of local communities, the Region, and the adjoining towns in other regions should be promoted.

II. REGIONAL PROFILE

This chapter provides a historic review of the demographic, economic, and social factors that have influenced the Region. Data profiles are an important tool in the planning process as it gives insight to current conditions along with historic patterns of change and those areas that will need particular attention in the future. This chapter will also provide the framework for other chapters in the Regional Plan where each topic will be discussed more thoroughly.

A. Background of the Region

The Region is comprised of ten towns including their villages, hamlets, and dispersed populations. The member towns are Andover, Baltimore, Cavendish, Chester, Ludlow, Reading, Springfield, Weathersfield, West Windsor, and Windsor. The Region is located in southeastern Vermont, along the Connecticut River, with Windham County to the south, Rutland County and the Green Mountains to the west, and the remainder of Windsor County to the north. The climate is generally temperate with moderately cool summers and cold winters; as in the rest of Vermont, it creates ideal conditions for summer and winter recreation, spectacular fall foliage, and springtime sap runs. Average annual precipitation is around 42 inches, and snowfall generally ranges from a low of 70 inches along the Connecticut River to as much as 200 inches in the Green Mountains. The growing season can range from 100 to 140 days depending on location, with the first frost generally occurring in early October and the last frost in late May or early June. The weather is unpredictable, and large variations in temperature, precipitation, and other conditions may occur both within and between seasons.

B. Physiographic Characteristics

Tectonic impact and glaciation have contributed to the physiographic diversity of the Region. The land is hilly and wooded with moderate to steep slopes. Southern Windsor County contains a broad range of landforms, from the rocky, acidic soils, spruce-fir forests and beech stands of the Green Mountains, to the fertile, sandy soils and white pines of the Connecticut River valley, and the hill farms, orchards, woodlots, and sugarbushes in between. The shallow upland soils tend to be dominated by bedrock, with small, dispersed sites containing "enriched" organic deposits. Soils along the Connecticut are deeper and more fertile, having been deposited by rivers of glacial melt, or by Lake Hitchcock, which covered a large part of the valley ten to twelve thousand years ago.

Much of the Region remains undeveloped or sparsely developed due to the physical constraints imposed by the terrain. Rivers and streams are interspersed throughout the Region, draining south and east to the Connecticut River. The combination of mountains, streams, valleys, and rocky land has resulted in areas with outstanding geologic features such as Cavendish Gorge and various other peaks, gorges, cascades, and waterfalls. The three principal rivers are the Connecticut River, the Black River, and the Williams River. The broad Connecticut valley holds fertile agricultural land (discussed further in the Plan's Land Use, Natural Resources, and Cultural and Aesthetic Resources chapters), while the narrower

and steeper Black and Williams valleys have traditionally been home to sawmills, woolen mills, gristmills, and small hydroelectric power dams. Numerous lakes, ponds, and wetlands comprise the remainder of the Region's surface water features.

Dominant physiographic land features in the Region include two mountains - Okemo Mountain (in Ludlow and Mount Holly) and Mt. Ascutney (shared by Windsor, West Windsor, and Weathersfield) - with elevations over 3,000 feet above sea level. Mt. Ascutney is an example of a monadnock, an isolated mountain of erosion-resistant rock rising above a surrounding area worn flat by water and ice. In addition, Terrible Mountain in Andover is over 2,800 feet in elevation and Hawks Mountain, shared by Cavendish, Baltimore, and Weathersfield, is nearly 2,100 feet above sea level.

C. Population

Vermont's earliest settlers, such as the Woodland Peoples and the Algonquin Indians, lived and traveled according to the contours of the landscape and sources of food. Archeological evidence of Indian settlements along the Connecticut River shows that the river was an important resource in this Region. Over the years, transportation improvements and settlement patterns shifted in response to technological improvements and changing economic resources.

The following sections provide a detailed picture of population changes in the southern Windsor County Region since 1970.

1. Population Growth

According to U.S. Census figures (see **Table 2.1** below), the general population in Region grew at a faster pace during the 1970s than during the 1980s. Overall growth between 1970 and 1990 was 2.6%, from 23,903 to 24,524 residents. The Region experienced population gains during the 1970s and losses during the 1980s, registering a net gain of 621 people over the twenty-year period. The Towns of Ludlow, Springfield, and Windsor experienced net population losses. Factors contributing to decreased population included the loss of major employers (especially those in the machine tool industry), reductions in the average household size, and the rising cost of living.

U.S. Census figures for 2000 reflected continued growth in the general population of the Region in every town except Springfield, most likely due to the additional loss of major employers in that area since 1990. The growth experienced in the rest of the Region contributed to a net gain of 581 people from 1990 to 2000. Overall growth from 1970 to 2000 was 5%, from 23,903 to 25,105 residents. Following losses in previous decades, the Towns of Ludlow and Windsor have experienced recent population gains. Contributing factors could include growth at Okemo Mountain Resort in Ludlow and the combined growth in jobs and tight housing availability in the Upper Valley.

Table 2.1 – Regional Population Trends: 1970-2000							
Town	**1970**	**1980**	**1990**	**2000**	**1970-1990 % Change**	**1970-2000 % Change**	**2007 Population Estimate**
Andover	239	350	373	496	56.1	107.5	548
Baltimore	170	181	190	250	11.8	47.1	260
Cavendish	1,264	1,355	1,323	1,470	4.7	16.3	1,391
Chester	2,371	2,791	2,832	3,044	19.4	28.4	3,031
Ludlow	2,463	2,414	2,301	2,499	6.5	0.6	2,654
Reading	564	647	614	707	8.9	25.4	712
Springfield	10,063	10,190	9,579	9,078	4.8	9.8	8,666
Weathersfield	2,040	2,534	2,674	2,788	31.1	36.7	2,842
West Windsor	571	763	923	1,067	61.6	86.9	1,099
Windsor	4,158	4,084	3,714	3,756	10.7	9.7	3,633
Region	23,908	25,309	24,524	25,105	206	5.0	24,836

Source: U.S. Census Bureau (1970-2000)

2. Age Characteristics

Between 1970 and 1990, the Region experienced a decline in the proportion of total residents represented by those under the age of 18 (school age and younger). In 2000, the U.S. Census applied a different distribution for these age groups, which included persons under the age of 20. Nevertheless, this younger group continued to decline from 1990 to 2000, although at a much slower rate.

The 18-64 age group (U.S. Census changed this to 20-64 in 2000), which represents the labor force, has remained relatively stable since 1980. From 1990 to 2000, only Springfield and Windsor experienced declines in this age group, again probably due to subsequent employment losses.

Regionally, the 65 and older age group, representing the retired and elderly, continued to increase from 1990 to 2000, but at a slower rate than the previous two decades. Springfield lost 110 residents from this group from 1990 to 2000.

3. Population Distribution

Certain aspects of population density have remained consistent since 1970 (See **Table 2.2**). Springfield, Windsor, and Ludlow have remained the most densely populated towns in the Region. This is to be expected, as they feature extensive infrastructure and support a large, diverse employment base. Transportation access has also been a contributing factor, since these towns are located along major transportation corridors. Andover and Reading continue to be the only towns with fewer than 20 persons per square mile. Data on population density variations by town provide only a rough indication of population distribution changes. Residents are not typically dispersed evenly throughout a town but tend to cluster in villages, hamlets, and neighborhoods of varying density. In general, population densities increase or decrease in relation to proximity to the core of these settlement areas.

Table 2.2 – 1970-2000 Population Density Comparison (persons per sq. mile)

Town	1970	1980	1990	2000	Growth 1970-80	Growth 1980-90	Growth 1970-90	Growth 1990-00	Growth 1970-00
Andover	9.3	12.8	13.0	17.2	37.6%	1.6%	39.8%	32.3%	84.9%
Baltimore	34.1	42.9	40.4	53.5	25.8%	-5.8%	18.5%	32.4%	56.9%
Cavendish	32.2	34.2	33.4	37.1	6.2%	-2.3%	3.7%	11.1%	15.2%
Chester	43.8	50.1	50.7	54.5	14.4%	1.2%	15.8%	7.5%	24.4%
Ludlow	72.4	67.2	64.3	69.4	-7.2%	-4.3%	-11.2%	7.9%	-4.1%
Reading	13.4	15.6	14.8	17.0	16.4%	-5.1%	10.4%	14.9%	26.9%
Springfield	228.3	207.1	194.3	184.1	-9.3%	-6.2%	-14.9%	-5.2%	-19.4%
Weathersfield	51.7	58.4	61.1	63.7	13.0%	4.6%	18.2%	4.3%	23.2%
West Windsor	24.8	32.3	37.4	43.2	30.2%	15.8%	50.8%	15.5%	74.2%
Windsor	235.3	217.2	189.5	192.1	-7.7%	-12.8%	-19.5%	1.4%	-18.4%
Region	74.5	73.8	69.9	73.2	-1.0%	-5.3%	-6.2%	4.7%	-1.8%

Source: U.S. Census Bureau (1970-2000)

4. Seasonal/Second Home Population

The scenic and recreational assets associated with the towns in the Region are well known to visitors and residents. Increased emphasis on tourism and recreation, combined with the growth in the second home market, resulted in significant fluctuations in the seasonal population between 1980 and 1990. Based on estimates that assume 2.5 persons per unit, if the 3,096 seasonal units in the Region were occupied at a given time, the total population would increase by over 7,700 people.

The RPC has made rough estimates of seasonal fluctuations in population based on statistics provided by the U.S. Census Bureau, and the results of a Travel Industry Survey conducted by the Vermont Agency of Commerce and Community Development and the Vermont Department of Employment and Training. Longer-term population increases, based on occupancy of seasonal homes, are thought to be larger in the summer months. Short-term increases in population, resulting from the influx of people on day trips or weekenders staying in commercial lodging establishments, are almost certainly highest on peak winter weekends. Many of these short-term visitors pass through southern Windsor County on their way to destinations in other parts of the state, and contribute to the Region's traffic congestion problems.

D. Economy

1. Economic Trends

Southern Windsor County belongs to a region which earned the nickname "Precision Valley" early in the twentieth century. The large numbers of companies specializing in precision manufacturing created wealth and a high standard of living. Opportunities were available to anyone willing to invest the time and energy to master requisite skills up through the 1970s. Precision Valley formerly employed thousands of workers in machine shops large and small, and was known as the "Machine Shop of New England." Consistent, however, with the overall trend of the latter half of the 20th century, manufacturing entities were bought up by absentee owners.

At the same time, globalization, automation and national economic mismanagement conspired to move manufacturing away from achieving efficiencies through economies of scale to improving profits by increasingly strong waves of cost reduction. The result in Springfield, Windsor, Claremont and Bellows Falls was that many of the large machine tool firms sold off their industrial sites or abandoned them in bankruptcy reorganizations. Despite economic development measures and programs, and the fact that the "Precision Valley" is located near institutions of higher education and has infrastructure more conducive to manufacturing, it has yet to recover.

Along with the national and global factors that influence the Region's economy, there are several regional factors that also affect how the local economies fare. These factors are thought to be unique to the Region. They are characteristics that can either be: (1) targeted as assets and used to enhance positive change, or (2) issues that may lead to continued impairment and need to be addressed by policy.

- The strong influence of nearby northeast metropolitan areas offers opportunities for tourism and economic development.
- The area has a substantial amount of facilities and assets that are available for development without adversely impacting open land.
- As an area undergoing economic change, the Region has experienced an increasing number of home businesses. Economic development policies should look at this as a positive opportunity.
- The average age and the rate of aging of the Region's population, as well as the State, are both higher than the national average. In this environment, identifying where new workers will come from in the future and attempting to retain and train our young people is essential.

What this review of the Region's economic performance means from an economic development perspective is that:

- Successful economic development strategies for the Region are likely to reflect a mix of development and re-development initiatives.
- It is likely that a significant period of time will be needed to reverse this overall decline.
- There is a need for a constant and consistent commitment to long-term economic development strategies and an extraordinary level of regional patience waiting for real and sustainable results of implemented policies to emerge.
- Strategies that work to assist in improving the quality of life and the perception of an improving quality of life will be key to work force recruitment and retention.

2. Poverty and Wages

Although poverty rates have decreased between 1989 and 1999, data indicates that job quality is eroding. This suggests that the relatively high-wage manufacturing jobs lost in recent decades are being replaced by lower-paying employment opportunities.

According to the US Census, there has been a significant decrease in the number of persons (22%) and families (19%) living in the Region below poverty level between 1989 and 1999. Wages in the State of Vermont have historically fallen, and continue to fall, far below the national average. The average wage has fallen in Vermont due, in part, to the changing structure of the State's economy from manufacturing to service-related jobs and to the proportional increase in nondurable goods-related jobs within the manufacturing sector itself.

Median adjusted wages decreased by an average of 12.3% throughout the Region between 1990 and 2000. With a reduction in the average family median income, combined with the increasing health insurance and housing costs, a low- to moderate-income family will likely struggle to make ends meet. The second largest investment in many people's lives is buying and maintaining an automobile. This becomes more and more difficult to do given these economic realities. Unfortunately, in most communities, having access to a reliable car is the sole means of access to quality employment.

Table 2.3 illustrates the economic downturn throughout the Region since the late 1970's.

Table 2.3 – Residents Employed by Industry Type

Industry by Sector	1980		1990		2000		1980-2000
	Employed	% of Total Industries	Employed	% of Total Industries	Employed	% of Total Industries	% Change
Services	3,539	31.7	4,305	37.0	2,879	22.2	-18.6
Manufacturing	4,363	39.0	2,753	23.7	2,273	17.5	-47.9
Trade	1,484	13.3	2,058	17.7	1,709	13.2	15.2
Construction	597	5.3	1,089	9.4	904	7.0	51.4
Finance/Ins./Real	308	2.8	503	4.3	501	3.9	62.7
Tran/Util./Comm.	540	4.8	470	1.0	760	5.9	40.7
Ag./Forest/Min.	344	3.1	461	4.0	319	2.5	-7.3

Source: US Census 2000.

E. Housing

1. Housing Unit Growth

According to U.S. Census data, there were 14,205 housing units in the Region in 2000, which represented less than a 3% increase from the number of housing units in 1990 (13,697). The majority of housing units in the Region are single family homes (65%), with multi-family units comprising another 28%, and mobile homes representing the remaining 7%. Almost all towns in the Region experienced an increase in housing units between 1990 and 2000 with the exceptions of Springfield, West Windsor and Windsor who experienced 7%, 3% and .4% decreases, respectively. **Table 2.4** below illustrates how growth in total housing units in the Region's ten towns has varied.

Table 2.4 Housing Unit Growth by Town						
Town	**1990**		**2000**		**Change 1990-2000**	
	Housing Units	**% of Region**	**Housing Units**	**% of Region**	**Total**	**%**
Andover	292	2.2	350	2.5	58	19.9
Baltimore	91	.7	113	.8	22	24.2
Cavendish	782	5.7	852	6.0	70	9.0
Chester	1,529	11.2	1,611	11.3	82	5.4
Ludlow	2,677	19.5	3,001	21.1	324	12.1
Reading	390	2.9	404	2.8	14	3.6
Springfield	4,250	31.1	4,232	29.8	-18	-.4
Weathersfield	1,249	9.1	1,315	9.3	66	5.3
W. Windsor	768	5.6	716	5.1	-52	-6.8
Windsor	1,647	12.0	1,611	11.3	-36	-2.9

Source: U.S Census 2000.

2. Vacation and Second Home Development

In 2000, there were 3,043 seasonal housing units in the Region. **Table 2.5** breaks down this number by town. Out of the 508 additional housing units added to the Region between 1990 and 2000, 274 were seasonal. While Okemo Mountain Resort and the lakes region are largely responsible for Ludlow's 13.6% increase (226 units), surprisingly, Springfield showed

Table 2.5 Seasonal Housing Units				
Town	**1990**	**2000**	**Total**	**%Change 1990-2000**
Andover	135	110	-25	-18.5
Baltimore	7	3	-4	-57.2
Cavendish	223	195	-28	-12.6
Chester	304	261	-43	-14.1
Ludlow	1,647	1,871	224	13.6
Reading	115	94	-21	-18.3
Springfield	100	150	50	50.0
Weathersfield	149	103	-46	-30.9
W. Windsor	374	226	-148	-39.6
Windsor	42	30	-12	-28.6

Source: US Census 2000.

a 50% increase in seasonal units from 1990. The remaining towns all had decreases with West Windsor showing the greatest decrease in numbers of units. This number is expected to dramatically increase with the recent sale of Ascutney Resort with its new owners planning on developing future seasonal units. While the Region's and also surrounding resorts continue to expand their facilities, vacation housing continues to be an influence throughout the region, accounting for 21.4% of the housing stock.

F. Energy

Back in August 2006, the Vermont Council of Rural Development held a Summit that addressed Vermont's concerns about global climate change, oil dependency, "peak oil," and perceptions of the growing challenge of national energy policies. Paralleling global and national security concerns were questions regarding Vermont's future energy supply (re-licensing the Vernon (now Vermont Yankee) Nuclear plant, future Hydro-Quebec contracts, and the high cost of gasoline and heating oil). The Summit was not organized to answer these challenges, but rather to consider ways to expand energy as an economic sector providing major opportunities in rural Vermont.

U.S. Senator Patrick Leahy opened the Summit, and called for a pro-active national policy to promote renewable energy and end America's dependence on foreign oil. At the state level, Governor Jim Douglas spoke of the importance of renewable energy to the future of the state and outlined the strong initiatives Vermont would be undertaking to address climate change, support biomass and agricultural generation, and advance efficiency and conservation. He supported Vermont's goal of producing 25% of its energy needs from renewable farm and forest resources by 2025.

It's been over two years since the Summit, and Vermont, as well as the Region, is still facing the same challenges. In addition, with recent dramatic increases in fuel and heating oil costs, Vermonters (as well as the nation) saw how such dependency on these resources affected their lives dramatically. The purpose of the energy chapter of the Regional Plan is to look at the Region's current energy consumption, conservation methods and initiatives member towns can take, and the numerous alternative energy resources that are available when considering future energy resources. There is no one solution that will solve all of the future energy challenges that we face as a region, state or a nation, however, exploring all options will hopefully provide more answers to fulfill our responsibility to the future.

G. Transportation

1. Transportation Trends

Vermont, being largely a rural state, is heavily dependent upon the automobile to meet the transportation needs of the state (see **Table 2.6**). All categories related to more motor vehicle use show significant increases between 1980 and 2000, outpacing general population growth and far outpacing increases in roadway miles. Automobile registrations increased by 53% while population grew only 19% in that twenty year period, suggesting that car ownership per person is increasing. A more than 76% increase in vehicle miles traveled, with only a 1.5% increase in miles or roads, indicates roads are experiencing much more use. The resulting wear and tear from this increased roadway traffic will be expensive to address. Preliminary reports suggest that travel in Vermont is decreasing since the price of gas reached $4.00 a gallon in 2008.

Table 2.6 – Transportation Trends in Vermont

Category	1980	1990	2000	% Change 1990-2000	% Change 1980-2000
Population	511,456	562,758	608,827	8.19	19.04
Motor Fuel Use (gallons)	N/A	337,267,000*	411,065,000	21.88	N/A
Total Vehicle Miles Traveled	3,718,100,000	5,864,800,000	6,553,996,076	11.75	76.27
Automobile Registrations	254,849	326,997	388,773	18.89	52.55
Truck Registrations	68,3335	114,114	137,611	20.59	101.38
Total Motor Vehicle Registrations	391,829	531,313	637,671	20.02	62.74
Total Miles of Highway	14,066	14,126	14,275	1.05	1.49

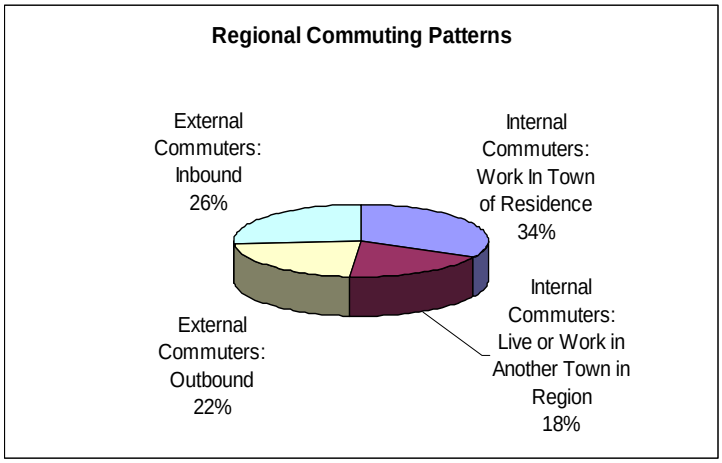
Sources: US Census 2000, FHWA, VTrans.
*Note: Motor fuel use for year 1991

For the regional economy to remain strong and continue to grow, the transportation system must accommodate the mobility needs of commuters and businesses in a safe and efficient manner. This means maintaining good access to major market areas by keeping existing infrastructure in good working condition. Freight, commuter and tourist travel should be made more efficient through intermodal connections; for example, "ski train" connections between Amtrak and/or the Green Mountain Railroad with express bus services.

As the regional economy lags behind economic growth in Vermont and in the Upper Valley, increasing numbers of commuters will travel outside of the Region for employment. As that trend increases, so too will single-occupant vehicle use increase unless other modes are incentivized. Other modes should be marketed and made available to employees by businesses. Infrastructure improvements, such as expanded or new park-and-ride lots and increased fixed-route transit service, would help provide commuters with cheaper and more efficient travel options.

2. Regional Commuting Patterns

According to the U.S. Census Bureau, there were 15,743 commuters in this region in 2000. This number includes residents who live and work in the Region (52%), residents who live in the Region but commute to work outside the area (22%), and non-regional residents who commute into the Region for employment (26%)(see **Fig. 2.1**). The traffic generated by these workers, particularly during peak hours, provides insight into the Region's commuter traffic patterns. Public transportation providers within the Region have noted that since 2000, commuting has increased particularly between Springfield/Weathersfield and the Upper Valley.



Source: U.S. Census Bureau, 2000.

Fig. 2.1 – Regional Commuting Patterns (2000)

III. LAND USE

The manner in which inhabitants occupy and use land creates a complex pattern of development that affects the social, economic, and natural resources within and beyond the immediate area. Poor planning and unregulated land use can have negative impacts on communities in terms of the natural environment, quality of life, and local economic resources. Planning for the efficient use of land resources can result in the betterment of towns and the natural environment.

All towns in the Region have written comprehensive plans. In addition, many communities have enacted implementation measures such as zoning and subdivision regulations and created Conservation Commissions in an effort to address land use issues in a more comprehensive manner. However, communities throughout the Region are faced with problems such as insufficient funding, overburdened community facilities, rising real estate costs and property taxes, loss of revenue, lack of sufficient and accurate data and/or technical expertise, and unplanned or undesirable growth.

Planning efforts should place an emphasis on those characteristics that are unique to the Region. Most towns in southern Windsor County were developed in the traditional Vermont pattern of a compact village center surrounded by rural countryside. In order to maintain this pattern, economic growth should occur first in areas such as village or urban centers where infrastructure and vacant structures already exist and can accommodate additional growth. Above all, towns should continue to set the stage for their own development by planning for growth to accommodate the needs of current and future residents in keeping with the unique character of their town.

A. Land Use Trends

1. Historic Settlement Patterns

Historic sites and structures, utilities and facilities, community services, commercial and residential development, employment, transportation, recreational opportunities, farms, and other features are all woven together with the natural environment to make up the unique fabric of the Region. The predominant pattern of village centers surrounded by working rural landscapes reflects the history of the Region, and contributes to the quality of life that residents cherish. In general, the municipal plans in the Region seek to preserve these historic land use patterns. And, these patterns continue to form the basis for the land use goals, policies, and recommendations described later in this chapter.

Towns in the Region were first established in the mid- to late-1700s. Settlers came primarily from southern New England attracted by the availability of land and an abundance of natural resources. Settlement patterns were affected by access to waterways, agricultural soils, transportation routes, and protection from New England's severe climate. Those areas with rugged terrain were sparsely settled, while villages were settled primarily along rivers and streams, with farms around the perimeter. The Black River, the Williams River, and Mill Brook provided a major source of power for the Region's mills and encouraged industry to develop along the waterways. Larger settlements occurred in towns such as Windsor in the

fertile Connecticut River Valley, Chester in the Williams River Valley, and Springfield and Ludlow in the Black River Valley.

Access to metropolitan areas, recreational opportunities, water, good soils, and other social and environmental factors continue to determine where growth is likely to occur. More recently, the growth in the popularity of the Region for skiing and tourism has increased development in Andover, Chester, Ludlow, Reading, and West Windsor. The influence of tourism is now felt throughout the Region. Most of the commercial and industrial development has occurred along the major highways interconnecting the villages, and along the state and interstate highway systems. Because of this trend, strip development, and seasonal traffic congestion are emerging problems in the Region. Towns should remain aware of the potential for strip development, and include prevention strategies and tools such as cluster development, mixed use zones, and the official map in their town plans and zoning regulations.

2. Current Land Use/Land Cover

As the Current Land Use/Land Cover map (**Appendix A - Map 1**) shows, large areas of the landscape in the Region are forested. Although this map is based on orthophotographs taken in 1994, the distribution of land uses has remained fairly consistent over the last decade. Those lands that are forested for timber usage contribute to the local economy, and those that aren't provide wildlife habitat and recreational opportunities, and maintain the air and water quality that are important for the quality of life of the Region's residents.

Over the last five years, the greatest development trend has been single family homes and small subdivisions in the more rural towns. Development in these areas has been largely dependent on site limitations. Recent changes to state regulation of residential on-site wastewater systems allow for greater development of lands with steep slopes and shallow depth to bedrock. Since many of these constrained lands may now be suitable for supporting on-site septic systems, local planners should assess the possible consequences on land use patterns in their towns.

U.S. Census 2000 population figures show a clear trend for residential growth in outlying rural towns and slower growth in regional centers. Near Okemo Mountain Resort in Ludlow, the development of second homes and vacation condominiums has occurred at a rapid pace. According to 2000 Census figures, the number of seasonal housing units increased by 13.7% between 1990 and 2000. Most of these units were developed on the mountain or in other rural areas, and outside of the Village. As buildable land on the mountain becomes scarce, these larger developments are likely to move to outlying towns such as Andover and Cavendish.

While the use of agricultural land is not as prevalent in the Region as it was in the past, the farms and open fields that remain are extremely valuable for their contributions to the aesthetic quality of the landscape, the Region's food supply, and for their ability to provide flood storage and wildlife habitat. Agricultural land also tends to be the most flat and buildable land in many communities in the Region and may be considered prime for industrial development. In developing or updating comprehensive plans, towns should

prioritize areas of aesthetic and resource significance and consider higher intensity development for areas closer to public utilities and services.

Windsor and Springfield, which have extended water and sewer service to industrial parks outside their downtowns, should consider carefully the area between their industrial parks and downtown areas. With available water and sewer, these areas could easily be consumed by strip development and sprawl. The trend toward revitalization of downtowns and infill redevelopment of brownfield sites can help to counteract this development pressure outside downtowns.

The natural resources maps (**Appendix A - Maps 4 - 9**) show publicly owned lands, Public Water Supply Source Protection Areas, Natural Heritage Inventory sites, wetlands, floodplains, and wildlife habitat areas that have been mapped by the State or Federal government. Descriptions of these features may be found in the Natural Resources chapter of this Plan. These areas continue to be important for protection of public water supplies and for the rural character and aesthetic qualities that make the towns in the Region special. Development that is too close to surface waters, encroaches on Public Water Supply Protection Areas, or fragments areas of contiguous forest land can threaten both the quality of life and the health of humans and wildlife residing in the area. When determining future land use patterns for the Region, the connection between these and other important natural areas, such as vegetated buffers adjacent to surface waters and wetlands, must be considered in conjunction with the patterns of settlement that have occurred over the years.

3. Growth Management Act

The Vermont Legislature enacted Act 200, amending the Municipal and Regional Planning and Development (24 V.S.A. Chapter 117), including the first state planning goal: "to plan development so as to maintain the historic settlement pattern of compact village and urban centers separated by rural countryside" (24 V.S.A. § 4302(c)(1)). The following tools have been created by legislation to help achieve this and other state planning goals.

a. Downtown Program

The Vermont downtown program was created in 1994 to support downtown revitalization efforts. In 1998, the Downtown Development Act (24 V.S.A. Chapter 76A) created a process to establish designated downtowns. Towns may choose to develop downtown revitalization plans and apply to be designated by the Downtown Development Board. Designations are valid for five years, at which point towns can reapply. Some of the benefits of this voluntary downtown designation include eligibility for the Downtown Transportation Fund, priority consideration is given by any state agency administering any state and federal assistance program, and eligibility for State tax credits. For more information on program benefits see 24 V.S.A. §2794. Designated downtowns in this Region currently include Windsor and Springfield. Ludlow is currently preparing an application.

b. Village Center

In 2002, the Downtown Development Act was amended, establishing a new category of designation as village centers. Designated village centers are eligible for many of the same benefits as Downtowns, but are not eligible for the Downtown

Transportation Fund. See 24 V.S.A. §2793a(c) for more information on these benefits. Cavendish and Proctorsville are designated as village centers.

c. New Town Center

24 V.S.A. §2793b enables municipalities to apply to the Downtown Development Board for designation of a new town center as long as no traditional downtown or new town center already exists. New town centers should encompass an area planned for or developing as the municipality's central business district. Existing or planned urban infrastructure is also needed in order to accommodate this growth by providing urban streets with curbs and sidewalks, public water and sewer systems, and public parking. There are no designated new town centers in the Region at this time.

d. Growth Centers

In 2006, Act 183 was enacted establishing a process for the State to designate locally planned growth centers. The Vermont Downtown Board was expanded to review and approve applications for designated growth centers. There are currently no designated growth centers in the Region.

A planning coordination group – staffed jointly by the Department of Housing and Community Affairs and the Land Use Panel of the Natural Resources Board – was established to assist municipalities in applying to this program. At the request of a municipality considering growth center designation, regional planning commissions will provide technical assistance in accordance with 24 V.S.A. §2793c(a)

Growth centers must include the areas within or adjacent to designated downtown, village center or new town center, and be able to accommodate the majority of growth anticipated by the municipality over a twenty-year period. The required planning process for growth centers includes twenty-year projections of population, housing and employment growth; mapping the proposed growth center area including resources, infrastructure and capacity for growth; conduct a build out analysis to determine if the proposed area can accommodate the anticipated twenty-year growth. In addition, the growth center plan should discourage growth in the rural areas outside of the growth center and establish implementation measures, including land use regulations.

Statutory Definitions per 24 V.S.A. §2791:

Village Center: means a traditional center of the community, typically comprised of a cohesive core of residential, civic, religious and commercial buildings, arranged along a main street and intersecting streets.

Downtown: means the traditional central business district of a community, that has served as the center for socio-economic interaction in the community, characterized by a cohesive core of commercial and mixed use buildings, often interspersed with civic, religious, and residential buildings and public spaces, typically arranged along a main street and intersecting side streets and served by public infrastructure.

New Town Center: means 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, supported by planned or existing urban infrastructure, including curbed streets with sidewalks and on-street parking, stormwater treatment, sanitary sewers and public water supply.

Benefits of designation include regulatory and financial incentives for growth centers, such as:

- Off-site mitigation of primary agricultural soils at lower mitigation ratios;
- Streamlining the Act 250 review process by allowing for a master plan permit for the growth center;
- The ability to create Tax Increment Financing (TIF) district(s) within growth centers to fund infrastructure improvements;
- Priority consideration for funding, including state public facility improvements, wastewater facility improvements, brownfields remediation, Community Development Block Grant (CDBG) program implementation grants, Downtown Transportation Fund, Transportation Enhancement improvements, and housing renovation and affordable housing construction programs.

e. Vermont Neighborhoods Program

In 2008, Act 176 was enacted creating the Vermont neighborhoods program, which seeks to stimulate new housing development in areas within and surrounding designated downtowns, village centers, new town centers and growth centers. The program is administered through the Department of Housing and Community Affairs in coordination with the Natural Resources Board. The Downtown Development Board reviews and approves Vermont neighborhood applications in accordance with 24 V.S.A. §2793d. Benefits include the relaxation of Act 250 regulations, exemptions from the land gains tax and reduced permit fees. There are no designated Vermont neighborhoods in the Region.

Statutory Definitions per 24 V.S.A. § 2791:

Growth Center: means an area of land that is located either in or adjacent to a designated downtown, village center or new town center as approved in a town plan; will accommodate the majority of growth anticipated over a twenty-year period; and contains a mix of uses in an urban density consistent with 24 V.S.A. § 2791(12)(B). Noncontiguous lands might be allowed where natural or physical constraints exist as long as it is necessary to accommodate future growth and the combined growth center area functions as a single integrated area.

Vermont Neighborhood: means an area of land that is in a municipality with an approved town plan, a confirmed planning process, zoning bylaws and subdivision regulations; and is in compliance with the following:
- Located either within a designated downtown, village center, new town center or growth center, or an area outside but contiguous of the above designated districts and is not more than 100% of the total area of the downtown district, 50% of the village center district, or 75% of the new town center;
- Contiguous lands compliment the designated districts by integrating new housing and provide the infrastructure and density criteria in § 2791(15)(B).

B. Future Land Use

1. Future Land Use Map

For the purposes of this Plan, the following future land use categories have been established. These categories are defined below and depicted on the Future Land Use map (**Appendix A - Map 3**).

- Regional Centers;
- Town Centers;

- Village Centers and Hamlets;
- Medium-Density Neighborhoods;
- Resort Centers and Recreational Areas;
- Industrial Sites;
- Rural; and,
- Resource.

These categories are meant to serve as a guide to the desired types and intensities of future uses appropriate for each area by describing the values, or functions, that it provides for the Region. The overarching goal of this Regional Plan is *to encourage growth in the areas of concentrated development described below in order to maintain the traditional, Vermont landscape of densely-populated villages surrounded by open fields and large blocks of forested lands*. Development is inappropriate if, on a regional scale, whether alone or combined with other uses in the area, it threatens the intent of the category descriptions below.

The Future Land Use Map is general in nature, and the boundaries of different areas were drawn with this in mind. They are not meant to be detailed representations of present conditions, nor are they intended to be precisely bounded areas of completely segregated land uses for the future. Development in any of these areas is largely dependent upon, but not limited to, the following:

- Suitability of the soils;
- Site limitations;
- Presence and condition of existing natural resources such as but not limited to floodplains, primary agricultural soils, geologic formations, archaeological evidence, and rare, threatened or endangered species;
- Available community infrastructure, facilities or services;
- Slope of the land and how it relates to stormwater issues as well as safe emergency vehicle access to the site; and
- Local regulations.

a. Regional Centers

Regional centers include the central business districts of Ludlow, Windsor and Springfield. These areas provide regional services, shopping and employment opportunities. They are served by infrastructure – including but not limited to urban road networks, sidewalks, public water and wastewater systems – that support the highest densities in the Region. A high-density mix of uses such as commercial, residential, civic, light industrial and public gathering spaces should be concentrated in these areas. Multi-storied buildings that mix retail uses with residential and/or professional offices are typical. Redevelopment, urban in-fill and the adaptive reuse of existing buildings and "Brownfield" sites are encouraged in these areas. Public transportation services, pedestrian and other non-vehicular infrastructure should be provided. Buildings should be oriented to the street with streetscaping, trees and public gathering spaces provided in order to create a functional and pleasant pedestrian environment. Adequate on- and off-street public parking, and off-street private parking should be provided. Regional centers should be immediately

surrounded by medium-density neighborhoods, and then by a low-density, rural working landscape.

b. Town Centers

Town centers include the villages of Chester/Chester-Depot, Cavendish, Proctorsville and North Springfield. Town centers are similar in density to regional center, but are smaller and provide localized shopping and services, with limited employment opportunities. These areas are served by public water and wastewater services, and provide additional infrastructure supporting a high-density mix of uses. High-density residential and medium-density commercial and civic uses and public gathering spaces are encouraged. As with regional centers, redevelopment of existing buildings, adaptive reuse of "Brownfield" sites and in-fill are encouraged, as well as providing pedestrian and other non-vehicular infrastructure, orienting buildings to streets, streetscaping, trees and public gathering places. On-street public parking and off-street private parking located to the side or rear of buildings should be provided. Town centers are surrounded by some medium-density residential neighborhoods, and then by low-density rural/working landscape.

The village of Ascutney is also encouraged to function as a town center with the future provision of public water and/or wastewater services.

An additional area designated as a town center is located along River Street (VT Route 106) half-way between the Springfield regional center and the North Springfield town center. This area currently exhibits a mix of strip commercial development, but is encouraged to redevelop over time as an area of concentrated development with a mix of land uses, consistent with this town center category.

c. Village Centers and Hamlets

Village centers include the smaller villages of Brownsville, Feltchville and Perkinsville (see Town Centers above for discussion on the village of Ascutney). Hamlets include Downer's Corners, Gassetts, Peaseville, Simonsville, South Reading and Weathersfield Bow. These areas are generally not served by public water or wastewater services, so densities are encouraged as soil conditions allow. However, the future provision of water and wastewater services is encouraged. Privately owned community water and/or wastewater systems may allow for increased densities. Concentrated areas of moderate-density residential uses should be encouraged, with commercial and civic uses, such as neighborhood stores, places of worship, recreational facilities and primary schools. Sidewalks or paths should be provided along major roadways or connecting to important destinations, including schools, recreation facilities and post offices. Village centers and hamlets should be surrounded by a low-density rural/working landscape.

A village center is also designated for the area in Ludlow along VT Route 100 just north of VT Route 103. This is an area of emerging strip development, but is encouraged to cluster future development in a mix of land uses consistent with the village center category description.

d. Medium-Density Neighborhoods

These neighborhoods include the medium-density residential neighborhoods that immediately surround regional and town centers in Chester, Ludlow, Springfield and Windsor. Medium-density neighborhoods are typically served by interconnected streets, public sidewalks, and public water and wastewater systems. These areas may also include limited commercial and civic uses, such as places of worship, recreational facilities and schools. Commercial uses should be limited to small-scale operations that are compatible with the surrounding residential uses, such as neighborhood stores and home occupations. Neighborhood areas should be surrounded by a low-density rural/working landscape.

e. Resort Centers and Recreational Areas

Resort centers and recreational areas are unique features that influence the balance of the cultural, natural and infrastructure systems surrounding them. They are located in areas with abundant scenic and natural resources that are attractive for their recreational, tourism, and/or second home opportunities.

Resort centers can generate significant traffic during the peak tourist seasons of winter and autumn foliage. Their influence extends throughout and beyond the regional context. Though they offer significant seasonal employment opportunities, the high cost of housing and typically low wage scale can result in increased commuting from beyond the host community. Transportation issues are difficult to address due to the seasonal fluctuations associated with resorts. Development often includes condominiums, second homes, time-share interests and recreational structures. Resort centers in the Region are shown on the Future Land Use Map as points, but include broader areas surrounding Okemo Mountain Resort (including the Okemo Base Lodge and Jackson Gore areas) in Ludlow, and Ascutney Mountain Resort in Brownsville. Both resorts are expanding or considering expanding into four-season resorts, which may change their traffic impacts, growth patterns and other influences.

Recreational areas include Lakes Pauline and Rescue in Ludlow. The roadways and dense housing surrounding the lake represent potential threats to water quality from failing septic systems, and sedimentation and other pollutants from the roadways.

f. Industrial Sites

Industrial sites include areas where existing and future industrial activities are encouraged, including new development, redevelopment and the conversion of previous non-industrial uses. Growth in these areas is intended to provide jobs for residents and increase municipal tax bases. The designation of industrial sites is to locate businesses in areas without creating adverse impacts on adjacent land uses. Industrial uses, which are important to the region, need to be located in areas where off-site impacts such as noise, traffic and light/glare can be mitigated. Landscaping or other screening should be provided between all industrial uses and abutting incompatible land uses and major roadways. Industrial sites are shown on the map as points, but include traditional industrial parks as well as other sites designated for industrial uses.

The industrial site located along Clinton Street in Springfield immediately southeast of the Springfield Regional Recreation Center is intended for redevelopment, allowing for a mix of uses but primarily targeting future industrial uses for local jobs.

g. Rural

Most land in the Region lies outside of the areas designated for concentrated growth. Rural areas support a variety of different land uses, including low-density residential, small-scale commercial and outdoor recreation. These areas are rural in character and are generally valued for environmental and recreational uses as well as for the primary purpose as a working landscape, which includes agricultural, forestry and earth extraction uses. These working landscape activities contribute to the economy by providing jobs in the natural resource sector as well as attracting tourists who want to take advantage of the recreational opportunities. The RPC shall review Act 250 applications for earth extraction operations on a case-by-case basis for positive benefits for the Region as well as negative impacts on the environment, infrastructure and adjacent land uses. Development within rural areas is largely dependent upon local regulations and site limitations, including but not limited to the suitability of the soils, the presence of floodplains, and distance from community facilities and services.

It is in the interest of the Region that rural character shall remain the dominant feature of these rural areas. Rural character includes significant amounts of open space, compatible building styles, low-density residential settlements, lightly traveled two lane roads, and numerous agricultural and forestry operations.

Much of the recent development in the Region has occurred in rural areas even though it is encouraged in designated areas of concentrated development.

Development in rural areas should avoid sprawl and strip development land use patterns. Small-scale commercial uses are encouraged in nodes or clusters, rather than in a linear development pattern along major roadways. Residential uses are encouraged, but should be clustered or built along the periphery of important fields and other natural resources in order to minimize negative impacts. Large developments are encouraged to employ innovative site designs, such as planned unit developments (PUDs) and/or "crossroads hamlet" land use patterns, in order to cluster residential units, minimize road networks and limit site disturbances. Traditional hamlet patterns are emphasized over suburban, gated or cul-de-sac patterns.

h. Resource

Resource areas represent natural areas that require protections because of their fragile nature, irreplaceable value, and unique or important ecological functions. These areas consist of the following sub-groups:

(1) High elevation areas over 2,500 feet in elevation;

(2) Steep slopes in excess of 25 percent gradient;

(3) Class 1 and 2 wetlands;

(4) Permanently conserved lands, both public and private;

(5) FEMA-designated floodways;

(6) Critical wildlife habitat areas and wildlife travel corridors as mapped by the Department of Fish and Wildlife; and

(7) Prime agricultural soils (as defined by the USDA).

Resource areas are generally more remote than rural areas. A combination of conserved lands and a working landscape that allows for outdoor recreation, hunting, forestry and agricultural activities are encouraged. As in rural areas, the RPC shall review Act 250 applications for earth extraction operations on a case-by-case basis for positive benefits for the Region as well as negative impacts on the environment, infrastructure and adjacent land uses. Residential or commercial buildings are discouraged. Very low-density residential uses shall cluster or locate at the periphery of natural resource areas in order to minimize negative impacts. All land uses, including roads and utilities should avoid fragmenting large blocks of forested lands, wildlife habitat and wildlife travel corridors. High elevation areas should remain as predominately wilderness areas, but wind energy and telecommunication facilities may be allowable if the facilities and access roads minimize impacts on natural resources and aesthetics.

C. Special Considerations in All Land Use Categories

1. Supporting Traditional Land Use Patterns

As the Region's population and economy grows and expands, each community will be affected differently. Factors such as geographic location, natural resource constraints, regulations, public policy, and public investments contribute to the direction that new growth takes in any community. The future land use categories described above are intended to support traditional land use patterns, be consistent with the state planning goals, and incorporate "Smart Growth Principles" as defined in state statute.

The future land use categories do not mean that all growth should only occur in regional centers and not in rural areas. Rather they reflect a regional policy that intensive development should occur first in those communities best able to accommodate it, and in the appropriate densities to maintain the traditional land use pattern. They also reflect a regional policy that scarce public funding for improvements in infrastructure should be directed in ways that support the current and desired scales of growth. For example, a large-scale investment in wastewater or pedestrian facilities would be more appropriately made in a regional center than in a rural area. Furthermore, these categories reflect a regional policy to prioritize the reinvestment in villages and brownfield sites over greenfield development in rural or resource areas.

2. Resource Protections and Working Landscape

The rural and resource areas were developed in order to protect specific natural resources and traditional rural economic activities. However, there are several important resources that may occur within any of the land use categories, and which merit special attention and protection. They include: Public Water Supply Source Protection Areas; FEMA-designated floodplains; slopes between twelve and twenty-five percent gradient (12 - 25 %); vegetated

areas next to surface waters; Class 3 wetlands and vernal pools); Natural Heritage Inventory sites; regionally significant historic sites; and other locally defined sensitive natural areas and scenic resources. Development should avoid or minimize negative impacts to these resources.

3. Interstate Interchanges and Major Highway Corridors

There are two Interstate 91 interchanges: Exit 7 in Springfield and Exit 8 in Ascutney; both are discussed in more detail in the Regional Transportation Plan (RTP, Volume 2 of 2). Interchanges are prime areas for development due to their generally favorable site conditions and easy access for trucks and the traveling public. These areas also serve as gateways to the Region. In many locations throughout the country, interstate interchanges have experienced unplanned strip development which negatively impacts: the capacity and safety of the highway system, aesthetic and natural resources in these areas, and the economic and cultural viability of traditional villages.

Executive Order 07-01 was signed by the Governor in 2001 to encourage land uses at Vermont interchanges to be consistent with state land use goals. In 2004, the RPC developed Interstate Exits of the Region: Study and Policies that is discussed in more detail in the RTP. The Town of Weathersfield developed the I-91 Exit 8 Interchange Master Plan in 2008, which recommends incorporating the current strip commercial development along Exit 8 into the village of Ascutney through improved local regulations, including access management, roadway and pedestrian connections, and site plan review standards. The Town of Springfield created an Exit 7 zoning district to accommodate services for the traveling public, while also protecting major highway systems and not competing with downtown businesses. Development in interchange areas should be consistent with these initiatives and local regulations.

State highway corridors and intersections form the transportation network that is essential for access to jobs, services and emergency services. Poorly planned adjacent land use developments and access management can have a detrimental effect on these highway systems. The functionality of interstate interchanges and the state highway network should be preserved to maintain or improve capacity and safety, reduce vehicular delays and to not preclude future intersection expansion needs.

4. Energy Conservation

Effective land use planning should promote energy conservation. The future land use categories are, in part, established to encourage energy conservation by concentrating development in smaller, dense village areas with a mix of uses that encourage travel by walking, bicycling and public transportation, and reduces the energy required to provide town services.

The siting, design and construction of buildings significantly influences the energy demands for heating, cooling and lighting the structure. Innovative site designs - through building orientation, construction and landscaping - are encouraged to take advantage of solar heating and passive cooling in order to reduce energy demand otherwise used for traditional heating and cooling systems. Energy efficient lighting, such as LED fixtures, is encouraged to

reduce electricity consumption. See the Energy Chapter for more discussion on energy conservation.

LAND USE GOALS

1. To preserve the historical development pattern of mixed-use urban and village areas surrounded by open land, agriculture, forest, and low-density residential use.

2. To direct growth and development toward areas of the Region where it will be most effective and efficient to provide the necessary public infrastructure and services.

3. To achieve the concentration of infrastructure development within areas determined by town plans as desirable for growth.

4. To establish land uses and land use patterns that protect and enhance the values defined in this chapter.

5. To provide a regional transportation system that encourages and complements historic land use patterns.

LAND USE POLICIES

1. Development should be consistent with the future land use categories and map.

2. Revitalization of downtown areas, including the appropriate use, maintenance and reuse of existing historic structures and other existing buildings whenever possible, should be encouraged.

2. Excessive commercial development along major transportation routes (i.e., strip development) is discouraged. Access management and innovative commercial development that maintains the characteristics of existing villages, hamlets, and towns is encouraged.

3. Towns are encouraged to adjust zoning and subdivision regulations to allow for densities that protect or enhance the existing settlement patterns and resources.

4. In order to maintain the existing settlement patterns, higher density residential, commercial, and industrial development should be located in Regional Centers, Town Centers, and areas identified as desirable for growth in municipal plans.

5. Town efforts to attract and locate viable and appropriate businesses in areas targeted by the town for growth should be supported.

6. Where towns support residential, resort, and mixed use development tailored to the tourist and ski industries, such development should be sited and designed to protect the settlement patterns and natural resources of the town and Region.

7. Priority for the use of public funding for the maintenance or improvement of infrastructure shall be for those that support concentrated development in Regional, Town and Village Centers.

8. Use of public funds for the development of affordable housing and assisted living facilities within Regional, Town and Village Centers shall be supported.

9. Use of public funds for the conservation of natural resources is encouraged.

10. Local efforts to encourage compatible development adjacent to significant natural resources (waterways, large forested areas, wildlife habitat, etc.) by requiring buffer strips, visual screening, and other mitigation devices should be supported.

11. The RPC should assist towns to eliminate or mitigate the effects of development on natural resources that extend beyond town borders or are considered regionally significant as determined by the affected towns and the Region.

12. The placement of municipal and other government buildings should be in established downtown and village centers in order to maintain and encourage the vitality of downtown areas.

13. Programs that help owners of farm and forestland bear the financial responsibility of resource protection should be supported.

LAND USE RECOMMENDATIONS

1. Help towns to evaluate proposed development projects for possible adverse effects to important natural resources, both within and beyond town borders.

2. Work with communities to develop a process for designation of growth centers.

3. Assist communities with developing effective bylaws, including zoning and subdivision regulations, that are consistent with the purpose and intent of their town plans and that consider the needs and plans of adjacent towns and the Regional Plan.

4. Support town, public, and private conservation organizations in protecting significant cultural resources, farmland, forestland, shorelines, and significant plant and animal species and their habitat.

5. Encourage state and federal agencies to contact local planning commissions and the RPC when considering the location or relocation of government buildings.

IV. COMMUNITY UTILITIES AND FACILITIES

A. Water, Sewer, and Electricity

The efficient use of community water and sewer services, and electricity is vital to the health and welfare of regional residents. The placement and use of these services (and of the transportation network) often determine the character and development patterns of a town. The provision of services is inherently linked to population, population density and economic growth. Developers often look more favorably to sites that are situated within convenient reach of public services. Likewise, population growth is more likely to occur in areas where service costs can be shared by larger numbers of users to reduce the cost to individuals. Therefore, towns should carefully plan the placement of service lines to correspond to the areas in which they would most like to see development occur.

1. Electrical Transmission Lines

Electric transmission service in the Region is provided by the Vermont Electric Power Company (VELCO). (Electricity producers are discussed in the Energy Chapter.) Electricity, like water and sewer, is an important service for present and future development. The provision of electric utility services enables developers to plan for building structures and developing land at significant cost reductions and increased efficiencies. It is therefore important to place transmission lines and substations in areas that have been designated as desirable for growth.

Transmission lines transport electricity from various generators to customers through switching stations and substations. The larger network of transmission lines and stations are referred to as "the grid." According to VELCO and Central Vermont Public Service (CVPS), the portion of the grid that connects southern Vermont, southwestern New Hampshire and northeast Massachusetts is their top area of concern for power failures during periods of peak electricity demand. Therefore, they are currently proposing to build new capacity along the Vermont Yankee to Coolidge Substation (Cavendish) transmission line. This proposed "Southern Loop" transmission upgrade project will address their reliability concerns in this region and beyond. The Department of Public Service's 2005 Vermont Electric Plan indicates that growth in electricity demand in the four southern counties in Vermont is not pronounced except in a few isolated areas. (The 2005 Vermont Electric Plan is currently being updated, however the *approved* 2005 Plan is cited in this section.)

The 2005 Vermont Electric Plan also encourages customers to use energy efficient appliances and take measures to reduce their electricity use during peak demand periods, as a way to reduce the demand; thereby, deferring costly transmission line upgrades and building new power plant capacity. Other demand side management efforts include encouraging "green buildings," siting new houses to maximize solar advantage, decentralized energy production such as generating electricity for individual residential or commercial buildings, or through energy conservation measures. (See the Energy Chapter for conservation strategies.)

Power generating facilities and electrical transmission facilities are approved by the Public Service Board under 30 V.S.A. §248 (Section 248). Projects subject to Section 248 review, including net-metered private wind turbines, are exempt from local regulations. However, the impacted municipality and regional planning commission may participate as interveners in the proceedings. Under Section 248 review process, projects are evaluated to determine if they serve the general public good and if they are consistent with the Regional Plan.

2. Community Water and Sewer Service

Currently, Cavendish, Chester, Ludlow, Springfield, and Windsor utilize public water and wastewater facilities (see **Table 4.1** for municipal wastewater facilities, and **Table 4.2** for municipal water supply systems). All of these towns are currently operating below their capacities and have sufficient excess

Table 4.1 Wastewater Treatment Facilities in Southern Windsor County**

Town	Facility Capacity (MGD*)	Avg. Daily Flow (MGD*)	% of Design Capacity	Sludge Treatment or Disposal Technique	Effluent Disposal Location	Upgrades Proposed or in Progress
Andover	N/A					
Baltimore	N/A					
Cavendish[1]	0.150	0.074	49.3%	Trucked to Glens Falls, NY WWTF, incinerated	Black River	Permit exp. 6/30/2011
Chester[2]	0.175	0.080; seasonal var.	46%	Trucked to Glens Falls, NY WWTF, incinerated.	Williams River	$1.1 mil. upgrade completed. Permit exp. 3/31/2009.
Ludlow[3]	1.050	0.381	36%	Trucked to Glens Falls, NY WWTF, where it is incinerated	Black River	Granted permit to design capacity. Permit expires 9/30/2011.
Springfield[4]	2.20 permitted; 2.4, actual	1.30	59% permitted; 54%, actual	Composted and provided for public use.	Black River	Operating under exp. permit until CSO is completed.
Windsor[5] Main WWTF, includes W.A.S.T.E. pipeline from Mt. Ascutney Resort	1.13	0.429	38%	Spread on the Redick Farm on Rte 5 in Windsor	CT River	Permit expires 6/30/2010
Windsor[6] Weston Hgts WWTF	0.015	0.008	53%	Spread on Redick Farm on Rte 5 in Windsor	CT River	Permit expires 9/30/2011

*Million Gallons per Day; Source: Town Managers or Town Wastewater System Operators, July/August 2008.
The State requires that stormwater drains and sewer systems be separate or progress be made toward separating them with the eventual goal of eliminating the mixing of stormwater and sewer.; however, there is no set time limit to be universally completed.
1 Separate stormwater system from main sewer lines. May be a small amount of residential sump pumps that still feed into sewer system.
2 Separate stormwater system from main sewer lines. Town continues to refurbish manhole covers to prevent stormwater intrusion.
3 Separate stormwater system from main sewer lines. Most sump pumps feeding into sewer have been discontinued.
4 Town continues ahead with stormwater completion scheduled to be finished Summer 2009.
5 Separation project complete; possibly a few roofs still draining into the sewer system.
6 Separate stormwater system from main sewer lines.
**Note: Towns of Reading, West Windsor and Weathersfield not applicable.

wastewater capacity to meet their needs for the foreseeable future. Chester completed a $1.1 million upgrade of its wastewater treatment facility in 2007. Ludlow recently received a permit to increase its wastewater permit to the design capacity of its facility. Springfield completed system upgrades in 2004, expanding its facility from 2.2 to 2.4 million gallons per day and improving phosphorus treatment. Springfield also expanded its infrastructure along VT Route 11 to the Southern State Correctional Facility. Since a pressure reduction valve was necessary to tap into a force line, it is unlikely that many of the properties along the line will connect to it; therefore, it is not seen as a contributor to sprawl. Springfield's public water system is currently operating under a temporary permit, and the Town is actively working to address low pressure problem areas. Springfield is under a 1272 Order from VT DEC to separate their stormwater and sewer infrastructure; the town is almost complete with the separation project, currently working on the final construction contract. There are no other plans in the Region to increase capacity or to extend infrastructure for wastewater facilities.

Table 4.2 Municipally Owned Public Water Supplies in Southern Windsor County [6]

Town/System Name	Source Name/Type	Population Served[1]	Average Flow MGD)	Capacity [2] (MGD)	Capacity Used
Cavendish & Proctorsville Villages	Well in Cavendish Village [5, 6]	700 – 900 (Seasonal variation)	0.045	0.140	32%
Chester Village	Jeffery Well (Primary) Canal Street Well Pierce Brook Reservoir Tank	1,200	0.154	0.864 [4]	18%
Ludlow Village	Springs and Galleries off Rte 100 South; Little League Field Well [3]	1,000 (800 Units)	0.240	1.000	24%
Springfield	Wells off Fairgrounds Rd.	8,000	0.800	2.100	38%[7]
Windsor	Wells near Lake Runnemede	2,500	0.696	1.500	46%

*Million Gallons per Day; Sources: Vermont Department of Health; Water System Operators, August 2008
Note: All have Source Protection Areas
1 Estimate of population served from best available data.
2 Estimate of capacity from best available data. This is the estimated capacity if fully utilized and is not necessarily the capacity that is, or has been, utilized by the operator.
3 Secondary well; emergency/backup supply only
4 Includes primary well (425 GPM) plus 1 million gallons of storage.
5 Second well drilled in close proximity to primary well. Primary well accesses gravel packed vein of water, while secondary well taps deeper bedrock vein. Town is currently seeking permits for approval. Wells in Proctorsville have been decommissioned or are no longer in use due to saline contamination.
6 Installation of new filtration equipment to be completed in 2009 will reduce levels of manganese and iron in water supply
7 Demand has steadily decreased from historical high due to reduced number of industrial shops and installation of low-flow fixtures.

Weathersfield and Windsor are considering an extension of Windsor's municipal water supply system and connecting with the privately-owned community water system that serves Country Estates Mobile Home Park in Ascutney.

Avoiding scattered development is a primary goal of both Acts 200 and 250. The Vermont Agency of Natural Resources (ANR) has defined "Smart Growth" in Vermont as "land development that preserves and enhances our natural resource heritage, traditional compact

community settlement patterns, and a working rural landscape by integrating economic, environmental, and community goals." Carefully planned infrastructure investments can encourage smart growth and discourage scattered development, but an extension of these services along rural highway corridors might allow for unwanted strip development. Local zoning provisions can restrict strip development in these situations. Without more public infrastructure funding opportunities, small communities are limited in encouraging dense, mixed-use development in villages not currently served by water and wastewater facilities.

The identification of areas suitable for growth and development is closely linked to the existence of municipal water and wastewater service. Regional centers listed in the Land Use chapter of this plan were chosen largely because of their proximity to existing services, or potential for the efficient creation of new or expanded systems. These centers represent the Region's highest priorities for directing growth through the creation of additional municipal water and wastewater capacity. (See the Land Use chapter for more on smart growth, growth centers, and sprawl.)

3. Private Water and Sewer Systems

Areas in the Region are served by a number of private water systems (see **Table 4.3**). There is also a privately owned water line in the village of Ascutney serving roughly 160 units. The town of Windsor provides wastewater service to Ascutney Mountain Resort through a line owned by the resort, and connected to the municipal system. Several Windsor residents living along Rte. 44 are also connected to this system. The Village of Brownsville currently is served by individual septic systems and a few of the systems have failed in recent years. The Windsor / Ascutney Mountain Resort wastewater system could potentially be expanded to support future growth designated in the West Windsor Town Plan. Monitoring to ensure the efficiency of these systems is important for the protection of the water supply, which is essential to the health and welfare of the Region.

Table 4.3 Non-Municipal Public Water Supply Systems in the Region

Town	Community Water Systems (C) [1]	Non-transient Non-community Water Systems (NTNC) [2]	Transient Non-community Water Systems (NC) [3]	Total
Andover	0	0	1	1
Baltimore	0	0	0	0
Cavendish	0	0	3	3
Chester	0	0	1	1
Ludlow	11	1	10	22
Reading	0	1	0	1
Springfield	1	0	3	4
Weathersfield	1	1	10	12
West Windsor	1	1	0	2
Windsor	3	1	0	4

Source: Vermont Water Supply Division; SDWIS Program, August 2008; Note: All have Source Protection Areas.
1. For example, mobile home parks, condominiums or prisons with residents leasing month-to-month or owning

2. For example, schools or factories; and 3. For example, campgrounds or lodging

In addition to municipal and private water and wastewater systems, the Region is also served by privately owned individual wells and on-site septic systems. In 2002, state Potable Water Supply and Wastewater Regulations (10 V.S.A. Chapter 64) were amended by the Vermont Legislature. As of July 1, 2007, the ANR has universal jurisdiction over on-site septic and potable water permits. ANR developed new rules on September 29, 2007, which allow for innovative or alternative systems (Subchapter 10 of the *Wastewater System and Potable Water Supply Rules*).

Under the new state regulations, towns can no longer issue septic permits, but they may still require the connection to a municipal wastewater system, collect connection and usage fees, require pre-treatment before discharge into the municipal system, request copies of any water or wastewater plans submitted to the state, and require notification before a new system is covered up. Town health officers can still enforce existing local permits, require the abatement of health hazards, and report failed systems to the state. Towns may seek designation to administer the state rules locally.

De-centralized septic systems may allow for greater densities where municipal wastewater systems are not available. A decentralized system is where a cluster of structures share a common wastewater system for either on-site or off-site disposal. *Wastewater Solutions for Vermont Communities* (Vermont Department of Housing and Community Affairs, January 2008) is a good guidance document for solving community wastewater problems. In some cases, the establishment of a public or community water system serving village lots with on-site septic systems may facilitate increased densities.

Monitoring to ensure the efficiency of these systems is important for the protection of the water supply, which is essential to the health and welfare of the Region.

Please see the Natural Resources chapter for a discussion on the nature and importance of groundwater, threats of contamination, Source Protection Areas, regulations, an update on on-site wastewater systems, and other water related issues.

B. Solid Waste Facilities

Until its dissolution on June 30, 2007, the New Hampshire/Vermont Solid Waste Project was a bi-state agency serving a total of 29 towns in New Hampshire and Vermont. The Project created two districts which were formally organized in 1981. Two facilities were constructed in New Hampshire, including a waste to energy facility in 1987 and an ash monofill in 1988. At that time, the Project contracted with Wheelabrator Claremont, Inc., to incinerate solid waste from its member towns' residential, institutional, and commercial sources. All of the towns in the Region were served by these facilities, and are now part of the Southern Windsor/Windham Counties Solid Waste Management District (District). See the District's website at www.vtsolidwastedistrict.org for more information. (See **Table 4.4** for a listing of the facilities serving the Region' towns).

In June 2007, the District signed a three-year contract with Casella Waste Management, Inc. d/b/a Gobin Disposal Systems for solid waste transportation, disposal, and recycling services. The agreement may continue for two additional one-year terms.

Table 4.4 Solid Waste Facilities in the Region

Town	Location of Transfer Station	Location of Recycling Facility
Andover	Springfield	At Springfield Transfer Station
Baltimore	Springfield	At Springfield Transfer Station
Cavendish	Transfer Station in Cavendish Village on Rte 131	At Cavendish Transfer Station
Chester	Springfield	At Springfield Transfer Station
Ludlow	Transfer Station on Rte 100 South about one mile from Village	At Ludlow Transfer Station
Reading	Weathersfield	At Weathersfield Transfer Station
Springfield	Transfer Station on Fairground Rd. in Springfield	At Springfield Transfer Station
Weathersfield	Transfer Station on Rte 106 about one mile north of Rte 131	At Weathersfield Transfer Station
West Windsor	Weathersfield	At Weathersfield Transfer Station
Windsor	Fast Trash on Central St. - Operated by private businesses for a fee.	Windsor Recycling Center 15 Central St

Source: SW/WCSWMD, August 2007
Note: Ludlow Village residents have curbside pick-up

The passage of Act 78 by the Vermont legislature in 1987 marked a significant change in the way Vermont communities deal with solid waste disposal. This revision to state solid waste law recognized the environmental and economic impacts of landfilling and incinerating an ever-increasing waste stream, and articulated policies encouraging reduction, reuse, and efficient disposal of solid waste. State law also defines a role for regional planning commissions in solid waste planning, conditioning certification of solid waste facilities on conformance with a regional plan.

The ANR is required to prepare and maintain a State Solid Waste Management Plan, establishing statewide goals. In addition, all Vermont municipalities, either individually or as part of a solid waste district or an intermunicipal association, are required by Vermont law to adopt a Solid Waste Implementation Plan (SWIP). The SWIP documents town or district waste management facilities and articulates how solid waste will be managed over the subsequent five years. All SWIPs must be in compliance or consistent with the State goals, as well as in accordance with any municipal or regional plan, prepared and adopted pursuant to 24 V.S.A. Chapter 117.

In 1993, in order to conform to Act 78, the District adopted a Comprehensive Solid Waste Management Plan. On June 2, 2008, the District received pre-approval from ANR of it's revised SWIP. The District held two public hearings and adopted the SWIP in 2008.

1. Household Hazardous Waste Collections

Household hazardous waste collections are sponsored by the District twice a year. The District contracts with a company to collect materials that are banned from landfills and incinerators. The one-day events are open to residents and businesses; only the latter are charged for participating. Much more household hazardous waste could be diverted from the waste stream if the District had a year-round, permitted facility capable of accepting it.

In order to ensure that solid waste management in the Region protects the environment, is economically efficient, and safeguards the health of the Region's residents, the goals, policies, and recommendations at the end of this chapter are adopted.

C. Community Health and Safety Resources

The health and safety of residents are of primary importance within any community. The provision of adequate services and facilities, including hospitals, ambulances, clinics, elderly care, convalescent homes, senior citizen centers, psychiatric care, police and fire protection, and detention facilities, helps to ensure a safe and healthy social environment.

1. Hospitals

Health care for the Region is provided through a variety of facilities and services. Currently, the Region hosts two hospitals: Springfield Hospital and Mt. Ascutney Hospital. Springfield Hospital is affiliated with the Health Center at Bellows Falls, and provides a full-range of inpatient and outpatient care, including 24-hour emergency services, birthing center, adult day care and specialty clinics. The inpatient psychiatric center in Bellows Falls has 12 beds, and Springfield Hospital has 57 beds. Mount Ascutney Hospital, located in Windsor, is affiliated with Dartmouth Hitchcock Medical Center (DHMC), and provides a variety of services, including a 24-hour emergency medical facility, acute care, rehabilitation services and specialty clinics. Mount Ascutney Hospital provides 33 beds. In addition, several hospitals in New Hampshire provide service to the Region, including Alice Peck Day Hospital in Lebanon, Valley Regional Hospital in Claremont, and DHMC in Lebanon. There are medical clinics in Chester, Springfield, Cavendish, and Ludlow. Residents may also commute to additional facilities in Vermont, such as the Mountain Valley Health Center in Londonderry and Rutland Regional Medical Center. Residents must travel to DHMC, Cheshire Medical Center in Keene, NH, or other hospitals outside of the region for specialized care, such as dialysis or radiation treatments.

2. Nursing Homes and Assisted Living

The Vermont Health Care Association currently lists four nursing homes, three residential care facilities, and three assisted or independent living facilities in the Region as members (see **Table 4.5**). The largest nursing home, Springfield Health and Rehab Center, is located in Springfield and provides care with 102 beds. Other nursing homes include Mt. Ascutney Health Center in Windsor with 35 beds, Gill Odd Fellows Home in Ludlow with 56 beds, and Cedar Hill Health Care Center in Windsor with 39 beds. At the same site, Cedar Hill

also offers 15 rooms in the Cedar Hill Victorian House residential facility and 20 apartments in the Village at Cedar Hill assisted living facility. Residents can transition as needed depending on their health care needs. Historic Homes of Runnemeade, formerly Stoughton House, consists of three facilities: Stoughton House, which is assisted living and consists of 26 beds; Evarts House, which is supported living and consists of 12 rooms and was renovated in 1998; and Cox House, which consists of six independent apartments, renovated in 2000. There is a high demand for more elderly care and housing facilities in the Region, and that need is expected to grow during the next several years (see the Housing chapter for more information).

Table 4.5 Nursing Homes, Residential and Assisted Living Facilities in the Region

Facility Name	Location	Services	Number of Beds	Demand
Gill Odd Fellows Home	Ludlow	Nursing	56	High
Springfield Health & Rehab Center	Springfield	Nursing	102	High
Brookwood	North Springfield	Residential	15	High
Cedar Hill Health Care Center	Windsor	Nursing	39	High
Cedar Hill Victorian House	Windsor	Residential	15	High
Village at Cedar Hill	Windsor	Assisted Living	20	High
Stoughton House	Windsor	Assisted Living	26	High
Evarts House	Windsor	Residential	12	High
Cox House	Windsor	Independent Living	6	High

Source: SWCRPC, Staff at the above facilities, 2008

The State of Vermont has "aging in place" policies enabling Vermonters to stay in their homes and communities as long as they wish, instead of moving to a nursing home or assisted living facility. However, significant investment in public transportation, home care and other services is necessary to provide for elders and persons with disabilities to age in place safely and comfortably. According to a report developed by the Vermont Department of Aging and Independent Living in 2005, current transportation funding levels are not adequate to support "aging in place" (*Vermont Elders and Persons with Disabilities Transportation Program Review*).

3. Correctional Facilities

Two correctional facilities are located in the Region: Southeast State Correctional Facility in Windsor and Southern State Correctional Facility in Springfield. The Southeast State Correctional Facility previously housed female inmates, with capacity for 114, and is located on approximately 946 acres of land in Windsor. The Vermont Department of Corrections recently moved all female inmates to the Northwest State Correctional Facility in Swanton facility, and is utilizing the Windsor facility now as a work camp. The Southern State Correctional Facility, a medium security prison, was built in 2003 off VT Route 11 near the I-91 Exit 7 interchange in Springfield. It currently houses approximately 347 male inmates (99% full).

See the Emergency Planning and Management chapter for emergency services in the Region.

D. Communications Facilities

Communications facilities are an essential service for most residents and businesses in Vermont. Countless economic, social, and cultural benefits are available to communities that possess free and open access to people and ideas in other parts of the world. With technological advances, the Region's communication facilities have expanded in recent years to include, not just radio, cable television and land-based telephone services, but also mobile telephones, high-speed internet and satellite television. Developing the necessary communications infrastructure and access to these services, such as high-speed internet, is an integral component of economic development and land use planning. It is challenging to plan for voice, video and data communications due to the rapid advances in these technologies.

1. Telecommunications

a. Land-Line Telephone Services

Land-line telephones are the traditional telecommunication method for most homes in Vermont. Ninety-eight percent (98%) of Vermonter households have telephone service (FCC, Telephone Penetration by Income by State, 2003). While cellular telephones and email are now very common, land-line phones continue to provide critical functions, including 911 emergency services and health care information networks. In this Region, these services are provided by four providers: Comcast, VTel, TDS and FairPoint. In 2008, FairPoint Communications, Inc. purchased Verizon land-line telephone operations.

b. Wireless Communication Facilities

The maintenance of a modern and accessible wireless communications and telecommunications network is considered by many to be essential to the public welfare. Many more Vermonters have cellular phones now than in 2003 when this plan was last written. In 2000, there were 109.5 million wireless subscribers in the United States, and 207.9 million in 2005 (Semi-Annual Wireless Survey, CTIA – The Wireless Association). There are currently 2,099 wireless telecommunications towers in New England (an increase from 207 towers in 2003), 51 in Vermont (42 in 2003), and 11 in our Region (three in 2003).

Public safety agencies, such as emergency medical services, fire, and police departments, rely on wireless communications and telecommunications to provide essential services. Telecommuting, or working at home, can lessen traffic and motor vehicle pollution, extend the life of the existing regional and national highway infrastructure, and save traveling costs for workers. However, because telecommuting allows people to live farther from employment centers, it may also influence local development.

At the same time, the network infrastructure must be developed in an efficient, safe, and thoughtful manner. Possible impacts upon scenic and cultural resources, aesthetics, and public health should all be considered during the planning process. These concerns have become even more urgent as wireless telecommunications facilities steadily increase in number to provide seamless service to customers.

(1) Telecommunications Act of 1996

Congress enacted the Telecommunications Act of 1996, which called for the rapid deployment of advanced telecommunications and information technologies and services. The Act significantly limited communities' traditional zoning and health authorities over the siting of towers, giving the FCC almost sole power to regulate a variety of environmental siting issues including public health concerns.

There is no FCC requirement that the system be seamless, yet this is the industry's goal. Wireless telecommunication facilities require near "line of sight" access from the user to a tower to avoid disconnected calls. In addition, the new technology, PCS and SMRS in particular, operate at a low frequency with a range of only one and half to two miles. Our Region's topography dictates that these facilities are located at close intervals, resulting in more locations.

Some people express concerns regarding the health risks of electromagnetic fields and radio frequency radiation (RFR), also called radio frequency emissions, at the levels set by the Federal Communications Commission (FCC) in its standards. However, communities can not regulate RFR emissions unless they exceed federal standards set by the FCC. Facility operators and service providers must comply with the standards set by the FCC.

(2) Local and Regional Planning

Thoughtful local and regional planning, which includes viewshed analysis, should be done for the inevitable siting and development of future wireless communications facilities. The Vermont League of Cities and Towns has prepared a Model Wireless Telecommunications Facilities Bylaw. Contact the RPC office if your town would like a copy. The RPC can also assist towns in understanding the limitations of the Telecommunications Act of 1996 and how Act 250 applies, identifying which ridge lines and viewsheds to preserve, determining alternative locations and designs that could mitigate negative impacts, and outlining provisions for the removal of a facility when it is no longer needed. 24 V.S.A. § 4412(9) authorizes local administrative review for telecommunication facilities with no or de minimis impacts.

2. Interoperable Communications for Emergency Services

During emergency response operations, first responders need to communicate among different organizational structures and levels of government. First responders include a variety of disciplines from all levels of government, including but not limited to police, fire, EMS, state hazardous materials team, corrections, conservation officers and others. The current emergency communication infrastructure does not allow for the necessary inter-disciplinary voice and data communications to take place. Challenges to this include the state's mountainous terrain, incompatible radio equipment and frequencies, different dispatch centers and reporting procedures, and other obstacles. Vermont Communications ("VCOMM") is a diverse group of local, state and federal agencies and private community professionals, convened by the Vermont Department of Public Safety to develop a shared interoperable radio communications system for all first responders within Vermont. The VCOMM system established an interoperable network with consistent radio channels for

town emergency services to communicate with other municipalities, as well as increasing the mobile coverage of radio networks throughout the state.

3. Television, Videoconferencing and Other Media

While television and radio are largely used for entertainment purposes, they are a key part of the communications system in the Region. Both play a role in accessing information and emergency broadcasting. Cable television is available in at least a portion of eight towns in the Region (see Table 3.6). There are two satellite television providers that can serve any location as long as the site allows for adequate satellite reception. Local public access television channels include Springfield Area Public Access television (SAPA TV), Ludlow-Cavendish area public access television (LPC TV) and Windsor On-Air.

Numerous commercial radio stations serve this area, but only one station broadcasts from this region. Vermont Public Radio broadcasts on eight stations statewide, one of which – 89.5 WVPR – broadcasts from the summit of Mount Ascutney in Windsor.

Videoconferencing networks enable cost-effective communication and distance learning opportunities. Vermont Interactive Television (VIT) is used by educational institutions, governments, non-profit organizations and businesses for a variety of purposes, including public hearings, classes, public informational meetings, training sessions, candidate interviews and other uses. VIT is available at 15 sites throughout the state, including in the Howard Dean Education Center in Springfield.

Newspapers that serve this Region include the Eagle Times, The Message, Vermont Standard, Springfield Reporter, Weekly Flee, Valley News, Rutland Herald and Windsor Observer.

4. Internet Services

Many Vermonters and most workplaces in the Region now rely on the Internet and email to access information and communicate daily. It becomes evident how much our economy relies on these technologies when occasional widespread power outages severely restrict office work.

High-speed internet has become an important part of economic development, since much of the data and communications exchanges in today's business climate involve large amounts of information. Dial-up internet services are not fast enough to support data exchanges at current or future levels. High-speed internet includes:

- Broadband – High-speed Internet and communication networks provided by a wide band of frequencies (FCC: at least 200Kbps in each direction);
- Digital Subscriber Line ("DSL") – Technologies that extends the ability of copper telephone lines to carry high-speed data and communications;
- Satellite – High-speed satellite internet services are generally not as fast as DSL; however, are available on any site with a clear view of the southern sky; and
- Wireless Fidelity ("WiFi") – Technology that uses radio waves to provide high-speed wireless internet and communications network connections.

The Region is served by a variety of providers, including VTel, Comcast, AT&T Broadband, TDS, FairPoint, and satellite internet services, such as Hughes Net and WildBlue. **Table 4.6** lists these providers by town; however, these services may be available only in portions of a town. For example, DSL is available in the village of Ascutney but not in some other parts of Weathersfield.

Table 4.6 Utility Service Providers

Utility Type	Service Providers	Andover	Baltimore	Cavendish	Chester	Ludlow	Reading	Springfield	Weathersfield	West Windsor	Windsor
Telephone	Comcast				X	X				X*	X
	VTel	X			X			X	X		
	TDS		X	X		X			X		
	FairPoint			X			X		X	X	X
Cable	TDS			X							
	Comcast			X	X	X	X	X	X	X*	X
Electric	Ludlow Electric			X		X					
	CVPS	X	X		X	X	X	X	X	X	X
Local Access	SAPA				X			X	X		
	LPCTV			X		X					
	Windsor On-air									X	X
High Speed Internet	VTel*	X			X			X	X		
	Comcast				X*	X			X*	X*	X
	AT&T Broadband										X
	TDS		X	X		X			X		
	FairPoint			X			X*		X*	X*	X

Source: Based on information provided by service providers compiled by SWCRPC, 2008. *Services may not be available in all areas

To successfully encourage business growth, high-speed internet is critical. High-speed internet is generally available in the most villages in the Region. The provision of these services is also critical in rural areas for accessing information and enabling distance learning. This is especially true for rural schools and for workforce training programs or distance learning programs.

E. Educational Resources

Educational opportunities available in the Region include child care facilities; elementary, middle, and high schools; vocational and technical schools, as well as access to colleges and universities; continuing education programs; and libraries and cultural opportunities (**Appendix A – Map 4**). Many factors should be considered in the analysis of schools and their ability to serve as adequate facilities for providing educational opportunities to area residents. Program and policy issues for public schools are generally addressed by local school or school district boards. Examples of facility issues and concerns which are relative to local planning for public schools include providing an appropriate size and number of classrooms for the number of students, the provision of transportation service for students, safety features, the need for specialized classrooms, sufficient funding to meet the requirements of State mandates for educational facilities, and the provision of suitable recreational facilities to meet student needs.

The towns of Springfield, Windsor, Ludlow, and Chester have high school facilities. Ludlow and Chester have union high schools which serve additional students from other towns outside of their respective town boundaries. High school students from Andover, Baltimore, Cavendish, Reading, Weathersfield, and West Windsor attend schools that are located outside of their town boundaries. Reading's high school students attend the Woodstock Union High School. Windsor Junior/Senior High School, the State Street School in Windsor, and Weathersfield and Reading Elementary School have all expanded their facilities. Almost all of the schools in the Region currently have sufficient capacity to meet anticipated needs for the foreseeable future. **Tables 4.7** and **4.8** show school enrollment trends over the past 20 years in the Region.

The River Valley Technical Center is located in the Howard Dean Education Center in Springfield. It serves over 450 students for at least one period of course work per day and provides services for 600-1,000 adults. Services include a job training program which is contracted through Vermont Technical College. Also locating in the Howard Dean Education Center is the Community College of Vermont's Springfield Office, VT Interactive TV, and UVM Extension.

Table 4.7 – School Enrollment 2003-2007 (Grades K-6)

Town	2003-04	2004-05	2005-06	2006-07
Andover/Chester	285	272	293	296
Cavendish	101	102	103	114
Ludlow	163	147	119	118
Reading	58	50	50	48
Springfield/Baltimore	826	902	903	899
Weathersfield	88	88	91	107
West Windsor	71	70	60	57
Windsor	271	285	236	247
Region Total	**1,863**	**1,916**	**1,855**	**1,886**

Source: Vermont Department of Education School Report, 2007

Table 4.87 – School Enrollment 2003-2007 (Grades 7-12)

Town	2003-04	2004-05	2005-06	2006-07
Andover/Chester/Cavendish (Green Mountain Union High School)	425	441	428	416
Ludlow (Black River Union School)	260	241	235	212
Springfield/Baltimore	596	572	546	539
Weathersfield Middle School (4-8)	176	150	129	121
Windsor	455	395	381	383
Region Total	**1,912**	**1,799**	**1,719**	**1,671**

Source: Vermont Department of Education School Report, 2007

The Vermont Legislature has enacted several educational funding programs seeking to provide all students with an equal opportunity for education regardless of municipal tax base. First introduced in 1997 under Act 60, the current program, Act 68, sets statewide residential and non-residential tax rates providing base level funding per pupil in all school districts. Each district may then request additional funding from local taxpayers. This program remains controversial as overall costs and tax rates continue to rise. According to

the Vermont Department of Education, per pupil spending in Fiscal Year 2007 ranged from $9,000 to $12,000.

F. Child Care

High quality child care services provide important benefits to a community and the Region. The availability of affordable, high quality child care contributes to early childhood development, enables parents of young children to enter or remain in the workforce, enhances the productivity of working parents, and contributes to the expansion of the local and regional economies. In addition, facilities that are located near residential clusters, schools, the workplace, or public transportation may reduce automobile trips and congestion.

Chapter 117 of the Vermont State Statutes now includes as a specific purpose to be furthered by municipal and regional planning: "To ensure the availability of safe and affordable child care and to integrate child care issues into the planning process, including child care financing, infrastructure, business assistance for child care providers, and child care workforce development."

The State of Vermont Child Development Division maintains a list of all registered home care providers and all licensed child care centers in the State. This list does not include informal arrangements. In general, the State simply regulates child care-providers requiring they meet the basic standards for children's health and safety. Many programs achieve a higher standard through accreditation by a national program. In our Region there are currently no listed state licensed facilities in the smallest, rural towns of Andover and Baltimore and as expected the more populated towns provide more services, such as Springfield with 19 homes and 12 centers listed. For a current listing of licensed providers and registered homes by town, visit www.brightfutures.dcf.state.vt.us.

Child care expenses can deter some families from seeking safe and convenient services. The Child Care Subsidy Program, which is based on gross monthly income and family size, is a program established by the Vermont Agency of Human Services, and can assist some low-income families with the cost of child care. There are also some tax credits available for both businesses and employees and employer child care subsidies, but many are under utilized. For example, an employer may offer Dependent Care Assistance Programs which provide child care subsidies, reserve slots at child care centers, and incentives to build onsite child care.

WATER, SEWER AND ELECTRICITY GOALS

1. To encourage technologies that will lessen dependence on fossil fuels.

2. To promote coordination and cooperation among local, state and federal efforts related to the provision of community facilities and services.

3. To achieve the provision of user-demand electricity at a reasonable rate in a safe, effective, and efficient manner.

4. To direct the placement of transmission lines to support designated village, commercial and industrial development.

5. To achieve the development, expansion and upgrade of efficient and environmentally sound public water and sewer systems within designated village, commercial and industrial areas.

6. To ensure that public well systems, private wells and septic systems are located most efficiently relative to current and proposed land use patterns and water conservation techniques.

WATER, SEWER AND ELECTRICITY POLICIES

1. Location and expansion of utilities and facilities should occur in areas best able to serve the public interest with the fewest negative side effects.

2. Expansion of utilities and facilities should result from a cooperative effort between municipalities, the RPC, and other related organizations.

3. Local efforts to address long-term utility and facility needs in a capital improvement plan, program, or budget should be supported.

4. Local communities should monitor and assess proposed development that will utilize public services, to ensure that new development does not exceed the capacity of existing or proposed community utility and facility infrastructure. (See 24 V.S.A. §3625 Allocation of Sewage Capacity.)

5. Extensions of service infrastructure should take place in areas proposed for development by town plans and local bylaws.

6. Multipurpose use of existing utility corridors and placement of new lines or extensions in existing corridors is encouraged wherever possible.

7. Towns are encouraged to consider the location of substations, utility lines and poles in their town plans.

8. Town efforts to minimize the aesthetic impacts of utility/facility development should be supported.

9. Town efforts to maintain, upgrade, and expand water/sewer distribution lines and sewage treatment facilities so that they meet or exceed federal, state and local standards should be supported.

10. The implementation of techniques to increase the operational life, efficiency and effectiveness of wastewater treatment facilities and water supply systems should be encouraged.

11. Consideration should be given to the impacts of water withdrawal and hydroelectric activity on water quality, as related to the assimilation of sewage effluent and the carrying capacity of the streams.

12. The quality of municipal and public drinking water supplies should be protected.

13. Towns are encouraged to extend water and sewer mains only in areas where future development is expected and supported by the land use designations of town and regional plans.

14. Water conservation techniques should be used in new development, and in the rehabilitation of existing development, to lengthen the life of wastewater treatment facilities and slow the depletion of groundwater resources.

15. Encourage energy conservation to reduce demand for energy production and transmission capacity.

16. Careful facility siting, landscaping and other mitigation techniques should be employed to minimize aesthetic impacts of transmission line projects.

WATER, SEWER AND ELECTRICITY RECOMMENDATIONS

1. Support the location and upgrade of utilities in conformance with the Energy Chapter of the Regional Plan and town plans.

2. Assist towns that wish to upgrade wastewater treatment facilities and adopt other techniques that will decrease the concentrations of phosphorous and other chemicals detrimental to surface waters.

3. Assist towns in the development or update of existing capital budget and improvement programs and facilities, and capacity allocation bylaws that reflect municipal policies on growth and development.

4. Encourage continual cooperation among local groups to evaluate water quality downstream of wastewater treatment facilities for conformance with state standards.
5. Where appropriate, coordinate with economic development organizations for towns wishing to extend water and sewer services beyond current boundaries, provided such extensions will meet federal, state, and local standards.

6. Work with local communities to ensure that sludge management throughout the area is in conformance with the Solid Waste section of this chapter.

SOLID WASTE FACILITIES GOALS

1. Reduce the volume of solid waste generated by homes, businesses, and public institutions in the Region.

2. Conform to the intent, goals, and requirements of 10 V.S.A. §6601 et. seq. (Act 78).

3. Reduce the environmental and financial costs associated with waste disposal for regional businesses and residents.

4. Explore new and existing methods of reusing solid waste and sludge that are economically and environmentally sound.

SOLID WASTE FACILITIES POLICIES

1. Promote efforts within or among the Region's towns to reduce waste production, reuse, or recycle; the hierarchy, as described in the Vermont Solid Waste Management Plan, of "reduce, reuse, recycle" should form the basis for all solid waste planning in the Region.

2. Support composting and land application of sludge in the Region provided that they do not pose a risk to human health, or have negative impacts on aesthetics or the natural environment.

3. When measuring the economic viability of solid waste reduction or recycling programs, avoided costs of solid waste production and disposal, and of environmental cleanup, should be considered as economic benefits.

SOLID WASTE FACILITIES RECOMMENDATIONS

1. Support and coordinate efforts at the federal, state, regional, and local levels to guide the effective management of septage and sludge material.

2. Pursue Zero Waste policies throughout the Region.

COMMUNITY HEALTH AND SAFETY RESOURCES GOALS

1. To ensure that adequate services and facilities exist in the Region to promote a safe and healthy social environment.

2. To maintain Enhanced 911 service as designed and provided by the Vermont Enhanced 911 Board.

3. To ensure that existing or proposed correctional facilities are sited, maintained, and managed in a manner which ensures the safety and security of local residents.

COMMUNITY HEALTH AND SAFETY RESOURCES POLICIES

1. Participation in the Vermont Enhanced 911 program by all towns in the Region is encouraged.

2. Expansion or creation of health and safety facilities is encouraged, as necessary, to meet the current and future demand.

3. Municipalities are encouraged to establish and adopt capital improvement programs and budgets as authorized under 24 V.S.A. §4426, to address identified needs for health and safety facilities and services.

4. Town, inter-organizational, regional, state, and federal cooperation is encouraged in the development of service areas and standards for health and safety facilities and services.

5. Where towns have identified needs, the expansion or development of elderly care facilities should be supported.

6. The Commission should cooperate with and encourage towns to fully consider the potential costs and benefits of regional or multi-community facilities and service delivery.

7. New nursing homes and assisted living facilities should be located within or adjacent to villages or along public transportation routes in order to provide efficient access to services for residents.

COMMUNITY HEALTH AND SAFETY RESOURCES RECOMMENDATIONS

1. Support the creation of overlay districts for lands occupied by correctional facilities to focus on regional issues such as lighting, traffic and security.

2. Analyze the geographic and age/sex cohort distribution of the population to determine the need for the expansion or development of elderly care facilities.

3. Assist towns in obtaining administrative and financial assistance from the Vermont Enhanced 911 Board for ongoing system maintenance.

4. Promote town and regional assessments of the impact of existing and potential development on public health and safety facilities and services prior to new development.

COMMUNICATION FACILITIES GOALS

1. Provide a robust, modern communications network for all residents, institutions and businesses in the Region, while minimizing the economic, environmental, health, aesthetic, and cultural costs of its development.

COMMUNICATION FACILITIES POLICIES

1. Encourage reduced rates on advanced telecommunications services, equipment and user training for libraries, educational and health care facilities. Support local access to diverse life-long distance learning opportunities and low-cost public-use computers connected to high-speed internet services.

2. Promote the development of broadband communication networks Region-wide.

3. New wireless communications facilities should be sited, constructed or modified as necessary to meet the Region's changing needs or changes in technology.

4. New or expanded wireless communications services must collocate on existing facilities or be sited on existing structures, where feasible, and shall minimize negative visual impacts.

5. Communications facilities, whether at new or existing sites, must demonstrate that that the facility complies with the applicable FCC emissions standards in order to protect public health and safety.

6. New communications facilities must minimize impacts on wildlife habitat and corridors, wetlands, rivers, streams, ridgelines and other natural, scenic, and aesthetic resources, and should comply with the following standards:
   - Protect view corridors from highways, residential areas, historic districts, public use areas, and outdoor recreation areas such as hiking trails, rivers, lakes, and ponds should be paramount in the design and siting permitted.
   - All new wireless communications facilities sited on a ridge should be located below the ridge so that the tops of any such facility are below the site lines of persons using the highways or in the residential areas and historic districts. At a minimum, the tops of such facilities must not exceed the elevation of the immediate ridge.
   - New access roads should be designed for minimal ground disturbance and clearing, follow the land contours, and avoid open land to minimize visual and ecological impact.
   - If new wireless communications facilities are added to existing wireless communications facilities on peaks or ridges, such existing facilities should be retrofitted or maintained in a manner to minimize any negative visual impact.
   - At the site of wireless communications facilities, the existing vegetation and

tree cover should be maintained to the maximum extent possible.

- Prior to the application hearing, a demonstration of the visual impact of the tower must take place to inform the public (by simulating the silhouette of the facility by raising a dark colored balloon to the height of the top of the proposed facility, or other reasonable simulation).

7. Decommissioned wireless communications facilities or portions of facilities must be removed and the site restored and reclaimed to its original condition. All roads and accesses to the site which are no longer needed should be reclaimed and restored.

8. Permits for communications facilities should require a performance bond or other financial security ensuring the reclamation and restoration of the site should the facility be abandoned or rendered obsolete by technological advances. The performance bond should take inflation into account as many years may elapse between construction and removal of the facility.

9. Promote the necessary infrastructure enabling interoperable communications to support emergency services.

10. Encourage increased access for residents to state and local public meetings and hearings through Vermont Interactive Television and public access television stations.

COMMUNICATION FACILITIES RECOMMENDATIONS

1. The RPC should increase access to public information in user-friendly electronic formats.

2. The RPC should seek, with the cooperation and assistance of the wireless communications providers and facilities owners and operators, to design a regional wireless communications facilities siting system, which would serve the Region.

3. The RPC should assist local planning boards and other town officials with developing and incorporating wireless communications policies and elements into their local town plans and zoning regulations or ordinances.

4. The RPC and its member towns should encourage the development and use of alternative technologies to serve the industry. These include, but are not limited to, "stealth" designs for wireless communications facilities or complete coverage of such facilities within existing buildings and structures, and satellite technology, which would reduce the need for new, and allow for the removal of existing, wireless communications facilities.

5. The RPC should study and address regional issues of siting, impacts, and standing regarding wireless communications facilities with all stakeholders.

6. All wireless communication facilities within the Region should be inventoried, located, and mapped by the RPC.

7. Utilize all available local media to seek public input in regional and town planning initiatives.

EDUCATIONAL RESOURCES GOALS

1. To provide equal access to high-quality public education for all students in the Region.

2. To ensure the provision of educational services in adequate facilities, at a reasonable cost, to meet or exceed state standards.

3. To ensure that schools are sited, developed, and maintained at a rate consistent with student population growth and are consistent with land use goals.

EDUCATIONAL RESOURCES POLICIES

1. Expansion or creation of academic, vocational, recreational, and cultural education facilities and resources to meet the needs of all residents will be supported, where communities show need and/or where existing facilities are inadequate.

2. The state is encouraged to provide greater financial and facilities assessment assistance to local and union school districts to meet state requirements for facilities and programs.

3. Factors such as school capacity, and travel time and distance for students should be used in determining the location of new school sites/facilities.

4. Efforts to evaluate the impacts of new development on local school systems, and to mitigate the impacts of such development should be supported.

EDUCATIONAL RESOURCES RECOMMENDATIONS

1. Coordinate efforts to expand, create and enhance educational facilities, programs and resources.

2. Provide the latest Census information related to school-age population to local communities.

3. Work with local communities to investigate the desirability of and locations for regional educational facilities.

CHILD CARE GOALS

1. Encourage a town-wide approach to funding child care, including maintaining an inventory of all child care programs in the town and their capacity, consider property tax abatement for family child care providers, conduct a child care needs assessment, address barriers to increasing child care capacity created by zoning bylaws.

2. Consider use of federal and state funds to assist with the development of child care infrastructure, such as Community Development Block Grant or U.S. Department of Agriculture Rural Development Community Facilities Grants, to assist in addressing child care infrastructure needs.

3. Provide opportunities for child care providers to enhance their programs, ensuring a well trained, educated, paid and benefited child care workforce.

CHILD CARE POLICIES

1. Town plans should assess future local needs and supplies of child care services, including whether local barriers exist for the provision of these services.

2. Member towns should periodically review land use regulations to identify mechanisms to promote the development of child care services in appropriate locations convenient to local services and densely populated areas.

3. Employers, schools, and community organizations should collaborate where feasible to ensure the availability of high quality, affordable child care services.

CHILD CARE RECOMMENDATIONS

1. Assist in an inventory of publicly owned buildings throughout the Region to evaluate and prioritize those suitable as a potential child care facility.

2. Assist towns interested in child care service availability needs assessment.

3. Work with realtors, developers, and regional development corporations to maintain an inventory of space available and suitable for child care businesses.

V. EMERGENCY MANAGEMENT AND PLANNING

A. Emergency Planning

Building disaster-resistant communities through sound land use planning is the primary goal of emergency planning. When considering future land use in town plans and zoning regulations, towns should weigh the predictable consequences of development given disaster risks such as flood hazard areas, steep slopes, and inadequate roads. Emergency planning fits best land use practices, saves lives, reduces incidences of injury, and protects public and private property, as well as the cultural, historical, and natural resource assets of the Region.

There are four main objectives in emergency planning:

- Mitigation
- Preparedness
- Response
- Recovery

Being prepared for when an emergency or natural disaster occurs is a priority for all towns in the Region. To help off-set the damages caused by these events, the RPC along with each town has a 2006 Federal Emergency Management Agency (FEMA) approved All-Hazards Mitigation Plan. With the plan and membership in the National Flood Insurance Program (NFIP) (discussed later in this chapter) all towns within the SWCRPC Region may apply for Pre-Disaster Mitigation, Hazard Mitigation, and Flood Mitigation grants all administered through FEMA. In addition to the All-Hazards Plan, towns may choose to adopt an Emergency Operations Plan (EOP) that outlines the specific procedures and locations for American Red Cross shelters, hazardous materials, and other emergency services.

B. Mitigation

Mitigation is any action taken to reduce the loss of life (human, pets, or livestock) or property in the event of a foreseeable natural or man-made disaster. Mitigation reduces exposure to, probability of, and potential loss from hazardous and disastrous events. It includes compliance with the NFIP flood hazard regulations. Towns must be in compliance with this program in order to enable property owners to obtain flood insurance to blunt the effects of catastrophic loss. All towns in the Region are members in the NFIP program.

FEMA, through Vermont Emergency Management (VEM), has a hazard mitigation program to assist towns in permanent mitigation projects. The result of this program is a FEMA approved All Hazards Mitigation Plan that outlines a town's background along with a vulnerability assessment. Through risk analysis, towns can identify areas of concern and assign a priority ranking to mitigation projects. FEMA offers additional resources for making communities disaster-resistant. The Vermont Local Roads Program, administered through St. Michael's College, assists towns in setting the proper standards for planning roads, culverts, bridges, and access to local roads.

C. Preparedness

Preparedness is taking stock of the persons and assets available for response to an emergency resulting from damage caused by a natural or man-made hazard. The first step in preparedness is the town's Rapid Response Plan (RRP), which is a guide for use in the early stages of disaster response. It identifies key emergency personnel (rapid response team), contact numbers, locations, tasks, and an evacuation plan. The RRP is not required, but is highly recommended as a first phase local plan. The Rapid Response Plan differs from an EOP in that it only involves the first phase of a response. The EOP offers a more detailed and effective guide to dealing with emergency situations.

D. Response

Response is a time sensitive reaction to an incident designed to save lives and property and stabilize the situation. Response includes warning, evacuating, rescuing, sheltering, informing, and providing medical care to the public.

A town's response is often dependent on mutual aid, an agreement among towns in the Region to assist or standby with equipment and personnel during an emergency. Though few formal agreements have been made, many ad hoc mutual aid agreements exist throughout the Region. The need arises for additional assistance when one emergency situation is greater than what can be reasonably handled by the responding department. The situation may be a multiple alarm fire, such as the Springfield movie theater in summer 2008, or emergencies of a regional scope, such as the Middlebury train derailment in 2007.

E. Recovery

Recovery is the effort to restore the infrastructure and the social and economic life of communities after a disaster. It incorporates mitigation and preparedness strategies to lessen and avoid damage from the next event.

F. Emergency Services

1. Ambulance

Ambulance and emergency rescue service is provided through volunteer services in Chester, Cavendish, Reading, and Ludlow. Several towns, including Andover, Baltimore, Weathersfield and West Windsor contract with other municipalities, as well as private firms from within and outside of the Region for ambulance service. Springfield and Windsor provide full-time ambulance service.

2. Fire

All of the Region's towns currently utilize municipal fire departments. Andover contracts with the Town of Chester, and Baltimore contracts with Springfield for fire services. Capabilities of existing fire service facilities are generally considered adequate by the towns

to address current and projected needs. Weathersfield is expanding its fire protection infrastructure through the creation and installation of fire ponds and dry hydrants.

3. Police

Law enforcement in the Region is provided by local, county, state, and federal police offices. The towns of Springfield, Ludlow, and Windsor offer full-time 24 hour police service while Chester and Weathersfield have a full-time local police department supplemented by the Vermont State Police during off hours. All towns have, as required by state statute, an elected town constable. The Windsor County Sheriff's Office provides contractual patrol service to the towns of Andover, Cavendish, and Reading. In addition, the County Sheriff's Office serves as backup support for local and State Police when so requested. In addition, the State Police are mandated by Vermont law to provide service for any town that does not employ a full-time police department. State Police service for the Region is provided through the Rockingham and Royalton barracks. The duties of the various and related law enforcement organizations may either overlap or fall short of providing adequate coverage throughout the Region. An assessment of the service areas and coordination of the duties performed by each level of law enforcement would assist towns in planning for more efficient service. Such an analysis would also provide help for eliminating potential gaps in current and future services.

Since 1998, Enhanced 911(E911) service has been available for all Vermont towns choosing to participate in the system. Every town in the Region is participating in the E911 system. E911 relies on locatable physical addresses linked to telephone numbers. When an E911 call is made, the call taker is automatically provided with the name of the telephone subscriber, the location from which the call originated, and the names of all emergency service providers for the location. The call can then be forwarded to the proper dispatch center(s) to dispatch emergency service providers to the scene, even if the caller is unable to describe his or her location or the nature of the emergency. It is extremely important for towns to make the E911 Board immediately aware of any road changes to keep the master lists accurate and up-to-date.

G. Hazard Assessment

During the process of developing the Regional All-Hazards Mitigation Plan, a regional risk assessment was completed. The assessment began with an inventory of possible hazards along with assigning a probability and vulnerability score to each hazard. The LEPC #3 was extensively involved in this process as it mirrors the process to develop the Regional Emergency Operations Plan. A probability score of 0-4 was given to each potential hazard with 0 being unlikely and 4 being an annual event. Next a vulnerability score of 1-4 was assigned with 1 being a moderate event impacting between 30-300 people and 4 being a disaster impacting over 9,000 people. **Table 5.1** below shows the results of the risk assessment.

Table 5.1 Results of Regional Risk Assessment		
Type of Disaster	**Probability**	**Vulnerability**
Residential Fire	4	1
Flash floods/Ice Jams	4	2
Blizzard or Severe Storms	3	4
Power Outages	3	4
Slow-rising Floods	3	3
Hazardous Materials Release	3	3
Hurricanes/Severe Storms/Tornado	3	3
Airplane	3	2
Major Fires/Industrial Explosion	3	2
Dam Break	1	4
Wildfire	4	1
Avalanche, Landslides & Mudslides	1	1
Serious Earthquake	1	4
Nuclear Power Incident	1	4
Civil Disturbance	1	2
Epidemic	1	3
Terrorism: Explosives & Biologicals	1	4
Nuclear Attack	0	4
Meteorite Fall	0	4
Drought	1	1

Source: Regional All Hazards Mitigation Plan

According to the National Climatic Data Center, 201 emergency events occurred in Windsor County between January 1, 2000 and February 28, 2008, resulting in two deaths, two injuries, and $6.353 million in property damage due to:

- **floods** – 16 events and $1.704 million in property damage;
- **winter storms** - 88 events with one death, two injuries, and $3.019 million in property damage;
- **extreme cold** – 12 events and $100,000 in property damage;
- **thunderstorms, precipitation, and/or high winds** - 59 events with 1 injury, and $1.2 million in property damage;
- **lightning** – 7 events with 1 death, and $130,000 in property damage; and
- **hail** – 19 events and $200,000 in property damage.

In addition to the above listed weather related emergency events, there are also man-made emergency events including vehicular crashes. According to the Vermont Department of Transportation data on federal aid system roads in the Region, from 2002-2006, there were 1,797 vehicle crashes resulting in 710 injuries and 12 deaths.

H. LEPC #3

Emergency management in Vermont is primarily a town responsibility, led by its local emergency managers, or persons in the community who are involved in emergency preparedness. It is handled differently from town-to-town.

In the late 1990s, VEM recognized that most towns lacked the staffing and equipment to accomplish tasks set forth by FEMA, which require local governments to prepare for future disasters and to qualify for assistance in the event of a federal disaster declaration in the Region. Regional planning commissions are seen as partners in the delivery of educational information, training, and expertise.

Under 20 V.S.A. §32, Local Emergency Planning Committees (LEPC) are appointed under the State Emergency Response Commission. The LEPC includes membership from fire departments, local emergency medical services, law enforcement, regional planning commissions, hospitals, Vermont Department of Health, Vermont Emergency Management, American Red Cross, and other interested public and private individuals.

The LEPC performs a number of duties including: activities pursuant to the Emergency Planning and Community Right-to-Know Act (EPCRA), 42 U.S.C. §11001 et seq. (1986), collection and administration of data related to the legal right to know what chemicals are used, stored, transported through or made in the region store hazardous materials, coordinating with local emergency officials in the development of both local and regional emergency management plans, and pursuing additional funding opportunities. In addition, the LEPC is responsible for developing a regional disaster response plan, which includes training and testing exercises.

LEPC #3, covering all ten towns in the Region plus Hartford, Hartland, and Norwich, has developed an All-Hazards Emergency Operations Plan. The plan has received LEPC approval and will be sent to each town to be used as a reference tool during an emergency event.

EMERGENCY PLANNING AND MANAGEMENT GOALS

1. To build disaster-resistant communities in the Region through sound emergency and land use planning.

2. To maintain Enhanced 911 service as designed and provided by the Vermont Enhance 911 Board.

EMERGENCY PLANNING AND MANAGEMENT POLICIES

1. Encourage towns to undertake and periodically review an all-hazards risk assessment in their community to identify potential hazards and the life and property at risk, including cultural, historical, and natural resource assets.

2. Encourage towns in emergency planning to develop and implement regulations to make communities more disaster-resistant.

3. Encourage towns to review, update, and adopt Rapid Response Plans yearly for newly identified risks.

4. Encourage towns to adopt minimum standards for public roads, bridges, and culverts, using the Vermont Local Roads Program and FEMA standards.

5. Encourage towns, in the adoption of minimum road standards, to include the requirement that all private roads and driveways be properly constructed to prevent damage from storm water runoff.

6. Explore efforts to develop a regional emergency response plan that includes surrounding areas in Vermont and New Hampshire.

7. Participation in the Vermont Enhanced 911 program by all towns in the Region is encouraged.

EMERGENCY PLANNING AND MANAGEMENT RECOMMENDATIONS

1. Work with towns to undertake and periodically review an all-hazards risk assessment in their communities to identify potential hazards and the life and property at risk, including cultural, historical, and natural resource assets.

2. Work with towns to plan and adopt regulations that promote mitigation, preparedness, response, and recovery in the event of a disaster.

3. Work with towns to keep their Rapid Response Plans current.

4. Work with towns to compile a comprehensive all-hazard risk assessment and emergency response plan for the Region.

5. Assist towns in obtaining administrative and financial assistance from the Vermont Enhanced 911 Board for ongoing system maintenance.

VI. NATURAL RESOURCES

The landscape of the Region is a mosaic of forest, field, wetland, and developed land. In order to maintain the diversity of plant and wildlife species that have existed in the Region for generations, land use planning should consider the health of the ecosystems needed to support a variety of species, including humans. Maintaining biodiversity within an ecosystem ensures that the system is in balance.

Changing land use patterns have resulted in ecosystems shifting and changing across our landscape, affecting the associated wildlife. In this Region and across much of Vermont, the landscape has undergone shifts from an original landscape of forested land to agricultural lands in the 19th and early 20th centuries and now back to primarily forest land. While the conversion of agricultural fields to forestland is beneficial to some species, those species that thrive in open fields and "edge habitat", the area between field and forest, must subsist on declining habitat area. However, the re-establishment of forest land in the Region has significantly improved the water quality of our rivers, streams and lakes along with the species that depend on aquatic habitat. In addition, from a human perspective, the loss of agricultural land has made communities within the Region less self-sufficient, requiring many food products to be imported from other regions and states.

Piecemeal development over time often leads to fragmented forestlands and wildlife habitat areas. Land use regulations that require minimum lot sizes but do not allow for the flexibility of clustering development while protecting valuable resource lands can have negative effects on the ecosystem as a whole. Allowing development to encroach upon critical natural areas, such as floodplains, is not only detrimental to the habitat but also jeopardizes property and infrastructure. Just as we plan for the connection of economic and residential centers with roads, planners should provide for connectivity of wildlife habitat so that the nonhuman populations inhabiting the Region may be sustained through future generations. The following sections outline the diversity of resource lands in the Region while providing policies and recommendations that strive to connect and integrate the landscape types for balanced ecosystem sustainability.

A. Agricultural Lands

The agriculture practices of the 19th and early 20th centuries factored heavily in the historical and cultural development of Vermont and the Region. Historically, Vermonters have always had an active, dynamic relationship with the land. Historical land use patterns emphasized densely settled village centers with farms outside of the villages. The villages provided a conduit for marketing supplies and services into and outside of the Region.

Beginning in the mid-19th century, agriculture slowly began to evolve from an institution that promoted self-sufficiency to one of specialization. Causes for this structural change can be traced to competition from the Midwest and West, the expansion of the railroad and the migration of young people from rural to more urban areas. In Vermont, as well as the Region, the 19th century saw the rise and fall of the sheep farm and woolen mill. Sheep farming dramatically changed the Vermont landscape and economy through the clearing of forestland and the resulting soil erosion. Approximately 80% of forested land in the state

was cleared for farming and grazing, and large woolen mills were built along Vermont's rivers. These changes to the landscape had lasting effects such as erosion and loss of topsoil to flooding. The loss of quality topsoil also contributed to the decline of agriculture statewide. To date, the mills still help define the character of many Vermont villages, including Ludlow and Cavendish.

The next agricultural trend in the state and Region was dairy farming, which dominated the landscape and economy for the first half of the 20th century. Since World War II, the decline in agriculture has been profound, with the loss of over three million acres of farmland and thirty thousand farms in the state. Currently, 21% (approximately 1.24 million acres) of total land in Vermont is devoted to agriculture. According to the Vermont Agency of Agriculture, there were only 1,406 dairy cow operations remaining in Vermont as of January 2003. Seventeen of these are located in our Region: Baltimore - 1, Cavendish - 2, Chester - 3, Reading - 2, Springfield - 5, Weathersfield - 1, and Windsor - 3. Underlying causes for the decrease include the dramatic drop in net income for farmers; the economic benefits of changing agricultural lands to other types of land use; tax policies; the expansion of the Interstate Highway System; and the increasingly international orientation of agriculture. Other major factors have included increased production through genetic engineering of plants and animals, increased reliance on chemicals to increase crop yields resulting in more productive farms on fewer acres of land, and dramatic changes in the regulation of the dairy industry.

The proximity of the Region to the Boston-New York corridor initially provided markets for agricultural products, but has now resulted in increased demand for the land to be used for more than agricultural uses. Increased recreational development and reduced profitability in agriculture have resulted in a near total decline of full-time farming in the Region, except for a few dairy and self-sufficient operations. During the past thirty to forty years, much of Vermont's farmland has converted to commercial and residential development, and much of it has reverted to forest cover. This forestland has allowed timber production which was prevalent across the state in the early 19th century to return as a significant factor in Vermont's agricultural economy. Unlike earlier times, however, properly applied modern forestry techniques and regulations help make logging a sustainable industry, ensuring healthy forests and a strong economic base well into the future.

Along with the decline in full-time agriculture operations has come an increase in the number of part-time farmers and specialty businesses that are trying to take advantage of markets located in the greater Upper Valley. As dairy production has become less profitable, many farmers have begun to diversify (or change altogether) their operations in an effort to increase net farm income. The means of diversification include the raising of exotic animals such as fallow deer, beefalo, llamas, alpacas, emus, and elk, and the development of specialty products such as organic vegetables, Christmas trees, turkeys, and sheep. Some of the more traditional Vermont products, like cheese, apples, and maple syrup, also benefit from Vermont's emergence in the national economy as a producer of high-quality, specialized farm products

Benefits of productive agricultural lands include:

- A more self-sufficient regional population;
- A local, stable and reliable supply of food products;
- Preserving regional heritage; and,
- Supporting the tourism economy.

Vermont is currently a net importer of food supplies. However, foreseeable changes may require increasing local food production in the future as transportation costs rise, the costs of petroleum and petroleum-based farm supplies increase, the western United States experience increasingly more severe water shortages and other factors.

1. Classification of Agricultural Soils

The Region has many areas identified as having prime agricultural soils (**Appendix A – Map 5**). As defined by the Natural Resource Conservation Service, prime agricultural soils are available for use and have a combination of the best characteristics for producing food, forage, fiber, and oilseed crops. The best suited land uses for prime agricultural soils includes forests, cropland, pasture, or other similar uses; but once developed, these soils lose their agricultural characteristics. Prime agricultural soils are valuable for their current and/or potential future farming uses.

Also located within the Region are many areas of agricultural soils of statewide importance. These soils exhibit many of the same characteristics of prime agricultural soils but are constrained by one or more of the following: slope, erosion potential, depth to bedrock, or location within a designated floodplain. Agricultural soils of statewide importance may also be valuable for their current and/or potential future farming uses.

When classifying agricultural soils, location and accessibility are not considered due to their physical and chemical makeup. In addition, NRCS definitions do not balance competing local and regional goals such as the locations of desirable local development in village and downtown areas.

2. Protection of Important Agricultural Soils

Over the past thirty years, Vermont has seen a marked increase in the conversion of prime agricultural lands to non-agricultural uses. These lands are a finite resource. Their use for non-agricultural purposes should be strongly discouraged. Communities, with the support of the RPC, should begin to develop a program that will locate, prioritize, monitor, and promote the protection of these valuable resources.

Protecting important agricultural soils, while also encouraging smart growth, is challenging. Many historic villages are located in river valley and are surrounded by areas of prime agricultural soils and/or agricultural soils of statewide significance, which restrict future growth in those areas. Agricultural soils that are rated by the NRCS as prime, statewide or locally important are regulated through Act 250 Criterion 9(b). A balance is necessary in order to protect agricultural soils, while allowing the flexibility to facilitate new growth within or adjacent to historic villages in accordance with the State Planning Goal in 24 V.S.A. §4302(c)(1).

There are tools available to help towns find that balance. The Land Evaluation Site Assessment (LESA) process can be used to reassess soil classifications within a town. A comprehensive study is undertaken in order to identify and rank important local agricultural soils based on soil characteristics and site considerations. The resulting designation of "locally important farm lands" typically differs from the "Prime" and "Statewide" classifications used by the state. Town officials can then develop and implement policies through local zoning and subdivision regulations, to protect these soils from transportation and development projects. Pursuant to 6 V.S.A. §8, the Secretary of the Agency of Agriculture established guidelines to assist the municipal and regional planning commissions of the state in identifying agricultural lands.

The Vermont growth center designation is another optional tool to achieve a balance between development and resource protection. Under 24 V.S.A., Chapter 76A, towns may apply for a growth center designation from the Vermont Downtown Board which reviews all applications. A benefit of the designation allows for lower ratios for off-site mitigation required of developments that impact agricultural soils within designated growth centers.

B. Forest Resources

Forested land in the Region comprises approximately 75-80% of the total land area, and serves as a major asset to the Region. Forestlands provide a natural system of surface and groundwater filtration, air purification and soil stabilization, and provide critical habitat for many species of native wildlife. Vermont forests also are frequently home to a great diversity of significant natural communities along with many rare, threatened, and endangered species. They also serve as an important economic resource for the Region. They form the foundation for numerous outdoor recreational activities such as walking, hiking, skiing, hunting, and camping; provide timber for construction and woodworking industries; serve as a renewable resource for energy use through heat and power production; and provide the scenic qualities of an attractive natural setting for residents and visitors. Proper management of forested land takes into account all of these economically and environmentally beneficial values and balances them for the common good.

1. Forest Fragmentation

The management and prevention of forest fragmentation is a key component in the long term health and productivity of Vermont forest land. The creation of smaller forest patches due to development of housing and associated components such as roads and power lines may create unusable forest for many of the original inhabitants. As discussed in the Wildlife Section of this chapter, species such as black bear and fisher need undeveloped blocks of forest land (over 2,500 acres) in order to sustain a healthy population. For smaller species, and many predatory birds, a habitat range of between 100 and 500 acres is needed for survival. Bald eagles, osprey, turkey, and even deer are unable to find the appropriate amount of food and forage in smaller blocks thus resulting in an overall decrease in biological diversity. As development increases, species that are more accustomed to human interaction such as raccoon, squirrels, and skunks will increase in population due to the increase in forest edge habitat where they thrive.

Most of the forested land in the Region is in private ownership. Vermont's Use Value Appraisal (or Current Use) Program has been successful in bringing a large amount of private forestland in the Region under sound management plans. (See **Table 6.1** summarizing enrollment in the Current Use Program.) Even if left forested, small lots in multiple ownerships can be difficult to effectively manage; recreation access and timber production can be reduced due to differing objectives of landowners.

Towns are encouraged to plan for the protection of large areas of important forested land. By developing open space plans, Forest Land Evaluation and Site Assessment (FLESA) or encouraging planned unit development that encourage higher density development while protecting valuable open space, municipalities can ensure that large tracts of forestland remain contiguous. Local planning and conservation commissions may also take advantage of state and nonprofit organizations that can assist with incorporating forest resource planning into comprehensive plans.

Table 6.1 Southern Windsor County Current Use Program

Town	Total Acres	Forest	Non-Productive* Forest	Agricultural	Total Enrolled Acres	% of Total Acres
Andover	18,432	2,995.7	45.75	316.03	3,357.48	18.2
Baltimore	3,002	997.8	4.0	146.7	1,148.50	38.3
Cavendish	24,832	2,934.03	67.26	390.2	3,391.49	13.7
Chester	23,040	11,463.11	140.59	1,101.61	12,705.31	55.1
Ludlow	21,704	2,458.52	20.55	194.89	2,673.96	12.3
Reading	26,624	8,187.88	147.10	705.41	9,040.39	34.0
Springfield	31,557	7,270.33	148.21	2,080.09	9,498.63	30.1
Weathersfield	29,292	5,189.71	113.95	1,519.63	6,823.29	23.3
West Windsor	15,808	1,318.59	39.9	362.47	1,720.96	10.9
Windsor	12,544	1,799.02	58.7	656.46	2,514.18	20.0

* Conditions which cannot adequately support that use due to steep slopes, ledge, or wet soils.
Source: State of Vermont, Division of Property Valuation and Review, 2002

In 2007-2008, as part of a Municipal Planning Grant (MPG), the Reading Planning Commission, with assistance from the RPC and in conjunction with a statewide effort sponsored by the Vermont Natural Resource Council (VNRC) and Vermont Forum on Sprawl (now Smart Growth Vermont), developed policies and regulations that could help control the fragmentation of their important forestlands. The final report documents the process of mapping priority lands, lays out issues associated with forest fragmentation, identifies a range of policy options, and recommends specific town plan and zoning changes for Reading that will inform a larger campaign of the VNRC. In addition to developing

planning strategies for towns to address the problem of forest fragmentation, VNRC's campaign looked at workable tax relief and other landowner incentive programs to reduce forest fragmentation and promote the ability of forest landowners to hold onto their land.

2. Timber Production

Managing privately owned forestland for timber production has become a more significant part of the state and regional economies as forest cover has increased over the past 20 to 30 years, and over 80% of the forest land in the state is privately owned. When done carefully, logging is the kind of natural resource-based industry that furthers regional goals concerning open space, wildlife habitat, air and water quality, scenic resources, access to recreation, and the tourism economy. Logging operations that are based on sound management plans, follow Vermont's Acceptable Management Practices, and help conserve valuable forest, air, water, wildlife, and recreation resources should be supported, especially when they contribute to regional forest products industries. Realizing an economic return on forestland through responsible timber harvesting is a legitimate tool for maintaining the integrity of large forested tracts. Owners of private forestland should be encouraged to continue the recreational opportunities they provide and to work together to manage contiguous wood lots and recreational trails.

3. Forest Legacy Program

Vermont participates in the Forest Legacy Program (FLP), a Federal program that supports State efforts to protect environmentally sensitive forest lands. Designed to encourage the protection of privately owned forest lands, FLP is an entirely voluntary program. To maximize the public benefits it achieves, the program focuses on the acquisition of partial interests in privately owned forest lands. FLP helps States to develop and carry out their forest conservation plans. It encourages and supports acquisition of conservation easements, legally binding agreements transferring a negotiated set of property rights from one party to another, without removing the property from private ownership. Most FLP conservation easements restrict development, require sustainable forestry practices, and protect other values. In Vermont, the Vermont Department of Forest, Parks and Recreation has conserved approximately 53,000 acres in Vermont through the FLP.

4. Public Forest Lands

The Region also has a substantial amount of publicly-owned forestland (see **Table 6.2**). In addition to several town forests and land owned by the U.S. Army Corps of Engineers, a large amount of forestland is owned by the State of Vermont. The state-owned forest in the Region is managed under the concept of integrated use, a strategy of land management that considers public needs and the capabilities of the land to meet those needs. There are two State parks with camping facilities and trail networks. There are seven Wildlife Management Areas (WMAs) in the Region: Hawks Mountain, Knapp Brook, Tiny Pond, Arthur Davis, Little Ascutney, Weathersfield, and Skitchewaug. While originally purchased specifically for hunting, today WMAs emphasize conservation of wildlife and fish habitat. Unlike Vermont State Parks which focus equally on recreation and conservation, WMAs attempt to provide visitors recreation opportunities through conservation. Some state land is leased to private companies for use as alpine ski trails. Most of the state forestland in the Region is managed for multiple uses, including hiking, snowmobiling, hunting, fishing, and skiing, and much of it is managed for timber production through controlled harvests as part of long-term

management plans. The Southeast State Correctional Facility in Windsor also includes a large tract of forest lands (**Appendix A – Map 3**).

Table 6.2 State-owned Land in Southern Windsor County

Town	Total Acres	State-owned	% of Total
Andover	18,432	1,399.5	7.6
Baltimore	3,002	50.0	1.7
Cavendish	24,832	6774.0	27.3
Chester	23,040	118.3	.5
Ludlow	21,704	3,203.1	14.8
Reading	26,624	6,676	25.1
Springfield	31,557	431.25	1.4
Weathersfield	29,292	1,887.6	6.4
West Windsor	15,808	2,337.16	14.8
Windsor	12,544	4,359.59	34.8

Source: SWCRPC 2003
Note: Not necessarily forestland

Because it is not subject to the same development pressures as privately-owned forestland, public forestland is an especially valuable asset to the Region, and becomes more valuable as large tracts of private land are fragmented and developed. Public land can be a real asset not only to the Region's natural environment, but also to its economy. When managed properly, the economic benefits of public land can offset, to some degree, losses of local property tax revenue inherent in public ownership through the use of effective forest management practices such as selective cuttings. Management of state land should take all resource values into account. Although the economic values of recreation, wildlife habitat, and aesthetics are difficult to measure, these are important values that state-owned forestland provides for the Region.

The Region and adjacent regions presently have several "secondary" wood product manufacturers. Secondary manufacturing refers to the creation of wood products other than raw lumber or paper, such as furniture and other specialty and value-added wood crafts. These types of industries tend to provide a large number of jobs relative to the amount of wood needed for harvest. Manufacturing of secondary wood and agricultural products also adds value to these resources, and provides a good way to expand the Region's forestry economy without placing undue pressure on landowners to liquidate large amounts of timber

Productive forest soils, as defined in 10 V.S.A. §6001(8), are regulated through Act 250 Criterion 9(C).

C. Invasive Exotic Species

Invasive exotic species are non-native plants and animals that invade and alter both natural and managed areas. When they are free from natural predators, invasive exotics persist and proliferate to the detriment of native plants and animals. Not all non-native plants are invasive and not all invasive plants are non-native.

Fig. 6.1

Invasive exotic species have come to the Region through a variety of sources including, ornamental plant trade, conservation plantings, and agricultural operations. The threat of invasive exotic species to forest and open land in the Region is ongoing. Exotic honeysuckles, barberries, and buckthorns are all invasive shrubs or small trees that monopolize the understory (the area of a forest which grows in the shade of the emergent or forest canopy) of forests, both along the streams and farther upland, especially where the ground has been disturbed, in logging. Buckthorn is considered to be a major threat to the survival of future timber stands. Invasive exotic insects, such as the Hemlock Woolly Adelgid (see **Fig. 6.1**), pose a serious threat to forested riparian zones that are often comprised of significant quantities of eastern hemlock.

Aquatic invasive exotic species include zebra mussels that are a problem throughout the region and can severely impact water resources. They alter habitats by displacing native species on which organisms depend, while being of little use to those organisms themselves. This can be particularly detrimental to rare, threatened, and endangered species, which often require specialized environments to ensure their survival. Recreational opportunities may also be impaired if certain aquatic invasive exotic species such as zebra mussels (Dreissena polymorpha) spread to the region. While some aquatic invasive exotic species have not yet reached this Region, preventing their spread is essential.

Eurasian water milfoil (see **Fig. 6.2**) is an aquatic species, which can be found in the Connecticut River, the Mill Pond in Windsor; Lake Rescue; and at the confluence of the Black River and the Connecticut River, above and below Hoyt's Landing in Springfield. Purple loosestrife, the familiar beautiful flowering perennial plant of wetlands, is invading cattail marshes along the Connecticut and elsewhere. On the streambanks and along roadsides, Japanese knotweed (see **Fig. 6.3**), commonly referred to as "false bamboo", is very widespread, notably along the Black River in the area of the North Springfield Dam and along Fletcher Fields in Ludlow.

Fig. 6.2

Fig. 6.3

Since 1996, in an effort to control Eurasian water milfoil in Windsor's Mill Pond, the town has installed an impermeable barrier on the bottom of the pond at the public beach and has regularly made repairs to that barrier to make the beach more attractive for swimming. This treatment was undertaken with the help of the Water Quality Division, and is intended to become a part of a larger water milfoil control strategy as new technologies become available.

The most recent threat is from Didymo (*Didymosphenia geminata*) also known as "Rock Snot" which has been found in the Connecticut and White Rivers. This freshwater diatom produces a fibrous stalk that can develop into visible mats several inches thick that can carpet a stream bottom. Didymo can have negative ecological, economic and aesthetic impacts in infested areas, but how it will affect Vermont waters is yet unknown. There are no known methods of eradicating Didymo once it has been established so spread prevention is essential.

D. Wildlife Resources

The landscape of the Region includes a variety of natural resources such as rivers, lakes, forests, and wetlands that provide habitat for numerous wildlife and aquatic species. The abundance and diversity of wildlife provide both economic and recreational opportunities for residents in the Region and are an essential element of the Region's natural heritage. According to a study by the U.S. Fish and Wildlife Service, total expenditures for fishing, hunting, and wildlife-associated recreation in Vermont were $347 million in 2006.

Planning for the preservation of wildlife habitat is critically important for the continued survival of wildlife species in the Region and the economic benefits associated with them. In addition to providing habitat and creating economic opportunities, lands that are left undeveloped contribute to the rural character of the Region. A good planning resource for towns is *Conserving Vermont's Natural Heritage*, published in 2004 by the Vermont Department of Fish and Wildlife (VFWD).

1. Mast

Mast is high-energy food, including seeds, nuts and berries, produced by certain trees and shrubs, such as beech and oak. Mast production areas provide critical fall feeding areas for a number of mammals including black bear and turkey. A sufficient supply of these high-energy foods is necessary for pregnant female bears, prior to fall denning, to complete their gestation period and develop adequate milk for the cubs. In addition, mast areas are important for wild turkey, grouse, deer and a number of other birds and mammals. Mature oak and beech stands are the most important mast production areas for wildlife, and should be preserved whenever possible.

Natural events can also take a toll on wildlife food sources. Distribution of available hard mast was greatly influenced by the ice storm of January 1998. This storm's freezing rain damaged several hundred thousand acres of forest in Vermont. Particularly affected were beech stands, with higher elevation stands experiencing severe damage. In many cases 80% of the trees had greater than 75% crown loss. Such a decrease in food supply requires wildlife to disperse more widely in search of new sources. In 2000, wildlife biologists noted various individual beech trees and some beech stands that had been climbed by bears for the first time, most likely due to storm damage to traditional higher elevation feeding areas. Though the ice storm did severely damage mast production areas, the beech stands have recovered through new growth.

2. Habitat

A diversity of habitat types is needed for the continued existence of the various fish and wildlife species that inhabit the Region. A major deterrent to their survival and proliferation is the impact of human development on the natural environment. Although most development in this Region is done on a relatively small scale, cumulative development efforts can have a major impact on wildlife habitat. As people move to the Region the development of new single-family housing outside of villages is increasing. This growth pressure in rural areas is having a detrimental effect on large, contiguous blocks of wildlife habitat, including forest land, fields and other open spaces. Scattered, small-scale development causes fragmentation of these habitat areas, potentially diminishing or eliminating the land needed to support some species. A diversity of healthy populations can only be achieved through maintaining variety in the types of habitat available. Conservation of a diverse mix of natural areas and attention to connections between large tracts of wildlife habitat is necessary in order for a diverse and healthy wildlife population to survive and flourish. The following sections describe some important habitat types that may be found in the Region.

Large mammals such as moose, bear, deer, bobcat, and a variety of other animals including wild turkeys and grouse, rely on large contiguous areas of forests, fields and other undeveloped lands for food, shelter, breeding grounds and migratory stop-overs. The fragmentation of such land can result in decreases in the number of species as well as the sizes of populations of many species. A variety of songbirds reside in wooded areas that are characterized by less intense human use. In the Region, species may include red-eyed vireo, scarlet tanager, rose-breasted grosbeak, warblers, thrushes, white-throated sparrows, wrens, and many others.

Through Act 250, some protection is available for wildlife habitat areas under Criterion 8(a) - Wildlife Habitat and Endangered Species, which provides a detailed system to weigh evidence for a project and determine if a permit can be allowed.

Appendix A - Map 6 shows wildlife habitat areas identified by the VFWD and depicts blocks of undeveloped land that are likely to provide habitat for a variety of wildlife. Not only is minimizing the negative impacts of development on these large blocks of habitat important, but so is protecting wildlife travel corridors that connect these blocks. The boundaries of existing deer wintering areas and bear habitat have also been mapped, but are subject to change due to fluctuations in environmental conditions. These mapped areas are based on statewide data sources, so reviewing a development proposal for a specific site may require consultation with the VFWD or other qualified wildlife scientists to determine actual critical habitat areas and identify mitigation options.

a. Deer Wintering Areas

In winter months, deer tend to congregate in certain coniferous woods on western and southern slopes where they are protected from the wind and cold temperatures, and where they are offered greater mobility when searching for food. The greatest limiting factor on the size of the deer herd in the state is the quality and availability of the winter habitat. As stated in the VFWD's publication, *White-tailed Deer Management Plan, 1997-2006*, Vermont nearly lost its white-tailed deer population in

the late 19th century when the landscape was transformed from one which was 85% forested to one which was nearly void of trees (30%). Lessons like these reinforce the need to plan for future use and the demands on habitat.

b. Bobcat

Bobcats rely on large, contiguous areas to survive. Recent studies conclude that bobcat habitat preference is driven almost entirely by the presence of prey species. Habitats are predominantly comprised of "mature mixed woods" with a dense understory providing food and cover for prey and stalking cover for the bobcat, which must compete with other predators such as coyotes and fisher for food and space. Bobcat numbers are often underestimated due to their nocturnal habits and wariness. They favor areas with scattered swamps and southerly exposed rocky cliffs and ledges, where they can rest and sun. Denning sites must be secluded and quiet, and can be located in ledges, fractured rock, brush piles, hollow trees, and timber slash. When young bobcats move out, they survive as transients looking for territories to take over when another bobcat dies. Studies from other states have determined that home ranges for an adult male bobcat can be extensive, up to 60-square-miles, depending on the constancy of the environment. In addition to large habitat blocks, bobcats also need the connecting lands that bridge developed areas. These connecting lands allow for species reproduction and the protection of a healthy gene pool. If these connecting lands are lost due to development pressure, isolated populations may begin inbreeding thus increasing the chance of health problems and species loss.

c. Bear

Bears range over very large tracts of land in search of food. An adult male will range over a 25- to 50-square-mile area, while a female will cover between 10 and 15 square miles. Since bears are naturally wary animals, they rely on undeveloped travel corridors to link and provide access to suitable habitat. If travel corridors are fragmented, the bear populations will be threatened.

According to the VFWD, black bears are found throughout Vermont and the entire state is considered bear range. Bears currently traverse the Green Mountain Range into the towns of Andover, Baltimore, Cavendish, Chester, Ludlow and Reading. For planning purposes, the State has mapped four categories of bear habitat:

1. Bear production habitat: Regions frequently used by bears, including densities of cub-producing females, and generally require contiguous and remote forestland. The long-term stability of Vermont's bear population depends on these areas.
2. Seasonal bear habitat: Regions frequently used by bears, including some cub-producing females. These habitats often contain critical seasonal feeding areas.
3. Corridors: Regions often used by bears traveling between habitats.
4. Less-used areas: Regions that, in most years, are less frequently utilized by bears.

Black bears also need connecting lands and corridors to travel between habitats and breed grounds. As with the bobcat, bears must maintain a healthy genetic population to survive. In order to promote the stability of the multitude of animal species that rely on contiguous or interconnected wooded areas, local and regional planning should consider remoteness and connectivity as important environmental qualities. Such areas may host a number of compatible uses such as forestry and recreation.

E. Aquatic Habitat

The type of aquatic habitat needed for a successful population varies by species. However, many fish species in Vermont have lost habitat due to increased development along the shorelines of rivers and lakes. Some of the greatest threats to water quality and fish habitat are nonpoint source pollutants such as sedimentation caused by stream and river bank erosion and road runoff. Buffer areas of natural vegetation next to waterways can mitigate some of these problems and provide shaded areas along banks to keep water temperatures cool. Development increases the amount of stormwater runoff and the loss of trees along the shoreline allows sunlight to warm the temperature of the water. Species such as trout and salmon require coldwater habitat to live and share the need for cool, well oxygenated, free-flowing water with few blockages, and gravel stream beds for spawning. The most productive habitat for wild trout are small upland streams where water temperatures remain cool throughout the summer season and stream habitat has been minimally altered by land and water development activities. In the Region, wild trout populate Branch Brook in Ludlow, Twenty-Mile Stream in Cavendish, the upper North Branch of the Black River in Reading, Mill Brook in Reading and West Windsor, Mill Brook in Weathersfield, the upper Williams River in the Smokeshire District of Chester, Seavers Brook in Springfield, as well as many other small streams. In addition, the Black and Williams Rivers have played an important role in the salmon restoration program in the Connecticut River basin.

Dams and hydroelectric facilities inhibit the movement of fish populations to spawning areas and increase water temperature and sedimentation. Mitigation measures may include the construction of fish ladders or elevators to allow upstream passage to spawning habitat. Smaller barriers to aquatic organism passage are far more common. Road culverts with the downstream end hanging above water level prevent movement upstream. Replacing these culverts with ones of the appropriate size installed at grade allow fish species such as trout, smelt, suckers and minnows along with other aquatic organisms to pass through to the upstream portion of the habitat. A good resource for towns is the *Vermont Better Back Roads Manual* which provides resources on rural road stormwater techniques and fish friendly culvert designs.

Sewage treatment plants can degrade water quality by not fully treating effluent or by not having adequate facilities to treat certain nutrients such as phosphorous. The ability of streams and rivers to assimilate the discharge from sewage treatment plants and provide food supply and necessary habitat for spawning is predicated on stream depth and flow. Water withdrawal from rivers and streams can have a negative impact on fish species and should be studied before permits to withdraw water are granted. For a more in-depth

discussion on water quality issues that affect fish habitat and the state and local regulations that control these issues, see the Surface Waters section in this Chapter.

F. Rare, Threatened and Endangered Species; and Significant Communities

There are a number of rare, threatened and endangered plant and animal species and significant communities in the Region, including the peregrine falcon, dwarf wedge mussel, timber rattlesnake, and the cobblestone tiger beetle. The VFWD's Nongame and Natural Heritage Program has identified and mapped rare, threatened and endangered species, and significant natural communities throughout the State.

In order to protect these important natural areas, habitat areas or natural communities have been identified by points on the map but do not reveal which species reside in those areas (**Appendix A – Map 7)**. In addition, the U.S. Environmental Protection Agency (EPA) and the U.S. Department of Fish and Wildlife recognize the Connecticut River Rapids Macrosite area, stretching from the Wilder Dam in Hartford to Weathersfield Bow in Weathersfield, as an area of species and habitat richness. Endangered and threatened species are protected under 10 V.S.A., Chapter 123.

According to the U.S. EPA, threatened and endangered species are defined as:

> **Endangered Species**: "…means any species which is in danger of extinction throughout all or a significant portion of its range other than a species of the Class Insecta determined by the Secretary to constitute a pest whose protection under the provisions of this Act would present an overwhelming and overriding risk to man."
>
> **Threatened Species**: "…means any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range."

Vermont statute maintains that endangered species rules "shall [not] cause undue interference with normal agricultural or silvicultural practices", but does not exempt these practices from federal law protecting federally designated endangered species (10 V.S.A. §5408(d)).

The VFWD defines a rare species as:

> **Rare Species**: "…one that has only a few populations in the state and that faces threats to its continued existence in Vermont."

Rare species face threats from development of their habitat, harassment, collection, and suppression of natural processes, such as fire. The VFWD uses a ranking scheme that describes the rarity of species in Vermont. The range is from very rare to common and widespread, based on the number of known occurrences, the population size, and the degree to which the populations are threatened.

A significant community, as defined by the VFWD's Nongame and Natural Heritage Program, is also shown on Map 6. These represent areas of land and/or water in which a natural community is, or was, present. VFWD should be consulted to determine if these areas have practical conservation value for the community, based on potential, continued or historical presence and/or regular recurrence at a given location.

G. Water Resources

Healthy ponds, rivers, streams, wetlands, and clean drinking water are all important elements of healthy ecosystems. Rivers and streams provide habitat for fish and other aquatic species and are recreational resources for swimming, canoeing, kayaking, fishing, and sight-seeing. Many of the region's rivers serve as mixing areas for assimilation of treated wastewater, and some ponds and reservoirs provide secondary sources of drinking water for towns. River and stream corridors, including a buffer area of natural vegetation, also provide natural greenway corridors that can connect networks of wildlife or recreational corridors across the Region. Wetlands are important for habitat, recreation, pollution and flood control, and the recharge of surface and ground water. Groundwater is the primary source for most residential and municipal water supply systems and has many points of exchange both to and from surface water systems. Water resources can easily be damaged if not properly managed. Human activity can adversely affect surface water, groundwater, and wetlands through direct and indirect discharges caused by land use activities throughout the watersheds that supply these resources.

1. The Hydrologic Cycle

The interrelation between the different water systems is clearly demonstrated by the hydrologic cycle - the way in which water moves through the environment. Generally, the cycle functions as follows: The sun causes water to evaporate from the ocean and other bodies of water, which is then carried by wind over land. The evaporated water falls to earth as snow, rain, or ice depending upon weather conditions. Vegetation catches and absorbs some of the precipitation. What is not used by vegetation falls directly to the ground or is evaporated back into the atmosphere. The water that falls to the ground without being absorbed or evaporated either percolates through the soil or runs off the land into depressions, lakes, streams, wetlands or other water bodies. The water that percolates through the soil slowly collects in pockets in the soil or fissures in rocks to become groundwater. Once the groundwater capacity of these spaces is filled, the water will migrate into surface water bodies. Once collected in water bodies, the groundwater and runoff water will again evaporate, thus completing the hydrologic cycle.

Land use activities can have a profound effect on the movement, storage, and transmission of water through the environment. The construction of impervious surfaces such as parking lots, driveways, and buildings can increase the velocity of runoff and inhibit the infiltration of water into the soil. The higher volume and velocity of water increases the potential for flooding and erosion and brings with it sediment and pollutants that wash over the land. Greater turbidity and pollutant levels caused by runoff damage habitat for fish and aquatic organisms, and impair the aesthetic and recreational values of the water body.

2. Basins and Watersheds

The Region is located in the Connecticut River Watershed, and sits within three basins, as defined by the State: the Black River (Basin 10), the Williams River (Basin 11), and the Lower Connecticut (Basin 13). Basins include a number of sub-basins, which are individual watersheds (Mill Brook) or sections of watersheds (Upper, Middle and Lower Black River). The State completes assessment reports for each basin about every five years. A more comprehensive "basin plan" is required for each basin under the Vermont Water Quality Standards (2000), and must be updated every five years. Assessment reports generally summarize monitoring data collected by the State and other projects conducted within the basin assessed. A Basin Plan summarizes current and past (within five years) assessment, planning, and implementation activities at the state and local level in the basin. It identifies topics or areas of special importance in the basin, identifies available management tools to address those topics, and makes specific recommendations on how to address key topics, including recommendations for continuing community based planning or implementation action. The basin planning process begins with any planning that has already been completed by organized watershed groups. The Mill Brook Watershed Association, the Connecticut River Watershed Council, the Connecticut River Joint Commissions, and its Mount Ascutney Region River Subcommittee, the Black River Action Team and the West River Alliance are all watershed groups working within our Region.

In June 2008, the Basin 11 plan was completed and signed by ANR's Secretary. Basin 11 encompasses the Williams River watershed, which includes portions of Andover, Chester, Cavendish, and Springfield. ANR is currently working on the Basin 10 plan with a 2011 target date for completion of the Ottauquechee and Black River watersheds, which covers portions of Baltimore, Cavendish, Chester, Ludlow, Reading, Springfield and Weathersfield in this Region (**Appendix A – Map 8**).

3. Surface Waters

The Region's surface water resources consist of ponds, lakes, rivers, and streams which offer a number of different uses, such as recreation; wildlife habitat; food supply; commercial, industrial, and domestic use; and public drinking water supplies. The major lakes and ponds in the Region are Lake Rescue, Stoughton Pond, Mill Pond, Knapp Ponds, North Springfield Reservoir, and Lake Runnemede. The largest rivers in the Region are the Connecticut, Black, and Williams. Major streams include Mill Brook, Twenty-Mile Stream, Jewell Brook, and Tracer Brook. Like other waters in the state, the surface waters in the Region are impaired to varying degrees of severity.

Most point source pollution problems in the state have been addressed through the construction of publicly owned wastewater treatment facilities. However, nonpoint source pollution continues to be a problem in many areas. The most common sources of nonpoint pollution include agricultural runoff, streambank destabilization and erosion, removal of riparian (streamside) vegetation, flow regulations/modifications, land development, and highway maintenance/runoff. The problems caused by these sources include thermal modifications, organic enrichment or low dissolved oxygen, and excess nutrients.

The State is required to list waters that are "impaired" according to the most recently adopted Water Quality Standards (See **Table 6.3**). The State is required to address these

"303(d) listed" waters with a Total Maximum Daily Load plan, which will identify sources of pollutants and specify maximum amounts that will be regulated in order to bring the water back to state standards. In 2008, the Black River (from it's mouth to 2.5 miles upstream in Springfield), and the Tributary to Jewell Brook in Ludlow were identified as "impaired" in our Region.

Table 6.3 303(d) Listed Waters-Impaired (Do not meet VT Water Quality Standards)

Waterbody ID	Segment Name/Desc.	Pollutant	Use(s) Impaired	Problem(s)
VT10-11	Black River; from mouth to 2.5 miles upstream (Springfield)	E. Coli	Contact Recreation	Combined sewer overflows
VT10-14	Soapstone Brook, Ludlow	Iron, Arsenic, Sediment	Aesthetics, Aquatic Life Support	Aquatic habitat impairment, some effect likely from Talc mine drainage, needs upstream assessment
	Tributary to Jewell Brook, Ludlow	Iron	Aesthetics	Evidence of Ludlow landfill leachate

Source: Vermont DEC – Water Division; 2004

Three waters in the Region are also listed as "In Need of Further Assessment" in the "2008 List Of Priority Surface Waters Outside The Scope Of Clean Water Act Section 303(D)" (see **Table 6.4** below). Waters on this list are in need of further assessment due to some identified or suspected pollutant that may be impacting one or more designated use of the waterbody. If future assessment results indicate impairment, the waterbody will be included in the next 303(d) list.

The Connecticut River Joint Commissions, made up of the Vermont Connecticut River Watershed Advisory Commission and the New Hampshire Connecticut River Valley Resource Commission, developed the Connecticut River Corridor Management Plan (CRCMP) that lists problems and provides recommendations to address these problems throughout the Vermont and New Hampshire portions of the Connecticut River watershed. According to the CRCMP, bank erosion is one of the greatest problems along the Connecticut River. Both the Old Connecticut River Road in Springfield and Brook Road in Windsor are examples of the effects of erosion and streambank destabilization. In order to prevent erosion, the CRCMP recommends that towns and landowners avoid substantial investment and construction in the floodplain and protect floodplain areas and other lands in the corridor for open space, agriculture, and forestry.

Table 6.4 Part C - Waters in Need of Further Assessment (May not meet VT Water Quality Standards)				
Waterbody ID	Segment Name/Desc.	Possible Pollutant	Possible Use(s) Impaired	Possible Problem(s)
VT10-11	Black River, 2.5 To 7.5 Miles Above Mouth	Sediment, Nutrients, E. coli	Aesthetics, Aquatic Life Support, Contact Recreation	Contributions From Urban Runoff, Land Development
VT10-14	Jewell Brook	Arsenic	Aquatic Life Support, Contact Recreation, Secondary Contact Recreation	Arsenic In Sediment From Former Mill
VT10-16	No. Branch Black River Above Stoughton Pond	Sediment, Nutrients, E. Coli	Aesthetics, Aquatic Life Support, Contact Recreation	Source(s) Need Further Assessment; Notable Erosion

Erosion and road runoff are significant problems in many rivers and ponds throughout the Region. Increased flows that come from stormwater runoff can carry sediment and other pollutants into surface waters and cause an imbalance in flow dynamics. This imbalance can lead to flooding and sedimentation in rivers, streams, lakes and ponds into which they flow. The RPC, with assistance from the Mill Brook Watershed Association, completed an erosion study for the Mill Brook and its major tributaries in 2000. The study mapped out erosion sites and categorized them by type and potential for remediation. In most cases the erosion is caused by the natural movement of the stream channel over time (the geomorphology of the river). If the river has access to the floodplain, the natural meandering of the channel will eventually bring the river to a stable state. Rechannelization over time as well as ongoing development that bring higher flows have contributed to the changing channel. In order to slow the process of erosion and allow rivers to reach a stable state, the communities within the watershed should discourage development in the flood plain and work with property owners to establish vegetated buffers where there are none.

An ongoing study throughout Vermont has been a Fluvial Geomorphic Assessment of rivers and streams. Each assessment is broken into three distinct phases where differing aspects of the stream are studied. Within the Region, Phase I assessments were completed looking at the erosion, floodplain access and bridge or culvert condition on the Black River and associated tributaries along with Mill Brook in Windsor. Phase II studies were completed during the summer of 2008 on portions of the Black River and Twenty Mile Stream in Cavendish. The results of these studies will allow towns to better address water quality concerns. The anticipated final product from the Fluvial Erosion Hazard study is a corridor management plan that will provide guidance on restoration projects that will help remediate water quality concerns.

In addition to the threats to surface waters coming from the watersheds in which they are located, pollutants can be carried into rivers and streams in the rainwater itself. For several years, there have been statewide fish consumption advisories for mercury content. The advisory guidelines are more stringent for the consumption of lake trout and walleye, especially for women of childbearing age, but suggest limits on consumption of all fish for all segments of the population. Unfortunately, one of the major contributors to mercury contamination appears to be atmospheric deposition, which cannot be effectively controlled at the regional or state levels.

Water quality problems are exacerbated by human activities taking place not only along shorelines but throughout watersheds. These issues should be addressed through planning, education, land acquisition and regulatory programs. To be effective, these measures should encompass not only local needs but those of entire watersheds and the Region (**Appendix A – Map 7**).

4. Wetlands and Vernal Pools

Wetlands and vernal pools serve as important feeding and breeding areas for a number of plant and animal species (**Appendix A – Map 7**). One-third of federally listed endangered species are dependent on these areas for survival. Upland wetlands provide an important early source of vegetation for bears that are emerging for springtime feeding. Many of these wetlands are fed by groundwater discharge and can produce vegetation earlier in the season because of the warmer groundwater.

Wetlands fulfill a variety of functions, including erosion control, flood storage, removal of pollutants, and wildlife habitat. The State of Vermont recognizes the importance of these functions in 10 V.S.A. §905. In 1990, the Water Resources Board issued the Vermont Wetlands Rules which classify all wetlands according to their functions. Wetlands in Vermont are classified by significance as either Class 1, 2 or 3. Class 1 wetlands are those that "are exceptional or irreplaceable in their contribution to Vermont's natural heritage and are therefore so significant that they merit the highest level of protection under these rules." Class 2 are those wetlands that "either taken alone or in conjunction with other wetlands, merit protection." Class 3 wetlands have been determined to be not significant enough to be protected by the State. According to the Vermont Wetlands Rules, wetlands are:

> ". . . 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, but exclude such areas as grow food or crops in connection with farming activities."

The major functional values of wetlands are:

- Storage of flood water and stormwater runoff;
- Protection of surface and groundwater through filtration of pollutants;

- Habitat for fish, wildlife, migratory birds, hydrophytic vegetation, and threatened/endangered species;
- Specialized, seasonal breeding habitat (such as vernal pools);
- Natural science education and research ;
- Recreational value; open space; aesthetics; and
- Erosion control through binding and stabilizing of the soil.

The degree to which a particular wetland fulfills the above functions, rather than size, determines its significance. In Vermont, 220,000 acres or 4% of the land area in the state have been identified as wetlands. The State's Wetlands Office estimates that over 80,000 additional acres of wetlands exist, and which still need to be identified on maps.

Development activity (other than certain agricultural/silvicultural activities and certain home maintenance activities) in or near a Class 1 or 2 wetland requires a Conditional Use Determination from the ANR to ensure no undue adverse effects on the protected functions. Zoning administrators in towns that have zoning are required to notify the Wetlands Office of activities proposed within wetlands prior to the issuance of a local zoning permit. The Wetlands Office has 30 days to provide comments on the project to the zoning administrator. This review mechanism protects zoning administrators from issuing local permits that might violate state and federal wetlands regulations.

Vermont wetlands are also protected under Act 250 and by some local bylaws. Federal protection is afforded by the U. S. Army Corps of Engineers and the U.S. Environmental Protection Agency through administration of Section 404 of the Clean Water Act. Section 404 regulates the dredging or placing of fill into any waters of the United States, including wetlands. The Clean Water Act also requires that regulated activities are certified by the states as being in compliance with applicable state water quality standards.

State and Federal regulations notwithstanding, the ANR's Water Quality Division estimates that between 200 and 400 acres of wetlands are lost each year in Vermont. This loss is offset by wetland restoration programs and natural reversion to wetland when land uses are abandoned, but clearly shows that existing regulations do not prevent all development in and around wetlands. The Vermont Wetlands Office has documented the loss of 118 acres and impairment of 265 acres of wetlands between 1990 and 1995 for projects that were reviewed under the Vermont Wetlands Rules. Smaller projects in Class 3 wetlands are not reviewed, and it is likely that development is still occurring in regulated wetlands without being reported to the Wetlands Office.

Vernal pools are temporary bodies of water which usually occur in woodland depressions and provide important breeding areas for a variety of amphibian and insect populations. Most vernal pools in Vermont are filled by spring rains and snow melt and are dry during the summer. The pools are typically shallow and may range in size from a few feet to 150 feet in width. They are safe breeding grounds for insects and amphibians because they do not support fish populations. Most vernal pools in the state occur in forested habitats, but they may also be found in meadows, sand flats, and river flood plains. Because of their small size and temporary nature, vernal pools are not protected under the Vermont Wetland Rules.

They are critical habitat areas for many species and should be identified and protected under municipal plans.

Vernal pools and Class 3 wetlands are not currently mapped in this Region. Vernal pools are not regulated by the State. Towns might consider creating a conservation commission to inventory vernal pools and Class 3 wetlands. Town plans and zoning bylaws could protect these resources if desired locally.

5. State and Local Efforts to Improve Water Quality

a. Riparian Buffers

A riparian buffer is a band of vegetation located next to a body of water such as a brook or stream. Maintaining vegetated buffers of native trees and shrubs is the easiest and most cost effective way to improve water quality in streams, rivers, lakes, and ponds. Buffers filter runoff from roads, lawns, stables, farms, junkyards, and construction operations that may carry fine sediment, nutrients, oils, fertilizers or other pollutants. The roots of vegetated buffers can also help to hold stream banks in place preventing erosion. By reducing the speed of runoff, buffers allow water to infiltrate into the soil and therefore reduce the volume of runoff into the brook. This has the combined effect of preventing flooding and recharging the groundwater supply.

The effectiveness and functions of buffers vary according to a number of factors, including soil type, slope, and the type of vegetation. Generally, the wider the buffer, the more effective it is in filtering pollutants, protecting banks, and providing habitat areas for birds and other wildlife. Vegetated banks also provide shade which keeps waters cool for native fish populations. The State of Vermont has recently adopted policies for designating buffer widths on projects that come under State review. The policy will look at the intended functions of a buffer and make a scientific determination of the width according to the characteristics of the site. In most cases, the State will require a minimum 50-foot buffer, and in many cases a 100-foot buffer. Site visits will likely be made to projects proposing smaller buffers, and different standards will be developed for urbanized areas

Buffers can clearly provide benefits to water quality, fish and wildlife habitat, and can offer some protection against flood damage and erosion. However, some flexibility in buffer type, width and/or construction materials should be considered for projects that provide significant public benefits (such as bike paths, parks, and other recreational uses).

b. Stormwater

Significant changes have been made in recent years to federal and state laws that regulate stormwater runoff. In 2005, the ANR adopted a new stormwater rule for stormwater runoff into water that is not primarily influenced by existing stormwater runoff. Permits from the Vermont Department of Environmental Conservation (DEC) are required for any development that disturbs 1 or more acres or is part of a larger development.

Under the rule, towns are responsible for ensuring that development plans have been stamped by a licensed engineer saying that they comply with the Vermont Stormwater Manual. Towns may also adopt local regulations for projects not covered by the State

regulations. To learn more about the new rules, visit this website: www.vtwaterquality.org/stormwater.htm.

The *Vermont Erosion Prevention and Sediment Control Field Guide* and *The Low Risk Site Handbook for Erosion Prevention and Sediment Control* are resources for appropriate measures for erosion prevention and sedimentation control during construction. Several measures can be taken to prevent stormwater runoff during construction including:

- Laying gravel on the construction entrance to prevent soil from being transported from the site onto the pavement;
- Properly installing and maintaining a silt fence;
- Diverting and slowing the rate at which stormwater runoff from any surrounding hillsides passes through the site; and/or,
- Exposing only the soil on the area which will be worked on and then stabilizing the soil when finished with approved methods.

Low impact development (LID) is a technique used to control stormwater runoff at building sites. Techniques can range from utilizing the natural swales and hollows in the landscape for stormwater infiltration to collecting runoff from roofs on buildings for domestic reuse. The goal of LID is to return the development site back to its original hydrologic functions using designs to infiltrate, control, reduce and store runoff at the source and to maximize groundwater recharge on-site.

6. Groundwater

Groundwater is the Region's primary source of drinking water. It moves underground through aquifers, which are water-bearing strata of permeable rock, sand, or gravel. Due to Vermont's geology, groundwater is often unpredictable as it travels through a maze of cracks in bedrock formations. It can infiltrate rock fractures and travel in unknown directions for long distances or break out to the surface. Potential groundwater pollutants include septage from improperly designed or malfunctioning septic tanks and leaching fields for wastewater, leakage from underground gas and oil tanks, and improperly disposed of chemical or radioactive materials. Once contamination occurs, control and abatement are extremely difficult, if not impossible. The key is to prevent pollution from entering rock fractures in the first place.

Effective June 9, 2008, Section 1 of Vermont Act 199 sets forth the General Assembly's finding that it is the policy of the state to protect its groundwater resources in order to maintain high-quality drinking water, that the groundwater resources shall be managed to minimize the risk of groundwater quality deterioration by regulating human activities that pose a risk to those groundwaters, and that the groundwater resources of the state are held in trust for the public.

As such, Act 199 states that, "Beginning September 1, 2009, any person that withdraws more than 20,000 gallons per day, averaged over a calendar month at a single tract of land or place of business shall file a groundwater report with the secretary of natural resources on or before September 1 for the preceding calendar year." It further states that, "On and after July 1, 2010, no person, for commercial or industrial uses, shall make a new or increased

groundwater withdrawal of more than 57,600 gallons a day from any well or spring on a single tract of land or at a place of business without first receiving from the secretary of natural resources a groundwater withdrawal permit."

In addition, a new Subchapter 6 was added to 10 V.S.A. Chapter 48, titled "Groundwater Withdrawal Program," covering matters such as groundwater withdrawal permits and reporting requirements, public input at hearings on permit applications, and the adoption of rules by the Secretary of the ANR implementing the new statutes. The rules shall include requirements for the mitigation of undue adverse effects on water systems and requirements for the renewal of permits.

The DEC's Water Supply Division has developed a groundwater protection strategy, including the identification and mapping of Public Water Source Protection Areas, for all communities in the Region. Vermont's Water Supply Rule (Environmental Protection Rules, Chapter 21; adopted April 25, 2005; www.vermontdrinkingwater.org) defines a Source Protection Area/Public Water Source Protection Area as:

> "…a surface and subsurface area from or through which contaminants are reasonably likely to reach a Public water system source."

Delineation of Public Water Source Protection Areas is required for approval of each new Public Community water system source (as defined by Vermont's Water Supply Rule), and for increases in approved yield of an existing source. Groundwater sources require delineation of Wellhead Protection Areas, which are delineated using existing geologic and hydrogeologic data and pumping test data, and giving consideration to several factors, including topography, expected use, soil types, and hydrogeologic modeling.

A major issue confronting local communities is protection of Source Protection Areas. As development pressures increase, land uses can occur near these areas that threaten groundwater quality. A few areas of major concern are the storage of chemicals or other potential pollutants, the possibility for spills, or the use of materials by consumers that could leach into the public water supply. The severity of the potential problem is increased by the fact that few communities have secondary water supplies in case of contamination.

In response to the 1996 amendments to the federal Safe Drinking Water Act, which required states to develop and implement a Source Water Assessment Program (SWAP). Vermont's SWAP includes different requirements for the three different types of public water systems. In Vermont, a Source Protection Plan includes the delineation, inventory, and assessment required under the federal program, and also includes a management plan for the potential risks and a contingency plan.

On July 1, 2007 changes to the Vermont on-site sewage statute were put into effect giving the ANR universal jurisdiction over all on-site wastewater permits, superceding any existing town or local septic ordinances. These changes may have an effect on the quality of Vermont's groundwater in the near future. The changes ease the technical requirements for the installation of septic systems, making much more land available for residential development. Eliminated is the exemption from review of most systems installed on parcels of land greater than 10 acres in size. The changes also lifted many of the restrictions on the

use of land with steep slopes and shallow depth to bedrock, increasing the amount of land available for residential use by as much as 50%. Towns should address the land use implications in town plans and land use regulations, if they so choose. Much of the land that was recently off-limits to development solely because of physical constraints may now be suitable for supporting on-site septic systems.

H. Soils

Composed of disintegrated rock, water, air, decaying organic matter, and microorganisms, soil is the critical link between rocks and plants. Soils vary greatly in their composition and determine where water impoundments occur, the kind and amount of vegetation that is available to wildlife as food and cover, and what types of land use are suitable. Potential uses include agriculture, forestry, earth resource and mineral extraction, and recreational and building site development.

The soils in Region occur in an orderly pattern that is related to geology, relief, climate, and the natural vegetation of the area. Individual soils on the landscape merge into one another as their characteristics gradually change. From the top of the Region's highest peaks to the banks of the Connecticut River, soils differ in slope, stoniness, wetness, degree of erosion, and other characteristics that affect their use.

A major threat to soils is erosion, which is a process that occurs naturally but can be greatly accelerated through human activity. Most soils in their natural state are protected from wind and rain by vegetation, which may range from grasses to dense forests. When vegetation is removed, fertile topsoil, which may only be a few inches thick, is the first to erode. Topsoil generally has more capacity than the subsoil to hold the moisture necessary for plant growth, supplies more nutrients, and more readily allows plants to establish root systems. Erosion, construction, mining, logging, and other activities may also destroy protective vegetation.

Since 1935, the U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS) has provided leadership in a partnership effort to help America's private land owners and managers conserve their soil, water, and other natural resources. Slope is the inclination of the land surface and is one of a few important factors in determining suitability for development. **Table 6.5** identifies the various NRCS slope classifications and the associated development constraints. **Appendix A – Map 9** shows slopes over 25 percent.

Table 6.5 Slope Classifications

% Slope	Classification
0-3%	Generally suitable for most types of development, may require drainage
3-8%	Most desirable for development, having least restrictions
11-15%	Suitable for low density development with particular attention given to erosion control, runoff, and septic design
15-25	Unsuitable for most types of development and septic systems, construction costly, erosion and runoff problems likely
>25	All types of construction should be avoided, careful land management for other uses needed

Source: Natural Resources Conservation Service

Generally, in Vermont, land in excess of 2,500 feet in elevation is considered a fragile environment and development should be strictly discouraged. The land tends to be predominantly steep with an extremely shallow soil depth to bedrock, low recovery rates of damaged vegetation, and high susceptibility to erosion. These highland areas are largely in forestland and contribute to the capture and filtration of clean water to lower elevation.

Ski areas may require construction in areas higher than 2,500 feet in elevation and with slopes greater than 25%. However, careful consideration must be given to any negative impacts new construction may have on the environment, such as degradation of water quality, erosion of topsoil, and encroachment on wildlife habitat.

Since most development outside of the Region's villages do not have access to a municipal sewer system, the suitability of soil for onsite wastewater treatment systems is important in evaluating where septic systems should be located and identifying the limitations of future development. Soils within the Region vary greatly with respect to suitability for private wastewater systems. **Appendix A – Map 10** shows the septic suitability of soils based on NRCS soils data.

I. Mineral Resources

Mineral resources, such as sand, gravel, crushed rock and stone, talc, soapstone, granite and marble, are necessary commodities in the Region for road improvement, building construction, drainage, construction of septic systems, and for export. Historically, the towns of Cavendish, Chester, Ludlow, Weathersfield, and Windsor were sources for the export of granite and marble. However, due to a combination of capital costs and reduced consumer demand, the excavation of granite and marble has declined dramatically. There were extensive lime quarries and kilns in Weathersfield - primitive ones in the early to mid 1800s and a well developed commercial operation in Amsden until the 1930s. There was soapstone mining in Weathersfield until 1910 and in Chester until the 1980s for stone used by the Vermont Soapstone Company in Perkinsville. Presently, only Holden Quarry in Chester still extracts talc.

Sand and gravel for domestic use, and talc for export are the predominant mineral resources mined in the Region today. Sand and gravel deposits occur in abundance along the Connecticut River and its tributaries. However, many town-owned pits are close to being out of sand and gravel for local highway uses, and prices from private sand and gravel sources have increased dramatically in the last 15 years. Talc is currently mined and processed in Ludlow. The talc mining industry is expected to remain stable into the foreseeable future.

Excessive resource extraction can permanently damage natural and aesthetic resources with broad implications for water quality and availability, as well as the potential for destruction of archaeological sites. Sand and gravel deposits serve as areas for aquifer recharge and filtration, vital for high quality sources of drinking water. Disturbance of these areas can reduce their natural ability to retain and filter groundwater, resulting in degraded water

quality. On-site storage and disposal of materials at extraction sites contaminates underground water supplies through the leaching of hazardous materials into the water table.

Mineral and earth resources extraction requires an Act 250 permit under Criterion 9 (d) and (e). Such operations bring noise, dust, heavy truck traffic, and negative impacts on local aesthetics, which often trigger local challenges by neighboring property owners. Criterion 8(a) - Wildlife Habitat and Endangered Species must also be taken under consideration.

J. Air Quality

Residents of the Region are fortunate to live in an area that has relatively clean air. However, threats to air quality do exist and may either be locally generated or transported from outside the State's borders. Local air quality problems may be generated through auto emissions, especially in congested areas; local industrial and manufacturing facilities, including mineral extraction; trash incineration; smoke from wood stoves; and illegal burning of garbage. Transported air pollution comes across state lines or from other regions of the country, as evidenced by acid rain and reduced visibility in the summer.

Air quality standards are set at the federal level, through the EPA. The Clean Air Act, which was last amended in 1990, requires EPA to set National Ambient Air Quality Standards (NAAQS) (40 C.F.R. part 50) for pollutants considered harmful to public health and the environment. It also established two types of national air quality standards: Primary standards (set limits to protect public health) and Secondary standards (set limits to protect public welfare, including protection against decreased visibility, damage to animas, crops, vegetation, and buildings.) The EPA Office of Air Quality and Standards set NAAQS standards for six principal or "criteria" pollutants: particulates, sulfur dioxide, carbon monoxide, nitrogen dioxide, lead, and ozone. Currently Vermont is "in attainment" for all standards set under NAAQS, however it is bordered by other states that are "in non-attainment" for some pollutants. It is important that development of new industrial or manufacturing facilities include approved emission control systems to stay in attainment, as well as preventing costly changes in the future. In addition, dust from mining operations and construction can cause local air quality problems if not properly controlled.

Noise may also be a side effect of mining and similar industrial activities that can negatively affect the quality of life of local residents and visitors, as well as wildlife. The Act 250 review process should prevent such negative effects; however, local planning commissions may want to address such issues when making land use decisions in their communities. The Noise Pollution Clearinghouse in Montpelier offers resources on this issue www.nonoise.org.

The greatest threat to air quality in the Region comes from motor vehicle emissions. Vermont requires that emission control devices be mounted on and in use in cars and requires that such devices be tested to ensure that emission standards are being met. Effective January 1, 2001, 1996 and newer gasoline powered vehicles, and 1997 and newer diesel powered vehicles of 8,500 pounds or less must pass an annual "On-board Diagnostic Inspection".

In addition, on September 12, 2007, the U.S. District Court for the District of Vermont decided against a group of automobile manufacturers challenging Vermont's vehicle emissions standards for greenhouse gases. In August of 2005, the Vermont Air Pollution Control Division introduced an amendment to Vermont's vehicle regulations. The amendment would require the State to adopt California's proposed greenhouse gas emissions standards for motor vehicles. The standards would be gradually phased in between model-years 2009 and 2016, and by model-year 2016, would require reductions of tailpipe greenhouse gas emissions from new motor vehicles of approximately 30 percent. Vermont and 13 other states are poised to adopt the California standards.

Regional and local planning commissions should address vehicle emissions problems through the planning of transportation networks to prevent congestion and through the promotion of public transportation and bicycle and pedestrian travel. Section 108(f) of the Clean Air Act lists Transportation Control Measures to reduce mobile source emissions (see Appendix C). States whose air quality fails to meet the NAAQS are required to implement various combinations of these measures in an attempt to improve air quality. See Volume 2: Southern Windsor County Regional Transportation Plan for additional discussion.

As discussed in the Energy Chapter, Vermont's primary energy sources produce very little air pollutions as protected by the U.S. EPA. The contract for electricity from HydroQuebec expires in 2012, and the operating license for Vermont Yankee expires that same year. Any other potential new and/or replacement energy plants should strive to not negatively impact air quality.

By-products from woodstove combustion may cause poor air quality in some areas, depending on topography and weather patterns. Federal law requires that new woodstoves contain clean burning combustion systems or catalytic converters; however, older stoves and outdoor-burning woodstoves (mounted on the exterior of a building) are exempt from such requirements. The state is considering rules regarding outdoor-burning woodstoves; municipalities or regions that have noticeable air quality problems related to wood burning may wish to address such issues at the local level.

For additional discussion on air quality issues and climate change, please refer to the Energy Chapter.

AGRICULTURE & FOREST RESOURCE 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. Expand the agricultural and forestry economies by coordinating planning, zoning, and economic development activities with member communities and organizations.

3. Protect the Region's rural character and working landscape.

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. Reduce fragmentation of forest and agricultural lands.

6. Protect and preserve the character and integrity of both significant public and private forest lands.

AGRICULTURE & FOREST RESOURCE POLICIES

1. Encourage measures that balance supporting land-based economies, protecting agricultural and large blocks of forested lands, with supporting development in or near town centers.

2. Work with landowners to create vegetated buffers between farmland and surface waters in the interest of protecting water quality as well as agricultural property.

3. 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.

4. The construction of utilities, roads or other land development should skirt tracts of productive agricultural and forest land rather than divide them.

5. Large tracts of economically viable Primary and/or Secondary Agricultural Soils located outside of downtowns, villages and other locally designated growth areas should be protected for current and/or future agricultural use. Development in these areas shall utilize innovative site designs (e.g. clustering, planned unit developments, etc.) in order to minimize negative impacts and preserve the agricultural viability of these soils.

6. Development within downtowns, villages and other locally designated growth areas should be allowed on areas of Primary and/or Secondary Agricultural Soils, if supported in the town plan, but shall use innovative site designs to minimize negative impacts and shall be required to maintain a small tract for future small-scale agricultural use or community garden.

7. State or federal programs and legislative efforts which protect and enhance the economic, cultural, environmental, and aesthetic values of agricultural and forest lands should be supported.

8. Support productive, sustainable forestry on large lots, contiguous blocks of forested lands, and forested corridors linking large tracts of forest lands, and maintain accessibility to those lands. Doing so will contribute to maintaining the ecological values and economic vitality of these forested areas.

9. Proposed roads or utilities should be sited to cause minimal negative impact to forest contiguity and aesthetics.

10. 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.

11. Encourage appropriately sited and designed businesses promoting the local processing, sale and distribution of native raw materials and products. 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.

12. State-adopted Accepted Agricultural Practices and Acceptable Management Practices shall be used in agricultural and forestry activities, implementation of Best Management Practices (BMPs) are encouraged in such operations, and point and non-point source pollution shall be minimized.

13. Conservation of agricultural and forested lands through the use of public/private funds for the purchase of development rights, fee simple purchase, and other such measures is encouraged.

14. The RPC 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 RPC 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.

15. It is the policy of the RPC to minimize or mitigate the loss of these resources to development. As an alternative to conventional methods, the RPC 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.

AGRICULTURE & FOREST RESOURCE RECOMMENDATIONS

1. Inventory and prioritize agricultural lands using the Land Evaluation Site Assessment (LESA) and Forest Land Evaluation and Site Assessment (FLESA).

2. Provide planning advice and support to Planning Commissions, Conservation Commissions, non-profit conservation organizations, and other groups interested in sustaining agriculture and forestry.

3. The RPC will evaluate proposed developments involving Primary Agricultural Soils 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.

4. Encourage the location of local farm and forest product industries in the Region where such industries would benefit the community and the Region.

5. Assist in mediation efforts when disputes arise concerning regionally significant agricultural or forested lands.

6. Work with various federal, state, local and non-profit agencies to disseminate information related to agricultural and forest management and develop planning policies and regulations.

WILDLIFE GOALS

1. Preserve or enhance the biodiversity and population of wildlife, including natural predators, by minimizing development impacts on large blocks of habitat and wildlife travel corridors.

2. Maintain or improve water quality necessary to sustain existing aquatic communities.

3. Support recreational activities, fishing and hunting done in an ecologically sound manner providing for the continued success of wildlife species and their habitat.

4. Combine recreation and wildlife corridor uses to develop a greenways network in the Region.

5. Encourage the use of the Region's forested land as both working landscapes along with wildlife habitat.

6. Protect rare, threatened, and endangered species and their habitats.

WILDLIFE POLICIES

1. Support local efforts to inventory and map large contiguous blocks of wildlife habitat and associated connecting lands that serve as wildlife travel corridors.

2. Development should be designed and sited in a manner to preserve contiguous areas of active or potential wildlife habitat by clustering, building to the periphery of habitat areas and/or planned unit developments. 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.

3. Large contiguous tracts of forest should be managed 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. Critical habitat types in the region that shall be considered during development planning include, but are not limited, to the following as identified by the Agency of Natural Resources:
   (a) Forested corridors or "greenways" used by songbirds during migration;
   (b) Open fields;
   (c) Cliff areas or rock outcroppings identified as habitat for peregrine falcons, bobcats or other wildlife;
   (d) Areas over 2,500 feet in elevation; and
   (e) Large tracts of contiguous forest land.

5. Vegetated buffer areas along stream and river banks should be encouraged in development plans in order to provide shade and mitigate the negative impacts of sedimentation and nonpoint source pollution on aquatic habitat.

6. Efforts to monitor and, where necessary, to mitigate the effects of hydroelectric facilities, dams and sewage treatment plants on important aquatic species shall be encouraged.

7. Support federal, state and local governments and conservation group acquisition of land and/or conservation easements that protect critical wildlife habitats.

8. Support federal, state, regional and local programs and initiatives that educate and encourage private and public landowners to recognize the importance of protecting and enhancing fish and wildlife habitats and ecosystems.

WILDLIFE RECOMMENDATIONS

1. Assist communities in addressing wildlife and habitat issues in town plans and implementation documents.

2. Coordinate with local communities and the Department of Fish and Wildlife, to ensure proper implementation of protective policies.

3. Develop significant wildlife habitat protection and water withdrawal policies that can be used as guidelines for communities and developers.

4. Review development proposals involving large tracts of forested land, and recommend developments to locate along existing road systems, and clustering of residential units along the perimeters of important habitat areas to avoid fragmentation and other negative impacts.

5. Support town planning commissions and/or conservation commissions to develop inventories of wildlife habitat and wildlife travel corridors in order to refine the Department of Fish and Wildlife's wildlife habitat suitability mapping information.

WATER RESOURCES GOALS

1. To protect, and improve where necessary, the quality and quantity of the Region's surface waters and the land surrounding them so that they support a variety of uses and functions including contact recreation, habitat for native flora and fauna, and flood and erosion control.

2. To protect and preserve wetlands so that they may serve the functions defined in the Vermont Wetlands Rules.

3. To ensure that all towns in the Region have drinking water supplies that are safe and sufficient to meet the needs of future growth.

4. To protect groundwater as a public trust.

WATER RESOURCES POLICIES

1. The RPC will assist towns in including a watershed planning component in their town plan in order to protect surface and groundwater resources.

2. Towns are encouraged to include "Best Management Practices" from the Connecticut River Corridor Management Plan (Volume V, Appendix E) in their town plans to minimize nonpoint pollution and improve water quality.

3. The RPC will work in cooperation with the state in developing watershed plans and/or basin plans for all of the Region's watersheds.

4. Local and regional organizations that provide educational, technical, and policy information on water-related issues to local communities shall be supported.

5. Headwater streams, gorges, waterfalls, and cascades and the land around these important resources should be protected.

6. Surface waters with minimum flows should be closely monitored to ensure that wildlife habitat and recreational values of these waters are not adversely impacted.

7. Development in flood hazard areas shall be in compliance with the municipal flood hazard regulations.

8. Continued assessment should be conducted on those water bodies that were "de-listed" on the State's 303(d) report.

9. Towns are encouraged to implement land use policies and regulations that address wetlands protection in town plans, zoning bylaws and subdivision regulations; and to include the protection of smaller wetlands (not included on National Wetlands Inventory maps) in their wetlands protection planning.

10. Destruction of wetlands and construction in wetlands should be avoided.

11. Towns are encouraged to control exotic invasive species that impair, or have the potential to impair, aquatic resources; public education efforts are also encouraged.

12. Land uses within Public Water Supply Source Protection Areas should not threaten the quality of groundwater supplies.

13. The storage or use of chemicals that could contaminate groundwater within Source Protection Areas is discouraged.

14. Communities are encouraged to adopt regulatory and non-regulatory methods to protect municipal groundwater supplies.

WATER RESOURCES RECOMMENDATIONS

1. Assist towns in developing policies and recommendations to protect water resources.

2. Coordinate with towns and the Vermont Water Supply Division to identify and inventory Public Water Supply Source Protection Areas.

3. Assist towns in the identification and development of secondary sources for public drinking water.

4. Support water quality programs and encourage community participation with efforts of local organizations.

5. Work with towns to ensure the protection of regionally significant headwaters, streams, gorges, waterfalls, and cascades.

6. Work with towns, neighboring towns, and regional planning commissions to develop watershed management plans using the Connecticut River Corridor Management Plan as a model.

7. Seek legislation establishing adequate funding for upgrade and repair of sewage treatment facilities.

8. Work with local, state, and federal government officials to provide adequate funding to protect water quality.

9. Develop an education program for planning commissions concerning the assessment of the impacts of development on surface waters.

10. Coordinate with the Natural Resource Conservation District to provide education to land owners and local officials concerning the control of agricultural runoff and available expertise in nutrient management planning.

11. Assist towns in the implementation of programs that promote the protection of wetlands.

12. The RPC will continue to act as a conduit for funding to local organizations working on water quality protection.

SOIL AND TOPOGRAPHY GOALS

1. Land uses and the intensity of land uses should be consistent with the suitabilities and limitations of the soils and topography of each site.

SOIL AND TOPOGRAPHY POLICIES

1. Take special precautions on steep slopes to avoid environmental damage, such as erosion and landslides, including:
   a. Minimize areas of earth disturbance, grading and clearing vegetation on slopes over 15%;
   b. Developments on slopes over 15% shall be designed to appropriately to minimize the potential impacts of erosion and stormwater; and,
   c. Avoid intensive development (other than appropriately designed recreational trails and ski lifts) in areas predominated by slopes exceeding 25% or above 2,500 feet in elevation.

2. Avoid developments on soils susceptible to flooding, erosion hazards and the failure of foundations and septic systems.

3. Avoid development on unstable soils that offer poor support for foundations or footings and are subject to slippage, or are poorly suited for road construction. Extensive site investigations may be required to determine the development suitability of such soils.

4. Ensure that all development proposals for shallow soils provide and conform to an erosion control plan for construction activities and a site drainage plan. Extensive site investigations may be required to determine the development suitability of such soils.

SOILS AND TOPOGRAPHY RECOMMENDATIONS

1. Assist towns in the development of policies and ordinances that minimize the negative impacts of development on steep slopes, high elevation areas, highly erosive and shallow, unstable wet soil types.

MINERAL RESOURCE GOALS

1. Encourage the well-managed extraction and utilization of mineral resources, which provide significant economic benefits to the Region.

2. Ensure that any extraction or recovery of mineral resources located below or adjacent to the surface of water bodies or impoundments is in accordance with appropriate state guidelines and any other applicable regulations.

3. Ensure that methods used for the extraction and utilization of mineral resources do not unduly impact surrounding land uses and minimize negative effects on the environment.

MINERAL RESOURCE POLICIES

1. Development on lands with the high potential for extraction of mineral and earth resources should not interfere with subsequent resource extraction or processing.

2. Mineral extraction activity that may significantly degrade the quality and quantity of other existing and future land uses is discouraged.

3. Mineral extraction activity that may destroy or significantly imperil necessary wildlife habitat will be discouraged.

4. Where mineral extraction is determined to be appropriate, adequate measures to minimize adverse effects (e.g., visual, noise, groundwater, surface water, and air pollution) on the environment and its wildlife should be taken.

5. Ensure that effective site reclamation and revegetation plans are provided and implemented.

6. Mineral extraction and processing facilities should be planned, constructed, and managed:
   (a) to provide direct access to Class III or better highways;
   (b) to not unduly interfere with the function and safety of existing road systems 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.

7. Mineral extraction and processing facilities should be planned and developed so as not to place an excessive or uneconomic burden on local and state highways and bridges.

MINERAL RESOURCE RECOMMENDATIONS

1. Assist towns to address both the economic benefits and environmental impacts of mineral resource extraction and recovery in their town plans and implementation documents.

AIR QUALITY GOALS

1. To maintain a consistently high level of air quality in the Region.

AIR QUALITY POLICIES

1. Prohibit development or activities that significantly degrade air quality.

2. Support efforts to reduce locally and regionally generated air pollutants by encouraging the use of energy conservation guidelines as developed by the Vermont Department of Public Service.

AIR QUALITY RECOMMENDATIONS

1. Work with towns to address air quality issues through the use of education, policies and regulations.

VII. CULTURAL & AESTHETIC RESOURCES

A. Cultural and Historic Resources

The cultural, natural, economic, and political history of southern Windsor County has shaped the character of the Region. This character is reflected in the buildings, archeological sites, structures, events, and traditions established by residents throughout the Region's history. The importance of these cultural and historic resources is reflected in their ability to provide a sense of continuity and permanence to the Region's cultural fabric. A shared sense of history and cultural pride creates stronger communities and encourages the appreciation of other cultures. Historic and cultural sites, buildings, and events can also provide economic benefits - from the reuse of existing structures as unique community gathering places for the enjoyment of music, theater, and other cultural performances, to the attraction of tourists to the Region. It is therefore important to protect significant cultural and historic resources from destruction or inappropriate alteration in order to avoid losing the sense of place that has been developed over hundreds of years.

The Region and its residents have played an important role in shaping Vermont and American history and culture. The Vermont Constitution was drafted and signed in Windsor. Adopted in 1777, it was the first constitution in North America to abolish slavery, and was also ahead of its time in expanding voting rights. The Crown Point Military Road, begun in 1759 and connecting Fort No. 4 in New Hampshire with the fortifications at Crown Point and Mt. Independence on Lake Champlain, was built through Springfield, Weathersfield, Cavendish, and Ludlow. It originally served as a military supply route for the British army, and later for American forces during the Revolutionary War. U.S. Congressman and General Lewis Morris, and U.S. Consul William Jarvis, both residents of the Region, were major contributors to the character of the national government and economy in the 18th and 19th centuries. Their homes still stand, serving as reminders of the Region's proud political and agricultural history. U.S. Secretary of State William Evarts made his home in Windsor, and President Calvin Coolidge was educated at the Black River Academy in Ludlow.

Southern Windsor County was home to the birth and development of the American machine tool industry, a tradition which continues today. Mass production of machine parts began at the former state prison in Windsor. This venture later became the Robbins and Lawrence Armory, which was an early manufacturer of rifles for the United States government, and produced 50,000 rifles during the Civil War for use by Union troops. Today it houses the American Precision Museum. Out of the armory came the Jones and Lamson (J&L) Company, which began a thriving machine tool industry in Springfield. J&L was followed by other familiar names, such as Fellows Gear Shaper, Bryant Grinder, and Lovejoy Tool. Since that time, only Lovejoy continues to operate today in a diminished capacity. Up north in Windsor, the industry continued after the demise of the armory, with the evolution of the Cone-Blanchard Company, which closed in the late 1990s. The building is now occupied by Seldon Technologies, which specializes in nanotechnology.

The woolen mill was also an important part of Vermont's history and economy in the 19th and early 20th centuries. Although the mills no longer operate, some of them can still be

seen across the Region. The Woolen Mill complex in Ludlow and the Mack Molding building in Cavendish are both excellent examples of how historic buildings can be reused while preserving their historic character. The old mill in Proctorsville serves as an example of how important historical development patterns are to Vermont communities.

Stone Village, Chester, Vermont

Besides the traditional, historic building types prevalent in Vermont and New England towns, there are other, more distinct architectural styles common to the Region. The most obvious example is the "Snecked Ashlar" or glimmer stone veneer sheathed rubblestone masonry, which were built in the 1830's and 1840's by itinerant masons with stone from the nearby hills. Making up Chester's Stone Village are the original ten snecked ashlar buildings built on North Street which are still occupied and in pristine condition. These buildings can also be seen in homes, schoolhouses, and churches across the Region. In Vermont, this type of construction is found almost exclusively in southern Windsor County. Another distinct architectural feature found more often in the Region than in other parts of New England is the recessed balcony, which can be seen, among other places, in Ascutney, Perkinsville, and Ludlow.

In addition to having distinct styles of architecture, the Region also has many individual buildings whose style or scale of construction makes them notable cultural and historic resources. The woolen mills mentioned earlier, along with the J&L and Fellows Gear Shaper complexes in Springfield, are examples. Two more examples, both in Windsor, are the Windsor House and the NAMCO block apartment building. The NAMCO block was built to house employees of the National Acme Manufacturing Co., which occupied the Lawrence and Robbins Armory building after the turn of the century. It is especially noteworthy because of its symmetry, and its efficient use of space, air circulation, and light. It was designed to provide the most comfortable living quarters possible within available space. After years of inattention, the Rockingham Area Community Land Trust and Housing Vermont are rehabilitating the building into 58 safe and affordable housing apartments. The Windsor House, according to the National Register of Historic Places, "served as a prominent hostelry for almost one hundred and fifty years and had many important personages sign its register, including Jenny Lind (famous Swedish opera singer known as the "Swedish Nightingale") and Theodore Roosevelt." Perhaps more importantly, the Windsor House is a shining example of the benefits of historic preservation. Threatened with destruction in the 1970s, the Windsor House was rescued by a local group calling itself Historic Windsor. This group saved the building, established it as a newly thriving commercial and cultural center, and engendered a sense of community spirit and pride that has brought new life to downtown Windsor. One of Windsor's greatest assets is its rich history, and that history is the foundation for much of the economic success enjoyed by the town in recent years.

Cornish-Windsor Bridge, Windsor, VT

The Region is home to several covered bridges built in the 19th century (Upper Falls in Weathersfield, Bests and Bowers in West Windsor, Baltimore in Springfield, Titcomb in Cavendish), which are representative of Vermont and New England history. Built in 1866, the Cornish-Windsor bridge is 465 feet long and is the second longest covered wooden bridge in the United States. Another transportation feature important to the history of the Region is the railroad. The construction of the railroad system in 1800s was instrumental in the development of industries such as the mining and manufacturing, and it accelerated the trend of westward migration by Vermonters in the latter half of the century. Vermont railroads had another important effect on the state, one that remains a part of its identity long after the decline of the railroads themselves - the creation of the tourist industry. It was the ease of rail travel that first brought vacationers to the state and the Region in large numbers, attracted by pastoral scenery, mineral springs, and mountaintop hotels. By 1950, Vermont was aggressively marketing itself across the country as a tourist destination, and today tourism and related service-oriented businesses are dominant factors in the Region's economy. Passenger rail service is making a comeback across the state and may someday re-emerge as a significant economic force in Vermont. The establishment of an Amtrak stop in Windsor has already started the process in the Region.

In addition to a rich American history, the Region retains some of its pre-Colonial heritage. People have likely lived in and around the Region for several thousand years. Many place names such as Ascutney, Connecticut, and Okemo are derived from American Indian names. In addition, Mount Ascutney is a prime example of a geological feature called a monadnock which is a Native American term for an isolated hill or lone mountain. The Crown Point Road was built along what had been a major east-west route through the Green Mountains for area Indian populations. In Springfield, an archeological discovery known as the Skitchewaug site has provided insight into the lifestyles of the Sokoki people who inhabited the Region in the centuries immediately preceding European settlement.

The Vermont Division for Historic Preservation (DHP) has produced a book for each town in the Region listing all of the sites and districts on the State Register of Historic Places. There are also numerous sites in the Region listed on the National Register of Historic Places. Chester, Ludlow, Springfield, Weathersfield and Windsor all have historically designated districts listed on the National Register. The Weathersfield Historical Society has produced its own detailed registry for the town, which has been adopted by the Vermont DHP. According to DHP, the state register is a list of "districts, sites, buildings, structures, and objects" of local, state, and national significance in "history, architecture, archeology, and culture"; the National Register is "the official federal listing of historic, architectural, and archeological resources worthy of preservation". The structures, sites, markers, and districts listed in these registries, along with the Region's cemeteries, are all of regional significance. **Table 7.1** below lists the museums located in the Region, celebrating both the cultural heritage and the contemporary talents of the Region's residents. **Table 7.2** below represents

a survey completed by the RPC in 1997 to determine what each town considered to be its five most significant historic and cultural resources.

Table 7.1 – Museums in Southern Windsor County	
Andover	None
Baltimore	None
Cavendish	Cavendish Historical Society Museum
Chester	Chester Art Guild Chester Historical Society
Ludlow	Black River Academy Museum
Springfield	Eureka Schoolhouse Miller Art Center – Springfield Art & Historical Society
Reading	Reading Historical Society
Weathersfield	Reverend Dan Foster House – Weathersfield Historical Society
West Windsor	West Windsor Historical Society
Windsor	American Precision Museum Old Constitution House Historic Windsor Cornish Colony Museum

Source: RPC 1997

Table 7.2 – Historic Resources Survey 1997			
Andover	Town Hall; Rowell's Inn; Middle Town, Pettengill & East Hill Cemeteries	Baltimore	School House; Baltimore Cemetery; Noah Piper House; Cellar Holes; Loomis House
Cavendish	Universalist Church; Academy Building; Historic Society Building; Old Jenney House; Crown Point Road	Chester	"so called" Academy Building; Yosemite Firehouse #2; Heald House; Chester Inn; Stone Village
Ludlow	Ludlow Graded School #10; Black River Academy Museum; Ludlow Woolen Mill; John Garibaldi Sargent House; Baptist Church	Reading	Reading Town Hall; Cellar Holes Bailey's Mills; Indian Stones; The 1815 House (Amsden Tavern)
Springfield	Eureka School House; Hartness House; Stellafane (observatory) Art/Historic Society Building Comtu Falls	Weathersfield	Upper Falls Covered Bridge; Weathersfield Center Historic District; Weathersfield Bow Historic District; Crown Point Road; Amsden Limekilns
West Windsor	Bowers Covered Bridge; Best's Covered Bridge; Brownsville Historic District; Sheddsville Historic Area; Daniel Cady Mausoleum	Windsor	Old Constitution House; Old Court House; Old South Church & Burial Grounds; Windsor-Cornish Covered Bridge; American Precision Museum

Source: RPC; this is not a comprehensive list of all historic resources for each town, but only a preliminary survey to determine what the towns consider as five of their most important historic resources.

The Region hosts numerous fairs and festivals that draw visitors from outside, including the Windsor County Agricultural Fair in Springfield, and the Springfield Apple Festival. Local events specific to each town, such as the annual Moon Dance and Heritage Festival in Windsor, also contribute to a strong sense of community.

B. Tools for Historic Preservation

The following are some of the most commonly used tools for protecting historic resources in Vermont. In addition, **Appendix C** lists several additional resources and tools for historic preservation.

State and National Registers - Listing on the State or National Register identifies a resource as having historical or cultural significance. While listing does not place any restrictions on property owners, it can foster a sense of pride and responsibility in individuals and communities. Listing on the National Register provides protection against the use of federal funds to negatively affect the historic character of a site; it can also provide communities and individual property owners with federal funding for rehabilitation projects, and with investment tax credits.

Downtown Designations - Vermont's "Historic Downtown Development Act" is intended to "encourage investment in and restoration of municipal downtown districts". Areas that receive designation as a "downtown development district" are eligible for benefits in the form of financial aid and tax incentives for certain projects. In order to obtain official district status for its downtown, a municipality must demonstrate that it has met certain criteria. In our Region, Springfield and Windsor have designated downtown status, and Ludlow is seeking designation.

Designated Village Centers – Village center designation, as provided for in 24 V.S.A. Chapter 76A, was created by the legislature to recognize and encourage local efforts to revitalize Vermont's traditional village centers. While village center revitalization is an ongoing process to improve a community's vitality and livability, village center designation is only one tool and its focus is on supporting commercial activity in the center of Vermont's villages. In our Region, the villages of Cavendish and Proctorsville are Designated Village Centers.

Certified Local Governments (CLGs) - A 1980 amendment to the National Historic Preservation Act of 1966 requires that at least 10% of states' Historic Preservation Funds be given to "Certified Local Governments" (CLGs). A local government becomes eligible for this program when the State Historic Preservation Officer (SHPO) certifies that the local government has established its own historic preservation commission and a program that meets state and federal standards. In addition to being eligible for matching survey and planning grants, CLGs review nominations of National Historic Register properties within their jurisdictions and provide local perspective to the plans and programs of the VT Division of Historic Preservation. Windsor is the only town in the Region that is a CLG.

Local zoning - Under Vermont law, towns may include Design Review Districts and Historic Districts in their zoning bylaws. Design Review Districts offer communities, after public hearing and preparation of a design plan, the opportunity to review and approve the construction, demolition, substantial alteration, movement, or change in use of a building within the district. Historic Districts offer a more specific set of guidelines for reviewing projects in the district based on historical and architectural significance and a predetermined

set of criteria. Towns may also include review of historic impacts under conditional use and site plan approval guidelines in their zoning bylaws.

Act 250 - Some development may be subject to review of potential impact on historic resources under criteria 8 and 10 of Act 250. Under criterion 8, applicants must show that a project will "not have an undue adverse effect on the scenic or natural beauty of the area, aesthetics, historic sites or rare and irreplaceable natural areas". Under Criterion 10, a project must be shown to be in conformance with "any duly adopted local or regional plan or capital program".

Section 106 of the National Historic Preservation Act of 1966 – The Vermont Division for Historic Preservation reviews projects when a federal agency/funding is involved with a project.

Vermont Historic Preservation Act – In accordance with 22 V.S.A. §742 the Vermont Division for Historic Preservation reviews projects when a state agency/funding is involved with the project, on behalf of the Vermont Advisory Council on Historic Preservation.

The most important tools for historic preservation in any town are a sense of pride and a strong stewardship ethic in its residents. Education and cooperation between local planning and development bodies, historical societies, residents, visitors, the business community, and property owners should be fostered throughout the Region. The cultural and historic resources of southern Windsor County may represent its most distinct and outstanding feature. Recognizing and protecting their value can foster civic pride; stimulate improvements in education; encourage environmental protection and sound land use planning; help attract businesses and expand tourism; and support the agricultural and forestry economies through the preservation of farms and maintenance of historical settlement patterns.

C. Aesthetics: Scenic Lands and Open Space

The harmonious mix of open space, villages, farms, country roads, mountainous terrain, historic architecture, and surface waters in the Region provides for scenic vistas and an attractive landscape. This landscape is also an economic asset, and has a tangible economic value to the Region. The rural lifestyle and scenic landscapes attract many tourists. Tourism is a significant industry in the Region. The preservation of these aesthetic and scenic resources has become increasingly difficult due to economic and development pressures. Over the past several decades, highway strip development has emerged between town village centers and the countryside thus threatening the Region's traditional land use pattern. Agricultural fields and working forestlands juxtaposed to dense villages combine to create the traditional Vermont landscape that residents and tourists cherish. Development can occur in ways that do not adversely impact this traditional landscape, such as innovative site plans, clustering around already established villages and town centers. Future development needs to be cognizant of the landscape's heritage and work towards mitigating any adverse impacts to the land's historic legacy.

Efforts to alleviate these pressures or to mitigate any negative effects of development are necessary to protect, preserve, and improve the significant aesthetic resources within the Region. Such efforts should include a continued emphasis and restructuring of municipal planning and zoning administration, which protects and preserves the landscape heritage in the Region.

The Region has prominent ridgelines and mountain tops that are inherently and especially sensitive, e.g. the Alps and Little Ascutney Mountain. Development in these areas is strongly discouraged. Such proposed development should work towards design plans that retain the prominent natural appearance by locating in less visible areas and away from highly visible ridgelines, blending and or hiding structures within existing wooded hillsides, and where possible, avoid excessive use of reflective glass. Aesthetic resources are protected by Criterion 8 of Vermont's Act 250, which does not relegate scenic beauty to pristine areas alone, but to settled areas and farmlands as well.

Natural beauty, visual harmony, and peace and quiet have all been addressed by the Environmental Board as aesthetic values. In its Quechee Analysis, "Undue Adverse Effects" are clarified by the following factors:

Would the project have any "adverse" aesthetic impact?

a. What is the surrounding area like?
b. Is the project compatible with its surrounding area?
c. Have suitable colors and materials been selected?
d. How visible is the project?
e. How does the project affect open space in the area?
f. Is the project proposed for a visually sensitive type of land?

If there is an adverse effect, is it "undue"?

a. Would the project violate any clearly written community standard?
b. Would the average person find the project shocking or offensive?
c. Has the applicant failed to take reasonable steps to lessen any adverse effects?

The Board has characterized the Vermont settlement pattern as open, rural areas punctuated by village centers and strives to protect that pattern. Though the term "aesthetics" is broadly construed, towns can use these factors when considering policies to guide the protection of aesthetic resources.

1. Light Pollution

One of the most valued resources of a rural region is a night sky unimpaired by "sky glow" from the misdirected light of urbanized areas and recreational resorts. Many outdoor lights are poorly designed or improperly aimed, allowing light to project above the horizon and wash out the view of the stars. Poorly designed exterior lighting also creates annoying glare, light trespass on neighboring property, and energy waste. There are now options for outdoor lighting, which are better designed to direct light downward where it belongs. Future consideration of this technology would help reduce cumulative negative effects on aesthetic resources.

2. Scenic Roads and Byways

Vermont has been involved with scenery preservation issues as early as 1937. In 1966, the State established the Scenery Preservation Council. Key milestones for the Council were the passage of the "outdoor Advertising Law, i.e., the billboard ban in 1968; numerous studies on Vermont's scenic qualities; and the publication of the "Vermont Backroads Handbook". The Scenic Roads Law was passed in 1977, initiating the state Scenic Roads Program. The purpose of the Scenic Roads Program was to protect the physical character and condition of the roadway right-of-way.

The passage of the Intermodal Surface Transportation Efficiency Act (ISTEA) in 1991 initiated the National Scenic Byways Program. In 1992, Vermont received ISTEA funding to develop the Vermont Byway Program which focused scenic byway designation through corridor planning at the local and regional level. The Vermont Byways Program expanded upon the strict approach of the former program to one that gives equal recognition to property rights, land use, and resource planning issues. The Vermont Byways program reflects a multifaceted approach to encourage communities, preservationists, business owners, and property owners to work together to protect Vermont's rural and scenic character. The purpose of the Byway program is to foster cooperative ventures or public-private partnerships, and to protect, enhance, and/or promote the natural, cultural, historic, archeological, recreational, and scenic qualities of the National Scenic Byways Program. Beginning in 1993 with the reactivation of the Scenery Preservation Council, the Scenic Roads Program was renamed the Vermont Byways Program.

The Scenery Preservation Council primarily focuses on the following:

1. Consultation with municipalities, regional planning commissions, and the Transportation Board for local, state, and federal designation of roads and highways.

2. Encourage and assist fostering awareness on scenery preservation and aesthetic issues related to roads, highways, and related areas.

3. Review applications to the National Scenic Byways Program and make recommendations to the Secretary of the Agency of Transportation.

A state-designated scenic byway may be nominated to be part of the National Scenic Byway program as long as it meets certain criteria and possesses one of six intrinsic qualities. The criteria for state designation to the National Scenic Byway Program are as follows: 1) must have a completed corridor management plan, 2) must accommodate bicycle and pedestrian traffic where feasible, 3) must accommodate two-wheel drive passenger vehicles with standard clearances. "All-American Roads" must meet the National Scenic Byway criteria listed above, and must possess at least two of six intrinsic qualities. The intrinsic qualities for which National Scenic Byways and All-American Roads are recognized are features that are considered representative, unique, or irreplaceable. These features fall under six broad categories: scenic, cultural, historic, archeological, recreational, and natural.

The National Scenic Byways program was established under the Intermodal Surface Transportation Efficiency Act (ISTEA) in 1991 in order to "identify, designate and promote

scenic byways and to protect and enhance the recreational, scenic, historic and cultural qualities of the areas through which these byways pass." Scenic Byways are eligible for federal funding for tourism or resource conservation activities along designated corridors (Vermont's Highway System Policy Plan, VTrans, 2004).

On September 22, 2005, the Federal Highway Administration awarded national designation to the Connecticut River Byway making it officially a National Scenic Byway. It is a two-state byway, spanning the west and east shores of the Connecticut River in Vermont and New Hampshire. The segment of the Byway in this Region includes the US Route 5 corridor through Windsor, Weathersfield and Springfield. The two spurs including VT Route 44 to Brownsville and VT Route 11 to downtown Springfield, continue to be part of the originally designated Connecticut River Scenic Byway .

State scenic roads may be established by recommendation of the Scenery Preservation Council per 19 V.S.A. §2501. Any construction or maintenance work on designated state scenic roads must be consistent with the standards established by VTrans pursuant to 10 V.S.A. §425. The segment of VT Route 131 in Cavendish is the only designated Scenic Highway in this Region.

Towns in Vermont are enabled to designate municipally-maintained roads as "scenic roads," as established by 19 V.S.A. §2502. Town scenic roads are also subject to the standards established by the State Transportation Board. Those standards for scenic roads address appropriate minimum roadway widths, alignment, landscaping and traffic control methods, pursuant to 10 VSA §425. There are no scenic roads in this Region at this time.

3. Scenic Resource Inventories

As part of the Connecticut River Scenic Byway Study, regional planning commissions developed systems to inventory and evaluate scenic resources. Because evaluation of these resources is subjective, such systems can be highly variable. Areas of scenic significance, including ridgelines, are determined through a process that involves public input by local planning boards, Conservation Commissions, and interested local residents. In addition to determining whether roadways are suitable for scenic byway programs, an inventory of scenic resources contributes to local open space, conservation, and telecommunications tower planning efforts. Currently, only the towns of Reading, Weathersfield and West Windsor have active Conservation Commissions.

The following landscape types are areas that towns may wish to consider when determining areas of scenic significance:

- shorelands adjacent to public lakes, rivers, or ponds;
- prominent ridgelines, mountain tops, or excessively steep slopes that can be viewed
- from public roadways;
- exceptional agricultural and historic areas, recognized as outstanding resources;
- areas within or immediately adjacent to wetlands and natural areas designated by towns or the state; or

- areas of high scenic quality such as ridgelines which are publicly recognized as exceptionally unique or are noted examples of the dominant characteristics of an area in the Region.

In addition, the diversity of landscape types; the size, scale, and architectural continuity of the manmade landscape; the focal dominance; and the intactness of the landscape are likely to contribute to the scenic qualities of an area.

4. Planning for Open Space

"Open space" may be defined as land which is not developed and is of some benefit to the public for many of the reasons described throughout this chapter and the Natural Resources chapter. Open space that is publicly owned or permanently protected through the sale or donation of development rights may ensure the long-term productive capacity of forest or agricultural land; preserve wildlife habitat; protect groundwater resources; provide recreation land; and preserve important historic, scenic and cultural resources.

Open space may be land that is conserved either through fee simple acquisition by local, state, or federal government or through the sale or donation of development rights to local government or a nonprofit conservation organization, often using a conservation easement which limits development on land while keeping it available for farming, forestry, and recreational enjoyment.

The Upper Valley Land Trust (UVLT) is located in Hanover, New Hampshire, and provides conservation leadership, tools and expertise to permanently protect the working farms, forested ridges, wildlife habitat, water resources, trails and scenic landscapes that surround residential areas and commercial centers. UVLT focuses its mission in 44 Vermont and New Hampshire towns (including Springfield, Weathersfield, Windsor, West Windsor and Reading) in the upper Connecticut River valley. UVLT is a sponsor member of the Land Trust Alliance, an organization that promotes land conservation by providing advocacy and professional resources to over 1600 land trusts nationwide.

In addition, the Vermont Land Trust (VLT) is one of the most effective land trusts in the country. Its primary focus is on permanently conserving productive, recreational, and scenic lands vital to Vermont's and rural economy and environment. VLT has helped landowners in communicates throughout Vermont, to permanently protect more than 483,000 acres – 8% of Vermont's privately-owned land. **Table 7.3** below lists conserved lands in the Region.

Open space may also be privately owned agricultural or forestland, which offers economic benefits through productive use and may contribute to the scenic nature of the landscape or be accessible for recreation. Owners of such land may be encouraged to maintain its productive capacity through programs such as Local Tax Stabilization agreements for farmland, forest land, or open space; or through the state's Use Value Appraisal Program, commonly referred to as "Current Use", which requires towns to assess enrolled farmland or forest land at use value rather than fair market value. Fear of liability often causes landowners to prohibit public access for recreational uses; however, legislation enacted in

Table 7.3 Conserved Land in Southern Windsor County			
Town	Total Acres	Conserved Acres*	% of Total
Andover	18,432	1,091.20	5.9%
Baltimore	3,008	N/A	N/A
Cavendish	25,344	202.90	.8%
Chester	35,766	230.00	.64%
Ludlow	22,912	29.00	.13%
Reading	26,560	951.59	3.6%
Springfield	31,552	364.90	1.2%
Weathersfield	28,032	2,074.63	7.4%
West Windsor	15,808	741.41	4.7%
Windsor	12,544	768.04	6.1%

Source: State of Vermont Tax Department, Property Valuation and Review, August 2001
* Includes Development Rights and Fee Simple Transactions

1997 protects a landowner from such liability, 10 V.S.A. §5791-5795. This may encourage landowners to make their land available to the public for hunting, fishing and other recreational uses.

In order to ensure that open lands that provide the greatest public benefit are protected for present and future generations, towns are encouraged to develop open space plans. Open space development is gaining favor as an alternative to large-lot zoning, which swallows up land and leads to sprawl. By clustering lots of smaller sizes and leaving large areas of open land to be enjoyed by residents, these "conservation subdivisions" can actually lower infrastructure costs for developers and produce other economic incentives, while preserving open space. Open space design can help to encourage a better sense of community as well as preserve the aesthetics we value so highly in Vermont. For more on this topic see the Land Use chapter.

CULTURAL/HISTORIC RESOURCE GOALS

1. To ensure the preservation, maintenance and enhancement of significant cultural and historic resources throughout the Region.

2. To promote the historical and cultural heritage of the Region.

3. To develop a policy on significant regional viewsheds.

CULTURAL/HISTORIC RESOURCE POLICIES

1. Towns are encouraged to inventory and prioritize local resources to protect significant cultural and historic resources in their town plans and implementation documents.

2. Proposed development adjacent to or within significant historic or cultural sites should be compatible with the resources, and should enhance their historic value and appreciation where possible.

3. Efforts of community, regional, state, and federal organizations which sponsor or provide financial or technical assistance for cultural and historic preservation and education in the Region should be supported.

4. Reuse of historically significant buildings and sites that maintains and preserves their architectural and historic character is encouraged.

5. Regionally significant historic buildings and sites should be preserved. Necessary renovations should reflect the historic character of the resource. In the case of private homes, owners are encouraged to consider the site's historic, cultural, and economic value to themselves and the community when deciding how best to maintain and manage them.

6. Encourage towns, through their Planning Commissions and on-site visits, to educate the public and promote awareness of significant cultural/aesthetic resources, such as cellar holes and stonework, etc.

CULTURAL/HISTORIC RESOURCE RECOMMENDATIONS

1. Work cooperatively with local communities to inventory and map significant cultural and historic resources to ensure their protection.

2. Work with communities to develop criteria for evaluating the impacts that projects may have on designated historic sites or districts.

3. Continue to support cooperative efforts to designate National Historic Register Sites and Districts and evaluate federally funded projects in the Region that impact designated properties and resources.

4. Support the development of programs focusing on local, regional, and state history and culture in the Region's schools.

5. Provide support for towns wishing to include design control districts or local historic districts in their zoning bylaws under 24 V.S.A. §4407.

SCENIC LANDS AND OPEN SPACE GOALS

1. Achieve a balance between scenic or open land uses and other land uses in the best interest of the environment and the Region's residents.

2. Maintain or enhance the diversity of ecosystems throughout the Region and promote connectivity between conserved lands wherever possible.

3. Protect the environmental character and integrity of significant natural and scenic resources as identified by member towns.

SCENIC LANDS AND OPEN SPACE POLICIES (*see also Natural Resources Chapter*)

1. Local, state or federal programs and legislative efforts which protect and enhance the economic, cultural, environmental, and aesthetic values of forested and scenic resources should be supported.

2. Local Tax Stabilization (Current Use) programs that provide incentives for landowners to conserve farmland, forestland, and open space should be supported.

3. Towns should be encouraged to develop policies that promote clustering or other development patterns that will maximize forested areas and open space.

4. Conservation of open and scenic lands through the use of public/private funds for the purchase of development rights, fee simple purchase, and other such measures should be supported.

5. The preservation of historic and archeological resources that enhance the significant scenic resources of the Region should be supported.

6. Development projects which complement or enhance significant scenic resources should be supported.

7. The following sites are inherently and especially sensitive, and as such, development in these areas is discouraged:
   - Hawks Mountain in Cavendish, Baltimore, and Weathersfield
   - The Alps region of Cavendish and Reading
   - Little Ascutney Mountain in Weathersfield and West Windsor
   - Terrible Mountain in Andover and Ludlow
   - The Pinnacle in Ludlow

8. Towns should be encouraged to develop policies for the protection of regional scenic viewsheds.

9. Structures and exterior areas should be illuminated only at levels necessary to ensure safety and security of persons and property.

10. Encourage exterior lighting that is designed so that light projects downward and is shielded from public roads, adjacent residences, and distant vantage points.

11. Encourage additional scenic byway designation where appropriate.

SCENIC LANDS AND OPEN SPACE RECOMMENDATIONS

1. Work with local communities to identify and develop a comprehensive inventory of forested lands, open space, and significant scenic resources throughout the Region,

and analyze the results. Assist communities in developing conservation strategies for locally and regionally significant scenic resources.

2. Work with member towns and appropriate agencies to secure donations or acquisitions of scenic easements, greenways segments, forested land or other land and water areas that will enhance the significant scenic resources of the Region.

3. Continue to work with, and assist in the development of, local Conservation Commissions.

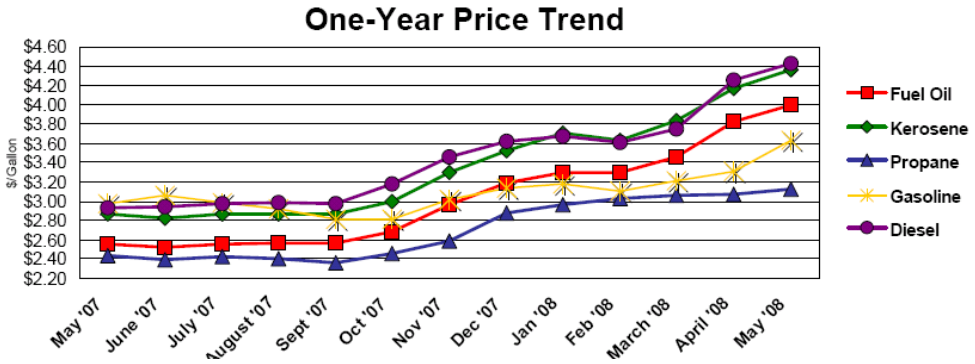
4. When the opportunity arises, work with local organizations, neighboring regional planning commissions, and state entities to evaluate certain roadways and corridors for Vermont Byway designation suitability.

5. Assist member towns to update town plants and implementation measures which protect and preserve the landscape heritage in the Region.

VIII. Energy

A. Introduction

Vermonters rely on energy to support their modern lifestyles. However, dramatic increases in Vermont energy costs since 2007 have impacted people's lives and the choices they make (see **Fig. 8.1**). Planning for our energy future and how it will affect our day-to-day lives is important. Energy planning needs to not only address demands in a cost effective manner, but should also be proactive and comprehensive. Challenges affecting energy prices include supply, affordability and environmental issues such as global warming. Other planning areas such as transportation, land use, and natural resources are impacted by energy supply and demand influences. On the national level, crude oil has reached unprecedented prices, and Americans are feeling the consequences of their fossil fuel dependency. Awareness around resource scarcity has spotlighted the human race's ability to exploit natural resources. The Regional Plan recognizes that production, consumption, and conservation play interdependent roles in effective energy planning. As such, the implementation of sound energy goals and policies will provide the necessary framework to aid towns in making practical and valuable energy decisions.



Source: Vermont Public Service Department

Fig. 8.1 Vermont Fuel Report – May 2008

B. Climate Change

1. Greenhouse Gases

Almost 200 years ago, a mathematician and physicist by the name of Jean-Baptiste Fourier discovered that the Earth's atmosphere could trap heat from sunlight. This process is now commonly referred to as the 'greenhouse effect'. Fossil fuels (oil, gas, and coal) have been burned to power more than 150 years of industrial activities. A significant byproduct from burning fossil fuels is carbon dioxide, which has been identified as one of the three major greenhouse gases (GHG) with methane and ozone being the other two. While some greenhouse gases are necessary for the earth's atmosphere to keep temperatures at habitable levels; excess amounts reduce the amount of heat loss into space and have a net effect of global warming.

2. Global Warming

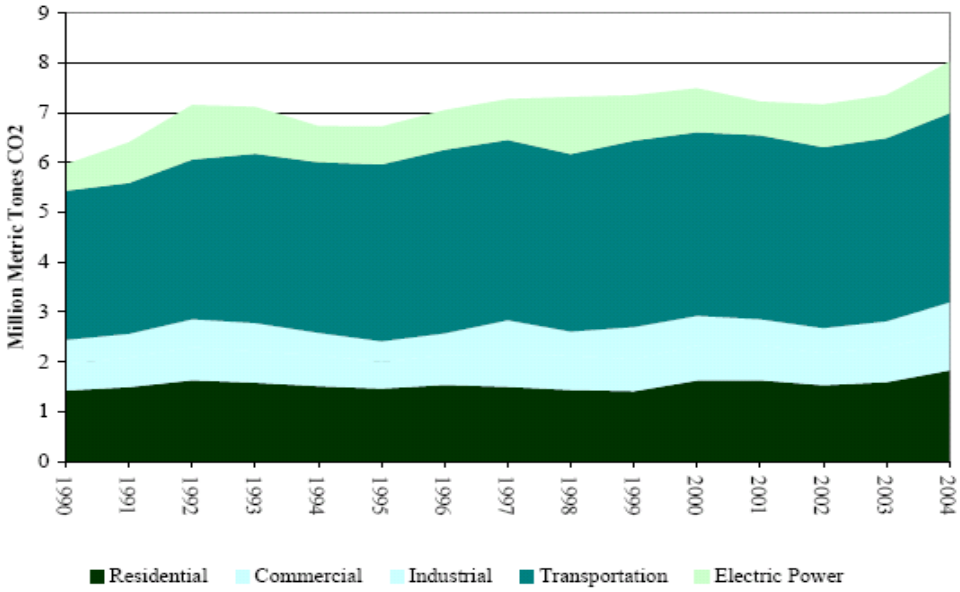
In 1988, the United Nations Environmental Programme and the World Meteorological Organization formed a scientific body composed of hundreds of scientists from around the world known as the Intergovernmental Panel on Climate Change (IPCC) (www.ipcc.ch/). The IPCC provides an objective source of climate change information based on scientific evidence. According to the IPCC, climate change is defined as:

> *Climate change refers to a change in the state of the climate that can be identified (e.g., by using statistical tests) by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or external forcings, or to persistent anthropogenic changes in the composition of the atmosphere or in land use.*

In 2007, the IPCC concluded "with at least 90% certainty, global warming is man-made and will continue for centuries, and that rising temperatures will cause sea levels to rise, floods and mass famine." In December 2007, both the IPCC's work and Al Gore were awarded the Nobel Peace Prize "for their efforts to build up and disseminate greater knowledge about man-made climate change, and to lay the foundations for the measures that are needed to counteract such change."

In 1998, the Kyoto Protocol, an international agreement, was created with the purpose of reducing global GHG emissions. Since then, 178 countries, not including the United States, and other governmental agencies have signed and ratified the agreement. Despite the United States' reluctance to act on the federal level, twenty-six states, including Vermont, have forged ahead with tackling carbon and global warming issues. In 2001, Vermont, along with neighboring states' governors and Canadian premiers, signed the Climate Action Plan, which calls for the reduction of GHGs to 10% below 1990 levels by 2020, and 75 - 85% reductions by 2050. Vermont's GHG emission reduction goals are to reduce GHG emissions by 25% from 1990 levels by 2012, 50% by 2028, and, if practicable, 75% by 2050.

While Vermont's 8 million metric tons of annual carbon emissions are relatively minute compared to the world's 28 billion, its emissions though have been steadily increasing since 1990 (see **Fig. 8.2**). With its heavy reliance on single occupancy vehicles to travel, Vermont's transportation sector accounts for almost half of its emissions. Reducing and meeting the emissions goals of the Climate Action Plan will be a challenge, and one that will need to address many contributing aspects including legislature, policies, infrastructure, land use planning, transportation systems management, alternative fuels, cleaner vehicles and overall public awareness.



Source: Vermont Public Service Department

Figure 8.2 Vermont's Carbon Dioxide Emissions from Fossil Fuel Consumption

C. Energy Consumption in the Region

According to the Vermont Public Service Department (VPSD), three sectors consumed most of Vermont's energy demand in 2005: heating (27%), electric (40%) and transportation (33%) (see **Fig. 8.3**). By 2010, VPSD predicts energy consumption to increase by 46%, while population is projected to change by only 5%. Such prediction clearly demonstrates the need for a change in consumption behaviors.

In May, 2008, the VPSD released a public draft of its third Energy Plan whose policy priorities include affordability, environment and reliability. The Energy Plan focuses on the State's efforts to transition from fossil fuels to cleaner energy supplies in a way that protects Vermont's economic and environmental future.

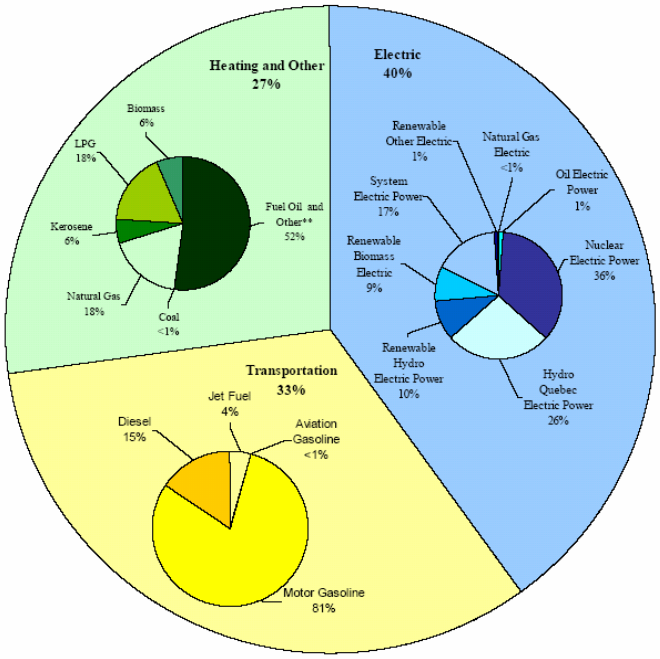


Fig. 8.3 Vermont's Energy Supply 2005
(% of Total Energy Consumed)

1. Electricity

Vermont uses more than a third of its total energy consumed in electricity. Two thirds of Vermont's electric supply is provided by Hydro-Quebec and Vermont Yankee Nuclear Plant (Vermont Yankee) and the rest by in-state hydro, biomass, and other renewables. Of the twenty separate electric companies providing electricity to homes and businesses, Central Vermont Public Service is the Region's sole electric provider with the exception of Ludlow Electric Light Department which serves Ludlow, Cavendish, Proctorsville, Mount Holly and Plymouth. See the Community Utilities and Facilities chapter for more information.

Customer type is an important factor when planning for future consumption needs. Residential needs differ significantly from commercial and industrial needs. According to VPSD, a typical Vermont household uses 600 kilowatt hours (kWh) per month with an average electricity bill of $80.00. While it's difficult to estimate the commercial/industrial sector's usage, its rate charge per kWh is $.08 as opposed to the residential rate of $.13.

Another factor not to be overlooked when considering future energy options is consumer choice. Often cleaner and healthier alternative energy choices involve start-up investment costs which will initially increase rates. Over time, however, savings will be seen as a decrease in energy usage will ultimately result in lower electricity bills. Capacity and willingness are also important aspects, since it is the consumer who will make the final energy decisions based on his/her individual circumstances and needs.

a. Hydro-Power

Vermont-based hydro power generates approximately 10% of the State's electricity production (30% when combined with Hydro Quebec). The State is considering improving efficiency at its 78 existing facilities to generate additional power. In January 2008, the ANR reported that additional opportunities exist for in-state hydroelectric capacity, and identified the following findings concerning Vermont's hydro potential and recommendations concerning permitting: 1) develop a comprehensive guide and low impact standards for development ; 2) retain and streamline present permitting process and prefeasibility assessments; 3) investigate increasing production at existing facilities; 4) retain existing conservation flow procedures; 5) and remove useless dams to restore stream and river connectivity to help balance cumulative impact of new hydroelectric development. (ANR, "The Development of Small Hydroelectric Projects in Vermont; A Report to the Vermont General Assembly," January 9, 2008.)

Vermont utilities obtain a third of their electricity supply from Hydro Quebec. As such, a pressing matter that is currently being addressed is the fact that Vermont's contract with Hydro Quebec will begin to expire in 2012. Vermont is also considering other hydro projects such as Lower Churchill Development. It is being developed by Newfoundland and Labrador Hydro with a completion date sometime in 2015. They are presently exploring options available for bringing the power to the New England markets. While the amount of hydroelectric power from New York has been significantly reduced since the 1950s, its price still makes it an attractive contributor to Vermont's electricity portfolio.

While there are clear benefits to developing a local renewable electric resource such as hydroelectric power, such benefits should be weighed against any negative environmental impacts. Power generated from a stream must not compromise the minimum stream flow necessary to support aquatic life forms. Adverse impacts to water ecosystems, and water quality should be avoided.

b. Nuclear

As one of the lowest carbon-emitting sources of energy, nuclear power has the greatest potential in helping to reduce regional carbon emissions associated with fossil fuel generated electricity. Roughly 35% of the electricity consumed in Vermont is provided by Vermont Yankee, a nuclear plant located in Windham County in the southeastern town of Vernon, which has been operating since 1971. In 2002, Vermont Yankee was sold to a subsidiary of Entergy Corporation of New Orleans, the second largest nuclear plant operator in the nation. With greater resources and expertise available to the facility, the subsequent increase in output was then sold into the New England market. Vermont Yankee is currently in the process of renewing its operating license which is due to expire in 2012.

While many view nuclear power as a source of abundant, clean, renewable energy, others argue that operations are not safe and pose a significant threat to public health, safety and welfare. Nuclear fission will always have levels of risks, including mining issues, waste disposal, and safety issues surrounding the decommissioning of a nuclear plant. Risks as well as benefits should be carefully weighed when considering nuclear energy.

c. Biomass

Biomass refers to living and recently dead biological material that can be used as fuel or for industrial production. Most commonly, biomass refers to plant matter grown to generate electricity or produce biofuel, but it also includes plant or animal matter used for production of fibers, chemicals or heat. Biomass may also include biodegradable wastes that can be burnt as fuel.

Converting municipal solid waste, farm waste and other biodegradable waste streams to energy could reduce global warming as well as reduce pollution and waste stream management problems. Landfill sites generate gases such as methane. Capturing this methane and using it as a fuel source can also reduce emissions of greenhouse gases. Waste may not meet all of our energy requirements, but not utilizing this energy source has a negative impact. The University of New Hampshire is the first university in the country to use landfill gas a primary energy source (www.grenvalhalla.com).

Vermont has been a national leader in wood biomass energy for over 20 years. According to the Biomass Energy Resource Center (www.biomasscenter.org), with the exception of methane recovery systems, biomass systems are usually fueled by waste wood, from logging operations, forest thinning, low-grade wood, and/or sawmill residues. These systems create a commercial market for wood whose extraction benefits forest health while also boosting the forest-product economy. Rather than depleting the forest resource, biomass energy, when sustainably supplied, helps it to grow. According to the June, 2007 *Vermont Wood Fuel Supply Study*, based on USDA Forest Service information, Vermont and the surrounding counties in New York, Massachusetts, and New Hampshire have:

- 9.3 million acres of forested land area designated as "timberland";
- 1.1 billion tons of above-ground biomass inventory on timberland;
- 24.8 million tons of net growth of new wood annually on timberland;
- 4.8 million tons of average annual harvesting to supply all current wood product market demand (includes saw logs, pulp, firewood, and biomass); and
- 20 million tons of under-utilized wood grown annually.

Current consumption of low-grade wood for fuel and fiber represents a significant demand on the region's forest; however, the study also found that forests are growing wood much faster than the current rate of harvesting. While biomass offers an alternative energy source, **Table 8.1** illustrates some of the pros and cons of biomass.

Table 8.1 Pros and Cons of Biomass

PROS		CONS	
Carbon Neutral	burning plant material releases the same amount of carbon dioxide originally taken out of the environment while growing	Start-Up Costs	Extra costs of installing technology to process and recycle wastes
Renewable	plants can be grown and people will continue to generate rubbish	Proximity	Biomass usually has to be harvested close to the station to be economical
Positive Side-Effect	collecting biomass to generate electricity also helps get rid of rubbish	Materials	Expensive to collect, harvest and store raw materials

Source: Meridian Energy Limited 2006

d. Other Sources

In addition to the sources listed above, there are other sources of electricity generation for both residential and commercial applications including photovoltaics, solar, and wind (discussed in Section E. Alternative Energy below), Cow Power (http://www.cvps.com/cowpower/; capturing methane gas in cow manure to generate electricity), geothermal (harnessing heat energy present underneath the Earth's surface), and tidal power (using water turbines to turn electrical turbines).

2. Heating

As illustrated in **Table 8.2** below, the Region uses various fuel sources for residential heating. Fuel oil and kerosene are the most frequently used fuel sources to heat residential homes (and water), with wood being the second most popular. With recent technology, wood biomass energy systems are now providing a sustainable and renewable source of heat for schools, state institutions and industrial applications.

Table 8.2 - House Heating Fuels By Town (%) – 2000

FUEL	Utility Gas	Bottled, tank, or LP gas	Electricity	Fuel oil, Kerosene, etc.	Coal or coke	Wood	Solar Energy	Other
Andover	.00	14.60	1.77	61.95	.00	21.68	.00	.00
Baltimore	.00	14.28	2.86	51.43	.00	31.43	.00	.00
Cavendish	.33	11.59	2.81	67.89	.00	17.05	.00	.33
Chester	.39	16.20	3.24	68.21	.00	11.27	.00	.69
Ludlow	1.89	9.15	4.62	75.75	.28	7.74	.00	.57
Reading	.71	13.33	1.40	62.45	.00	22.10	.00	.00
Springfield	1.44	11.40	5.43	74.39	.30	6.40	.00	.64
Weathersfield	.43	10.63	1.20	73.69	.00	14.05	.00	.00
West Windsor	.44	21.05	3.73	60.52	.00	13.16	1.10	.00
Windsor	.00	13.29	3.80	78.90	.00	3.51	.00	.50

Source: 2000 U.S. Census

a. Fossil Fuels

Petroleum-based fuels meet roughly half of Vermont's energy demands – 31% in transportation (gasoline and diesel); 20% by distillate, residual, propane and kerosene. Fuel oil is the primary source of energy for heating homes in the Region. Volatility in the countries supplying oil to the U.S., combined with increased world-wide demand, has contributed to unprecedented oil prices. Adding to this unstable market is the heightened concern for greenhouse gases and global warming. Burning of fossil fuels is not only the largest contributor of GHGs, but is also directly linked to the acidification of rivers, lakes and soil, and an increase in air particulates that adversely affect air quality. These factors will hopefully bring about a public awareness to cleaner, healthier choices provided by alternative energy resources.

b. Biomass

Biomass is organic, renewable and comes in various forms. Biomass is an attractive source of energy for Vermont especially since forest lands comprise of 77% of its land area. According to the Vermont 2005 Appliance Saturation Survey, 11% of Vermonters use wood as their primary source of heating. As more efficient wood-burning appliances (wood, pellet stoves) are added to homes, wood has great potential for replacing fossil fuels. At $180 per ton of wood pellets, the cost to heat with a wood pellet stove in Vermont during the 2007 heating season was less than that of every other fuel. According to the VDPS' November, 2007 Vermont Fuel Price Report, made from biomass such as sawdust are another form of heating and cost 50% less than oil ($13.64/mBTU, far below fuel oil versus $26.85/mBTU and even natural gas at $21.38/mBTU). Pellet-burning appliance sales have increased by almost 400% since 2000. With these increases, the cost of supplying the fuel wood is rising and availability is poor. Maintaining this fuel source to consumers without Vermont forests paying the price is a concern.

According to VDPS estimates, additional wood could be harvested for biomass fuel if more private land was carefully managed. When grown and harvested in conjunction with effective forest management plans, wood production for energy use adds no additional CO_2 to the atmosphere and does not degrade the forest resource. The use of biomass fuels can replace or reduce the use of non-renewable resources. In addition, jobs related to biomass energy are available to local residents. New biomass technologies exist which have the

potential to provide 90% efficiency and reduce emissions, a vast improvement over highly polluting fossil fuels. Locally, biomass energy is currently being utilized by 33 Vermont schools including Springfield High School and Weathersfield School which heat with wood chip systems.

c. Other Heating Sources

Other feasible heating sources are available, but are currently underutilized in Vermont. These heating sources include solar hot water heating systems and geothermal heat pumps. Passive solar construction techniques can significantly reduce the heating demands of structures. (See Section E. Alternative Energy below for more information.)

3. Transportation

The transportation sector accounts for 33% of the total energy consumed in Vermont, and is the largest source (44%) of GHG emissions. Gasoline use has grown at a rate of 1.4% annually, while diesel use has risen 2.7% suggesting an even more rapid growth in freight movement within or through the State. With its rural character, dispersed settlement patterns, and reliance on single occupancy vehicle travel, Vermonters have a difficult challenge to face in reducing its consumption in transportation fuels. While there are some strategies that can be implemented to gain some ground in this area, they will need to be implemented on state, regional and local levels.

In June, 2008, VTrans came out with a Climate Change Action Plan which has three major focus areas: reducing GHG emissions; protecting Vermont's transportation infrastructure from the effects of climate change; and reducing its own operational impacts. In reducing GHG emissions, VTrans is taking a three-pronged approach in promoting the development, availability, and use of cleaner burning bio-fuels; increasing vehicle efficiency; and increasing the efficiency of the transportation system.

On a more regional and local level, towns should promote alternative transportation options, such as ride-share programs, van-pooling, public transportation, flex-time, and bicycling which can not only help achieve a reduction in traffic and transportation fuels, but also helps to keep road maintenance costs down. Settlement patterns that are more concentrated and require less travel should be encouraged in order to take advantage of such alternative transportation options. This is especially the case in the winter season where due to the Region's rural characteristics, winter travel options are extremely limited. Municipalities should look into utilizing biodiesel to fuel town vehicles such as school buses. RPC should work with VTrans to explore alternative funding sources for transportation, as the above alternative options would have the net result of reducing state and federal fuel tax revenues.

D. Energy Conservation

While it is necessary to look into alternative energy resources, it is equally as important to conserve the resources that are already being used and will continue to be used until alternatives are available. Benefits of energy conservation include reducing electricity demands, reduction in air pollutants, increasing efficiencies and reducing overall use of resources which in turn lead to lower utility and heating bills.

In 1999, the State of Vermont established the Vermont Energy Efficiency Utility Fund (VEEUF) to fund ten core statewide energy efficiency programs, which were subsequently condensed into eight programs in 2003. These programs include: business existing facilities; business new construction; customer credit; business initiatives; energy efficiency products; residential new construction; residential existing buildings; and residential initiatives. Pursuant to 30 V.S.A. §209, the Vermont Public Service Board (VPSB) established a volumetric charge to customers, the Energy Efficiency Charge (EEC), for the support of energy efficiency programs. Currently, there are twenty (20) distribution utilities assessing these charges and utilizing the programs.

Vermont continues to invest more per capita in energy-efficiency programs than any other state in the U.S. Most recently, on March 19, 2008, Governor Douglas signed into law Senate Bill 209 -The Vermont Energy Efficiency and Affordability Act. The following is a list of some of the more important aspects of the act that will increase the state's use of renewable energy:

- Raises the cap on net metering to 250kW, expands the number of net metering systems allowed (from 1% to 2%), allows for full group net metering and improves aesthetic review of wind turbines;
- Establishes a new and simplified permitting process for meteorological stations used to measure wind resources;
- Strengthens the existing SPEED (Sustainably Priced Energy Enterprise Development) Program and existing Renewable Portfolio Standard;
- Establishes a formula for calculating the fair market value of new commercial-scale renewable energy plants for the purpose of setting the statewide educational property tax;
- Requires studies on increasing the use of biodiesel by state government and on reaching the goal of meeting 25% of our total energy from farm- and forest-based resources by 2025; and
- Creates a new heating energy-efficiency program for Vermont.

1. Local Energy Initiatives

Vermont Energy & Climate Action Network (VECAN) in partnership with the Alliance for Climate Action, New England Grassroots Environment Fund, Sustainable Energy Resource Group, Vermont Energy Invest Corporation and Vermont Natural Resources Council, work together to "plan and implement energy-saving, greenhouse-gas emission reduction strategies at the local level." VECAN developed a Town Energy and Climate Action Guide that provides communities with the necessary tools and resources to form their own volunteer energy and climate action committees. Under 24 V.S.A. §113, town selectboards are enabled to appoint an energy coordinator. Towns should consider not only energy coordinators but also Energy Committees in addressing a town's energy decisions. Go to http://www.vnrc.org/article/view/14458/1/625 to get a copy *The Town Energy and Climate Action Guide* by VECAN.

2. Efficiency Strategies

Vermont is the first state in the nation to have a non-profit organization that provides energy efficiency services to its residents under a contract with the Vermont Public Service

Board. Efficiency Vermont provides "technical assistance and financial incentives to Vermont households and businesses, to help them reduce their energy costs with energy-efficient equipment and lighting and with energy-efficient approaches to construction and renovation."

The Sustainable Energy Resource Group (SERG) is another Vermont based organization that promotes energy conservation, efficiency and renewables through the formation of town energy committees to help residents, businesses and municipalities reduce energy consumption, save money, increase the sustainable use of renewables, strengthen the local economy and improve the environment. Energy saving tips from SERG can be found at www.serg-info.org.

The following topics are areas in which towns are encouraged to look at when addressing energy efficiency:

- Efficient Buildings – energy audits and renovations (www.effiencyvermont.org);
- Work Options – telecommuting; 4-day work week; flex time;
- Baseline Buildings' Energy – using an easy on-line tool created by the Environmental Protection Agency, towns can benchmark their buildings' performances and compare them to similar public buildings (http:www.epa.gov/Region1/eco/energy/energy-challenge.html);
- New Developments – 'greening' town plans, zoning/subdivision bylaws; compact land use patterns;
- Biodiesel – Biodiesel for school buses;
- Educational Outreach – distribute Vermont energy standards to developers applying for building permits (Energy Code Assistance Center 1-888-373-2255);
- Change a Light Campaign – raise awareness and create cost-effective electricity by swapping out incandescent bulbs with compact fluorescent light (CFLs) bulbs. CFLs use roughly 1/3 less energy, have a $40-$70 electric savings, and release over 1/3 less carbon emissions.
- Public Campaigns – no idling; bike or walk to work; and
- Energy Section in Town Libraries – materials providing energy saving tips, residential and business emissions calculators, books and DVDs, etc.

3. Resources

See **Appendix B** for a listing of Energy Resources.

E. Alternative Energy

1. Wind

Wind is a clean, efficient and a sustainable source of energy for both commercial and residential energy production. Between 1996 and 2004, wind power production in the United States has increased four fold. Wind energy can save as much as 50-90% on electric bills and cost from $6,000-$22,000 to install. The investment pays for itself in around 6 – 15

years, with electric bills roughly $8-$15 for up to nine months of the year. New technologies have made it possible to utilize wind power more efficiently thus making it a viable alternative source of energy. While wind energy produces zero pollution and is a relatively secure fuel source, there still exists controversy over the siting of wind turbines with respect to noise, aesthetics and effects to wildlife.

a. Specifications

Wind turbine towers are mostly lattice or monopole construction made from steel. The blades are made of fiberglass-reinforced polyester or wood-epoxy. Commercial wind turbines range in size with the largest rotor diameters measuring 90 meters and with a total height of 135 meters (442 feet). Small turbines for residential or small businesses are much smaller with rotor diameters of 8 meters or less and mounted on towers 40 meters (131 feet) high. In Vermont, ridgelines are seen as ideal locations for wind generation facilities due to wind patterns and elevation (2,000 – 3,500 feet above sea level) conditions. Other factors that are considered for siting include proximity to transmission lines and substations, and meeting lighting requirements set by the Federal Aviation Administration for towers over 200 feet tall. Generally, an annual average wind speed greater than 9mph is required for small wind electric turbines (less for water pumping operations). Information regarding wind availability around Vermont is available through the American Wind Energy Association at www.awea.org.

b. Output

Energy output depends on the turbine's size and the wind's speed through the rotor. At a site that has an average wind speed of 12 miles per hour, a 10-kW wind turbine can generate about 10,000 kWh annually or enough power for a typical household. Using a 53,000 square foot school, a 250 kW turbine provides an average of 350,000 kWh of electricity per year which is more than this building would need. The excess energy could be fed back into the local utility system.

c. Land Use Implications

Since wind power relies on wind speed and power density to generate energy, it can be assumed that there will be proposals to site wind turbines in areas that have relatively constant strong winds for maximum benefit. Wind potential is rated in classes on a scale of 1 through 7, with 4 being suitable for utility-scale power generation. Andover, Ludlow and West Windsor are the only areas in the Region with Class 4 or higher ratings. Since most of the suitable areas are either privately owned or state-owned forest lands, the regional plan encourages development criteria to address environmental and community concerns. The following items should be considered when developing such criteria:

- Aesthetics – sensitive landscapes; scenic and historic resources;
- Noise – levels and affected persons living in a prescribed proximity;
- Wildlife habitats – protecting physical and ecological relationships;
- Surrounding Infrastructure – access to site; transmission lines; and
- Decommissioning – removal and restoration of land to its original state.

A residential wind siting handbook, *Siting a Wind Turbine on Your Property*, can be found at http://publicservice.vermont.gov/energy-efficiency/ee_renewables.html. The American Wind Association also provides a wind siting handbook at www.awea.org/sitinghandbook/

d. Permitting Requirements

Wind generation facilities are land uses and may be subject to local or state permitting requirements. Under 30 V.S.A. §248, the Vermont Public Service Board (Board) must issue a Certificate of Public Good prior to the construction of any power generation facility (wind, hydro, etc.) including net-metered residential wind turbines. It also provides for a review process whereby the Board looks at how a project will affect environmental, economic, and social impacts. Section 248 also provides that the Board give consideration to the recommendations of municipal and regional planning commissions and their respective plans. This is important to note as wind power facilities needing Board approval under Section 248 are preempted from municipal review. In addition, large-scale wind generating projects with the purpose of utility consumption are not subject to local zoning or subdivision regulations. Residential wind turbines; however, are subject to such regulations and considered accessory uses or structures subordinate to a primary use. Local zoning height restrictions often unintentionally prohibit the construction of wind turbines.

2. Solar

The power of the sun has great potential to supply electricity and provide heating in Vermont since the "fuel" is free. According to Vermont Public Service, enough sun hits the average residential roof in Vermont to supply 10 times the electricity used by the average homeowner. In addition, with today's window and insulation technologies, passive solar and daylight techniques can provide 30 – 50% of a buildings heating and lighting needs. Passive solar optimizes the amount of energy that can be derived directly from the sun and used for heating and lighting. It relies heavily on the design of the building, siting (southern exposure), and materials used (see **Fig. 9.4**).

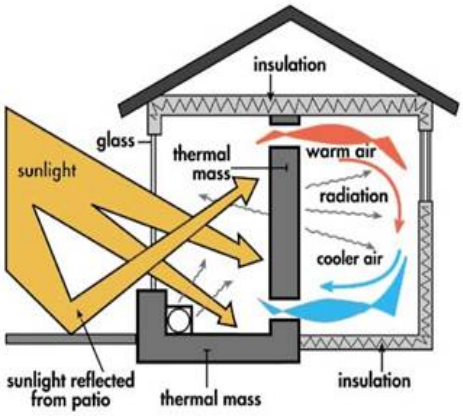


Fig. 9.4 Passive Solar Energy

Photovoltaics (PV's) and thermal collectors are used to capture the sun's energy. PV's can convert sunlight into electricity (such as seen with traffic signals), and thermal collectors heat water or air for residential or commercial uses. As part of the federal "Million Solar Roofs Initiative," Vermont has committed to 1,000 new solar installations by the year 2010. In order to reach that goal, VDPS is encouraging residents to install "net metered" renewable energy systems. Net metering was approved in 1998 and requires electric utilities to permit customers to reduce their electric bills by generating their own power using small-scale renewable energy systems. The excess power they generate can be fed back to their utilities. All equipment purchased to construct and install a net metered renewable energy system is exempt from the state's 6% sales tax.

While solar is one of the cleanest forms of alternative energy, comparatively, it is the most expensive since costs are front-loaded. These costs, however, should decline with the increase in technology which presently is in its infancy. In addition to initial investment costs, capacity to utilize solar energy can also be affected by siting and the lack of technical knowledge. Despite these constraints, its positive attributes make it an energy source that policies should encourage. Information regarding solar energy in Vermont can be found at http://publicservice.vermont.gov/energy-efficiency/ee_vtsolarguide.html.

3. Micro-hydro

Micro-hydro systems are those hydro-electric generating systems with a rated capacity of approximately 300 kW which is the maximum size for most stand alone hydro systems not connected to the grid, and suitable for "run-of-the-river" installations. "Run-of-the-river" refers to a type of hydroelectric generation where the natural flow and elevation drop of a river are used to generate electricity. This generation has a minimal environmental impact on the local ecosystem since the water runs straight through the generator and back into the stream.

Advantages to micro-hydro include:

- small amount of flow or a drop as low as two feet to generate electricity to a site up to a mile away;
- continuous supply of electrical supply compared to other renewable energies;
- cost run from $1,000 - $20,000 depending on site requirements and location;
- low maintenance fees; and
- ability to supplement with intake from existing power grid or other alternative systems if needed.

Disadvantages to micro-hydro include:

- suitable site characteristics (flow rate, output and drop);
- low power in summer months; and
- ecological impact (while small, still needs to be considered).

4. Vermont Incentives for Renewables and Efficiency

Vermont has many incentives for utilizing renewables and becoming energy efficient. Such incentives include sales tax exemptions, the solar and small wind state rebate program, corporate tax credits for solar, and several loan and grant programs. More information on state incentives can be found at the Database of State Incentives for Renewables & Efficiency's website http://www.dsireusa.org.

5. Alternative Energy Facilities

While the RPC supports and encourages the development of alternative energy facilities in the Region, it also believes that they should not come at a cost to the Region's natural resources. In that respect, the following guidelines shall be observed:

(a) developers should first define the character of the proposed site to determine how well the proposed facility will conform to the existing landscape including

scenic quality (focal points, viewer sensitivity, topographic diversity, prominence/dominance, order of landscapes and patterns of development);

(b) proposed projects should meet the aesthetic test set forth under Criterion 8 of Act 250;

(c) site selection should also consider access, site clearing, onsite power lines, substations, lighting and off-site power lines. Minimal disturbance of the site shall be a planning objective;

(d) reasonable measures shall be taken to mitigate possible destruction or impairment of habitats existing in a project area; and

(e) facilities deemed to be abandoned or unused should be removed by the owner/operator(s) within a reasonable time from cessation of operations, as well as restoring and/or enhancing the site back to its natural state.

F. Planning Implications

While energy decisions can seem like an uphill battle, every resident can make a difference. Small changes add up and sound regional and local planning can play a positive and effective role in guiding energy decisions. By promoting appropriate land use patterns, participating in energy development decisions, facilitating alternative transportation options, and encouraging energy conservation strategies; municipalities can provide leadership toward a position of sustainable energy use which will not only help to maintain a healthy environment, but will also build a foundation for economic health and stability.

Local planning and zoning bylaws also play an important role in promoting energy efficient development. Planning efforts should be cognizant of settlement patterns less dependent on single occupant vehicle transportation models, land uses and policies that encourage energy conservation and efficient uses of energy resources. In addition, when implementing town plans, municipalities should consider zoning bylaws and subdivision regulations in the development of alternative energy structures/systems where feasible. Furthermore, there needs to be some flexibility in zoning bylaws to allow for an increase in the use of emerging technological advancements in energy resources such as solar and wind.

ENERGY GOALS

1. To improve conservation and efficiency in the use of existing energy resources, and to facilitate the transition to cleaner energy resources in order to protect the environment.

2. To reduce demand for fossil fuels by promoting public transportation, ride-share programs and other programs that lessens the dependence on single occupancy vehicles.

3. To encourage land use patterns and development in the Region that use energy more efficiently.

4. To increase the awareness of residents and municipalities of energy conservation practices and programs through educational programs.

ENERGY POLICIES

1. Member towns and residents are encouraged to pursue the transition from the use of fossil fuels to renewable energy sources.

2. Promote the feasibility of alternative energy options for commercial and industrial uses.

3. No new dams or major improvements to existing dams should be encouraged, or permitted, without full consideration of its social, economic, and environmental impacts, and are in conformance with local and regional plans.
   (a) run-of-the-river projects are preferred over projects which require impoundments with low or minimum flows;
   (b) recreation and fisheries are high priorities for river uses and should not be significantly diminished by hydropower development; and
   (c) water quality and minimum flows to sustain aquatic life must be maintained.

4. Promote alternative transportation practices that promote energy efficiency such as: expanding existing park-n-ride commuter parking lots, bicycle paths to lessen the dependency on single occupancy travel

5. 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.

6. Prior to the construction of additional or upgraded transmission or distribution lines or related facilities, utilities should demonstrate that such public investments have maximized demand management, increase energy efficiency and promote energy conservation.

7. Where development and construction of alternative energy facilities and electric power generation facilities are proposed for public use, plans must consider placement of such facilities in locations where aesthetic and wildlife impact is minimal or reasonable measures have been employed to mitigate adverse impacts.

8. Capital investments of public utilities and services are encouraged within built-up centers to support the high intensities of use.

ENERGY RECOMMENDATIONS

1. Encourage the development of a transportation system that reduces the use of single-occupancy vehicles, and enables increased non-motorized vehicle and pedestrian traffic. Emphasize links between schools, stores, work and home, and coordinate these with the development of “greenway" segments.

2. Help towns to ensure that the design, location and maintenance of existing and future transportation systems are consistent with Smart Growth and Growth Center Planning.

3. Developers should examine alternative energy resources in the design and construction phases of new development, and promote the energy efficiency standards recommended by the Vermont Department of Public Service and Efficiency Vermont.

4. Encourage the concentration of energy-intensive facilities, housing and other uses to prevent the expense of distributing energy over large geographic areas.

5. Educate residents and local officials in the Region about the progress of utility restructuring and facilitate the transition when restructuring takes effect.

6. 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.

7. 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 and Efficiency Vermont may serve as a basis for the development of such conservation measures.

8. The Commission supports the implementation of the Least Cost Integrated Planning, as identified in Vermont's Twenty Year Electric Plan and the Vermont Comprehensive Energy Plan and recommends that due consideration be given to the benefits of utilizing local energy resources in all LCIP project analysis.

IX. HOUSING

Housing is a key element of any sustainable community. The supply of housing should be adequate to house those who work in the community and should expand at a rate that can accommodate economic growth. In addition, housing should be available to house the Region's expanding elderly population and to maintain a population of families that bring students to area schools. Housing issues in the Region vary dramatically from one town to another. While towns on the northern end of the Region are becoming bedroom communities of the Hanover/Lebanon area, Springfield is experiencing economic challenges, a declining population and deteriorating housing stock. In resort areas and towns with a large percentage of seasonal housing, high housing costs have created a shortage of housing that is affordable to those who work locally and in the service industries.

The amount and type of housing available for sale and for rent can have a direct effect on the nature of the landscape and the costs of municipal services. With careful planning and use of available resources, housing that is both affordable and attractive can serve area residents and can enhance the character of a community. This chapter addresses regional concerns through an assessment of the housing stock, and the goals, policies and recommendations as set forth by the RPC .

A. Housing Trends

Growth in the housing stock has slowed substantially in southern Windsor County. Whereas the housing stock increased by 18% (2085 housing units) between 1980 and 1990, the increase was only 7.9% (508 units) between 1990 and 2000 (see **Table 9.1** below). This contrasts dramatically from the 26% increase in housing stock between 1970 and 1980. The number of households in the Region increased by 780 between 1990 and 2000, more than the number of housing units built in the same period. This may explain the decrease in the number of seasonal units over the last decade. While the number of seasonal or second homes more than doubled (from 1,424 in 1980 to 3,096 units in 1990, or 217%) during the 1980s, the number decreased slightly to 3003 units (a decrease of 3%) in 2000. This decrease indicates that some seasonal units may have been converted to year-round housing to compensate for the slower growth in housing development.

From 1990 to 2000, housing stock increased in all towns except Windsor, West Windsor, and Springfield, which all lost housing units. The largest increase in the number of housing units occurred in Ludlow, which gained 324 housing units. Most of these (226) were seasonal. Andover, Baltimore, Cavendish, Chester, and Weathersfield all gained units overall, but lost seasonal units. According to the U.S. Census, West Windsor lost almost 50 units of seasonal housing since 1990.

Baltimore, Springfield and Windsor continue to have the smallest proportion of seasonal housing stock in relation to the total number of housing units in the towns. In Baltimore, 6.6% of the total units were seasonal according to U.S. Census 2000, while in Springfield and Windsor less than 3% of the total units were seasonal. Less than 10% of the total units in Weathersfield were seasonal (8.8%); all other towns had at least 15% seasonal units, with Ludlow having the greatest percentage of seasonal units; 62% of total housing stock.

Table 9.1 SWCRPC Regional Housing Data

	1990	% of 1990	2000	% of 2000	% Change 1990-2000
Total Households	9,815	100.00	10,595	100.00	7.95
Family households (families)	6,799	69.27	6,972	65.80	2.54
Married-couple family	5572	56.77	5,559	52.47	-0.23
Nonfamily households	3,016	30.73	3,623	34.20	20.13
Householder living alone	2,480	25.27	2,995	28.27	20.77
Householder 65 years and over	1,215	12.38	2,004	18.91	64.94
Total Housing Units	13,697	100.00	14,205	100.00	3.71
Occupied Housing Units	9,815	71.66	10,595	74.59	7.95
Owner Occupied	6,848	50.00	7,603	53.52	11.03
Renter Occupied	2,967	21.66	2,992	21.06	0.84
Vacant Housing Units	3,882	28.34	3,610	25.41	-7.01
Seasonal, recreational or occasional use	3,096	22.60	3,003 7	21.14	-3.00
Total ownership units	6,969	50.88	7,723	54.37	10.82
Total rental units	3,261	23.81	3,215	22.63	-1.41
Vacant ownership units V	121	.88	129	.91	6.61
Vacant rental units	294	2.15	223	1.57	-24.15

Source: 2000 Decennial U.S. Census

The total number of rental units available in the Region declined by 46 units (1.4%) region-wide between 1990 and 2000. The largest decrease in rental units occurred in the town of Springfield, where 70 units were lost over the decade. This decrease is likely due to a reduction in the number of units in two subsidized housing developments (Westview and Southview). Ludlow and Windsor also lost almost 30 units each, probably due to strong housing markets in both these towns. All of the other towns in the Region gained a small number of rental units, except Chester, which gained over 50 units (17% higher than 1990).

B. Household Characteristics

The total number of households in the Region grew by 8% between 1990 and 2000. This compares to a 5% growth in housing stock. The average household size decreased during that time period in most towns, meaning the size of housing units desired may have shifted to smaller-sized units. The total number of householders living alone grew by 21%, compared to the total number of family households which grew at only 2.5%. This transition was especially evident in the towns of Andover, Cavendish, Chester, and Ludlow, where the number of householders living alone grew by more than 25%. The number of households in which the householder was 65 or older also grew by 13% region-wide. Cavendish, Chester and Weathersfield showed the largest growth in these households, each with a greater than 30% gain.

C. Housing Availability

Ownership and rental vacancy rates give some sense of how the supply of housing is meeting the demand. A healthy vacancy rate is 5%, this number indicates that there is a selection of housing available. Lower vacancy rates can mean too much demand for housing and resulting higher prices; higher vacancy rates may mean there is a surplus of housing available due to overproduction or a loss of jobs and outmigration of population. Over the last decade, vacancy rates in the Region have generally declined. According to U.S. Census 2000 data, ownership vacancy rates are below 4% for all towns in the Region. Rental vacancy rates were higher than ownership. The towns of Springfield, Reading, Ludlow, Cavendish and Baltimore all had renter vacancy rates between 8 and 12% in 2000. With the low vacancy rates in surrounding towns, these high vacancy rates may be due to a large number of substandard units that are undesirable to many renters. Many rental units in Ludlow and the surrounding towns are rented as ski houses and are therefore not available to those who work in lower paying jobs in town. Renter vacancies in Andover, Chester, Weathersfield, West Windsor and Windsor all fell below 5%, indicating there may be a need for more rental housing in those communities.

D. Housing Types

Communities that sustain a variety of housing types can offer housing for the variety of residents who live, work and grow up in their towns. Rental units are usually located in multi-family structures, including accessory apartments, and are generally more affordable than ownership units. Rental units are also more likely to meet the needs of smaller households and single people. Mobile homes and manufactured housing provide another source of housing that may be affordable to lower incomes; however, the cost of land in the Region is high. Towns with larger shares of multi-family housing units or mobile homes may be able to serve broader income spectrums than towns with greater proportions of single-family homes. In terms of multi-family structures (2 or more housing units in a single structure, including condominiums), the Region had a total of 3,555 units in 2000 (approximately 25% of the total housing stock as compared to 22% and 23% for Windsor County and the State of Vermont respectively) (see **Table 9.2** below). This was a drop of 109 units since 1990.

Towns with greater than 30% of their total housing in multi-family units included Windsor (37%) and Ludlow (39%). The high percentage of multi-family units in Ludlow is attributable, in part, to the condominiums at Okemo Mountain Resort. Many of these units are used as resort homes, and therefore may not be included in the town's affordable housing stock. Towns with less than 10% of their housing in multi-family units included Andover (4.9%), Baltimore (8.8%), Reading (3.0%), and Weathersfield (2.6%). The remaining towns ranged between 13 - 29% of total housing as multi-family units.

Mobile homes accounted for about 7.2% of the total housing units in the Region, slightly less than that for both the State of Vermont and Windsor County. The towns with the greatest percentage of their housing stock in mobile homes included Baltimore (10.6%), Cavendish (11.7%), and Weathersfield (23.6%). Towns with less than 5% of their housing in mobile home units included Andover (3.1%), Ludlow (4.8%), West Windsor (1.7%), and

Windsor (4.3%). The other three towns in the Region ranged between 5% and 9% of housing units as mobile homes.

Table 9.2 Housing Units by Type 2000

Location	Total Units	2000 Units by Type							
		Single Family[1]		Multi-Family[2]		Mobile Home		Other[3]	
		Total	% Total	Total	% Total	Total	% Total	Total	% Total
Vermont	294,382	203,309	69.1	67,768	23.0	22,631	7.7	674	.2
Windsor Co.	31,621	22,135	70.0	7,003	22.1	2,410	7.6	73	.2
Andover	350	322	92.0	17	4.9	11	3.1	n/a	
Baltimore	113	91	80.5	10	8.8	12	10.6	n/a	
Cavendish	852	630	73.9	117	13.7	100	11.7	5	.6
Chester	1,611	1,242	77.1	245	15.2	116	7.2	8	.5
Ludlow	3,001	1,682	56.0	1,175	39.2	144	4.8	n/a	
Reading	404	346	85.6	12	3.0	36	8.9	10	2.5
Springfield	4,232	2,782	65.7	1,232	29.1	218	5.2	n/a	
Weathersfield	1,315	971	73.8	34	2.6	310	23.6	n/a	
West Windsor	716	587	82.0	117	16.3	12	1.7	n/a	
Windsor	1,611	945	58.7	596	37.0	70	4.3	n/a	
Region	14,2005	9,598	67.6	3,555	25.0	1,029	7.2	23	.2

Source: U.S. Census Bureau, 2000 Decennial Census
1 Single family units are attached or detached from other buildings.
2 Multi-family units are structures containing 2 or more residential units.
3 Other is units used as permanent residence, including campers, vans or other structures

E. Housing Costs

According to figures from the Vermont Department of Property Valuation and Review, the average Fair Market Value (FMV) of a single-family house on less than six acres (R1) in southern Windsor County increased from $93,123 in 2001 to $196,546 in 2007, an increase of 111%. Ludlow remains the most expensive town to purchase a single R1 home with an average cost of $306,174.

Moreover, the cost of land itself in the Region has increased dramatically thus making housing even less affordable. As an example, West Windsor has primarily five acre zoning, and can cost from $125,000 to $140,000, which for most people is not affordable. Factoring in the cost of building a home at $150 sq./ft., a 1,500 sq./ft. home would cost $225,000 without even factoring in utilities such as sewer and water. Since ones housing costs should not exceed more than 30% of ones annual income, this scenario is well beyond the median income of any Windsor County resident.

Department of Housing and Urban Development (HUD) reports the median family income in 2008 for Windsor County is $61,600 and $61,628 for Vermont. According to a recent report published by the Vermont Housing Council, the median cost for a single family house in Vermont in 2007 was $317,900. A family would have to have an annual income of $103,000 a year to own a house at the median price. Considering these figures and the values of homes, families earning the median family income would have great difficulty purchasing a single-family house on less than six acres in the towns of Ludlow and West

Windsor. Those earning less than the median income, or single-householder households would have difficulty purchasing homes in other towns in the Region as well. A family with an income of $30,000 could afford a home that costs approximately $75,000. According to **Table 9.3**, these families would only be able to afford to purchase mobile homes at current fair market values.

Table 9.3 2007 Counts and Average Fair Market Values (FMV)

Town	R1		R2		MHU		MHL		Commercial Apt.	
	Count	Avg. FMV*	Count	Avg. FMV*	Count	Avg. FMV*	Co unt	Avg. FMV*	Count	Avg. FMV*
Andover	152	222,540	195	375,953	11	8,848	8	107,159	0	0
Baltimore	37	149,140	37	234,745	1	3,270	9	66,667	0	0
Cavendish	317	166,080	131	295,199	60	7,456	60	81,673	2	232,326
Chester	827	186,231	414	290,353	22	16,844	126	104,156	9	591,382
Ludlow	613	306,174	148	441,067	92	24,831	53	123,832	4	8,173,108
Reading	152	202,809	199	470,494	0	0	12	86,614	0	0
Springfield	2,544	136,832	376	235,465	102	10,984	84	73,814	36	319,739
Weathersfield	602	175,456	412	286,425	155	25,077	139	107,661	0	0
West Windsor	311	260,054	297	499,355	0	0	10	205,622	1	208,675
Windsor	945	160,144	94	280,008	40	22,940	29	89,327	21	546,137
Region	6,500	196,546	2,303	340,907	483	15,031	530	104,652	73	1,678,561

Source: Figures based on 2007 Vermont Department of Taxes, Division of Taxes, Division of Property Valuation and Review: FY 2008 Annual Report "Municipal Equalized Values by Category"
* FMV: Fair Market Value determined by dividing the equalized total value for each category by the number of properties represented. "Equalized Values" are 411 listed values that have been adjusted to reflect current market values
Property Definitions are as follows:
R1 - Residential on less than six (6) acres
R2 - Residential on greater than 6 acres, not including working farms
MHU- Mobile Home Unlanded -(set up on land not owned by the owner of the mobile home, as in mobile home parks)
MHL- Mobile Home Landed -(set up on land owned by the owner of the mobile home)
Commercial Apt - Commercial apartments with five (5) or more units.

Fair market rents (FMR) for an average two-bedroom apartment in 2000 was $623 per month in Windsor County, in 2005 the FMR had risen to $659 per month. Estimates from HUD for 2008 show an additional increase of $76 since 2005. See **Table 9.4** for additional rental information. When developing housing elements of town plans, towns should collect primary data on rental costs to get a better picture of rental costs and needs.

Table 9.4 Fair Market Rent FMR for Windsor County (Dollars)

Year	Efficiency	One BR	Two BR	Three BR	Four BR
2000[1]	441	484	623	774	922
2005[2]	500	560	659	897	1,067
2008[3]	581	651	735	1,043	1,240

Source: HUD 2008 Fair market value rent information www.huduser.org
1 2000 Census Base Rents
2 2005 FMR Summary developed and updated starting with the 2000 Census benchmark and including any subsequent rebenchmarking using local Random Digit Dialing (RDD) or American Housing Survey (AHS) data.
3 The Final FY 2008 2-Bedroom FMR is the product of the 2000 Census Base Rent for a non-metropolitan county area times the 2000-to-2005 Update Factor (1.2074) and the 2005-2008 Update Factors (1.0744 x 1.0376) for Windsor County Vermont

One measure of whether wages are keeping up with housing costs is the "housing wage." The housing wage is the wage a household would have to earn so that it would not pay more than 30% of its income for housing. Using the fair market rent value of $735 per month for a two-bedroom rental, a household would have to make an average annual wage of $29,400. **Table 9.5** shows the average annual wages in the Region for 1990, 2000 and 2005. Wages have increased in all towns except Springfield since 2000. Approximately two people in a household would have to collect above the average annual wage in order to meet the median family income level for the area.

Table 9.5 Average Wage in Southern Windsor County (Dollars)

Town	1990[1]	2000[1]	2005[2]
Andover	17,991	31,414	32,546
Baltimore	n/a	n/a	32,947
Cavendish	15,473	23,651	26,621
Chester	15,762	23,866	26,839
Ludlow	14,664	21,766	25,229
Reading	20,161	16,100	30,105
Springfield	20,730	29,477	26,670
Weathersfield	17,409	23,745	32,251
West Windsor	16,799	22,559	41,197
Windsor	19,609	24,919	27,039

Source: 1 US Census Bureau, 1990 & 2000 Decennial Census;
2 Vermont Economic and Demographic Profile Series 2007; n/a denotes Not Applicable

F. The Affordability Gap

A State Planning Goal established under 24 V.S.A. §4302(c)(11), is "to ensure the availability of safe and affordable housing for all Vermonters." The price for most housing in the Region is far above what the average person working in the region can afford. The value of ownership housing is rising rapidly in all towns except for Springfield, especially compared to wages in those towns, meaning most people who work in town must live elsewhere if they want to own a home. Likewise, those who want to live in many of the towns in the Region must work where wages are higher. According to the Vermont Housing Council study, "the gap between what a household can afford and the income necessary to purchase a home is likely to grow unless there is a significant increase in the supply of houses affordable to first-time homebuyers, and unless the buying power of Vermont families keeps up with the rising prices of homes." Some other reasons for the affordability gap are:

- High utility and child care costs.
- High construction costs compared to other parts of the country.
- Market demand for existing and new units to be used as second homes.
- Changing demographics that created a greater need for single person housing, and more initial homebuyers.
- Lack of steady, high wage jobs – many jobs in the Region are seasonal and therefore not regarded as steady employment by banks. In addition, many service industry jobs do not bring in incomes sufficient for homeownership.
- Greater perceived value for saleable housing units and homeownership than for rental units.

- Lower lending appraisals on new construction. For most lower income families, being able to purchase a new house that has low maintenance costs is a much safer and more workable option than purchasing an older home. However, bank appraisals on newly built homes often do not cover the costs of construction. Nor do they value energy conservation features such as Energy Star certifications that document lowered energy costs.
- Vermont's property tax relief program does not help first-time homebuyers as banks do not allow rebate to be taken into consideration.

Housing is generally considered affordable if total housing costs, including rent or mortgage principal and interest, taxes, insurance, utilities and other related housing costs are at or below 30% of household income. According to the definition of affordable housing in state statute (24 V.S.A. §4303 (1)), housing is affordable if total housing costs do not exceed 30% of the income of a household's inhabitants who's income does not exceed 80% of the country median income. Thus, in Windsor County, at 80% the 2008 estimated median household income ($61,600), no more than $1,232 per month would go for total housing costs. Since many of the Region's households fall below the Windsor County median income, providing housing that is safe and affordable for all residents is necessary (see **Table 9.6**).

Table 9.6 Affordable Housing Costs by Income Category in Southern Windsor County

Household Income as a % of the 2008 Median Family Income	Income Category	Household Income Range ($)[1]	Affordable Monthly Housing Costs($)[2]
81 – 100	Moderate	49,896 – 61,600	1,247 – 1,540
51 – 80	Low	31,416 – 49,280	785 – 1,232
31 – 50	Very Low	19,096 – 30,800	477 – 770
30 and less	Lowest	18,480 and below	Less than 462

Source: HUD guidelines for Median Family Income
1 MFI for Windsor County in 2008 is $61,600, as reported by HUD Data
2 30% of monthly gross income for housing expenses

Some of the changes made to the Vermont Municipal and Regional Planning and Development Act (24 V.S.A. Chapter 117) in 2004 were intended to better address affordable housing needs. Under the equal treatment of housing provision (24 V.S.A. §4412 (1)), no local bylaw may have the effect of excluding affordable housing for low and moderate income populations. In addition, this statute enables accessory dwelling units for single-family residential dwellings. 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.

G. Subsidized Housing

A number of housing units in the Region are maintained for families with lower incomes. These properties are managed by State or local housing authorities or by organizations such as the Rockingham Area Community Land Trust (RACLT) whose mission is to develop and manage housing for low and moderate income families in their service area. **Table 9.7** lists

housing that is available for low-income and very low-income residents in towns within the Region.

Table 9.7 Subsidized Housing Units in Southern Windsor County

Town	Housing Facility	Income Group*	# of Units	Units Sizes	# of Units w/Features
Cavendish	Cavendish Sr. Housing	Low and Very Low	6	1 (BR)	E-5, WC-5
Cavendish	Proctorsville Green	-	16	1, 2	E/D-6, WC-1
Chester	Chester Depot	Very Low	6	1, 2	E-2
Chester	Chester Elderly Apts.	Very Low	36	1	D-4, E-32, WC-3
Chester	Pleasant Brook Apts.	Very Low	24	1, 2, 3	WC-2
Ludlow	Gill Terrace Retirement	Low	24	1	E-24, WC-3
Ludlow	Black River Overlook	Very Low	25	2, 3	WC-2
Ludlow	Tuckerville MH Park	Low	25	MH lots	-
Springfield	Evergreen Heights	Very Low	44	1, 2, 3	D-4, WC-5
Springfield	Edwin L. Huber Bldg	Low	60	1 & eff.	E-60, WC-3
Springfield	Louis H. Whitcomb Bldg	Low	72	1	E-72, WC-7
Springfield	The Maples	Subsidized	28	1	E-28, WC-4
Springfield	Mountain View Apts.	Low & Very Low	72	1, 2, 3	-
Springfield	Southview Apts.	Very Low	69	1, 2, 3, 4	WC-6
Springfield	Wall Street Apts.	-	13	1, 2, 3	WC-2
Springfield	Westview Terrace Apts.	60% of Median (tax credit property)	58	1, 2, 3, 4	E-11, WC-4
Springfield	Allenson Apts	Moderate	30	1, 2, 3	-
Springfield	154 Paddock Road	Low	6	1, 2, 3	-
Springfield	12 Valley Street	Low	2	2, 3	-
Springfield	54 South Street	Low	2	1, 2	-
Springfield	Red Maple MH Park	Low	7	MH lots	-
Springfield	Windy Hill Acres MH Park		74	MH lots	-
Windsor	NAMCO Block	Mixed Income	58	2, 3	2, 3 – BR
Windsor	Central Street	-	44	2	-
Windsor	Cox House	-	7	1	-
Windsor	Olde Windsor Village	Low Income	77	1, 2	E-67, WC-4
Windsor	Phelps Court	Very Low Income	14	1, 2	WC-2
Windsor	Bunker Hill MH Park	Affordable	20	MH lots	-

Source: Vermont Housing Data, 2008
*Private Ownership
E= Elderly; D= Disabled; WC= Wheelchair Accessible Residents; BR= Bedroom

Most of the subsidized housing units are located in higher density neighborhoods where residents have access to services and public transportation. These connections are important in order for residents who might not be able to afford automobiles to have access to employment, retail areas and health services. The majority of subsidized units in the Region are located in Springfield and Windsor. Although these areas are ideal for providing higher density housing, outlying towns must also begin to make efforts to provide housing for those who work in their communities but cannot afford to live in them.

H. Homelessness and Transitional Housing

Homelessness is a problem in the Region and the State that is not easily quantified. Families and individuals may find shelter in tents, cars, or with relatives. These people are not counted in the U.S. Census, but may seek shelter from the few shelters that exist in or near the Region.

Currently there are no overnight shelters available for homeless individuals or families in the Region. The Upper Valley Haven (Haven) in White River Junction has the capacity to house eight families and also provides educational programs (See **Table 9.8**). The typical stay for a

Table 9.8 Statistical Comparison for the Upper Valley Haven

SHELTER	2007	2006	2005
Total Persons	118	150	166
Total Families	38	45	51
Total Children	60	85	96
Total Bednights	8,483	9,465	9,827
Average Persons per Night	24	26	27
Average Length of Stay (Days)	88	79	54
Median Length of Stay (Days)	87	86	48
TURNAWAYS			
Total Persons	1,025	783	825
Total Children	421	349	387
Total Families	230	195	202
Total Couples	42	28	35
Total Single Men	114	64	76
Total Single Women	91	91	84
FOOD SHELF			
Total Number Different Families	1,401	1,395	1,268
Total Number Food Referrals	4,360	4,046	3,654
Total Number Individuals	11,680	11,721	10,720
Percent Children	38%	41%	42%
Average Referrals Per Month	364	337	305
FREE BREAD PROGRAM			
Total Number of Visits	8,403	6,903	7,535
Average Visits Per Month	701	576	627
FREE CLOTHING PROGRAM			
Total Number of Visits	3,996	3,940	3,798
Average Visits Per Month	333	329	317
SALVATION ARMY			
Total Bednights	216	152	145

Source: Upper Valley Haven, 2008

family is two to three months. The Springfield Family Center provides a day shelter and food kitchen for Springfield residents and those who are homeless. Located across the Connecticut River in Claremont, NH is the Sullivan County Housing Coalition which also provides shelter. In addition, the Morningside shelter in Brattleboro offers shelter for singles and couples. According to statistics gathered by the Haven, clients are staying at shelters longer because they are unable to find affordable housing. The average length of

stay at the Haven rose sharply from 54 days to 88 days between 2005 and 2007. As a result, the shelter was able to serve fewer families, and over 1000 people were turned away in 2007.

According to observations by the Haven staff, the largest growing populations of homelessness are teens and the elderly. Teenagers who have been in foster care are often without a home after they turn 18. The Windsor County Youth Services located in Ludlow, oversees the operations of Mountainside House and The House at Twenty Mile Stream. Mountainside House is a residential teen shelter and transitional living facility serving young men in crisis located in Ludlow. The House at Twenty Mile Stream, is a similar facility serving young women which is located in Proctorsville. In addition, there is a transitional housing for those ages 18-22 that also provides housing. The growing elderly population includes a number of individuals who worked in low paying jobs which have resulted in lower social security payments. This population requires housing that is close to services and public transportation.

Housing that is supported by social service agencies, sometimes called "transitional housing" or "housing with supportive services" is also of great need in the Region for families or individuals who do not qualify for subsidized housing, or are looking for subsidized housing that is not yet available. A housing situation that is supported with counseling from social service agencies can help families eventually move into a longer term housing situation. Currently these people must rely on the scarce shelters outside of the Region, or stay with family or friends.

I. Fair Housing Laws

State and federal fair housing laws help protect against housing discrimination. Under the Federal Fair Housing Act and the 1988 amendments, individuals may file complaints alleging housing discrimination on the basis of race, color, national origin, religion, gender, handicap, or familial status. Those individuals may also allege related acts of discrimination that are governed by other federal laws such as the Civil Rights Act of 1964. Vermont law (9 VSA §4503) prohibits any person from engaging in "unfair housing practices" such as the refusal to sell or rent and many other actions involved in the advertisement, financing, and brokering of a dwelling.

1. Municipal Responsibility in Fair Housing

Fair housing laws also protect homeowners and residents from being victimized by practices such as steering potential residents to only certain communities, neighborhoods, or developments. A municipality has fair housing responsibilities regardless of whether or not the federal or state government has funded the activity that is the basis for the complaint. A fair housing violation does not require a discriminatory intent: a violation can be found simply because municipal officials carried out regular activities in a routine way and failed to recognize their special fair housing responsibilities.

Municipalities carry out four broad categories of activities that affect housing. Each category can trigger municipal fair housing responsibilities:

1) Regulatory Activities - When a municipality enacts and administers regulations (e.g., zoning or building/housing codes) that affect existing or potential residential properties;
2) Provision of Services - When a municipality provides routine services in residential areas or to residents;
3) Provision of Subsidies - When a municipality offers financial incentives (e.g., grants, loans, or loan guarantees) or special services (e.g., special infrastructure projects or housing rehabilitation services) to residential property owners or to residents; and
4) Proprietary Activities - When a municipality buys or sells real property, particularly if the property was used or will be used as a residence.

Under the Fair Housing Act, a person who believes that he or she is a victim of housing discrimination may file either a complaint with HUD or a lawsuit in federal or state court. If a municipality must defend itself against a complaint based on the Fair Housing Act, or if it is found to have violated the Act, the costs can be considerable. Municipal officials who are considering a new ordinance, expenditure, or action, or reviewing an existing one can begin to avoid allegations of failing to meet its obligations by asking, "What are the fair housing implications in undertaking this action?"

2. Fair Share Housing

One issue that has received recognition nationwide and has been addressed by planners at all levels of government is the inability of low and moderate income households to locate in desirable areas at affordable costs. Court decisions and legislation in many states have required that each town meet its share of the need for affordable housing. As **Table 9.9** shows, the towns of Springfield and Windsor carry a disproportionate number of housing units for low- and very low-income households, while the towns of Andover, Baltimore, Reading, Weathersfield and West Windsor have no subsidized housing. In Weathersfield, 23.6% of total housing units were mobile homes in 2000, serving some affordable housing needs. Baltimore dropped from 25% of total housing units in mobile homes in 1990 to 10.6% in 2000. Cavendish has mobile homes accounting for 11.7% of total housing stock.

Table 9.9 Low/Moderate Housing in Southern Windsor County Towns

Town	Total Households	% of Total	Subsidized Units	% of Total
Andover	215	2.03	0	0
Baltimore	92	0.87	0	0
Cavendish	617	5.82	6	0.79
Chester	1,296	12.23	66	8.70
Ludlow	1,060	10.00	74	9.75
Reading	286	2.70	0	0
Springfield	3,886	36.68	450	59.29
Weathersfield	1,167	11.01	0	0
West Windsor	456	4.30	0	0
Windsor	1,520	14.35	163	21.48
Total	10,595	100.00	759	100.00

Source: US Census Bureau, 2000 Decennial Census

In creating a Fair Share housing policy for the Region, towns may choose to work together to meet regional housing needs. For example, one town may contribute services to another town that has a larger supply of affordable housing units, and thereby share affordable housing responsibility. In order to develop a Fair Share housing policy in the Region, a study of the available stock and current and future housing needs of the Region's residents would first have to be conducted.

J. Regional Housing Needs

According to the Upper Valley Housing Needs Analysis (Analysis), a recent study completed in 2002 by Applied Economic Research (AER) of Laconia, NH, there is a housing crisis in the Upper Valley. The Analysis covers three Labor Market Areas (LMAs): Hartford/Lebanon, Springfield and Claremont. The Region falls mostly in the Springfield LMA, except for the three northern towns which fall in the Hartford/Lebanon LMA. According to this report, housing production in the larger region (made up of all three LMAs) will have to increase from the pace of the 1990s, during which 4,150 units were added, to a total of 9,700 units during the next decade. According to the Analysis, "this level of production would resolve current vacancy shortfalls, meet the needs of the expanding economy, provide expanded housing choices and keep housing appreciation in line with area income growth".

The housing shortage is most acute in the Hartford/Lebanon LMA, where the economy continues to grow in spite of economic slow-downs in other parts of the State. Over the last decade this combined area added 5000 new households but only 2500 new housing units. Housing affordability in this region is a significant problem. During the 1990's, home prices rose by 33% while incomes increased by only 10% during the same period. The towns of Windsor, West Windsor and Reading lie at the southern end of the Hartford/Lebanon LMA. These towns, and to some extent other towns in the Region, may be impacted by the housing shortage further north. Already the Park & Ride lots at I-91 exits 7, 8 and 9 are well-used by commuters and are typically close to or at capacity. The number of the Region's workers commuting to the Upper Valley increased to 17 percent of workers in 2000. (See commuting discussion in Chapter 2 of Volume 2: Regional Transportation Plan.)

The Analysis describes the housing need in the Claremont and Springfield Labor Market Areas in terms of rehabilitation of existing housing stock more than development of new housing. On the Vermont side of the river, this is true for the town of Springfield in particular which has a supply of housing that is fairly affordable but often in disrepair. The ongoing economic shift that has occurred in the Region from high-paying manufacturing jobs to lower wage service jobs, as well as recent plant closings in both Windsor and Springfield, makes the need for housing that is affordable to lower income groups especially strong. **Figures 9.2 – 9.4** illustrate the demand and supply for housing types by different income levels within the four labor market areas in the study, and the resulting affordability gaps.

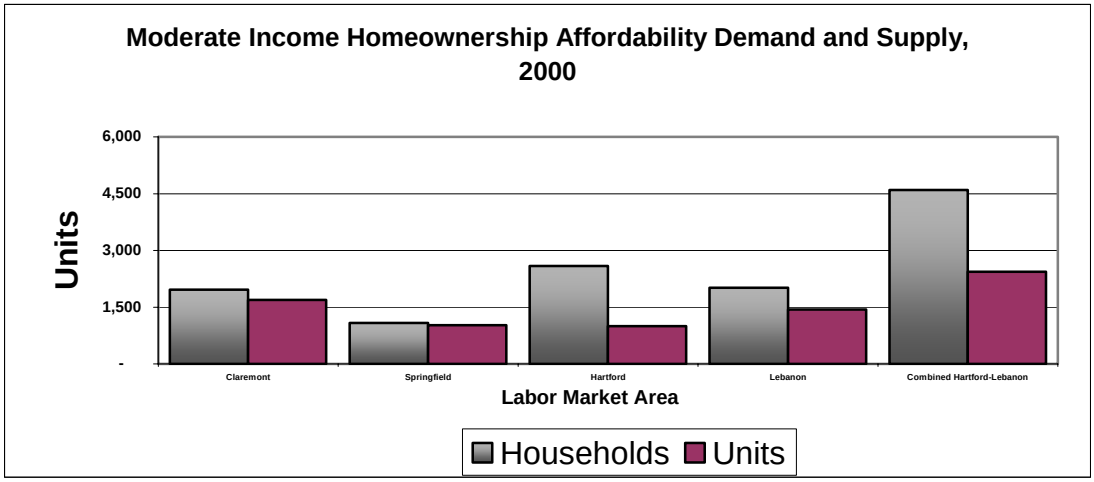


Figure 9.2

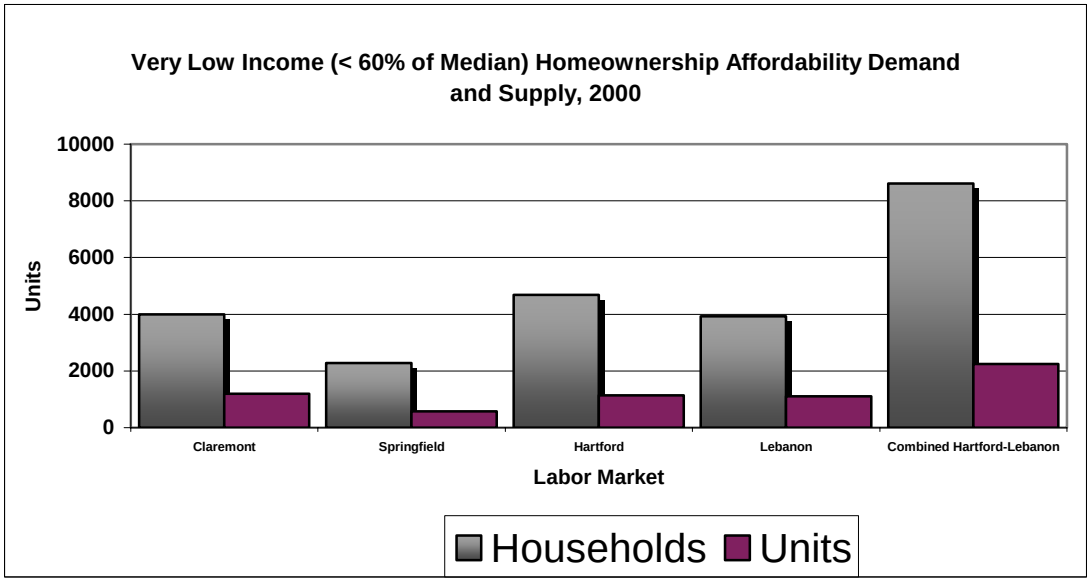


Figure 9.3

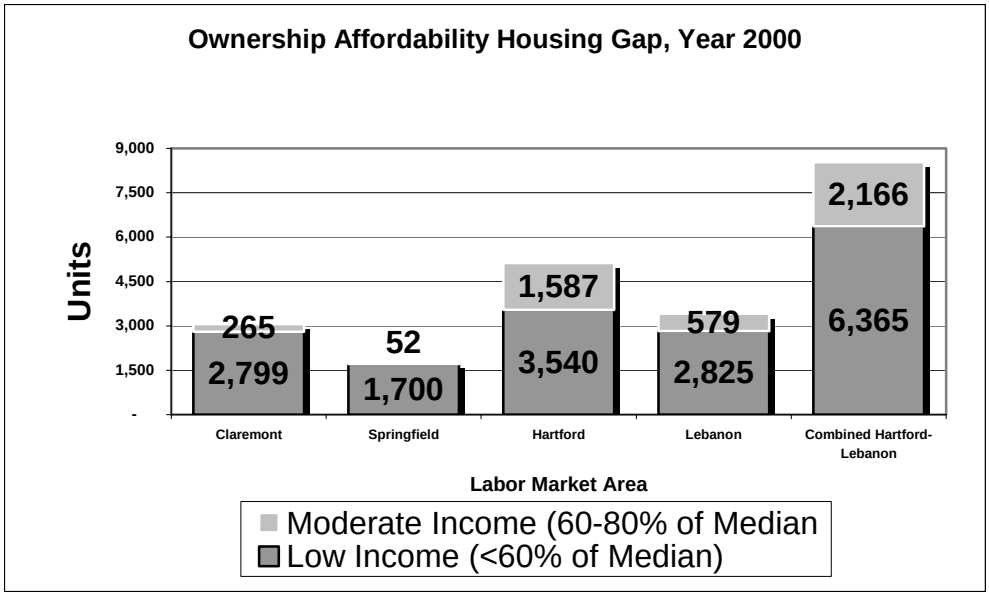


Figure 9.4

Source: Figures 9.2 - 9.4 are from the Upper Valley Housing Needs Analysis, AER Associates (2002)

For the Analysis, AER Associates developed a model to determine the number of housing units that would be needed over the next decade. The most striking need in all LMAs is the need for rental housing whereas only 150 rental units were developed over the past decade in the entire study area, 2850 units are needed in the next decade. Most housing needs were found in the combined Hartford-Lebanon LMA, where over 4500 ownership units and 2100 rental units will be needed over the next decade. In the Springfield LMA, only 389 ownership units and 253 new rental units will be needed from 2000-2010. The majority of the need in this LMA will be in rehabilitation of existing units.

The Analysis is useful in its broad-based overview of the housing situation in the Upper Valley. However, it is important for towns to conduct housing needs analyses as part of their local planning processes. Local knowledge and local data on housing inventories and costs will enable more precise assessments of local housing needs assessments.

Where a clearly identified need is demonstrated, providing housing for the lowest income groups will free up housing for those with moderate incomes that may have been living in housing below their means. In southern Windsor County, the housing need spans the income levels. Towns with little or no subsidized housing should consider methods for developing or encouraging housing for lower incomes in order to provided places to live for those who work in their communities. Towns with larger supplies of subsidized housing should continue to focus on rehabilitation programs for dilapidated housing. These towns should also consider mixed use developments that provide economic growth as well as housing for low to moderate incomes in downtown areas.

The Department of Housing and Community Affairs (DHCA) lists five factors for communities to consider when planning for their housing needs:

- To what extent does the project meet the identified housing needs of the municipality (or region)?
- How closely do households meet the goal of spending no more than 30% of their gross income on housing costs?
- How closely does the total project meet the goal of assessing an average initial rent of no more than 30% of the gross income of a household earning 80% of the county median income?
- How long will the project continue to provide affordable housing to households at or below the median income?
- How wide a range of income groups will be served by the development?

Depending on the need for affordable housing, municipalities may wish to review planning documents and offer incentives for the development of certain types of housing. The following are examples of methods that may be used to enable development of a variety of housing types and encourage affordable housing projects:

- Review local regulations for cost considerations related to housing.
- Identify community infrastructure and services available to support housing capacity.
- Seek community financing to develop appropriate housing and services.
- Eliminate exclusionary practices such as large lot size minimums in densely settled areas where water and sewer are available.
- Allow conversion of larger homes to multiple units.
- Permit and encourage densities of development compatible with affordable housing and with traditional village and downtown development.
- Encourage Planned Unit Developments (PUDs) that allow for density, coverage, and setback variations within specific districts.
- Allow density bonuses for the development of some percentage of affordable housing (inclusionary zoning).
- Develop a streamlined permit review process for affordable housing.
- Use a Development Review Board to expedite permit review.
- Require replacement of lost affordable housing units.
- Establish and maintain an appropriately balanced mix of housing across the full range of cost levels.
- Develop or continue partnerships with Rockingham Area Community Land Trust and other affordable housing developers.

In order to standardize the types of subsidies that municipalities offer for the development of affordable housing, DHCA recommends that towns set up categories of affordable housing and the income levels they serve. Towns may then structure the allocation of subsidies based on local needs. For example, a development that offers permanently affordable housing units and serves a mix of income groups reflective of community needs might receive a higher density bonus and faster review than a project offering only short-term affordable housing for moderate income groups. The following two sections are based on DHCA's suggested categories for types of affordable housing and income groupings.

Length of affordability - DHCA defines categories of affordable housing according to the number of years in which it will remain affordable. Housing which will remain affordable for 99 or more years is termed "permanent" and includes community land trusts, equity cooperatives, nonprofit rentals, and public housing. "Long-term" affordable housing is guaranteed to be affordable for 15 to 98 years through legally binding agreements which stabilize rent or restrict resale values. Such agreements include loan agreements, land covenants, deed restrictions, zoning permit conditions, and lease agreements. "Short-term" affordability includes housing that is affordable for less than 15 years and may include low-cost condominiums without resale restrictions, low-cost rentals without stabilization agreements, and projects with balloon mortgages or adjustable rate mortgages which may require refinancing in less than 15 years.

Income groups - DHCA and other housing experts encourage housing developments that will accommodate a mix of income levels with a certain percentage serving the lowest income groups. Concentrating the very lowest income levels in one place has proven to have negative impacts in many communities.

K. Implementing Affordable Housing Plans

Once towns have established the need for low and moderate income housing and have developed a plan for addressing that need, there are a number of methods for developing affordable housing. In addition to creating incentive programs to attract developers of affordable housing, towns may wish to work with nonprofit housing organizations in order to take a more proactive role in the development of affordable housing. State and federal grant and loan programs are available for financing new development or rehabilitating existing affordable housing. Some of these programs come in the form of block grants that may be distributed by local housing groups. Towns may wish to establish revolving loan funds in order to finance affordable housing projects as they come up or to enable homeowners to rehabilitate deteriorating housing. A list of organizations that can help towns to develop capacity and resources for developing affordable housing is included in **Appendix B**.

HOUSING GOALS

1. To promote sufficient availability of safe and affordable primary housing for all residents of the Region, in accordance with Vermont state legislative mandates.

2. To ensure that housing is available in a variety of types that meet the needs of diverse social and income groups and is located conveniently to employment, services, retail centers, and educational and recreational facilities.

3. To ensure that new housing in village and downtowns conforms with the existing traditional development patterns.

4. To educate the public about housing needs within the community.

5. To preserve and maintain the existing housing stock throughout the Region, especially in existing areas of concentrated residential development.

6. To promote innovative planning, design and construction of housing in order achieve greater energy efficiency, reduction in housing costs, and minimize environmental impacts.

HOUSING POLICIES

1. In town and village centers, existing housing stock should be rehabilitated as long as it is economically feasible. Incentive programs that encourage owners to rehabilitate existing units should be supported.

2. In town and village centers, mixed-use districts that allow both commercial and residential uses shall be encouraged.

3. Housing developments with mixed income and age groups shall be encouraged.

4. Housing that is newly constructed or rehabilitated through the use of public funds should remain permanently affordable.

5. Housing development and rehabilitation which result in concentrations of poverty, blighted residential areas and the segregation of various income groups should be discouraged.

6. Funding opportunities should be focused on blighted residential areas.

7. Encourage the development of rental housing on a scale and design compatible with existing neighborhoods.

8. Existing and potential siting of manufactured housing and mobile homes should be considered when addressing affordable housing needs.

9. The use of innovative construction and design techniques that enhance the affordability, energy efficiency, and environmental suitability of housing for all residents should be promoted.

10. Minimize long-term living costs through high quality design, energy efficient construction, and proximity to employment and/or service centers.

11. Encourage new rural housing development to be sited so as to preserve the greatest amount of open space and blend harmoniously with the natural environment.

12. Multi-family housing, assisted living facilities and group homes should be encouraged in close proximity to services in village and urban centers or along public transportation fixed routes.

13. Mechanisms such as cluster development, planned unit development, inclusionary zoning, conversion of single-family to multi-family homes, and linkages should be promoted in towns where there is significant need for affordable housing.

14. Encourage a balance of housing for low, medium and high incomes, maintaining a proportionate balance of affordable housing units as new housing units are developed.

15. Innovative strategies for conversion of suitable units of the existing housing stock to serve the needs of the elderly and special needs groups should be encouraged.

HOUSING RECOMMENDATIONS

1. Create and maintain a regional housing inventory and related data (including comparisons with other geographic areas) and provide information to member communities to assist in needs assessment and prioritization of housing-related activities.

2. Continue to assist member communities in the identification of housing needs and in the development of implementation strategies for community housing plans.

3. To facilitate the coordination between public and private agencies involved with planning, financing and development of affordable housing.

4. To educate the public about housing needs within the community.

X. ECONOMIC DEVELOPMENT

A. Introduction

The Region's residents enjoy a quality of life that would not exist without a strong and diverse economy. The survival of such an economy depends upon maintaining existing economic resources, and developing new economic resources that increase the potential for greater income and diversity. The purpose of this chapter is to define goals and recommendations based on information, data, and analyses of the Region that will improve the economy and, therefore, the standard of living and quality of life of residents.

This chapter cites information and analyses from the Regional Strategic Economic Development and Community Development Plan (Economic Plan) which was developed over an 18 month period and finalized in February 2003 (publications page of www.swcrpc.org). The Economic Plan was developed through a collaboration of many parties in the Region including the RPC, and highlights the key findings and conclusions that have served as a living road map since its publication.

When evaluating the Region's economy, it is important to recognize that economic development is more than creating new jobs, building new roads, attracting more businesses, constructing new housing and increasing the taxable grand list. Economic development also includes considerations of the quality of jobs and the sustainability of a high quality of life for residents of the Region. As the Economic Plan illustrates the interdependence between high quality of life, a clean environment, high-paying jobs, regional income and public revenue is referred to as a "circle of prosperity."

B. Economic Characteristics and Trends

1. Economic Trends

a. Local Economic Trends

This Region's ten towns are diverse in their history, geography and accessibility; factors which have ultimately influenced the types of economic activity that are found in each town.

Springfield and Windsor are part of the area once known as the "Precision Valley" for its past predominance in the machine tool and precision metal working manufacturing sector. Located on major waterways (Black River, Mill Brook and Connecticut River), and in close proximity to established road and railroad networks, they were ideal for manufacturing centers, which contributed to their standing as a major economic force in Vermont in the early 1900's and during WWII. While rapid changes in this industry lead to major declines in employment between 1970-1990, both towns maintain their accessibility to road networks and past infrastructure that make them ideal for future economic development.

Ludlow, also one of the most developed towns in the Region, started out as an agricultural community, before becoming a center for manufacturing in the late

1800's. The railroad provided a link to the rest of the state and the country, allowing Ludlow's manufacturing industry and textile plants to grow and become successful. In the 1940s, Ludlow's primary economic base involved textile mills. In 1956, ski facilities were developed and later improved on Ludlow Mountain, later to become Okemo Mountain Resort. Ludlow has undergone significant economic restructuring over the past two decades, making a transition from a dominantly manufacturing "mill-town" to a service-oriented tourist destination.

In addition, the towns of Chester, Ludlow and West Windsor have local economies heavily dependent on tourism and second home owners who visit these areas to enjoy ski resorts, country clubs, restaurants and boutiques that cater to this population.

Weathersfield and Cavendish historically had numerous mills along the Black River in the early 1800's. Agricultural activities predominated along the Connecticut River in Weathersfield. In recent years, a tourist oriented economy is growing in Cavendish influenced by Okemo in Ludlow. Mack Molding, which makes custom plastic molds, is Cavendish's largest employer, and operates in a former woolen mill in Cavendish Village. Currently Weathersfield has a number of small businesses, including service industries, construction, orchards, gravel quarry and metal recycling.

Like with the towns discussed above, agricultural and mill activities predominated historically in Reading, Baltimore and Andover. These towns remain mostly rural today, with current economic activity involving, but not limited to, home based businesses, manufacturing/processing of local products, small shops, and occupations that rely on the internet.

b. Macro-Economic Trends

Developing appropriate goals, policies, and recommendations requires an understanding of the current performance and structure of the Region's economy. This understanding includes the macro-economic trends and the unique regional factors affecting it as well as information about the situation-performance and economic structure. Lastly, identifying key industries will help to determine what needs remain to be met for businesses and how to attract new companies as well.

There are many global forces that will have a significant influence on the economic environment over the coming years. Some forces are inevitable and it is vital to understand their influence in order to react accordingly.

Macro-Trend 1: Markets are Becoming Increasingly Global

Economic development policy must be made considering national – if not global – economic factors for many of the Region's key employers. It cannot be made in isolation of these still-unfolding factors.

Macro-Trend 2: Demand for "Green Products" is Rising

Increased awareness and concern for global climate change has created an emerging market for green technology in the country and around the world. (See Energy

Chapter for more discussion on climate change). This demand encompasses a variety of potential products including ones focused towards alternative energy, energy-efficiency and environmentally friendly products and processes.

Macro-Trend 3: Technological Innovation
Technological innovation is making us more productive at changing the way goods and services are made. Continued growth in productivity and continued investment in training the Region's workforce to meet these technological needs is key to the regional economy's ability to compete in the future.

Macro-Trend 4: Internet Commerce and Telecommuting
The widespread adoption of information technology means a "new economy" competition is here to stay. The Region's economies must be able to apply knowledge and technology to the production process in order to remain competitive.

c. Key Regional Industries

During the Economic Plan research process, a list of key regional industries was generated based upon relative wage level and job growth performance over the past two business cycles and updated recently. This process identified 18 sectors meeting the initial threshold criteria. These sectors were then grouped into 8 defined sectors (listed below). This analysis did not include the governmental sector since the strategy was to build regional competitiveness. The following representative firms are not intended to be all-inclusive.

- **Specialty Food Products**

Defined as: Product development, marketing and/or distribution functions associated with food products targeted to niche consumer markets.
Representative Regional Firms: Drew's All Natural, Harpoon Brewery, Black River Produce, Cavendish Game Birds

- **Publishing**

Defined as: Firms specializing in the development, publishing, marketing and distribution of products consisting of intellectual property and or data.
Representative Regional Firms: Newsbank, Inc.

- **Natural Resource Based Manufactured Products**

Defined as: Traditional and high value products manufactured from intermediate natural resources materials.
Representative Regional Firms: Jeld-Wen, Kiosko, Inc., Clear Lake Furniture, Vermont *Hardwoods*

- **Engineered Products and Design Support**

Defined as: Fabricated specialty goods including the engineering and design required to satisfy customer specific needs and specifications.
Representative Regional Firms: Hancor, Inc., Mack Molding Company, NBC Solid Surfaces, Inc., Simon Pearce, IVEK Corp., Kiosko, Inc., Acrylic Design, Inc., Lucas Industries, Inc., M.E. Baker Company

- **Traditional Machine Tools**

Defined as: Firms engaged in the design, manufacture, repair and rebuilding of metal forming machines and machine tooling.
Representative Regional Firms: Vermont Machine Tool, Lovejoy Tool Company, , Rod *Gray* Machine Tool Services, Dun-Rite Tool, CNC North, Vermont Precision Machine Service, VPE, Inc.

- **Construction**

Defined as: Firms engaged in the design and/or construction of buildings or building materials.
Representative Regional Firms: Gurney Brothers Construction, Miller Construction, Inc., Daniels Construction, Crown Point Builders, Inc., Biebel Builders, Inc., All Seasons Construction

- **High Value-added Professional, Scientific and Technical Services**

Defined as: Firms specializing in selling professional, scientific and technical knowledge and skills primarily to other industry clients and customers.
*Rep*resentative Regional Firms: Stantec, Precision Valley Communications, Dufresne and Associates PC, Seldon Technologies

- **Destination Family Resort and Recreation**

Defined as: Firms providing the core services of lodging, meals and recreation activity to traveling and vacationing consumers.
Representative Regional Firms: Ascutney Ski Mountain, and Orange Lake Resort at Ascutney, Crown Point Country Club, Okemo Mountain Resort and Okemo Valley Golf Course

Developing an understanding of why these sectors may or may not have been successful in the Region is the key to building competitiveness. Finding ways to build on and potentially replicate these successes is not only critical to supporting current successful sectors of the economy, but also vital in helping those sectors that are struggling to develop a job retention strategy to protect and grow the Region's current employment base.

2. Economic Sectors

The service sector is an important part of the local economy. This sector includes such types of employment as health care, education, recreation, and arts and entertainment. Some of the largest service employers in the Region are health care providers, such as Mount Ascutney Hospital and Health Care Center and Springfield Hospital. Some of these service providers are the fastest growing, highest wage earning sectors of the regional economy.

The need to develop a strategy to meet the demands of the regional economy, and create and maintain jobs that mirror economic trends is necessary to preserve quality of life and also to create a critical mass of skilled labor. Workforce development opportunities provided by the Connecticut River Valley Workforce Investment Board (WIB) and the Howard Dean Education Center include a major starting point to achieving this goal. WIB is responsible for coordinating workforce training in southern Windsor County, takes input

from employers and workers in the Region and partners with area educators and providers to help develop training programs to serve the area's economic development needs.

In addition to the largest employers highlighted in **Table 10.1**, it is also important to consider that businesses employing five or fewer individuals account for a large percentage of employment in the Region. The smaller, more diverse nature of these businesses allow for increased flexibility and adaptability for them to respond to changing global and local demand.

Table 10.1 Largest Employers in Southern Windsor County

Employer	Product/Service	Town	# of Employees 2003	# of Employees 2008
Okemo Mountain Inc.	Ski resort	Ludlow	1200 winter 250 summer	1500 winter 300 summer
Local Government	Schools, municipal services	All towns	273	1,349
Springfield Medical System	Hospital/Medical services	Springfield	480	600
Mt. Ascutney Hospital	Hospital	Ascutney	320	475
State Government	All services	All towns	224	405
Jeld-Wen	Door/Window Manuf.	Ludlow/Springfield	97	250
Newsbank, Inc.	Electronic pub.	Chester	260	200
Black River Produce	Wholesale distribution	Springfield	130	152
Mack Molding	Injection-molded plastic	Cavendish	140	103
Shaw's	Supermarket	Springfield/Ludlow	NR	100
Ascutney Mtn./Orange Lake Resorts	Skiing	Brownsville	250	100 winter 50 summer
Simon Pearce, US	Glass/Ceramics manufacturer.	Windsor/Quechee Village	97	95
Federal Government	All services	All towns	NR	93
Kiosko Inc. (2006)	Furniture and retail fixture producer	Springfield	N/A	90
Precision Valley Communications Corp.	Utility network mapping/eng. Services	Springfield	56	86
Gill Odd Fellows Home	Nursing home	Ludlow	80	80
NBC Solid Surfaces	Fabricates/installs solid surfaces	Springfield	NR	80
Visiting Nurse Alliance of VT and NH	At-home nursing services	Ludlow, Chester, Springfield	75	80
Lovejoy Tool Company	Indexable insert milling cutters manuf.	Springfield	76	68
Hancor	Plastic drainage pipe manuf.	Springfield	65	65
VTEL	Telecommunications	Springfield	59	65
IVEK	Dispensing manuf.		NR	61
Stantec	Engineer consultants	Springfield	72	60
Springfield Printing	Printing services	Springfield	NR	50

NR: Not recorded
Source: Vermont Department of Labor (2007), SWCRPC (2008)

C. Economic Future and Vision

1. Regional Economic Vision

The Economic Plan created an economic vision for the Region which still holds true today. It states:

> *"To improve the quality of life of families in our Region and to retain more of our Region's young people in the future, we need a diverse base of globally competitive, successful businesses. Achieving that will be the result of a shared Region-wide effort to strengthen existing key businesses in the Region while we constantly search for and capitalize on new opportunities."*

2. Economic Services and Programs

As reflected in the Economic Plan, there are a variety of organizations that continue to provide economic development services to the Region. The combined efforts of these organizations have resulted in a diversified economic base, which has formed the foundation for this area's economic recovery. These organizations, and their mission statements, where applicable, include:

- Springfield Regional Development Corporation (SRDC): The SRDC's mission is to "help companies create and sustain employment in our Region". SRDC provides assistance to existing businesses and attracts new businesses to the Region. SRDC is also active in assisting new start up companies. They provide assistance with site location, financial packaging, training, permits and industrial site development. SRDC works with all applicable and appropriate federal, state and local programs. www.springfieldevelopment.org

- Southern Windsor County Incubator (SWCI): SWCI serves the municipalities of Cavendish, Chester, Springfield, Windsor, Ludlow, and Weathersfield and provides support to innovative entrepreneurial activity in order to enhance the creation of profitable businesses, add meaningful jobs, attract new people, ideas and capital, and enhance the quality of life in southern Windsor County for the benefit of all. The Incubator has particular focus on sustainable technologies. http://swcincubator.org

- Springfield on the Move (SoM): SoM is a non-profit organization whose mission is to work with property owners, businesses, citizens and town governments to enhance and revitalize Springfield's downtown as an attractive desirable and economically viable destination for residents and visitors. www.springfieldonthemove.org

- Windsor Downtown Program: An organization established to revitalize the downtown area and to increase visibility for, and preserve and beautify, Windsor's designated downtown.

- Ludlow Streetscapes, Inc.: Streetscapes is incorporated as a 501(C)(3), non-profit organization. The organization's mission is to "make Ludlow a more attractive location in which to live, work and play by ensuring the vitality of its central business district." Streetscapes is partnering with the Village of Ludlow in its application to the Downtown Program.

- Windsor Improvement Corporation (WIC): WIC is leading an effort to revitalize the Windsor downtown and riverfront area into mixed-use and light industrial activities.

- Connecticut River Valley Workforce Investment Board

- Connecticut River Development Corporation (CRDC)

- Local Development Corporations – Chester, Ludlow, and Windsor: Each functioning locally by providing advice and direction for revolving loan funds and property development.

- Local Chambers of Commerce:

Andover, Cavendish, Chester, Ludlow:
Okemo Valley Regional Chamber of Commerce; www.okemovalleyvt.com

Springfield, North Springfield, Weathersfield:
Springfield Regional Chamber of Commerce; www.springfieldvt.com

Reading, West Windsor, Windsor:
Windsor-Mt. Ascutney Region Chamber of Commerce; www.windsorvt.com

These organizations have implemented a variety of projects aimed at achieving economic revitalization through modernizing the existing infrastructure and training of the Region's workforce. This in turn will hopefully attract a variety of businesses to the area and positively impact the quality of life of residents.

D. Issues and Opportunities

1. Adaptive Re-use and Brownfields

Adaptive re-use of the existing infrastructure left behind by the departure of machine tool and other large manufacturing plants represents an economic opportunity that not only contributes to the revitalization of downtowns, but also provides potential space for new businesses. The RPC has partnered with many different organizations to help see this to fruition and has been successful in attracting new businesses to Springfield and Windsor.

Since 1999, the RPC has been an active participant in the Environmental Protection Agency's (EPA) Brownfields Program, which provides federal funding for assessing and cleaning up brownfields. The RPC Brownfields Program has been assisting towns and

property owners throughout the Region in the process of revitalizing brownfields. These properties, when cleaned up, have the potential to become valuable to the surrounding community. Redeveloped properties not only generate tax revenues, jobs, and stimulate economic growth, but they also turn blighted sites into a place that is both productive and aesthetically pleasing or attractive.

The Program offers two avenues for assisting property owners and *bona fide* prospective purchasers of brownfields properties in the Region: (1) the Southern Windsor County Brownfields Reuse Project (SWCBRP) – grant funding which allows property owners or prospective purchasers to take advantage of technical assistance, and (2) the Southern Windsor County Brownfields Revolving Loan Fund (SWCBRLF) – allowing the RPC to administer grants to municipalities and nonprofits, and low-interest loans to those who meet EPA eligibility requirements.

The SWCBRP, funded through the EPA, has helped to facilitate various stages of cleanup at the following sites:

- Windsor Welcome Center – newly renovated Welcome Center in former home of Windsor Machine Products – downtown Windsor
- Proctorsville Green – redeveloped affordable housing complex - Cavendish
- Old Fellows Gear Shaper Facility – redevelopment of former machine tool shop – Springfield
- Jones & Lamson Site – former machine tool company - Springfield
- Jones Center – former machine shop now used for industrial space for three companies - Springfield

2. Economic Downturn

According to the October 2008 Vermont Economy Newsletter, perhaps the biggest impact of the national economic downturn starting in 2007/2008 will be on state revenues. The state benefited this decade from rising income tax revenues due to the progressive nature of our income tax structure and rapid income growth in the upper income quintile. In this recession, that group is likely to be hard hit as capital gains, business income, and dividend and interest income will be constrained by the recession and financial market crisis. Falling earnings from high-income Vermonters will lead to large declines in income tax revenues, requiring cuts at a statewide level. Given the high proportion of state and human services in Springfield, statewide budget cuts have the potential to greatly impact our Region.

3. Changing Demographics

According to the May 2008 Vermont Economy Newsletter, the Region's population is aging as discussed in Chapter 2 – Regional Profile. Vermont's as well as the Region's slow population growth, are limiting the growth of our work force and could potentially have an impact on the regional economy. One of the major challenges facing this Region today is how to retain and attract younger people to this area to offset the growing population of people 60 years and over in this Region (22.2% in 2007).

4. Affordable Housing

Another challenge to economic growth is to ensure affordable housing for workers in this Region. (See Housing Chapter for more information on Affordable Housing). Like most of the Northeast, this Region suffers from a lack of housing units, both new and old, at a price that is affordable for a significant portion of the workforce. The 2003 Vermont Job Gap Study documents that a significant percentage of full-time workers in Vermont still do not earn enough to pay for all the basic necessities of living. Focusing on the development of affordable housing in the Region, coupled with attracting new good paying jobs, is paramount to ease this burden.

5. Workforce Training

The Howard Dean Education Center in Springfield serves as a valuable resource for workforce development and training in this Region. Services provided at this center include the River Valley Technical Center, serving over 450 students, a job training program contracted through Vermont Technical College, the Community College of Vermont's Springfield Office, Vermont Interactive Television (VIT), and the University of Vermont (UVM) Extension. In addition, as previously discussed above, WIB also serves as an important resource for workforce development.

6. Child Care

While Vermont law is very restrictive regarding child care, the industry is a necessary part of the Vermont economy — pumping money into local communities by supporting working families, creating jobs and generating taxes through employment and the purchase of goods and services. Money spent on child care stays in Vermont communities, helping children, families and local businesses. Statewide, childcare:

- Is a significant force in the state's economy;
- Enables people to work; and
- Impacts economic growth when supply is insufficient.

7. Green Economy

Today's world is experiencing an increased awareness of our individual and collective impact of our consumption on the environment. This has created a fast-growing global movement for environmentally friendly goods and services and a growing desire to explore a variety of renewable energy sources such as solar or wind to reduce the world's dependency on fossil fuels thus decreasing consumer's carbon footprints. All of this is collectively referred to as the "Green Economy".

Vermont has long been recognized for its environmental ethos and is largely considered a leader as a Green state, even being named as one of the three "greenest" states in the country by *Forbes Magazine* in October, 2007. To support the growth of the Green Economy businesses, Vermont has built an infrastructure in the form of public programs and public/private partnerships focused on developing this industry. As a past leader in innovation and industry coupled with an available stock of industrial property, our Region is uniquely poised to take advantage of this new industry. Taking advantage of this position

could be the opportunity this Region has been looking for to reemerge as a competing exporter of Green products.

ECONOMIC DEVELOPMENT GOALS

1. To maintain and enhance the "quality of life" enjoyed by residents of the Region in order to retain current and attract new businesses and workers.

2. To diversify the Region's economic base thereby reducing the risks of depending too heavily on one economic sector.

3. To support the redevelopment of downtowns by assisting local downtown and development groups.

4. To maximize the use of existing infrastructure and buildings to the greatest extent possible with economic development efforts focusing on the redevelopment of under-utilized or vacant industrial buildings and parks.

5. To designate local and regional growth centers and industrial parks that direct and concentrate future economic expansion.

6. To support economic development within areas of concentrated development (Regional Centers, Town Centers and Village Centers) and industrial parks by expanding and improving regional infrastructure such as telecommunication, transportation, energy, sewer and water systems.

ECONOMIC DEVELOPMENT POLICIES

1. The Region's comparative advantage is in its quality of life, excellent work force and entrepreneurial spirit. Economic development activities should strengthen and enhance these regional characteristics.

2. Regional development activities should support the diversity of the Region's economic base by encouraging entrepreneurship, supporting the expansion of local businesses and attract new businesses that are consistent with the Regional Economic Development Plan.

3. Support economic development efforts that will promote building sustainable competitiveness in the highest return, value-added sectors of the economy.

4. Infrastructure expansion or extension, especially sewer and water should be done in a way that restricts expansion and/or extension to those growth areas designated in town plans and zoning regulations.

5. Communities are encouraged to support vocational and technical training opportunities to maintain a skilled work force.

6. Towns are encouraged to focus industrial and commercial development within designated areas, including Regional Centers, Town Centers, Village Centers and industrial sites.

ECONOMIC DEVELOPMENT RECOMMENDATIONS

1. Assist municipalities in a review of their regulations and administrative procedures to ensure clarity in their permitting process.

2. Encourage towns to develop capital improvement programs so that future expansion/maintenance of infrastructure will not place undue hardship on communities.

3. Provide education forums and other types of technical assistance to educate municipalities on economic development and infrastructure planning.

4. Continue to provide staff assistance to local economic and downtown development groups.

XI. Implementation

Implementation of the goals and policies outlined in this document depends upon the cooperative efforts of the Region's member communities, along with the efforts of the numerous local, regional, state and federal agencies, and private interests involved in land use planning activities. The RPC must work with all of these groups to successfully implement this Plan, and the Plan has been written with this idea as its foundation.

At the federal level, the Regional Plan can be used to justify and prioritize the use of federal funds for community development, transportation improvements, natural resource protection and management, and other investments. Careful planning and clear statements of regional goals and priorities help to ensure that federal money is spent usefully and fairly. State funding can be secured through the same process, and state government can use the Regional Plan in several other ways, as well. One of the goals of Act 250 is to include local and regional planning concerns in the state regulatory process. These concerns are addressed by requiring developers to show that projects will conform to local and regional plans. Regional plans are used in the certification of solid waste facilities and in the granting of certificates of public good for electric generation and transmission facilities; they may also have an effect on state policy through the statutory requirement for review of state agency plans (24 V.S.A. §4305(d)).

At the local and regional levels, the Regional Plan interacts with plans of surrounding regions, municipal plans adopted by member towns, and with the activities of developers and other private groups. Implementation of this plan can only proceed if its goals and policies are compatible with those of adjoining regions and member towns. It is the responsibility of the RPC to provide assistance to its members in the development of their town plans and to help ensure that those plans are in the best interest of not only an individual town, but for all towns in the Region. This Plan sets forth guidelines for the most effective implementation measures to be developed by local governmental bodies with assistance from the RPC. Finally, it is the duty of the RPC, through the adoption of this Plan, to provide general advisory guidance for managing the growth and development of the Region. Additionally, the Plan should provide guidance to developers to help ensure the orderly, efficient, and healthful use of land and resources.

A. Determination of Substantial Regional Impact

The RPC should act as a review agency for any proposed development of substantial regional impact. The RPC is required under Vermont law (24 VSA §4345(a)) to define "substantial regional impact as that term may be used with respect to its region." As such, the RPC defines "substantial regional impact" as:

> *Any proposed development of such size, scale, character or intensity of use that it has a sustained influence upon: the growth and development in adjacent towns; the regional economy; affordable housing stock; or regionally important cultural and natural resources or infrastructure; and meets one or more of the following criteria:*

1. It may affect the Region's economy by:

   (a) Generating new employment equal to or greater than 1 percent (1%) of the Region's existing employment as measured by the Department of Employment and Training; or

   (b) Increasing the cost or availability of affordable housing in the town in which the project is located or in adjacent towns;

2. It may affect the infrastructure capacity by:

   (a) Substantially affecting the safety of the traveling public on highways and other transportation facilities within other towns;

   (b) Generating peak hour traffic equal or greater than five percent (5%) of the peak hour capacity of the transportation network serving the project site;

   (c) Contributing to a reduction in the peak hour Level of Service (LOS) from D to E or from E to F;

   (d) Substantially changing the service area or capacity of utility services, including but not limited to, public water and sewer systems, demand for energy, and/or solid waste services;

   (e) Generating student populations that will adversely affect school capacities in one or more neighboring communities and/or union high school districts; or,

   (f) Creating capital improvements such as the extension, upgrading or enlargement of electrical transmission lines.

3. It may change the existing settlement patterns in the Region by:

   (a) Requiring the alteration, degradation or destruction of designated regionally significant historic, cultural, natural, aesthetic or scenic features;

   (b) Locating in geographic areas that have not supported the type, scale or intensity of proposed development in the past, and is not supported by local or regional Future Land Use Maps; or,

   (c) Disregarding the scale, architectural or design features of nearby existing structures.

4. It may affect the natural resources of the Region by:

   (a) Producing excessive pollutants or substantially degrading air or water quality;

   (b) Altering, degrading or destroying the animal and/or plant habitat as identified in this Plan as worthy of protection; or,

(c) Substantially fragmenting or reducing the area or productive capacity of regionally significant forested and agricultural lands;

The definition of substantial regional impact shall include both individual project proposals as well as cumulative impacts of multi-phased projects as described in this Chapter. Proposed developments that have substantial regional impacts may have positive as well as negative impacts.

An impact analysis should be provided for any project of substantial regional impact. The analysis should include such effects as population growth in other towns, impact on infrastructure capacity (roads, traffic congestion, public water and wastewater facilities, schools, etc.), and impacts on cultural and natural resources (critical wildlife habitat, water quality, scenic resources, etc.).

1. Cumulative Development Impacts

When certain development occurs incrementally, there is concern for the impacts resulting from that cumulative growth. Development or a series of developments, when located within a limited geographic area, under the control of a single applicant, and planned incrementally over a relatively short period of time, can produce environmental, social, and economic impacts that are contrary to sound and coordinated comprehensive planning, which is the goal of this Plan and Vermont law. Incremental development review methods have the potential of failing to adequately evaluate the cumulative impacts of growth within an area. (Examples of this kind of development could include a large multi-phased subdivision or recreational area such as a ski resort.)

In these situations, the RPC may request cumulative impact review by requesting, coordinating and reviewing cumulative impact studies. The scope of each cumulative impact study or master plan should address impacts to both the natural and human environment and offer measures to avoid and/or mitigate adverse impacts. The costs of such studies shall be borne by the applicant.

B. Implementation

The Regional Plan should be implemented in a number of ways. Most implementation measures rely on coordination with municipal planning and regulation efforts, as well as the efforts of other municipal, regional, state, federal and private entities. Implementation of the Regional Plan consists of the following measures:

- **Municipal Planning**. The RPC will offer assistance to municipalities as they prepare new or updated plans, bylaws, ordinances, and other implementation tools. RPC staff will help local planning commissions assemble and analyze data, conduct research and surveys, and prepare text and maps. Whenever requested by a municipality, the RPC will also review local plans to evaluate their consistency with the goals of 24 V.S.A. §4302, and their compatibility with the Regional Plan and the approved plans of other municipalities in the region. Currently, all towns have plans approved

and planning processes confirmed by the RPC, which makes them eligible for the state municipal planning grant program.

- **Training**. The RPC will organize, sponsor, and conduct workshops and training seminars for local officials as well as hosting workshops with state agencies and the Vermont League of Cities and Towns (Vermont Interactive Television). RPC staff frequently meets with local boards to address specific issues and/or concerns and is often the most effective means of outreach to its member towns. The GIS Planner often assists towns with specific mapping needs and training of local officials.

- **Special Projects**. Member towns often want to undertake special planning studies to address a particular issue in their community, e.g. resource mapping, transportation studies, emergency (rapid) response plans. The RPC is available to assist towns either as a principal consultant or with technical and data support services.

- **Mapping**. Every effort will be made to ensure that GIS activities are supported and accessible to municipalities in the Region. The RPC has a full complement of GIS hardware and software and a GIS Planner (as well as other staff) trained in the operation of such systems. The RPC has undertaken many mapping projects for its towns in the past, and will continue to do so in the future.

- **Grant assistance**. The RPC will continue to assist municipalities in the preparation of applications for grants to support planning initiatives, housing or economic development projects, and other programs of public benefit, e.g. Municipal Planning Grants, Municipal Education Grants, EPA Brownfields Grants, and Town Highway Structures Program. The RPC will also continue to assist towns and agencies with project management services.

- **Collaboration**. RPC's goals can also be achieved by close collaboration with other state, private and/or public organizations as well as other regional planning commissions. Combining resources can be an effective means of achieving a common interest and reinforce the commission's goals and programs. It also provides an opportunity to aggregate resources that might not otherwise be available.

- **Committee Assignments**. The RPC established special focus committees to address particular issues of importance to the Region. These committees include: Executive, Budget, Personnel, Permit Review and Town Plan Review Committees. The RPC also appoints members and staff to serve on the boards or committees of other organizations, such as the Connecticut River Joint Commission's Vermont Watershed Advisory Commission. The RPC also established two advisory committees to guide two of the organizations bigger programs: the Transportation Advisory Committee

(TAC) and Brownfields Steering Committee. The RPC needs to evaluate the work of its committees and assignments annually.

- **Reviews of State Agency Plans**. It is important for the RPC to coordinate with state agencies and evaluate the impacts of state agency plans and programs on municipalities and the region, and to provide responses accordingly.

- **Development Reviews**. Under state law the RPC is enabled to participate in various regulatory and non-regulatory proceedings. The RPC takes a very active role in reviewing every Act 250 application that it receives to determine conformance with the Regional Plan. The RPC should be active in proceedings that have a bearing on the Region: Department of Public Service (Section 248), Water Resources Board, and Rules put forward by state agencies.

Additional implementation measures rely on coordination with municipal planning and regulation efforts, as well as the efforts of other municipal, regional, state, federal and private entities

C. Plan Relationship

For this Plan to be effective, the plans of adjacent regions and member towns must be considered and efforts made to ensure that all plans are coordinated and consistent with one another. It is therefore advisable to review the appropriate plans to determine if conflicts exist and resolve any differences cooperatively. As of the adoption of this Plan, all towns in the Region have duly adopted municipal plans approved by the RPC pursuant to 24 V.S.A. §4350. Upon request by member towns, the RPC works with local planning commissions to draft or amend municipal plans; if a town wishes to have an Act 200 approved plan, this process includes helping the local planning commission to incorporate the required elements and planning goals into the plan. It is equally important to respect the wishes and planning goals of towns without approved plans. The RPC strives to include the perspectives of these towns in its deliberations through local representation on the Board of Commissioners.

The three Vermont regional planning commissions that adjoin southern Windsor County are Two Rivers-Ottauquechee, Windham and Rutland Regional Commissions. A fourth adjoins the Region to the east in New Hampshire: the Upper Valley Lake Sunapee Regional Planning Commission. Each has adopted a regional plan. The RPC has reviewed each of them, and taken care to ensure that the goals, policies, and recommendations of the Regional Plan are compatible with those of plans adopted by adjacent commissions. Due to the developmental nature of the local, regional, and state agency plans, the RPC provides elements of its plan for review and continually reviews elements of adjoining regions and member communities for consistency. The RPC is working with the various local, private and state entities to ensure planning consistency at all levels. As such, the RPC has provided each town in the Region; the Vermont Department of Housing and Community Affairs; the Vermont Agency of Natural Resources; the Southern Windsor/Windham Solid Waste Management District; Conservation Commissions; Chambers of Commerce; regional

development corporations; and abutting towns and regional commissions with copies of the draft of the Regional Plan and an invitation to comment.

Each town plan in the Region uses different future land use designations or terminology; however, many of these proposed designations are similar in nature or effect. In so far as most town plans designate areas of concentrated development to be surrounded by rural areas, the Regional Plan is compatible with all of the town plans in the Region.

Should conflicts between the Regional Plan and plans of adjacent regions or member towns arise, the RPC will attempt to resolve them to the benefit of all affected parties, so that the future visions of all affected parties can be realized. RPC staff can assist municipal planning commissions in updating town plans at their request. In doing so, the update process will strive to: encourage compatibility with neighboring town plans, lead to more effective management of the Region's lands, and attain both the state planning goals and the goals and policies of the Regional Plan.

APPENDIX A – MAPS

1. CURRENT LAND USE/LAND COVER

2. EXISTING REGIONAL DEVELOPMENT PATTERN

3. FUTURE LAND USE

4. UTILITIES AND FACILITIES

5. IMPORTANT FARMLANDS

6. WILDLIFE SUITABILITY AND CORRIDOR RATING

7. SIGNIFICANT NATURAL RESOURCES

8. WATER RESOURCES AND FLOOD AREAS

9. TOPOGRAPHIC CONTRAINTS

10. ON-SITE SEPTIC SUITABILITY

APPENDIX B - RESOURCES

NATURAL RESOURCES

Vermont Department of Environmental Conservation – (802)241-3800
http://www.anr.state.vt.us/dec/dec.htm

Vermont Agency of Natural Resources – (802)241-3600
http://www.anr.state.vt.us

Vermont Department of Fish and Wildlife – (802)241-3700
http://www.vtfishandwildlife.com

EMERGENCY MANAGEMENT

Federal Emergency Management Agency (FEMA) – (800) 621-FEMA(3362) or
http://www.fema.gov

Vermont Emergency Management (VEM) Hotline – (800) 347-0488 or
http://www.dps.state.vt.us/vem/

Emergency Planning and Community Right-to-Know Act (EPCRA) – (888) 372-7341 or
http://www.epa.gov/oem/regional/content.htm#r1

National Flood Insurance Program (NFIP) Hotline, Region 1 Office – (781) 848-1908 or http://www.fema.gov/business/nfip/

Vermont Local Roads Program, St. Michael's College – (800) 462-6555

Vermont Hazardous Materials (HAZMAT) Hotline – (800) 641-5005

Local Emergency Planning Committee, Contact: SWCRPC – (802) 974-9201

ENERGY RESOURCES

Apollo Alliance
http://www.apolloalliance.org

Association of Vermont Conservation Commissions
www.avccvt.org

Building Green, Inc.
www.buildinggreen.com

Biomass Energy Resource Center
www.biomasscenter.org

Efficiency Vermont
www.efficiencyvermont.org

Energy Federation Inc.
www.efi.org

Energy Guide
www.energyguide.com

Energy Star
www.energystar.gov/products

Fairwind Vermont
www.fairwindvermont.org

Green Community Technologies
www.greencommunitytechnologies.com

Idle-free Vermont
www.idle-freevermont.org

Renewable Energy Vermont
www.revermont.org

School Energy Management Program
http://www.vtvsa.org/school-energy-management-program.php

Sustainable Energy Resource Group
www.serg-info.org

USDA Rural Development
www.rurdev.usda.gov/rd/energy/

Vermont Biodiesel Project
www.vtbiodieselproject.org

Vermont Green Building Network
www.vgbn.org

Vermont Department of Public Service – (800) 828-2811

Vermont Energy Star Homes
www.vtenergystarhomes.com

Vermont League of Cities and Towns
www.vlct.org

Vermont Natural Resources Council
www.vnrc.org

Vermont Office of Economic Opportunity
www.ahs.state.vt.us/oeo/weather.htm

HOUSING RESOURCES

Springfield Habitat for Humanity – (802) 885-6440

Springfield Housing Authority – (802) 885-4905

Housing Vermont – (802) 863-8424
http://www.hvt.org

Rockingham Area Community Land Trust – (802) 885-3220
http://www.raclt.org

Vermont Community Loan Fund – (802) 223-1448
http://www.vclf.org

Vermont State Housing Authority – (802) 828-3295
http://www.vsha.org

Vermont Housing Finance Agency – (802) 864-5743
http://www.vhfa.org

Southeastern Vermont Community Action – (802) 722-4575
http://www.sevca.org

Vermont Department of Housing and Community Affairs – (802) 828-3211
http://www.dhca.state.vt.us

Vermont Housing and Conservation Board – (802) 828-3250
http://www.vhcb.org

U.S. Department of Housing and Urban Development – (802) 951-6290
http://www.hud.gov

U.S.D.A. Rural Development – (800) 414-1226
www.rurdev.usda.gov

ECONOMIC DEVELOPMENT RESOURCES

Springfield Regional Development Corporation (SRDC) – (802) 885-3061
www.springfielddevelopment.org

Southern Windsor County Incubator (SWCI)– (802) 885- 3061
www.swcincubator.org

Springfield on the Move (SoM) – (802) 885-1527
www.springfieldonthemove.org

Windsor Improvement Corporation (WIC) – (802) 785-4521

Connecticut River Valley WIB – (802) 885-3061

Connecticut River Development Corporation – (802) 674-9202

Chambers of Commerce:

Andover, Cavendish, Chester, Ludlow:
Okemo Valley Regional Chamber of Commerce; www.okemovalleyvt.com ; (802) 228-5830

Springfield:
www.springfieldvt.com; (802) 885-2779

Reading, Weathersfield, West Windsor, Windsor:
Windsor-Mt. Ascutney Region Chamber of Commerce: www.windsorvt.com; (802) 674-5910

CULTURAL & AESTHETICS - PRESERVATION RESOURCES

Agency of Commerce & Community Development (802) 828-3211
www.dca.state.vt.us

Vermont Division for Historic Preservation (802) 828-3213
www.historicvermont.org

Department of Housing & Community Affairs (802) 828-3211
www.dhca.state.vt.us

Historic Windsor, Inc. & The Preservation Education Institute (802) 674-6752
www.historicwindsor.com

National Trust for Historical Preservation (617) 523-0885
http://www.preservationnation.org/about-us/

Historic New England (617) 227-3956
www.historicnewengland.org

National Park Service – Preservation
http://www.nps.gov/history/preservation.htm

Preservation Trust of Vermont (802) 658-6647
www.ptvermont.org

Vermont Land Trust
www.vlt.org

Upper Valley Land Trust (603) 643-6626
www.uvlt.org

Vermont Historical Society
www.vermonthistory.org

Vermont Scenic Byways Program
www.vermont-byways.us/

Vermont Housing & Conservation Board
http://www.vhcb.org/conservation.html

Vermont Natural Resources Council (802) 223 - 2328
www.vnrc.org

APPENDIX C -
CLEAN AIR ACT - Section 108(f)
TRANSPORTATION CONTROL MEASURES

(i) programs for improved public transit;
(ii) restriction of certain roads or lanes to, or construction of such roads or lanes for use by, passenger buses or high occupancy vehicles;
(iii) employer-based transportation management plans, including incentives;
(iv) trip-reduction ordinances;
(v) traffic flow improvement programs that achieve emission reductions;
(vi) fringe and transportation corridor parking facilities serving multiple occupancy vehicle programs or transit service;
(vii) programs to limit or restrict vehicle use in downtown areas or other areas of emission concentration particularly during periods of peak use;
(viii) programs for the provision of all forms of high occupancy, shared-ride services;
(ix) programs to limit portions of road surfaces or certain sections of the metropolitan area to the use of non-motorized vehicles or pedestrian use, both as to time and place;
(x) programs for secure bicycle storage facilities and other facilities, including bicycle lanes, for the convenience and protection of bicyclists, in both public and private areas;
(xi) programs to control extended idling of vehicles;
(xii) programs to reduce motor vehicle emissions, consistent with title II, which are caused by extreme cold start conditions;
(xiii) employer-sponsored programs to permit flexible work schedules;
(xiv) programs and ordinances to facilitate non-automobile travel, provision and utilization of mass transit, and to generally reduce the need for single-occupant vehicle travel, as part of transportation planning and development efforts of a locality, including programs and ordinances applicable to new shopping centers, special events, and other centers of vehicle activity;
(xv) programs for new construction and major reconstructions of paths, tracks or areas solely for the use by pedestrian or other non-motorized means of transportation when economically feasible and in the public interest. For purposes of this clause, the Administrator shall also consult with the Secretary of the Interior; and
(xvi) program to encourage the voluntary removal from use and the marketplace of pre-1980 model year light duty vehicles and pre-1980 model light duty trucks.