WINDHAM REGIONAL PLAN

Adopted September 30, 2014

Windham Regional Commission
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RESOLUTION

WINDHAM REGIONAL PLAN ADOPTION

Whereas, 24 VSA Chapter 117 provides that regional planning commissions shall adopt regional plans and sets standards for the content and adoption of regional plans; and

Whereas, the Windham Regional Commission (WRC) has continuously operated with a duly updated Regional Plan; and

Whereas, the Commission in its Annual Work Program for FY2014 and 2015 directed that an updated regional plan be prepared; and

Whereas, the Regional Plan Update Committee and staff have prepared drafts of the Windham Regional Plan for public review; and

Whereas, the Commission has held three duly warned public hearings and four informal community meetings to discuss and consider comments and recommendations; and

Whereas, additional comments and recommendations have been received by WRC staff through direct communication by local officials and interested citizens, and have been accorded the same due consideration; and

Whereas, the Regional Plan Update Committee has found that the testimony offered improves the Plan and helps to ensure that it best reflects the needs of the Region and desires of the Commission's member towns; and

Whereas, the Regional Plan Update Committee now recommends modifications based on testimony received;

Now, Therefore, Be It Resolved that the Windham Regional Commission adopts the Windham Regional Plan as presented on September 30, 2014; and

Be It Further Resolved that amendments to this Plan may be considered by the Windham Regional Commission as appropriate to reflect further needed revisions.

Adopted by a majority vote in excess of 60% of the town representatives to the Windham Regional Commission on the 30th day of September, 2014.

[Signatures]

Jodi French, Chair

Tom Consolino, Secretary
Acknowledgements

Countless individuals, including citizens, businesses, non-profits, and government representatives from throughout the Windham Region and State of Vermont made important contributions to updating this Regional Plan. Over a two-year period, these individuals generously offered their time to review drafts, to attend meetings, to address public concerns, and to propose and discuss document changes that respond to the region’s changing conditions. This process is essential to creating a Regional Plan that accurately reflects the needs and opportunities of the region, while providing a vision for the region’s future. We extend a sincere thank you to all of the many individuals who made contributions to the completion of the Windham Regional Plan.

Each of the Windham Regional Commission’s Committees made significant contributions to the review of chapters related to their topic areas. The Regional Plan Update Committee was particularly involved in the update process by reviewing each chapter, addressing concerns, and editing the completed draft. We are sincerely grateful for the dedicated efforts demonstrated by these individuals:

Greg Brown  Dummerston
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“From the Windham Regional Plan, 2014, as adopted by the WRC on September 30, 2014”
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EDUCATIONAL, CULTURAL, AND RECREATIONAL RESOURCES

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UTILITIES, FACILITIES, AND TECHNOLOGY

Utilities
Health and Social Service Facilities
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Governmental Services

TRANSPORTATION

Existing Transportation Network
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INTRODUCTION

GOALS AND OBJECTIVES

VISION FOR THE WINDHAM REGION

The following statements of long-range desires constitute a shared vision for the future of the Windham Region. They form the basis of this plan and will provide a background for understanding the plan's policies. When readers of the plan are uncertain about the reasons for a policy, returning to the vision statement should help. The vision is:

FOR THE PEOPLE...

- A high quality of life, defined as a composite of our economic, social, cultural, and ecological well-being;
- Support for modern infrastructure and telecommunications, while protecting the environment;
- A special place to live and work with a caring attitude for the environment, for each other, and for our communities and their institutions;
- A strong sense of history and culture;
- Stewardship of the region and its resources so that future generations will enjoy a sound economy, a healthy environment, quality education, and effective health services;
- A sense of independence and self-reliance that also recognizes our interdependence and the need for mutual cooperation;

FOR THE PLACE...

- A variety in land use that reflects the region's diverse mix of rural lands, small communities and large centers, with the natural environment and working landscape part of our daily lives;
- A region made better as a result of our efforts;
FOR THE COMMUNITIES...

- Individual places with their own identity and self destiny, commercial and industrial centers, historic villages and downtowns, residential communities, and recreational centers, all of which both contrast with and complement each other;

- A functional man-made environment, with interest, beauty, and value that complements our natural environment;

- Decision-making that encourages public involvement at every stage, and affirms the legal right and obligation of elected and appointed officials to act. An educated and informed citizenry ready to make effective choices;

- Dialogue within and among the region’s towns about where and under what conditions change and growth should occur, and support for a type and pace of change that are appropriate for the region and its communities;

FOR THE FUTURE...

- A sustainable future with an identification of—and focus on—critical issues, especially including environmentally and economically sustainable energy sources;

- Development, conservation, and preservation interests working together for the benefit of our communities and the environment;

- A regional commission that recognizes and supports the goals, policies, and issues of member communities as expressed in town plans, and that fosters cooperation among town, state, and federal governments and between public and private interests; and

- Recognition of the rights and responsibilities associated with property ownership.

THE WINDHAM REGIONAL COMMISSION

The Windham Regional Commission (WRC) is an association of 27 towns, formed in 1965, subsequently constituted by the State Legislature, and now operating under the Vermont Municipal and Regional Planning and Development Act (24 V.S.A. Chapter 117). The WRC’s mission is to assist member towns to provide effective local government and to work cooperatively with them to address regional issues. Each member town appoints two commissioners to represent that town’s interests in regional affairs. Additionally, the WRC has up to ten citizen interest commissioners who represent other regional interests such as agriculture, arts, natural resources, energy, housing, and business and industry. The WRC is supported by an annual appropriation from member towns, an annual appropriation from the Legislature, and by private, state, and federal grants.
The WRC was created following Governor Philip Hoff's 1962 expansion of the state planning program, with four basic goals:

- Promote economic development, increasing jobs and income;
- Preserve the natural beauty of Vermont;
- Obtain and maintain efficiency in government expenditure; and
- Safeguard and extend local autonomy in planning and development decisions.

**PURPOSE AND USE OF THE WINDHAM REGIONAL PLAN**

The purpose of the Windham Regional Plan (the plan) is to provide guidance for change in the Windham Region. The plan reflects shared values and concerns of the people who live in the 27-towns and it discusses issues facing the region. Based on a set of overarching regional goals and priorities, the plan sets long-term policies for the region. The plan is a living document that must continually evolve to reflect the dynamic social, economic, and environmental conditions in the region. Statute requires that the regional plan be updated only once every eight years, but it is the WRC’s intent that the review and update process should be an ongoing effort.

**WHO USES THE PLAN?**

The plan is the basis for the WRC’s day-to-day operations and guides regional planning efforts. The WRC commits its staff and resources to work on implementation of the plan’s stated priorities, goals, and policies. The WRC’s Executive Board, committees, and professional staff implement the plan.

Towns with active planning programs also use the Regional Plan as a guideline for local planning efforts, or they may adopt portions of this plan as their own. When applicable, the District Environmental Commission and other state agencies use the plan to review both public and private development proposals. The plan also serves citizens and government agencies as a source of regional information.

**LEGAL AUTHORITY AND USE OF THE PLAN**

The plan is to be used by the WRC, town planning commissions, selectboards, state agencies, landowners, and citizens in a number of ways:

- To guide basic decisions for planning programs at the WRC;
- To provide guidance for planning and development initiatives at the local level;
Introduction

- To serve as a basis to evaluate and review development projects proposed under Title 10 V.S.A. Chapter 151: State Land Use and Development Plans (Act 250) and Title 30 V.S.A. § 248 (Public Service); and
- To assist, where needed, in determining compatibility of state and federal agency plans affecting land use with regional and local planning and development priorities.

PLAN ORGANIZATION

The plan is divided into two main sections, and is laid out such that the major themes and policies are presented first and foremost in this document. The first section includes the introduction, planning topic summary and policies, and the implementation discussion. The second section provides the current reference information, data, and analysis on each of the planning topics. The Windham Region Transportation Plan is included as an addendum to this plan and follows the same format. Also included in the addendum, this plan incorporates by reference the 2014 Comprehensive Economic Development Strategy (CEDS), produced by the Southeastern Vermont Economic Development Strategies (SeVEDS).

This introduction presents the overarching themes and goals that influence all other elements of the plan. The following pages will outline the specific issues and policies that will direct the planning work of the Windham Regional Commission over the tenure of this plan. Each summary and policies section corresponds with a particular planning topic, and additional information on each topic is found in the corresponding chapter in Section Two. These planning topics include Land Use; Energy; Economy; Natural Resources; Housing; Education, Cultural and Recreational Resources; and Utilities, Facilities and Technology.

The planning summaries provide specific directive language for the regional planning efforts, which are highlighted in bold in the summary sections. The planning topic policies provide the framework for review and evaluation of projects and issues brought before the Windham Regional Commission. The policies provide direction for the Region. The differences between region-wide policies and actions can be subtle, and the WRC will continue to more explicitly differentiate policies and actions as plan updates proceed. Additionally, the implementation section found directly following the summary and policies section discusses how the plan will be put into action as well as how the plan will provide the guidance for the WRC's Annual Work Program.

Following Section One, there are a number of regional maps that show existing and proposed land use, natural resources, public resources, etc. Section Two of this plan provides more detailed data and information on each of the planning topics presented in Section One. These chapters provide the data and information that serve as the foundation for the directive language and policies of the plan. Increasingly the plan is read and referenced in a digital format. To take advantage of the use of digital technology, and to better inform the reader, embedded hyperlinks are found throughout the digital copy of the plan to direct readers to the proper authoritative websites and documents. The vision,
goals, objectives and policies contained within this plan are not dependent upon access to these additional digital resources. The links are provided for additional reference information only.

At the end of each chapter in Section Two, a box highlights the topic of energy and its relationship to the chapter. Energy is emphasized in this plan, as it was in the 2006 Regional Plan, due to its great significance to the Region. This was revealed during development of the 2006 plan, in which over 60 percent of WRC commissioners identified energy as the number one priority for the future development of the Region and protection of its resources. This plan describes the current state of energy supplies and use in the Windham Region, the issues and concerns about the future of energy, and policies aimed at improving energy use or at least reducing the impact of potential challenges.

MAPS

This plan contains maps that present important background information and others that present a vision for the region’s future. The text and maps should be used together to be properly understood.

The maps present information in a generalized format. More detailed information often is available from other maps or data sources, and those are referenced on the maps. Users of this plan and its maps are encouraged to consult those sources when more detailed information is needed regarding the presence, absence, or precise location of a given map feature.

REGIONAL GOALS

A set of regional goals has withstood the test of time for relevance and importance to the Windham Region. These goals evolved from prior plans and they continue to be the subject of on-going dialogue between the WRC and its member towns. The regional goals which correspond generally to the Vermont Planning Goals are:

- To plan development in order to maintain the region's land use and historic settlement pattern of compact villages and urban centers separated by rural countryside;
- To encourage the availability of a reliable, sufficient, and economical energy supply, to support energy conservation and efficiency, to encourage the development of appropriately scaled and sited energy generation resources, and to facilitate conversations between towns where different interests exist;
- To provide for safe, convenient, economical, and energy efficient transportation systems including options such as public transit and paths for pedestrians and bicyclists, where appropriate;
- To provide a vital and diverse economy with rewarding job opportunities and high environmental standards for the region's citizens;
Introduction

- To encourage and strengthen agricultural and forest enterprises;

- To maintain and improve the quality of air, water, wildlife, and land resources in the region;

- To identify, protect, and preserve regionally important natural and historic features of the Vermont landscape;

- To provide for thoughtful and efficient use of the region's natural resources, including the prevention of surface water and groundwater pollution, the protection of fragile natural habitats and endangered or threatened species, the avoidance of agricultural and other land-use practices that lead to soil erosion, the management of woodlands on a sustainable basis, and the sensitive treatment of scenic resources. Mineral extraction should have minimal adverse effects on aesthetics, water quality, air quality, and special community resources (such as historic sites, recreation, or scenic areas), and effective site rehabilitation plans should be provided and implemented;

- To plan for, and to educate the public about, natural and other hazards in the region, the prevention and mitigation of these hazards, and for preparedness, response, recovery, and resilience.

- To educate the public about the inherent risk to life and property associated with development within river and stream corridors, including fluvial erosion hazard areas, and to continue to develop actions and policies that prevent and mitigate these risks wherever possible.

- To promote the development of housing suitable to the needs of the region and to ensure the availability of safe and affordable housing for all citizens of the region;

- To broaden access to education and training for all citizens;

- To maintain and enhance recreational opportunities for both residents and visitors in keeping with the carrying capacity of natural resources and public facilities;

- To plan for, finance, and provide an efficient system of public facilities and services (such as schools, water and wastewater facilities, highways and bridges) to meet future local, regional, and state needs; and

- To support affordable access to high-quality health care services for all citizens.
The region’s natural features, built environment and public infrastructure are the foundation for future development and conservation efforts, and a basis for future land use planning. The Existing Land Use/Land Cover Map illustrates the current distribution of land uses and land covers in the region. This plan differentiates between four main land covers, that is, the physical materials that cover the surface of the earth: urban/built-up areas, forests, open land such as agricultural fields and meadows, and water.

The Windham Region is predominantly rural and undeveloped. Almost 86 percent of the total land area is forested and only 6 percent is open. Urban and built up areas such as residential commercial, industrial, public and semi-public uses constitute less than 5 percent of the region. The remaining 3 percent is covered by water and wetlands.

This plan recognizes 9 proposed land uses, each varying in their density and characteristics: regional centers, large-scale commercial/industrial, rural commercial, resort centers, villages, hamlets, rural residential, productive rural, and resource lands. Each designation is characterized by levels of development density that exists along a continuum, so that the difference between each of the proposed land use designations may overlap at times. Figure 1 provides a graphic representation of where each of the proposed land use designations falls along the spectrum of development.

**FIGURE 0-1: PROPOSED LAND USE DESIGNATIONS DEVELOPMENT SPECTRUM**

Source: WRC
This regional land use plan proposes a regional framework for decisions related to growth and development based on the recognition of existing settlement patterns, the availability of existing and planned public infrastructure (water, sewer, and roads), and the land use policies established in current town plans. Much work has been done by town planning commissions to develop local land use plans that contribute to the vision and structure for the land use planning presented here.

The proposed land use categories are intended to complement, support, and reflect town land use planning by presenting a regional structure for future settlement patterns. The following text provides a brief definition for each of the categories, while a longer discussion of each can be found in the Land Use Chapter. The Proposed Land Use Map illustrates the distribution of the categories throughout the Region. All development shall conform with the land use designation within which it falls. Permit applications, including Acts 250 and 248, shall demonstrate land use designation conformity.

- **Regional Centers** are the Region’s core downtowns, plus their surrounding mixed-use neighborhoods, which accommodate high density commercial, institutional, and housing services.

- **Large-scale commercial/industrial centers** consist of areas where existing and future commercial and industrial activities are encouraged, including new development, redevelopment, and conversion of previously non-industrial uses.

- **Rural commercial** areas, concentrated along US 5, VT 9, Vt 30, and VT 100, include areas of mixed-use development built in a spread out pattern. Typically dominated by commercial service industries, the intent of this land use category is to transform these areas into higher-density, compact, mixed-use settlements through infill and redevelopment.

- **Resort centers** are developments that are associated with large-scale recreational facilities, which in this region are concentrated around ski area facilities.

- **Villages** are less densely populated and smaller than regional centers, but similarly accommodate many of the same residential, civic, commercial and light industrial uses.

- **Hamlets**, smaller than villages, are typically concentrated residential settlements in rural areas that may or may not provide minor commercial and civic services.

- **Rural Residential**, characterized by low and very low density housing, includes areas that are already committed to residential development or are in proximity to already developed lands.

- **Productive rural lands** include forestlands, active agricultural lands, sand/gravel/mineral deposits, and high-value forest and agricultural soils that, when in productive use, contribute to the working landscape and have significant economic value.
Resource lands are dominated by lands requiring special protection or consideration due to their uniqueness, irreplaceable or fragile nature, or important ecological function. As a subcategory of Resource lands, this plan recognizes critical resource areas as key sites that are particularly sensitive and should be given maximum protection.

CURRENT LAND USE ISSUES

Changes in the region’s landscape and population make it apparent that several issues and opportunities must be addressed. These issues and opportunities will define the land use patterns of the Windham Region in the years to come.

As shown in the Population Section of the Windham Region Profile, there is a clear and continuing trend of population growth in outlying towns and very little growth in regional centers and villages, despite strong state, regional, and local goals and policies to direct growth to areas with existing services and infrastructure. These trends should be tracked going forward as their nature is not well understood based upon the data. The U.S. Census shows that between 1980 and 2010, eight regional centers and villages (Bellows Falls, Brattleboro CDP, Jacksonville, Newfane, North Westminster, Saxtons River, West Brattleboro CDP, and Westminster Village) experienced net losses in population despite overall population growth throughout the region. In the last ten years, West Brattleboro and Brattleboro, the two population centers within the largest population town in the region, saw losses of 15.0 percent and 11.0 percent respectively.

Some “ski town” areas saw high rates of new development despite dramatic population declines. For example, 305 new units were constructed in Dover between 2000 and 2010 and yet the population dropped 20.3 percent. Wilmington saw a 15.7 percent population decline. These trends are likely attributable to the increase in the number of housing units used as second homes. The trend in these two “ski towns” parallels others in the state such as Ludlow and Killington.

While regional centers, villages, and “ski towns” witnessed population declines, the towns seeing the largest population growth in terms of added residents were Athens (102), Marlboro (100) and Windham (91), none of which have a village or downtown in their borders. These towns saw an increase in the number of new housing units and/or an increase in the occupancy of housing units. For example, 42 new units were created in Windham between 2000 and 2010. Higher occupancy rates reflect more homes that are used as a primary residence year-round or for longer periods of time. For example, the occupancy rate of housing units in Athens rose from 67.6 percent in 2000 to 78.4 percent in 2010, which was one of the largest increases in the state. Interestingly, Athen’s median age stayed nearly the same over this 10-year period. In contrast, Windham’s median age increased significantly from 42.8 to 49.8, suggesting an aging population and possibly an influx of retirees. Marlboro experienced both the addition of new housing units (29 new units from 2000 to 2010) and an increase in occupancy; in 2010 there were 48 more housing units occupied than in 2000. The town also saw an increase in the number
of people reporting living in group quarters from 188 in 2000 to 216 in 2010, which may be attributable
to more students identifying Marlboro College as their location of residence. These three factors—new
housing units, an increase in the percentage of housing units that are occupied, and more college
students recorded by the Census Bureau—contribute to Marlboro’s 10-year population increase of 100
persons. The traditional development model of compact villages surrounded by rural countryside
promotes traditional New England settlement patterns, allows for efficient use of roads and public
infrastructure, and contributes to a greater sense of community in the region. **The WRC will continue to support both regulatory and non-regulatory tools to direct growth to areas of the region with adequate services and infrastructure, and away from highly valued environmental areas, and will work with towns experiencing high levels of growth to help maintain traditional settlement patterns.**

Decisions made regarding land use and development have direct impacts on the region’s overall energy efficiency. As noted above, there is a clear trend of growth occurring in the smaller towns, far from the regional centers. This spread-out pattern of development leads to an increase in the number of daily car trips and to average trip distance. Such development not only consumes more energy for transportation, but also requires expansion of electric distribution lines and other infrastructure. It costs more for individuals and businesses to pursue their regular activities, and it has a negative effect on environmental quality generally and air quality specifically. **The WRC will continue to promote development in regional centers and villages to reduce energy consumption and to require new development proposals to demonstrate evidence of energy efficient design principles.**

Historically, industrial development has occurred in the established urban centers of Brattleboro and
Bellows Falls and in the region's larger villages. Over the years many industries closed due to
technological change, reduced need to be near rail and/or water, market changes, and mergers. In the
wake of these closures, communities have been left with vacant, under-utilized, and possibly
contaminated parcels, including brownfield sites. **The WRC will continue to support redevelopment of vacant or underutilized urban parcels and will work with local development groups or committees to encourage rehabilitation of these parcels to meet current industrial and commercial needs.**

The WRC has been working with the Brattleboro Development Credit Corporation (BDCC) to attract new
commerce and industry to the Windham Region to support economic growth and the development of a
high-wage, highly skilled workforce. While this expansion is encouraged on existing brownfield sites, it
may be necessary to designate new areas or expand the existing commercial/industrial areas to
accommodate new growth. **The WRC will continue to work with BDCC and our member towns to ensure adequate industrial areas are designated and will refine the region’s commercial/industrial zones as part of an interim update to ensure that development of this land use category is being appropriately directed.**
Once cultural centers for their residents, many villages have become homes for people who travel to other places for work, shopping, and recreation. Those villages on major regional routes are faced with increased through-traffic generated by local residents, tourists, and trucks, a trend that was noted in earlier Windham Regional Plans and that appears to continue unabated. The WRC will continue to work with towns and VTrans to reduce conflicts between traffic needs and everyday village functions through practices like shifting peak traffic volumes, traffic-calming measures, and pedestrian-safety improvements. (See Transportation Plan Policies)

Many of the region’s villages have very limited infrastructure to support future growth, with most lacking adequate water supplies and septic disposal options. Available buildable land tends to be in small parcels. Many village buildings are underutilized. Failed septic systems can harm the quality of life and threaten public health and environmental quality. In many such cases, septic system failures are not easily remedied due to the close proximity of other existing on-site septic and water systems or to poor soils. The WRC will seek funding to complete a village water and wastewater needs assessment and a wastewater feasibility plan to identify current barriers to development. The WRC will prepare conceptual community water and sewer plans, and related financing and fiscal management profiles.

Trends toward forest parcel subdivision by many individual owners, and by residential and intensive recreational development, continue to threaten traditionally significant timber production, hunting, and wildlife habitat. Many of the more regionally-significant undeveloped forest areas in the central part of the region remain in private ownership and without formal conservation protection. The WRC will continue to support the State’s Use Value Appraisal (UVA) program and will encourage preservation of forested land tracts through enrollment in this program, utilization of conservation easements, purchase of lands by conservation organizations, or by development restrictions incorporated in local zoning.

In Windham County, approximately 83,000 acres were farmed in 1970. The US Census of Agriculture shows that between 1992 and 2002 the number of acres of land in farms increased by about 40 percent, from 43,985 acres to 61,596 acres, but then dropped to 50,764 acres in 2007. Despite this loss of acreage, Windham County agriculture is increasingly diverse. In 2007, U.S. Census of Agriculture
reported that there were 428 farms with average annual sales of $50,018 per farm. That is an increase from 2002 when there were 397 farms with average annual sales of $46,150. A statewide “farm-to-plate” program reinforces the region’s growing interest in locally produced foods. Farmers and food processors in the region can reasonably be expected an increase in both direct market and wholesale opportunities in the coming years. **The WRC will discourage irreversible development of the region’s prime agricultural soils, require mitigation for agricultural land that is developed, and will support efforts to strengthen this sector of the regional economy.**

Open spaces are public and private lands that are undeveloped and contribute to the natural and scenic landscape of the region. Open space planning is a part of shaping growth. Just as it is important to identify areas appropriate for development and direct growth there, it is also important to identify areas where development is inappropriate and then work to discourage such activity. Towns often do this as part of the local planning and zoning process; however, it is also necessary to create a comprehensive regional open space plan that looks beyond municipal boundaries and targets conservation efforts to areas that will provide the maximum amount of public benefit. **The WRC will complete a comprehensive Open Space Plan for the Windham Region.**

Housing development outside of the villages and downtown areas should be contiguous with existing settlements and should employ conservation subdivision principles. **The WRC will provide guidance to its towns on adopting appropriate tools for regulating development in rural areas, and for developing conservation subdivision language in town plans and land use regulations. To restrict rural sprawl, the WRC will facilitate inter-town conversations to identify and preserve wildlife corridors, ecologically sensitive lands, large conservation blocks and gateway transitions between neighboring towns.**

**POLICIES**

1. **Direct new growth, such as jobs, housing, commerce, public infrastructure, industry, community facilities, into appropriate development types (regional centers, commercial/industrial areas, rural commercial, resort centers, and villages). New growth should give attention to the type and scale of the existing form, in order to keep these centers culturally, socially, and economically viable. In-fill development and “brownfield” redevelopment are encouraged in these areas.**

2. **Utilize strategies that increase the energy efficiency of new and existing development. All Major projects reviewed under Act 250 shall provide evidence demonstrating how the development is energy efficient from a regional land use perspective, including projected transportation, heating, and electricity needs.**

3. **Preserve the historic and architectural character of the region. Support the reuse and repurposing of viable existing structures to retain historic development patterns, densities, and character in the region, especially within regional centers, villages, and hamlets.**
4. Consider current and future housing requirements when evaluating business development and expansion projects. Encourage measures that will establish and maintain an adequate housing stock for area workers that satisfy a diversity of needs and income levels.

5. Develop master plans for the transformation of existing rural commercial areas, as identified on the Proposed Land Use Map, into areas serving a mix of uses, offering diversified transportation options and planned infill locations, while also conforming to traditional historic development patterns.

6. Where strip development has already occurred beyond villages and growth centers, promote redevelopment that reflects the historic development patterns of existing hamlets and villages. Strip development in known floodplains and fluvial erosion hazard areas that has experienced past damage should be considered for floodplain restoration and hazard mitigation opportunities.

7. Concentrate ski resort expansion and secondary growth to minimize the trend toward dispersed/sprawl development. All ski resort development shall be reviewed and approved as part of a development master plan before any individual development projects are approved in order to assess cumulative impacts of the potential growth of the development.

8. Plan for and develop public infrastructure, including water and sewer systems, that promotes and enables greater densities in development centers, including regional centers, villages, resort centers, commercial/industrial sites, and growth areas as identified by town plans.

9. Develop and expand hamlets in a form that maintains traditional density and residential settlement pattern within the Windham Region. Encourage towns to enable this pattern of development in town land use regulations.

10. Provide guidance and training on regulatory and non-regulatory tools for open space and resource protection available to towns for use in town plans and regulations. Encourage implementation of tools such as conservation subdivision, clustered development, and variable lot size in all subdivision development, and especially within rural residential and productive rural lands.

11. Use open space plans and resource protection techniques to protect agriculture, forest, mineral, and Resource Lands from development and fragmentation. Encourage town open space planning and help coordinate those planning efforts through the development of a regional Open Space Plan.

12. Require all major projects reviewed under Act 250 to mitigate any loss of prime agricultural and/or forest land as a result of the development.

13. Promote critical resource areas by educating towns and the public on the importance of preserving exceptional natural resources. Preserve critical resource areas by identifying key sites and by assisting towns in incorporating provisions in their town plans and land use regulations to protect them (and, as appropriate, restore them).
14. Strongly discourage all development in Resource Lands for purposes other than forestry and agriculture. Any development proposed within critical resource areas shall provide evidence as to why the development cannot be avoided, and shall provide mitigation for natural resources impacted by the development.

15. Require that the benefits of any mitigation occurring as a result of a proposed development within the Windham Region be directed to the Windham Region.
A reliable and affordable supply of energy is critical to our society and to our way of life. The continuing theme of this Regional Plan is energy: the diversity and reliability of the energy supply, the short and long-term financial costs to obtain it, and the broad-scale environmental impacts and mitigation considerations related to its generation and use.

While energy issues are often national or global in reach, local land use decisions have a direct, lasting impact on the energy requirements needed to sustain the function of development. The Windham Region can lead by example by increasing the efficiency of its energy-dependent systems, identifying critical areas of improvement, and supporting local energy options that benefit its communities. The Windham Region actively supports partnerships, strategies, and state and federal legislation that will ensure the affordable and reliable production and delivery of energy to the region, in conformance with regional goals and objectives. It is our intent to work with the State, utility providers, our member towns, and neighboring regions to plan for energy demand and future shifts in primary energy sources.

Planning for the region’s future energy needs requires an understanding of both current and projected demand. Most readily available energy information is collected on a statewide basis, and is not regionally specific. The WRC will continue to work with the State, utility companies, and other energy suppliers to gain a better understanding of the region’s complete energy portfolio (transportation, heating, electricity, etc.) so as to adequately plan for the region’s future energy needs and to provide better guidance to our member towns.

In terms of statewide end-use energy consumption (Figure 2), the transportation sector accounted for an estimated 34 percent of the energy used in 2011, followed by the residential sector (31 percent), commercial sector (20 percent), and industrial sector (16 percent). Estimates indicate that fossil fuel-based energy sources account for approximately 57.9 percent of the energy used in the State. Renewable energy sources accounted for 26.8 percent, while nuclear and market energy sources accounted for 15.3 percent. These percentages vary from year-to-year based on a number of factors, such as winter and summer temperatures, building weatherization, pace of natural gas adoption, and economic growth.

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2 Estimates are based on 2011 non-electric consumption and 2016 projected electric consumption estimates. This combination offers a good overview of the near-future energy mix for planning purposes.

3 Vermont Public Service Department and U.S. Energy Information Administration
Energy conditions are rapidly changing in Vermont, in part due to volatile energy prices, regular and significant legislative changes to the State energy bill, new technologies, and the anticipated 2014 closure of Vermont Yankee Nuclear Power Station. Such conditions make it difficult to predict the region’s energy conditions and needs in the years to come. The State has adopted aggressive goals to create a renewable energy future. During the 2011-2012 legislative session, the State of Vermont amended the Sustainably Priced Energy Economic Development (SPEED) goal (adopted in 2005) with the Total Renewable Energy Goal which states that starting in 2017, 55 percent of each retail electric utility’s annual sales must be met by renewable sources, increasing by 4 percent every third year until 2032, when 75 percent of sales must be met by renewables (see Act 170). Additionally, in 2011, the Public Service Department (PSD) promulgated the Comprehensive Energy Plan (CEP) with a goal to satisfy 90 percent of energy needs across all sectors from renewable resources by 2050. The WRC will support state energy goals provided they comport with the provisions contained within this plan, including the protection of significant natural and cultural resources and human health and welfare.

Energy conservation and energy efficiency are among the best energy investments, providing opportunities for significant reductions in energy use and costs. While there are social and ecological impacts associated with all energy production, energy conservation and energy efficiency help reduce

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4 Public Service Department [http://publicservice.vermont.gov/topics/renewable_energy/state_goals](http://publicservice.vermont.gov/topics/renewable_energy/state_goals)

5 Reducing energy use. This applies to measures such as building weatherization and changes in personal habits (e.g., turning off lights, driving less) that reduce the amount of energy consumed.

6 Using less energy to perform the same functions and tasks. This applies to measures, such as the use of new technologies (e.g., LED lights, more energy efficient appliances) that use energy more efficiently and reduce waste.
these impacts by reducing demand. Lowering demand makes energy more affordable for all by reducing infrastructure requirements. In October 2011, The State of Vermont adopted Residential Building Energy Standards (RBES) and Commercial Building Energy Standards (CBES), which establish a minimum standard of energy efficiency for nearly all new residential construction, including building additions, renovations, and repairs statewide. Meanwhile, utility companies are actively installing Smart Grid technology, which allows consumers to monitor and to make more informed choices about their daily energy use. The WRC supports improved energy conservation and efficiency strategies as a preferred alternative to the construction of new energy generation and transmission capacity.

Energy conservation and efficiency should be a primary consideration in all development projects, with a primary land use goal of locating significant projects adjacent to or within existing developed areas. Scattered development increases the need for vehicular traffic, requires further extension of public infrastructure and utilities, and consumes a higher percentage of open space, all of which increases the overall energy demand of the project. There is also a direct relationship between development patterns and the subsequent transportation energy needed to sustain that development, which is especially significant in this State where the greatest end-use consumption of energy occurs in the transportation sector. The WRC will encourage development in the region that meets the highest State and regional standards and exhibits best practices in terms of energy conservation and energy efficiency.

The cost of energy in Vermont, across all sectors, is the third highest in the nation, averaging $27.77 per million BTUs. Only Hawaii and Connecticut have higher average costs. The high cost of energy in the state and in the region means that residents and businesses are paying more for the energy they use relative to the surrounding States and the country on a per-unit basis. This is partly due to the fact that natural gas prices nationwide have fallen to historic lows, allowing many residents and businesses across the country to take advantage of this economically priced fuel source. However, there is no natural gas pipeline currently serving the Windham Region, and delivery of compressed natural gas is only available to industrial users. In order to remain economically competitive, the region will need to look for diverse options to reduce energy costs. The WRC will continue to provide educational materials and workshops to inform towns, businesses, and residents how to reduce their overall energy costs, and will support development of energy facilities and sources that will provide competitively priced energy to the region.

Dependence on both external sources of energy and large-scale infrastructure places the region in a vulnerable position with regards to energy security. While it is acknowledged that these sources are

7 A BTU is the amount of heat required to raise the temperature of 1 pound (0.454 kg) of liquid water by 1 °F (0.56 °C) at a constant pressure of one atmosphere. It is the common unit used to compare energy use across the various types of energy use (heat, electricity, etc).

integral parts of a much larger and complex energy system, it is prudent for the region to consider options to increase energy security and stability during times of shortages and outages. The WRC will support diversification of energy sources in the region, redundancy of systems to support critical functions in times of supply interruptions as well as net-metering, off-grid, and community-scaled, distributed generation projects to enhance self-sufficiency and resiliency.

The combustion of carbon-based fuels releases greenhouse gas (GHG) emissions into the atmosphere contributing to alteration of the climate. The region’s current energy demand relies heavily upon fuel combustion. Energy consumed for transportation, space heating, and electricity generation accounts for more than 80 percent of Vermont’s annual statewide GHG emissions. Increases in energy conservation and efficiency in the region, coupled with a greater reliance on low GHG-emitting energy sources and renewable energy, will help reduce overall GHG emissions. Methane is both a valuable renewable energy source as well as a potent GHG that is 21 times stronger than carbon dioxide when released directly into the atmosphere. In this region, methane is primarily a byproduct of the livestock industry, particularly from dairies. Methane digesters have been developed to burn methane to create useful electricity. The WRC will encourage a shift away from GHG–intensive energy sources and towards socially and ecologically sensitive energy sources that have zero or low GHG emissions. The WRC will encourage the deployment of methane digesters.

Renewable energy is generally defined as any energy resource that is naturally regenerated over a human time-scale, including sources derived directly from the sun (such as thermal, photochemical, and photoelectric), indirectly from the sun (such as wind, hydropower, and photosynthetic energy stored in biomass), or from other natural movements and mechanisms of the environment (such as geothermal and tidal energy). The “renewable” characteristic of these energy resources means that they are not as vulnerable to supply disruptions and the increasing costs and volatility associated with a finite fuel source like fossil fuels. Although all energy sources create negative environmental impacts, renewable energy technologies are comparatively clean sources of energy that can have a much lower environmental impact than conventional energy technologies. The WRC will support the development and use of renewable energy resources that enhance energy system capacity and security, promote cleaner, more affordable energy technologies, increase the energy options available locally, and avoid undue adverse impacts of energy development on the local community and environment.

Every energy facility, including renewable energy systems, has varying social, economic, and environmental implications, some of which may impact the greater community. As with any development project, there are a variety of public perspectives and values leading to differences in opinion regarding how the region is best served. In some cases, concerns have been raised regarding location suitability and installation practices of energy generation. The WRC will encourage developers to use sound siting practices when installing energy facilities, support opportunities for public participation, and will facilitate inter-town conversations where differences exist. The WRC expects projects to comport with the vision and intent articulated in this plan and those of municipalities.
POLICIES

1. Ensure that all energy generation, transmission, and distribution projects further the regional goals for providing a reliable, sufficient, and economical energy supply to the region, promoting energy conservation and efficiency, and furthering the development of energy sources that have zero or low GHG emissions.

2. Work with the State, utility companies, and other energy suppliers to create a regional energy profile as a foundation for planning to meet future regional energy needs and to provide guidance on energy development in our member towns.

3. Support the State in achieving its Total Renewable Energy and Comprehensive Energy Plan goals through avenues that maintain an adequate, reliable, and economical energy supply without causing undue adverse impacts to humans and the environment.

4. Support cost-effective energy efficiency and energy conservation measures, and programs such as Efficiency Vermont to help reduce energy costs in the region.

5. Support incorporation of high-efficiency energy systems, sized appropriately to the energy need, and located in close proximity to the user base.

6. Support the advancement of Smart Grid technology to allow businesses and residents to make informed choices about their energy usage and expenditures by monitoring when they are using energy, how much they are using, and how much it costs.

7. Require that new development and renovations, at minimum, meet State commercial and residential energy building codes. Encourage development to utilize strategies to increase the energy efficiency, including consideration of transportation energy use, on-site generation and heating systems, and reuse/repurposing of existing structures.

8. Provide and distribute educational information on:
   a. Energy conservation techniques;
   b. Energy-efficient products and weatherization programs;
   c. Available energy options and their respective impacts and costs; and
   d. Opportunities for energy diversification and locally based energy sources.

9. Encourage an economically competitive energy supply through increased operation efficiencies, technology upgrades, and availability of low-cost fuels, including natural gas.

10. Balance improved efficiency and conservation measures with the need for new generation and transmission infrastructure to ensure adequate future energy supplies. Support requirements that
utilities improve the efficiency of procedures and infrastructure and assist customers to conserve energy and reduce costs.

11. Support the continued availability and use of net metering electrical systems, including both individual and group net metering installations.

12. Encourage a shift toward zero and low-GHG emission energy sources, including the capture of methane gas and its conversion to useful energy.

13. Require sustainable sources and practices for all biomass and bio-fuel projects to ensure that projects create a net reduction in GHG emissions, protect the working landscape, capture and reuse waste heat, and follow verifiable stewardship practices.

14. Support sound energy facility siting practices by ensuring that new developments give adequate attention to facility siting requirements, development constraints, natural resource protection, and land use compatibility.

15. With regard to all energy generation, transmission, and distribution projects:
   a. Adhere to a high environmental standard that includes avoiding negative environmental impacts to the extent possible and adequately minimizing and mitigating those that cannot be avoided;
   b. Conduct thorough and proper studies and analyses of all anticipated socioeconomic and environmental impacts, both positive and negative;
   c. Adequately address all areas of concern regarding proposed developments; and
   d. Effectively and adequately address all issues related to facility operation and reliability.

16. Facilitate public participation as an integral part of the decision-making process for siting, evaluating, and relicensing energy generation, transmission, and distribution facilities and for electric utility deregulation.

17. Facilitate inter-town conversations about appropriately scaled and sited generation sources, which include consideration of the wishes of residents regarding the meaning of “appropriate” as expressed in their town plans. The WRC recognizes that host towns and abutting towns may have different goals in this area, and will use its best efforts to gain consensus and/or cooperation among them.
The WRC has incorporated by reference the 2014 Comprehensive Economic Development Strategy (CEDS) for southeastern Vermont as a portion of this plan to guide its economic development policies. The CEDS will be referred to by the Commission in the development and implementation of its plans; however, the policies of WRC supersede the CEDS. The CEDS report was developed by the Southeastern Vermont Economic Development Strategies (SeVEDS), a non-profit organization that formed in 2007 to “reverse economic decline of the southeastern Vermont region” in collaboration with the Brattleboro Development Credit Corporation (BDCC).

The CEDS provides a vision for achieving economic prosperity in the Windham Region. This document highlights opportunities for regional collaboration to create an entrepreneurial environment that supports innovation and growth among businesses. It emphasizes the need for improving wage parity as compared to the surrounding area and for increasing the size and quality of the workforce, in part by attracting younger talent. Lastly, it stresses the need to mitigate the regional economic impact of Vermont Yankee Nuclear Plant’s 2014 closure. The WRC acknowledges the critical role that each of these objectives plays in creating an economically prosperous future. Land-based industries (agriculture, forestry, and outdoor recreation), arts and culture, and tourism also make vital contributions toward creating the region’s authentic quality of place.

As indicated in the CEDS report, and confirmed by research for this plan the Windham Region faces several key challenges that threaten its economic sustainability. First, recent regional trends show an aging population. Over the past two decades, the percent of the population under age 44 has declined, while the percentage of the regional population above age 45 has increased. This means that an increasing percentage of the population is retired or will be retiring within the next two decades. Retirees and semi-retirees usually contribute less to earned wages, while increasing the need for social services, potentially placing an economic strain on the region. At the same time, the number of young people in their early twenties entering the workforce has declined in comparison to historic numbers. Together this dynamic of an aging population, with fewer people in young cohorts emerging to replace those retiring threatens the economic sustainability of the region. **The WRC will support efforts to retain and attract young residents by promoting skill development opportunities, satisfying career choices, and life-style amenities targeting emerging professionals.**

Employment numbers and wages have remained relatively stagnant over the last two decades, similarly threatening the region’s economic sustainability. In fact, the region’s earned wages, adjusted for inflation, actually declined slightly between 1970 and 2010. Meanwhile, real per capita income rose during the same period, indicating that an increasing proportion of income is earned through non-wages, such as rents and investments, sources usually unavailable to younger residents. In comparison
to the surrounding region, median wages in the Windham Region are lower than Cheshire and Sullivan Counties in New Hampshire and Franklin and Hampshire Counties in Massachusetts, a condition that can make it difficult to attract and retain a skilled workforce. The WRC will collaborate with SeVEDS, BDCC, and other entities to promote the creation of meaningful, high-quality jobs and wage levels that will contribute to economic, social, and environmental health.

The region would benefit from the creation of an innovative, entrepreneurial environment, supported by a high quality, highly skilled workforce. The highest proportion of jobs is in the service sector, many of which are low-wage, entry-level positions with few, if any, benefits. Compounding the shortfall in high-quality jobs, Entergy Corporation announced that its Vermont Yankee (VY) Nuclear Plant is scheduled for shut down in 2014. Vermont Yankee (VY) has approximately 630 full-time, highly-paid employees, many of whom will no longer be employed by the plant within 9 to 12 months of its closure. The WRC will promote training programs and educational opportunities to enhance the workforce’s marketable skills and support regionally appropriate strategies for redirecting the VY workforce into new opportunities for meaningful career choices and economic development.

The region has a wealth of natural resources, which creates opportunities to expand upon its strong and lasting tradition in forestry and agriculture, its renowned scenic beauty, and its numerous outdoor recreational opportunities. In general, regional trends indicate that farms are increasing in number, while becoming smaller and more diversified. Farmers are also increasingly seeking value-added product and direct-market opportunities, such as selling through farmers markets and community-supported agriculture (CSAs). Forests are also a valuable renewable resource to the region, with almost 86 percent of the land area covered with trees; however, the forestry industry is threatened by reduced economic viability due to global competition the fragmentation of woodlots due to development and subdivision, rising property values, invasive species, browsing by deer and moose, and climate change. Each of the region’s natural resource attributes provide valuable opportunities to improve the quality of life for existing residents, attract new residents, and promote tourism to the region. The WRC will promote socially responsible and environmentally sound opportunities for local residents to utilize the region’s abundant natural resources through land-based industries, including outdoor recreation, tourism, agriculture, and forestry.

The arts and cultural activities make important contributions to the region’s economy. Boasting an impressive diversity of artists, as well as many cultural assets, the Windham Region attracts visitors and new residents from throughout New England and beyond who wish to participate in the region’s arts and cultural opportunities. A 2011 study conducted by the Arts Council of Windham County found that in 2010, 39 non-profit arts organizations contributed $11 million in direct and audience spending in Windham County.9 The WRC will promote the regional arts and culture sector by working with artist

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groups to identify core issues and needs, to define strategies for enhancing economic vitality, and to facilitate greater collaboration within the arts community.

The Windham Region offers numerous opportunities for addressing the challenges that threaten the region’s economic sustainability. In developing strategies for future economic development, it is important that the region capitalize on its existing assets, rather than fabricate an identity that is not authentic. Many residents and visitors are drawn to the region for its quality of place, characterized by a rural landscape and traditional villages, as well as for its authentic communities and lifestyles. The WRC will support a diverse and vibrant economy that builds on the region’s existing assets, including its authentic quality of place. The WRC will support municipal planning efforts that capitalize upon these opportunities and assets.

POLICIES

1. Work with BDCC and other organizations to attract and retain youth in the region by identifying and addressing barriers to their settling here, by providing targeted educational and skill training opportunities, and by creating meaningful career options with livable wages.

2. Promote activities and development that contribute to a strong and diverse economy, providing satisfying and rewarding job opportunities for citizens in all parts of the region and supporting a strong municipal tax base, while maintaining environmental standards and promoting environmental justice.

3. Generate a variety of stable, year-round jobs with wages and other compensation that provide a livable income, and that include skills training programs and other benefits that contribute to the personal development and quality of life for all workers, particularly in areas with high unemployment or high numbers of workers earning less than a livable wage.

4. Utilize existing financial, physical, and technical resources to facilitate economic development, including the creative use and revitalization of suitable existing space for manufacturing and industrial activities, commerce, housing, and the arts.

5. Develop and assist the growth of small businesses including home businesses and entrepreneurial ventures that help preserve and revitalize communities.

6. Support educational programs in technical and trade skills, as well as basic skills such as math and communications, in order to improve the value of opportunities for the region’s workforce, both entry-level and advanced.

7. Support the transition of Vermont Yankee employees into new jobs and industries through the development of specific job re-training programs, and entrepreneurial support strategies.

8. Encourage development of land-based industries, focusing on the production, distribution, and marketing of agricultural and forestry products and programs from within the region in a manner that
maximizes the sustainable use of these resources, minimizes and repurposes waste, and promotes the economic, physical, and environmental well-being of our communities and their residents.

9. Promote the economy through tourism activities that emphasize the character of the region itself: its beauty, culture, history, wildlife, and outdoor recreation.

10. Support the arts and culture industry by encouraging increased use of community resources, improved cultural opportunities for all residents, and enhanced year-round tourism.
The Windham Region is fortunate to have a wealth of valuable natural resources. Extensive forested lands, prime agricultural soils, river valleys, upland streams, and wetlands create a diversity of ecosystems in the region that support numerous plant and animal communities in addition to supporting human habitation. These interconnected ecosystems, consisting of humans, animals, plants, earth, air, and water can be sustained through careful resource use and conservation.

Forests play a major role in the ecological, economic, and social health of the region. With approximately 86 percent of the Windham Region forested, forestlands are a major component of our landscape and a critical one; forests form the environmental setting for human activity, reduce erosion and stormwater runoff (a major cause of flooding), improve water and air quality, support diverse plant and animal communities including rare species, and make a significant contribution to reducing climate change effects through carbon sequestration. The nature and diversity of forestry activity creates potential conflicts of interest within the forested land and with neighboring land uses. Therefore use of the region’s forests requires thoughtful management that embodies sound silviculture practices. Economic pressures threaten many forested lands with conversion to non-forest uses, while fragmentation of large wood lots into smaller parcels with multiple owners decreases the practicality of commercial timber harvest and the value of the parcel as wildlife habitat. Two effective strategies for keeping forestland intact over time are enrollment in the Use Value Appraisal program (also known as Current Use) and the use of conservation easements. The WRC will continue to support the State’s Use Value Appraisal program and will encourage preservation of forested land tracts through either enrollment in this program or through utilization of conservation easements.

Education is another key component in preserving the essential characteristics of this important resource. The education of woodland owners in the Windham Region has been enhanced by the requirements of the Use Value Appraisal program and by the longstanding, ongoing efforts of the regional Woodlands Owners’ Association, among other organizations. In addition, woodland owners have become more aware of management options that combine timber improvement and utilization with enhancement of wildlife habitat through educational programs provided throughout the region. The WRC will continue to support the efforts of education programs like these, and will provide workshops and other educational opportunities for towns and forestland owners throughout the region.

Surface waters are prominent landscape features throughout the region, often determining both the location and form of regional settlement. Surface waters include lakes and ponds (both natural and impounded), rivers and streams (permanent and intermittent), vernal pools, and wetlands. The region’s abundant surface water is a valuable resource providing aquatic and wildlife habitat, recreational...
opportunities, water for drinking and irrigation, and hydroelectric generation, among many other uses. Maintaining vegetated buffers within the riparian zones and shorelines of surface waters is critical to preserving water quality and ecosystem function by reducing sedimentation, water pollution, and stormwater runoff. The WRC will support water quality in rivers and streams by educating towns and the public about the importance of maintaining vegetative buffers along waterways and within stream and river corridors, support for the monitoring and management of nutrients and pesticides in and adjacent to riparian zones, and encouraging best practices for erosion control both during and after site clearing and construction.

Atmospheric pollution is the most common issue for the lakes and ponds in the region identified through State assessment programs. The region also has several waters on the State of Vermont 2012 303(d) List of Impaired Surface Waters. The most common pollutants for this region are acid and sediment, and the most common use impaired by such pollution is aquatic life support. The WRC will be cognizant of these impaired waterways, and will be especially mindful of the type of development proposed in proximity to these waters. The most stringent best management practices for water quality shall be employed near surface waters, particularly around impaired waters.

There are numerous small and large dams constructed on streams and rivers in the Windham Region providing a variety of benefits including power generation, flood control, and recreational opportunities such as swimming and boating; however these structures can have significant negative ecological impacts as they contribute to stream siltation, alter water levels, disrupt natural flow fluctuations, increase water temperature, decrease dissolved oxygen, and impede fish passage. Inspection and effective maintenance of all dams is essential to the protection of public welfare. When considering either licensing of new dams, or relicensing of existing dams, the WRC will ensure that all of these issues are addressed and given balanced consideration.

Additionally, construction of stream withdrawal facilities and ponds can have detrimental impacts on the health of the region’s waters. In the Windham Region, this activity is most prominent near ski resort developments for snowmaking. State regulations require ski areas to bring their water withdrawals for snowmaking into compliance with minimum flow regulations as part of any expansion of snowmaking. The WRC will give due consideration to the economic, safety, and environmental factors involved in the construction of surface water impoundments and withdrawals for any development activities.

Flooding during Tropical Storm Irene demonstrated the destructive aspects of the region’s surface waters. Floodplains are lowlands along rivers, streams, and lakes which periodically become inundated with water during times of high rainfall or spring runoff. They are important for temporarily retaining waters that might otherwise cause damage or destruction elsewhere. Development in floodplain and river and stream corridor areas is inherently dangerous, due both to the immediate hazards associated with floodwater inundation and to the increased flooding that may occur downstream when developed floodplains are no longer capable of retaining and infiltrating floodwaters. Such development can also
interfere with the function and quality of floodplain wetlands. The WRC will educate the public and town officials about the science and physics of watersheds, and how all areas of a watershed—from the uplands and headwaters to the watershed outlet—function together. The WRC will encourage the preservation and where appropriate restoration, of all floodplain areas by educating towns and the public on their importance, developing guidance policies for towns to incorporate appropriate land use restrictions in their town plans, encouraging best practices for stormwater mitigation, and facilitating inter-town discussions on the downstream impacts of land use. The WRC will discourage development in FEMA designated floodplains. In cases where floodways and floodplains are impacted by new or existing development, the WRC will encourage flood mitigation measures to be taken. Mitigation measures could range from changes to buildings (i.e., raising the structure above base flood elevation, addition of flood panels, etc.) to the restoration of floodplain access. The FEMA hazard mitigation grant program provides examples of a range of mitigation strategies associated with reducing flooding and mitigating flood impacts.

Fluvial (or river-related) erosion hazards (FEH) refer to major streambed and stream bank erosion associated with the often catastrophic physical adjustment of stream channel dimensions (width and depth) and location that can occur during flooding. Fluvial erosion becomes a hazard when the stream channel that is undergoing adjustment, due to its instability, threatens public infrastructure, houses, businesses, and other private investments. Consideration of stream geomorphology and long-term river dynamics in land-use decision-making can protect and restore water quality and habitats, and mitigate damages and economic losses incurred as a result of floods and fluvial erosion. The WRC will work with towns and other regional commissions to create appropriate models and to encourage the designation of FEH areas by supporting the study and mapping of FEH areas, promoting awareness among towns and the public of the importance of protecting these zones, and by assisting towns to incorporate relevant land use restrictions in their town plans.

With floods occurring naturally and regularly in the region, combined with an expected increase in frequency and severity of floods as a result of global climate change, it is critical that flood mitigation include an integrated planning approach that includes land use, development, and mitigation planning. Towns are strongly encouraged to mitigate risks to public safety and public and private investments by

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10 During the public comment period, the Agency of Natural Resources (ANR) indicated that the agency prefers the term “river corridors” instead of fluvial erosion hazard (FEH) areas. ANR offers the following definition: “River corridors consist of lands adjacent to and including the present channel of a river. River corridor delineations are based primarily on the lateral extent of stable meanders, the meander belt width, and a wooded riparian buffer to provide streambank stability. The meander belt width is governed by valley landforms, surficial geology, and the length and slope requirements of the river in its most probable stable form.”
protecting flood-prone areas and addressing flood issues in their town land use plans and capital improvement plans. The Vermont Statutes require that as of July 1, 2014, regional plans include a flood resilience element that identifies flood hazard and FEH areas, designates those areas for protection, recommends policies and strategies to protect them, and mitigates risks to public safety and infrastructure. While this plan recognizes the need to more fully address flood mitigation, the maps and data were not available at the time of plan adoption to adequately address this issue. The WRC will work with other Regional Commissions to create model language for Town Plans to assist towns with flood mitigation and will amend the Regional Plan before the next update cycle to more adequately address floodplain and FEH area protection and hazard mitigation.

There are many tools available to the region and towns for assessing their waterways and for promoting development that will allow existing waterways and future development to co-exist in a manner respectful of each other. These tools include stream geomorphic assessments, river corridor planning tools, streamflow protection mechanisms, and bridge and culvert assessment. The WRC will provide technical assistance to towns to help accomplish these studies while also undertaking region-wide research on Windham’s waterways. While engineering techniques may mitigate the consequences of development within river and stream corridors, the fact that development can take place in these areas does not mean that development should occur in these areas. Development in river and stream corridors fundamentally places life and property at risk, and may exacerbate problems downstream. Towns are encouraged to develop policies and regulatory and non-regulatory strategies to identify where development within the river and stream corridors represents an acceptable risk. The WRC shall continue to assist in the study of the region’s waterways, and discourage development in river and stream corridors, floodways, floodplains, and fluvial erosion hazard zones unless appropriate and proven mitigation measures are taken.

Groundwater provides the primary supply of potable water for most of the region. Groundwater occurs in the unconsolidated sediment of streams and buried valleys and in bedrock fractures. While groundwater potential in areas of unconsolidated sediment is generally favorable, wells producing water from rock fractures usually have low yields (ranging from two to fifteen gallons per minute). The region’s mountains and uplands have either exposed bedrock or bedrock covered by a thin layer of glacial till with low permeability; in these areas bedrock fractures are the primary source of groundwater.

Development in the region has traditionally been encouraged on soils suitable for in-ground sewage disposal systems. Often such soils are also closely associated with sites having high potential for aquifer recharge. Thus development on these soils may result in pollution of subsurface and surface waters. Potential groundwater pollutants include septage from improperly designed or malfunctioning septic tanks and leaching fields, leakage from underground gas and oil tanks and from commercial fuel, cooling and supply pipes, and from improper disposal of both stable and radioactive chemicals. Installation of public wastewater systems, especially in villages located in close proximity to rivers and streams, could help alleviate groundwater contamination. The WRC will seek funding to complete a village water and wastewater needs assessment and wastewater feasibility plan to identify current barriers to
Development, to develop conceptual community water and sewer plans, and to develop financing and fiscal management profiles.

Soil composition and characteristics are critical factors in determining plant and animal communities as well as in determining suitable land uses, including farming, forestry, mineral extraction, and development. Compared to other counties in the State, Windham County contains the smallest portion of prime agricultural soils, soils that are rated for high crop production potential, and the fifth smallest portion of soils of “Statewide Importance”. These limited agricultural soils are vital to the region’s economy, and must be protected from development through conservation or mitigation practices. Since most primary agricultural soils are flat and well drained, these areas tend to also desirable locations for development. The same tools identified above for forest land preservation are also available for prime agricultural soil preservation, including Use Value Appraisal, restrictive development easements, and placing land in permanent conservation. The region’s topography causes a large proportion of its soils to be shallow, unstable, highly erodible, wet, or poorly drained, particularly in mountainous areas. Wet soils may cause basement flooding and failure of footings, foundations, underground piping, and septic systems. The WRC will support the use of available tools and careful management practices to preserve prime agricultural soils throughout the region. The WRC will discourage development on soils unsuitable to the proposed use.

Mineral resources include deposits of sand, gravel, and other minerals, such as granite, slate, limestone, uranium, iron ores, and ultramafics (sulfide, talc, soapstone, and serpentine). Sand and gravel are economically important regional resources but are limited in supply and distribution. Highway construction, road maintenance, and housing and commercial construction all increase the demand for sand and gravel. Excavation activity, and the transport of the excavated material are known to have negative impacts on community infrastructure such as roads and bridges, on, resource lands, water and air quality, and on the quality of life adjoining neighborhoods. The WRC recognizes the need for mineral extraction in the region and will support protection of mineral deposits, but will also facilitate mitigation to reduce its negative impacts.

Natural areas, fragile areas, and wildlife resources are landscape features with ecological, educational, scenic, and contemplative value. Some areas are unique and considered rare. They provide ecological preserves of relatively unaltered environments that are important to plant and wildlife communities, biological diversity and the natural heritage of the region. State legislation provides a means to designate Natural Areas (10 V.S.A. § 2607) and Fragile Areas (10 V.S.A. § 6551). By law, Natural Areas are owned by the Vermont Department of Forests, Parks and Recreation. Hamilton Falls on Cobb Brook in Jamaica State Park and Terrible Mountain on the eastern border of Weston are the region’s only state-registered Natural Areas. A Fragile Area can be owned by any party, but it must be identified as having statewide significance. The only state-registered Fragile Area is the J. Maynard Miller Memorial Forest (the Black Gum Swamps) in Vernon.
The Silvio O. Conte Fish and Wildlife Refuge Environmental Impact Statement identifies four areas in the region as nationally important fish and wildlife habitats: the West River including the Rock River, Winhall River, and Wardsboro Brook tributaries, Westminster Flats, the Retreat Meadows, and Putney Mountain. The State created a new natural area in 2013 in Grafton and Athens called the Turner Hill Wildlife Management Area. In addition to these locations, the WRC identifies bear habitat and corridor areas, deer wintering areas, fish habitat, remote forested areas, areas where threatened or endangered species are found, and critical natural areas as important wildlife resources. Lands above 2,500 feet in elevation are also typically fragile due to their thin soils, steep slopes, and sensitive plant and animal communities. Definitions of these areas can be found in the Natural Resource Chapter of this plan. The WRC will support protection and preservation of all critical ecosystems listed in this section and should require the highest level of mitigation when reviewing development proposals in or adjacent to them.

Outdoor air pollution in significant concentrations can raise aesthetic and nuisance issues such as impairment of scenic visibility, unpleasant smoke or odors, impairment to water quality, and human health problems, especially for more sensitive populations like children, asthma sufferers, and the elderly. The region’s air quality is impacted by both local and distant sources of air pollution. Local sources include discharges from industries, combustion of fuels for residential and commercial heating, and significantly from non-point sources such as vehicle operation (see Air Quality Chapter of the Transportation Plan for additional information). As in other parts of New England, the topography, prevailing winds, and weather patterns also result in air pollution traveling from other areas of the country to southeastern Vermont. The WRC should consider the air quality impacts of any proposed development, and require air quality controls for any project that would have a substantial negative impact on regional air quality.

The Clean Air Act (CAA) requires the Environmental Protection Agency (EPA) to set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and to the environment. Six pollutants are measured: particulate matter, sulfur dioxide, carbon monoxide, nitrogen dioxide, lead, and ozone. The only State monitoring station located within the Windham Region is positioned at Mount Snow in West Dover. All of Vermont has been classified as “in attainment” or “indeterminate” for national air quality standards since 1988; however this could change if regulations become stricter.

Noise pollution, unpleasant or otherwise unwanted sounds, may be caused by road traffic, airplanes, recreational vehicles, construction and industrial equipment, personal sound equipment, and yard equipment. Noise Impact Assessments model the potential impacts of noise from a particular source on the surrounding environment. These assessments are essential for evaluating the impacts of projects that will emit significant sound levels, either during construction or through ongoing activities. The WRC will encourage completion of Noise Impact Assessments for all projects that have a significant potential for noise impacts.
The Windham Region enjoys exceptional scenic quality. Mountain landscapes, farm landscapes, historic villages and towns, ridgelines, the night sky and nighttime landscapes, shorelines, and scenic corridors are all highly vulnerable to development. Structures such as utility poles, telecommunication towers, wind turbines, cleared powerline rights-of-way, large-scale signage, and streetlights are considered by many to be incongruous with the region’s scenic landscape. Light pollution or “sky glow” is a cumulative and increasing problem, especially near the urban clusters along the region’s eastern border and near major resort development centers. Careful planning and design will often enable development without adversely affecting the scenic value of the landscape. The WRC will encourage protection of scenic viewsheds and provide assistance to towns in designating and protecting specific viewshed locations in the region.

POLICIES

FOREST RESOURCES

1. Maintain a high-value, forested landscape in the region composed of large, contiguous parcels by supporting programs such as Use Value Appraisal and encouraging the use of conservation subdivision models, conservation easements, and purchase and ownership of lands for conservation purposes by land trusts, state and local government, or other similar organizations.

2. Support the harvest and use of lower grade timber to ensure full use of the forest resource and help protect the region from the threat of wildfire destruction.

3. Encourage public, industrial, and private landowners to maintain and enhance forest resources on their lands, and to follow sustainable forest management practices that provide habitat for diverse natural species, avoid high grading of timberlands, and follow Acceptable Management Practices.

4. Support the management and eventual eradication of invasive species in the region through activities such as provision of education materials, sponsorship of workshops on best management practices, encouraging the involvement of community organizations, and requiring the eradication or mitigation of invasive species as a condition on permits for development where the introduction or spread of invasive species is likely.

5. Maintain the Vermont tradition of public access to forested lands by encouraging preservation of historic access points and promoting public access connections in development proposals.

6. Continue to support the Vermont Use Value Appraisal (Current Use) Program—a program critical to the forest resource in the region—on a fully funded basis.

7. Support organizations and educational programs that teach or demonstrate sustainable forestry and Acceptable Management Practices, to facilitate understanding and appreciation of the environmental, economic, and recreational benefits offered by the region’s forest resource.
SURFACE WATERS

8. Maintain and restore the chemical, biological, and physical quality of the region’s surface water per the objective in State water regulations.

9. Maintain undisturbed buffers of vegetation along watercourses, lakes, ponds, wetlands, and vernal pools consistent with State regulations and the highest precedent established by the District Environmental Commission and State Environmental Court in order to protect shorelines, provide shading to prevent undue increase in stream temperatures, to minimize effects of erosion, sedimentation and other sources of pollution, and to maintain scenic, recreational, and habitat values.

10. Evaluate the licensing or re-licensing of hydroelectric power generating facilities on a case-by-case basis in a manner that supports other provisions of this plan.

11. Maintain any designated Class I wetlands in their natural condition. Ensure that any permitted alterations to Class II and Class III wetlands do not significantly diminish their functional, ecological, or aesthetic values. All projects of regional importance shall provide evidence that onsite wetlands have been field checked and verified by an environmental official or State agency representative.

12. Evaluate inter-basin transfers of water on a case-by-case basis and require project proposals to demonstrate that the water quality in both the sending and receiving basins will not be significantly lowered, that the water table and stream flow in the sending basin will not be detrimentally lowered, and that peak flows in the receiving basin will not be detrimentally increased. For purposes of this policy, a basin is the drainage area of a watercourse that is at least 1,000 acres in area.

13. Encourage towns and community organizations to identify critical resource areas in the region and support efforts to protect these exceptional natural resources.

14. Support surface water classification and management strategies which are consistent with the municipal and regional land use planning objectives for the affected watershed, and which will effectively maintain or improve existing water quality.

15. Maintain water flows in streams at levels that support a full range of in-stream uses and values.

16. Require flood hazard and/or fluvial erosion hazard mitigation for development proposals in the floodway, floodplain or fluvial erosion hazard zone.

17. Support State regulations and programs to protect surface waters from run-off and sedimentation caused by agriculture, forestry, recreation, and development activities through the use of tools such as: Acceptable Agricultural Practices (AAP’s), Acceptable Management Practices (AMP’s) for forestry, and Best Management Practices (BMP’s) for erosion control.
GROUNDWATER

18. Avoid contamination of groundwater from the drilling of wells through the use of proper drilling technology and appropriate well placement.

19. Require small-quantity generators of hazardous waste to have storage and disposal plans demonstrating that water contamination risks have been minimized. Support efforts to make appropriate disposal of small-quantities of hazardous waste convenient and effective in the region.

20. Support the Department of Environmental Conservation Water Supply Division in regulating and monitoring water withdrawal from underground sources to ensure that aquifers and surface waters are not significantly depleted, and that water is properly allocated. Promulgation of specific laws and regulations to control water withdrawal and to ensure minimum flows is encouraged.

SOILS AND TOPOGRAPHY

21. Require developers to take special precautions on slopes to avoid environmental damage, including negative consequences associated with erosion and landslides.

   a. Minimize areas of earth disturbance, grading, and vegetation clearing on slopes over 15 percent;

   b. Design development on slopes over 15 percent such that it minimizes the potential impacts of slides and earthquakes; and

   c. Avoid development (other than appropriately designed recreational trails and ski lifts) in areas with slopes exceeding 25 percent or above 2,500 feet in elevation.

22. Require detailed site studies to determine suitability for development where steep slopes occur with shallow soils. Ensure that all development proposals on such soils provide and conform to a site drainage plan and an erosion control plan for construction phases of the development.

23. Avoid development on wet soils, mucks, clays, silts, and other unstable soils that offer poor support for foundations or footings or that are subject to slippage.

24. Ensure that gravel extraction does not have negative impact on groundwater, surface waters, recreation sites, scenic areas, and special community resources. Future access to gravel resources should be considered in development proposals. Best practices are to be used to minimize dust, noise, and other degradation of air quality.

25. Ensure that effective site rehabilitation plans are provided and implemented for new development projects.
NATURAL AREAS, FRAGILE AREAS AND WILDLIFE RESOURCES

26. Protect Natural Areas, Fragile Areas, wildlife corridors, and important plant and animal habitats.

27. Protect Natural and Fragile Areas from development. When development is proposed near a natural or fragile area a buffer strip, designed in consultation with the appropriate state agency, must be designated and maintained between the development and any natural or fragile area.

28. Support state, federal, and private acquisition of land and/or conservation easements to protect and connect important wildlife habitats and to encourage designation of State Natural and Fragile Areas.

29. Support local, regional, state and federal programs and incentives that encourage private and public landowners to recognize the economic importance of protecting, maintaining and enhancing fish and wildlife habitats and ecosystems.

AIR QUALITY

30. Require that development activities meet state and federal standards for air quality and noise.

SCENIC RESOURCES

31. Encourage towns to identify their scenic resources and support efforts for their enhancement and maintenance.

32. Encourage donation of scenic easements to public agencies or to private conservation organizations.

33. Require that the scale, siting, design, and management of new development maintains or enhances the landscape and protects high quality scenic landscapes and scenic corridors as identified by town plans.

34. Minimize visual impacts of high-elevation or ridgeline structures through co-location, design, siting, and color choice. Design and site high-elevation tower structures so that they do not require nighttime illumination.

35. Require illumination of structures and exterior areas only at levels necessary to ensure safety and security of persons and property. Require arrangement of all exterior lighting so that the light source (lamp) is not directly visible from public roads, adjacent residences or distant vantage points. Require shielding of exterior lighting so that the light does not project above the lamp. Discourage exterior area illumination of regionally prominent physical features and landscapes.

36. Plan new or improve existing roads so that they maintain or enhance scenic resources.

37. Screen new development from I-91 and other scenic roads and rivers, as identified by town plans, to the greatest extent practicable using vernacular perimeter plantings of hedges, hedgerows, and street trees.
Housing Summary & Policies

An adequate supply of year-round housing that offers varieties of housing size, cost, and location is essential to the economic and social health of every town in the region. Communities benefit when employees are able to live close to their workplace, young adults can afford to buy or rent in their hometowns, and elderly residents are able to remain in the community where they have family, friends, and history. Recent demographic trends are shifting in the region’s housing needs. For example, many aging residents seek or will seek to downsize to smaller homes with access to services, raising concerns regarding the availability of smaller, affordable homes. While the specific needs and dynamics vary from one part of the region to another based on economics, location, and demographics, there is a common need for adequate and affordable housing.

With regard to land use, all housing development should take into consideration the landscape and existing historic settlement patterns of the region. Housing should be located near community centers, and infill development is preferred over development that consumes large expanses of land in rural or resource land areas. Housing that is developed in areas already densely settled with existing infrastructure for roads, utilities and services provides a greater social and economic benefit to the community than housing developed in a “sprawl” pattern. In general, conservation subdivisions or variable lot size models are preferred for any subdivision developed within the region, especially if the development is happening outside development centers (regional centers, villages, hamlets).

Towns should identify areas for compact development and facilitate the kinds of densities needed to reduce per unit costs. Locating these areas near public services will improve affordability for residents and reduce municipal costs for services. Proper provision for adequate and safe water supply and sewage disposal will be integral to this development. Due to limited financial resources at the town level, it is essential that there is appropriate State and/or Federal funding to support community infrastructure to meet these needs. At the same time, implementing regulatory strategies that reduce development costs can help restrain per unit costs as well. For example, allowing cluster subdivisions or providing density bonuses for development that accomplishes desired outcomes can help reduce development costs.

CURRENT HOUSING CHALLENGES

The Windham Region faces several specific challenges when it comes to housing. The details of those challenges are examined in the Housing Chapter, and are summarized here:

An estimated 42 percent of owner-occupied households in the region reported housing costs at above 30 percent of their monthly household income and 45 percent of renter-occupied households reported their housing costs at above 30 percent of their monthly household income. Even with the recent fall in

Support data for this section:
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housing prices, wage increases have not kept pace, putting home ownership out of reach for many, even with relatively low mortgage rates. “Starter homes” are often priced too high for households earning at or below median income. There is also a significant drop-off in the availability of rental housing that is affordable for very low and extremely low income households in the region.

Overall, State and Federal housing programs have not succeeded in developing a stock of permanently affordable housing units sufficient to meet the needs of low and moderate income residents. Additionally, the region saw an estimated loss of 176 mobile homes from 2000 to 2010. This continues to be a much needed alternative to the high costs of housing in the region. This number is likely higher due to the loss of homes during Tropical Storm Irene.

Approximately a third of the housing stock in the region is characterized as “seasonal housing.” Compared to the categories for year-round owner-occupied and renter-occupied housing, seasonal housing saw the largest increase in total number of housing units in 2010, and is the only category to have its overall share of the housing units increase. Many towns have experienced a loss of social capital due to the high number of second home owners as a percentage of their total community population. In addition, seasonal properties are often purchased or constructed at prices out of scale to the local economy and can put upward price pressure on local housing.

Over the last ten years, the towns with the largest growth in housing stock were not the towns that saw the greatest increase in population. This may indicate a shift in occupancy make-up in new and existing housing stock. Increases in seasonal housing could also explain occurrences of increased housing without significant increases in population. There is conflicting data on the strength of this trend, and it should be tracked moving forward.

Homes are being built in sensitive environments such as on ridgelines and in wildlife corridors, as well as on forest parcels that have been subdivided for residential development. Technological advances have made it easier to overcome physical constraints and develop housing in environmentally sensitive areas that are often located at a distance from existing settlement areas. Development in these sensitive locations can threaten timber production, disrupt wildlife habitat and corridors, negatively impact hunting and other recreational uses, have intrusive visual impacts, threaten water quality in areas of headwaters, and lead to an increase in municipal costs.

The region has significant housing and development in floodways, due at least in part to the fact that these relatively level and open areas provide a path of least resistance for development, and also

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11 Social capital is based on Robert D. Putnam’s concept of civic engagement, creating social networks, and establishing trust and tolerance as discussed in Bowling Alone: The Collapse and Revival of American Community, 2000. It is generally defined as “the networks of relationships among people who live and work in a particular society, enabling that society to function effectively.”
because historically, access to water for power generation and other purposes was desirable. Storm events with widespread impacts like Tropical Storm Irene are infrequent, but storms that result in localized flash floods or ice jams have a relatively high frequency. Both radically affect the landscape and human habitation upon it, particularly within floodplains and fluvial erosion hazard areas. Such events reinforce the need to address existing and future development in flood-prone areas through regulatory and non-regulatory methods. Development in river and stream corridors can put life and property at risk and is strongly discouraged. The WRC strongly encourages towns to adopt and enforce flood hazard and fluvial erosion hazard bylaws and will assist in the development of such.

The region has seen significant losses of 2 unit structures, and the gains seen in other multi-unit categories have mostly occurred in resort areas. These housing options are critical, supplying much needed variety in housing prices for the region, as well as contributing to the overall diversity of housing stock. Nationwide analyses predict that the age cohort of teens through early thirties will gravitate towards denser living conditions, with less need for the individual space traditionally sought in single family housing development. The most recent Windham Windsor Housing Trust Housing Assessment Study confirmed that this trend is being seen in Windham County.

Nearly one-third of the region’s housing stock was constructed prior to 1940. While older housing units add to the historic character of a community, they also present challenges such as outdated electrical wiring, poor energy efficiency, aging septic systems, and the possibility of lead-based paint. Diminishing returns on investment are also a concern for individuals looking to purchase a home requiring significant investment in cosmetic and system upgrades.

**FUTURE HOUSING TRENDS**

While single-family homes may continue to be the preferred type of housing in the region, providing a mix of housing options will help meet the needs of various household types and income levels, attracting younger populations and allowing older populations to age in place. A recent report on national trends in real estate\(^\text{12}\) predicts that younger age cohorts, from teens to early thirties, will look for housing that provides access to socially rich environments with a variety of outlets for community engagement. This age group is predicted to prefer housing that fosters community relations and has less reliance on personal space and boundaries.

The report also predicts that the large population of seniors in the United States may choose, or for financial reasons find it necessary, to age in place or move in with relatives. Housing developments

offering more accessible arrangements or accessory apartments on existing housing structures will be in higher demand in the coming years. A report by Windham and Windsor Housing Trust found that within the Windham Region, the aging population was dispersing to rural communities more so than towards downtown areas. This is somewhat contrary to nationwide trends which have seen development of compact developments in urban and suburban areas for age-restricted living communities that are located close to amenities. In either case, accessibility will be a key component for housing an aging population. It is also expected that with the aging population in the region, second home owners may choose to retire to their second homes, transitioning these units to permanent occupancy. Future development should anticipate this transition, and be prepared to meet the needs of this aging demographic.

In terms of meeting the needs of these two age groups, the region’s villages and downtown centers can provide many preferred amenities. Local interest groups have also stressed the need for denser housing development located in proximity to employment and transportation, ideally being located in denser settlement areas. Additionally, public input has suggested that providing more opportunities for ownership in downtown centers would be welcome and could help add to the diversity of housing options. However, barriers to this type of development do exist in the form of high costs for bringing older buildings up to modern accessibility codes as well as a lack of public infrastructure in the region’s villages.

As is true of most of New England, there remains a gap between the spectrum of housing that would be affordable to residents of the region and the actual cost of housing available in the region. While the price of housing declined during the recession, many houses and rental units are out of reach for low to moderate income residents. This trend is not expected to change unless additional affordable housing units are added to the housing stock in the region.

**CRITICAL ACTIONS**

The following are critical actions the Windham Regional Commission will take to help relieve some of the housing issues facing its populations.

One way to bring down per unit costs is to increase housing density. This means enabling the kinds of development patterns that are a historic tradition in Vermont—compact villages and downtowns. A major barrier to this type of development is the availability of public sewer and water infrastructure. The WRC will seek funding to complete a village water and wastewater needs assessment and wastewater feasibility plan to identify current barriers to development, to develop conceptual community water and sewer plans, and to develop financing and fiscal management profiles.

A healthy economy and jobs that pay a livable wage are of critical importance in addressing the issue of an insufficient supply of affordable housing. For the Windham Region to retain and attract businesses
and workers, including seasonal workers who serve the resort and tourism industries, there must be an ample supply and a wide variety of housing types for people of all incomes. The WRC will support and encourage economically, socially, and ecologically appropriate housing projects that add to the diversity of housing stock in the region, ensure that mitigation fees stay in the region, and will educate towns and the public on regional housing needs and alternative affordable housing options.

Demographic trends indicate that elder services in general, and long-term care needs in particular, will have growing and ultimately profound impacts on the region. The State of Vermont expects an increasing demand for long-term care services by 2020 with peak demand not occurring until after 2030.\textsuperscript{13} Providing senior housing that is located in close proximity to services and transportation is of particular importance as accessibility issues will increase as the population continues to age. Meeting the housing needs of the growing population of elders and people with disabilities will require developing a mix of housing types (including low and moderate income units, accessory units, independent living units, service enriched units, and subsidized and unsubsidized units) that have easy access to services and public transportation. The WRC will support this type of development throughout the region, and especially in the regional centers and villages.

There is a need for a much more detailed understanding of the Windham Region’s housing market to help focus application of very limited resources on the most productive housing strategies. Windham and Windsor Housing Trust has put together a thorough assessment of affordable housing needs in the region, specifically focusing on the population centers of Brattleboro, Bellows Falls, and Wilmington. This level of assessment and information is needed for the region as a whole. One area in particular that would benefit from a more detailed assessment is the need for seasonal workforce housing in areas surrounding resort centers. The WRC will complete a real estate market analysis to establish a foundational understanding of the current residential real estate market in the Windham Region, and analyze present and future market condition implications for the affordability and availability of housing for the regional workforce, as resources are available.

\textsuperscript{13} Shaping the Future of Long Term Care & Independent Living, 2003-2013, Vermont Department of Aging and Disabilities, Agency of Human Services, January 2004.
POLICIES

1. Promote a diversity of housing stock within the region offering safe, adequate, accessible, and affordable housing to meet the needs of all residents across the entire income spectrum and increase opportunities for owner-occupied housing.

2. Develop housing in a manner that maintains the historic settlement pattern of compact village and urban centers separated by rural countryside, and that has minimal impact on natural resources, open space, floodplains, fluvial erosion hazard zones, and important agricultural and forest lands.

3. Implement innovative planning, design, and construction techniques that minimize the long-term cost and energy consumption of housing, including locating housing convenient to community centers, in proximity to transportation centers, in a compact development arrangement, and employing energy efficient construction techniques.

4. Promote and facilitate the design and retrofit of life safety and accessibility improvements in housing units.

5. Assist the coordination between public and private agencies involved in planning and financing of affordable housing, including alternative mechanisms such as land trusts, cooperative housing, limited equity cooperatives, and others.

6. Ensure that publicly funded projects do not revert to market-driven housing through support of Vermont Housing and Conservation Board (VHCB) covenants that restrict resale to eligible households, VHCB Mortgage Deeds, and Windham and Windsor Housing Trust (WWHT) agreements that restrict resale prices.

7. Support rehabilitation and maintenance of existing affordable housing stock.

8. Support affordable housing projects and encourage waiving of fees, tax credits and property tax abatement, and assistance with public grants and other sources of funding.

9. Facilitate opportunities for housing that is affordable to the region’s workforce. All Major Act 250 applications for development that will create fifty new full time equivalent positions shall provide evidence that there is existing available and affordable housing stock for the new employees within a thirty mile commuter shed. If housing that meets this requirement is not available, the development shall include affordable housing within the project or a mitigation payment to be used for affordable housing in the Windham Region.
The Windham Region is fortunate to have access to a variety of educational resources, a rich and vibrant arts and cultural heritage, and a wealth of natural recreational resources. These resources are foundational to fostering strong local ties to the community, and in turn improving the economic prosperity of those communities.

The availability of high-quality child care is a concern for many parents, employers and communities. Affordable, high-quality child care is essential in developing a full employment economy, raising income levels, and lowering the need for public assistance. High-quality child care can also have many positive benefits for a child’s social and intellectual development. Rural development and its corresponding commuting patterns and population growth patterns contribute to a unique environment for assessing specific child care facility location needs. In general, there is an overall need to increase the availability of high-quality child care. According to a 2013 study by the Windham Child Care Association, the largest barriers to child care access include location, hours of operation, and ages served. The population that appears to be most underserved is the 0-2 year olds (infants and toddlers). The WRC will continue to support efforts and facilitate action to increase the availability of needed childcare throughout the region.

Each public school in the region is part of a regional supervisory union that is charged with overseeing the operation and functions of the elementary and secondary schools. The WRC provides support to the supervisory unions such as facilitating community discussions on education, providing information and administering funding sources like the Safe Routes to Schools program, and providing educational and volunteer opportunities for students. These interactions also help students to be more aware of community engagement and the planning profession.

The WRC also addresses the land use issues associated with the development of new school facilities. School enrollment figures in the region have fallen consistently during the last ten years. As a result, the consolidation of schools and the upgrading of aging facilities have led to school construction projects in the region. Building new schools on the edge of a community on large, undeveloped parcels of land not only abandons the village and downtown and existing facilities, but also increases public expenditures, vehicle trips, pollution and loss of open space. The WRC will continue to encourage development of new or relocated education facilities in previously developed areas such as downtowns and villages. The WRC will also continue to provide support to the regional public schools in the form of public discussion facilitation and educational programs.

The Windham Region has several post-secondary and adult learning facilities. While these educational institutions are an asset to the region, the 2014 Comprehensive Economic Development Strategy (CEDS)
has identified the lack of an interconnected, collaborative system between the high schools, community colleges and universities as an opportunity for improvement in the region. Additionally, the report identified that true workforce development was non-existent outside of individual business employee training. **In order to help build connections between these entities, the WRC will support BDCC in working with educational institutions and employers, including the self-employed, throughout the Windham Region to facilitate collaboration and strengthening of “education to employment networks”**.

The Windham Region's libraries play an important role in serving the learning and information needs of its citizens, as well as providing community centers for meetings and cultural events. Adequate funding for libraries is a struggle in the region. Collaborations between local libraries and educational institutions in the region may aid in providing other avenues for support. Additionally, as the role of libraries continues to expand and to adapt to information technology advances, other opportunities for funding and collaboration may evolve, such as the creation of adult learning satellite facilities and telecommuting or video conferencing hubs. **The WRC will support the continued efforts of the libraries in the region to offer learning and information services and to facilitate collaboration that will ensure their future viability.**

Access to media resources is critical to an informed citizenry, enabling the population to share information and engage with others on important issues. Television, videoconferencing, radio, newspapers, and local websites are important avenues for distributing local and global news. Although internet and telephone and cellular communications are also primary avenues for the distribution of information, these topics are covered in the [Utilities, Facilities, and Technology Chapter](#). **The WRC will support expansion of access to media resources to all residents and businesses within the Windham Region, provided that the resulting impacts to human health, regional aesthetics and character, and scenic and natural resources have been adequately addressed.**

For an area of its size, the region is unusually rich in cultural resources. Nationally recognized musicians, artists, writers and craftspeople have chosen to make the region their home, and their presence has helped to attract a diverse and appreciative audience to the area. The presence of the arts community enriches the lives of residents and visitors, and enhances the region's economic vitality and appeal as a place to live and do business. Added to the attractiveness of its arts culture, the region has an abundance of historic resources as well. Historic structures and sites are an integral part of the Windham Region’s character and quality of life. They serve as a link to the past and help strengthen the local economy by promoting investment as well as tourism. **The WRC will continue to foster the growth and development of its rich arts and cultural heritage through collaboration and education efforts, and through efforts to preserve the historic resources of the Windham Region.**

Recreational resources throughout the region take many forms. Some communities, such as Brattleboro and Rockingham, have municipal recreation departments and provide a wide range of recreational activities for various age groups. Ski resorts play an important role in the Windham Region by providing
recreation to residents and tourists alike, in many cases through all four seasons. The region’s trail network is also an important recreational resource. The Appalachian Trail, Long Trail, and Catamount Trail all pass through the western part of the region and the West River Trail is being developed along the West River. Hiking, road biking, mountain biking, horseback riding, cross-country skiing, snowmobiling, and hunting are just some of the recreational activities that also take place throughout the region’s vast forest resource areas. Finally, the Windham Region is rich in water resources. Residents and visitors utilize the many rivers, streams, lakes, reservoirs, and ponds for water recreation such as swimming, boating, and fishing, although there is a shortage of access to lakes and ponds in the region. The WRC will continue to support and promote the wide variety of outdoor recreational opportunities throughout the Windham Region through activities such as mapping of regional resources and access points, facilitation of collaboration between recreational groups, and support of recreational activity development. The WRC will develop a recreation plan.

POLICIES

EDUCATIONAL SYSTEM

1. Increase the availability, affordability, and accessibility of childcare.

2. Encourage school construction and renovation projects in existing developed areas such as downtowns and village centers in order to take advantage of existing infrastructure, encourage walking and bicycling to school where appropriate, and to enhance revitalization of communities.

3. Encourage and contribute to the ongoing debate about sources and efficiencies of educational funding.

4. Support efforts of libraries to provide materials, technology and facilities for independent learning and development of life-long education.

5. Increase offerings for workforce training and adult education programs in the region, and help coordinate partnerships to ensure these programs are well-suited to both the self-employed and employer needs of the region.

6. Facilitate increased opportunities for public and private cooperation in offering vocational and basic competency training to employees and future employees of area businesses and industry.

MEDIA RESOURCES

7. Support greater penetration of public access, educational and government programming (PEG) through new PEG group formation and regional agreements. Encourage cable companies and other video programming service providers to support PEG operating and capital budgets. Encourage cable television companies to provide coverage of regular town meetings and other important local events as part of their cable franchise agreements.
8. Support increased access to information about local events in user-friendly electronic formats.

9. Encourage increased access for residents to state and local public meetings and hearings through Vermont Interactive Television, PEG channels, and other electronic means.

CULTURAL AND HISTORIC RESOURCES

10. Foster and encourage a vibrant local arts/cultural community through assistance and support for local arts friendly facilities, organizations, education, art marketing, and distribution efforts.

11. Support organizational and communication networks serving the region to promote the enhancement of cultural opportunities.

12. Protect places of outstanding educational, aesthetic, archeological, or historical value by discouraging development that would adversely affect these cultural resources, including their destruction or alteration, alteration of surroundings, or the introduction of non-harmonious visual or audible elements. Require mitigation of negative impacts in projects that create unavoidable conflicts.

13. Encourage preservation of significant historic sites or structures through support of ownership, protective easements, and/or other regulatory options.

14. Support rehabilitation and adaptive reuse of significant historic sites and structures.

15. Support local, regional, and State non-profit historic preservation trusts.

RECREATION

16. Provide varied and accessible opportunities for outdoor recreation.

17. Facilitate the orderly development of needed public and private recreational facilities.

18. Recognize the recreational potential of watercourses and shorelines and encourage provision of facilities for sustainable water-oriented day use that does not impair the resource or related habitat.

19. Protect existing trail corridors and encourage use of abandoned railroad beds, Class 4 roads and other public rights-of-way for future trail development and public access.

20. Encourage federal, state, and local acquisition of land and facilities well-suited for outdoor recreation, provided that adequate financial and management arrangements are made with the involved local governments.

21. Support United States Forest Service acquisition, other than by eminent domain, of private inholdings within and selected lands adjacent to the Green Mountain National Forest, and adjacent to the Conti Natural Wildlife Area, provided that adequate payments in lieu of taxes are made to the affected local governments by the U.S. Forest Service.
22. Increase public opportunities for multiple-use recreation and for public access to recreation lands. Ensure provision of separate areas or facilities for conflicting uses of recreational resources when such conflicts create safety hazards or significantly impair the use or enjoyment of the resource.
Although often concealed from public view, there are numerous infrastructure systems and public services that are critical to public health, the function of communities, and the ability of the region to attract and retain businesses and residents. Broadly speaking, these infrastructure and services include potable water supplies, wastewater treatment systems, solid waste management facilities, radioactive waste management, emergency planning and response, communications infrastructure, and human services facilities.

Water supply infrastructure is owned and managed by a variety of entities, including municipalities, communities, and individuals. With costs continually increasing, a significant challenge that many of the existing public water suppliers face is obtaining the funding to maintain infrastructure and to make system upgrades. Villages that do not have a public water supply often have difficulty attracting and retaining businesses due to the limitations of well water supplies. The WRC will support public water supply entities seeking funding for maintenance and upgrades to existing infrastructure and, where appropriate, the expansion of new public facilities to promote public health and encourage higher population densities in areas where growth is desirable.

Potable water in the region is obtained from both surface and groundwater sources. It is critical that these sources are protected from erosion and contaminants, particularly within the designated Source Protected Areas which surround each water supply site. Erosion and contamination, if not properly mitigated, may be generated by a variety of land uses and development types, including agriculture and forestry. The WRC will encourage sound erosion control and land use practices to protect water sources and will review new developments to ensure that public water supplies are protected.

There are fifteen publicly and privately owned wastewater treatment plants in the region. Many of these wastewater facilities are operating below capacity and system operators have trouble obtaining the funding needed to maintain and upgrade their infrastructure. Many villages have difficulty attracting or retaining businesses because they do not have public wastewater treatment systems due to the high cost of metering regulations associated with their installation and maintenance. The WRC will support treatment facility entities in obtaining adequate funding to meet state regulations. Where growth is appropriate, the WRC will encourage the installation of new public wastewater treatment facilities to protect public health and to support growth where higher densities are desirable.

Most of the wastewater produced in the region is treated through privately owned on-site wastewater disposal systems. It is crucial that wastewater systems function properly in order to prevent contamination of soil and water supplies. However, independently owned systems are difficult for state and local entities to regulate. The WRC will provide information to private entities encouraging them...
to properly maintain and upgrade their systems and will offer model language for creating pumping ordinances in their town plans.

Solid waste disposal services are essential to protect public health and the environment. In addition to the typical residential and commercial waste, there are numerous special wastes, such as hazardous materials, used motor oil, and septage that need to be properly separated and handled. As the region plans for its future solid waste management needs, it is important to develop strategies that reduce the quantity of waste generated and to ensure proper disposal of all materials. In 2012, the Vermont Legislature passed Act 148, mandating universal recycling and composting throughout the State, with incremental implementation through 2020. **The WRC will support reductions of solid waste, work with solid waste entities to plan for waste disposal needs, and ensure that public health and environmental quality are adequately addressed.**

Radioactive waste is classified as either low level radioactive waste (LLRW) or high level radioactive waste (HLRW). LLRW includes materials that have been exposed to neutron radiation, such as gloves and filters, while HLRW includes spent nuclear fuel, a byproduct of nuclear fission. In the Windham Region, most radioactive waste, both low level and high level, is generated at Vermont Yankee (VY) Nuclear Plant in Vernon, which is scheduled for closure in 2014. Local hospitals also contribute to LLRW generation. VY will continue to store all of its HLRW on-site until the U.S. Department of Energy secures a permanent storage facility. Radioactive waste could pose a significant threat to individuals and communities if not stored, transported, and disposed of properly. **The WRC will work with radioactive waste producing entities to encourage reductions of waste and ensure that remaining wastes are properly managed in order to protect the health of the public and the environment.**

Resilient communities are better able to withstand and recover from disasters. Two key elements of resilience are emergency planning and preparedness. Comprehensive emergency planning is achieved by mitigating potential hazards through implementation of sound land use practices and establishing emergency procedures to guide effective evacuation and response. Community experiences during and following Tropical Storm Irene in August 2011 revealed the importance of direct emergency preparedness, achieved through having the infrastructure, trained personnel, and emergency services in place to respond swiftly and effectively. **The WRC will assist towns, and emergency response and planning entities, in developing comprehensive strategies for mitigating and responding to emergencies. The WRC will work with town planning commissions to integrate hazard mitigation plans with town plans and capital improvement plans. The WRC will continue to respond to lessons-learned through Tropical Storm Irene and subsequent events and will work with towns, and state and federal agencies, to further define effective roles for the WRC in disaster planning, preparedness, response, and recovery.**

Information technology is vital to the daily operations of businesses and the modern lifestyles of individuals. Consequently, effective communications infrastructure is central to supporting future growth in the region. Many rural towns and villages, lacking the population density to attract
infrastructure investment, face considerable challenges with retaining and attracting businesses and residents. At the same time, communications infrastructure can receive public resistance due to concerns of its negative impacts to the area’s natural and scenic resources and on public health. The WRC will work with communication infrastructure entities and stakeholders to meet communications technology needs while also addressing concerns about the negative impacts to the environment, scenic resources, and public health of these technologies.

Human services and the facilities that house them are important to the health and well-being of the public. These services include care for children, the elderly, and persons with physical and mental disabilities, as well as services to support impoverished families and individuals. The Windham Region has an aging population that will increasingly need care in the coming decades. The rising cost of healthcare raises concerns regarding the financial condition of regional hospitals and healthcare facilities. Meanwhile, disparities in income are growing, increasing demands on social service agencies and their resources of food, shelter, heat, and other needs. The WRC will support human service agencies in developing appropriate and coordinated facilities and services to satisfy the needs of the community, as well as plan for the region’s future human service needs.

POLICIES

1. Maximize water conservation when planning for development through mechanisms such as low-flow fixtures, water-efficient technologies, and, where appropriate, computerized control systems in order to limit demands on public water supplies.

2. Assist towns and the Agency of Natural Resources (ANR) to develop and disseminate educational material explaining how to reduce hazardous elements and compounds that pose a risk of release to water and soil resources.

3. Support the acquisition of future public and quasi-public utility sites, properties, or interests, and assist towns with identifying these sites for future development.

PUBLIC AND PRIVATE WATER SUPPLIES

4. Develop or extend municipal water mains to only those areas where future development is appropriate, including regional centers, villages, resort centers, commercial/industrial locations as identified by town plans, or in areas where extension is required for public health purposes.

5. Review land development within existing or planned wellhead protection areas to ensure that it will not pose a threat of contamination to public water supplies.

7. Encourage testing of private water supplies for total coliform bacteria annually, and inorganic compounds and alpha radiation at five year intervals to protect public health.

**WASTEWATER TREATMENT**

8. Support environmentally sound and affordable wastewater treatment, including research regarding the viability of alternative on-site management systems such as composting toilets and gray water recycling.

9. Educate town representative and the public about the importance of adequately investing in the maintenance of existing public wastewater infrastructure and, where appropriate, the construction of new systems to protect public health.

10. Plan development so as to manage wastewater effectively and to maintain surface and groundwater quality.

11. Support development of new wastewater treatment facilities in areas where future growth is appropriate, including regional centers, villages, resort centers, commercial/industrial locations, and growth centers as identified by town plans, and in areas where extension is required for public health purposes.

12. Encourage installation of community wastewater treatment systems in villages, hamlets, and in clustered housing developments, and ensure that agreements for those facilities adequately provide for ongoing maintenance and oversight.

13. Work with municipalities to improve outreach to on-site sewage disposal system owners through provision of guidance material explaining how to properly maintain their systems. Support development of model pumping ordinance language.

14. Support programs to assist with the replacement of failed on-site sewage disposal systems.

**SOLID WASTE MANAGEMENT**

15. Support regulations that govern the safe disposal of all wastes, including hazardous wastes. Encourage all towns to support and participate in regional or state-sponsored household hazardous waste collection programs.

16. Support federal, state, and local actions that reduce the volume and toxicity of solid waste in the Windham Region, including implementation of Act 148.

17. Work with solid waste entities and towns to plan for waste disposal needs, including regulations under Act 148, through the establishment of recycling, composting, waste reduction and reuse, and general waste management programs, while addressing public health, environmental quality, and impacts on adjacent and nearby land uses.
18. Support the assessment of waste disposal fees that accurately and fairly charge disposal costs to the waste generators.

19. Work with the District Environmental Commission to satisfy waste management requirements in Act 250 land use permit applications, as appropriate.

**RADIOACTIVE WASTE**

20. Ensure the safe and effective storage, transportation, and disposal of low level radioactive waste (LLRW).

21. Work to assure that standards proposed for a LLRW storage site in Vermont are at least as stringent as those applied to any alternative site.

22. Minimize the generation of LLRW and high level radioactive waste (HLRW).

23. Support increased local and regional public involvement regarding all spent nuclear fuel permitting and licensing decisions.

**EMERGENCY PLANNING**

24. Build disaster resistant and resilient communities by promoting sound land use planning that accounts for known hazards.

25. Encourage towns and the State of Vermont to continue to improve and adopt road, bridge and culvert codes and standards.

26. Encourage towns to require that all new public and private roads and driveways are properly constructed so that they do not contribute to the damage of town roads from stormwater.

27. Support a regional effort to develop a hazard plan for each town according to FEMA guidelines that stresses disaster mitigation and post-disaster resiliency through coordinated efforts.

28. Encourage towns to adopt and implement flood and fluvial erosion hazard area regulations.

29. Encourage the development and improvement of emergency evacuation plans and local emergency operations plans.

30. Encourage the inclusion of provisions for pets and livestock in town disaster plans.

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

**EMERGENCY RESPONSE**

32. Provide timely and effective emergency services to all persons regardless of their ability to pay.
33. Provide fire hydrants or other water sources in proposed developments so that fire-fighting personnel can adequately serve all structures.

34. Design and build new roads so that emergency vehicles can readily maneuver and access all proposed structures.

35. Ensure that the additional emergency service personnel, facilities, and equipment needed to effectively service new development are available to avoid placing undue demands on existing resources.

36. Support the development and installation of an additional or improved emergency communications infrastructure, systems, and procedures.

**COMMUNICATIONS INFRASTRUCTURE**

37. Promote universal access to broadband telecommunications and information services that are competitive in availability and cost.

38. 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 to low-cost public-use computers for internet access.

39. Encourage modernization and expansion of transmission and receiving equipment at existing transmission and receiving stations, including co-location of radio communications.

40. Encourage siting, design, and access to communications towers and structures to provide quality transmission and to minimize negative impacts on natural and scenic resources.

41. Require that communications towers and structures be set back from property lines and public rights of way, such that the tower or structure will not cross the aforementioned lines or rights of way in the event of a collapse.

**HUMAN SERVICES**

42. Support the development of appropriate facilities to provide for child care, eldercare, and care for persons with disabilities in the region.

43. Assist the coordination of community service organizations to avoid duplication of effort, as is feasible and appropriate.

**Note:** Transportation is addressed in the *Windham Regional Transportation Plan* which contains the *Transportation Synopsis & Policies*. These two documents are addenda to this plan and the information and policies contained therein have the same standing as all other elements of the Windham Regional Plan, but are provided as separate documents.
APPLICATION OF THE REGIONAL PLAN

PUTTING THE REGIONAL PLAN INTO ACTION

This Windham Regional Plan provides a vision for our region's future and offers guidelines, policies, and programs that together can serve as a roadmap to guide our region’s growth and development. The plan benefits from insights gained through engagement in prior and ongoing projects with member towns, state agencies, and other organizations since the last Regional Plan was published in 2006. This chapter describes methods the Windham Regional Commission offers to implement these guidelines, policies, and programs. When implementing this plan, it is important to review how this plan fits within the context of this region, neighboring regions in Vermont, and the state as a whole. The Windham Region also borders two other states, New Hampshire and Massachusetts, which can have important implications. The WRC is increasing collaboration with its counterparts in Massachusetts and New Hampshire.

Local municipal implementation of policies and programs promoted in this plan requires consideration and coordinated action by public bodies—federal, state, and regional agencies and non-governmental organizations—while naturally and necessarily engaging town officials. All our citizens have a stake in this region's future and therefore deserve a proportionate interest in the plan’s implementation. The WRC strives to employ a traditional, cooperative approach when working with its member communities and other parties.

The WRC has two established mechanisms for Regional Plan implementation: proactive espousal of the plan’s guidelines, policies and programs, and cooperative engagement with and support of member communities and other entities, including federal and state agencies, in response to new or amended state or federal guidelines, policies or regulations.

General implementation strategies are discussed in this chapter. The plan also functions as the basic foundation for the Commission's annual Work Program. Programs identified in this plan and the implementation strategies will be reviewed each year in preparing the Work Program. Consideration should be given to identifying the highest priority needs in formulation of the document. This Regional Plan also receives regular review and maintenance so as to provide timely guidance.
WRC TECHNICAL ASSISTANCE TO TOWNS

The established municipal plans of all its member towns provide important vehicles to further Regional Plan policies. Reciprocally, the Regional Plan provides a framework to guide member towns when developing or amending their own town plans, pursuant to 24 V.S.A, § 4349a. Within the constraints of available financial resources, the WRC staff will continue to assist its member communities as guided by the Commission’s Municipal Services Policy. This policy describes the range of technical assistance offered, with priority status being given to those services which, by statute, are required of the regional planning commission in service to towns. A town may also choose to provide financial support to the WRC to support a specific town initiative.

The WRC is charged by the State to prepare and maintain Town Plan implementation guidelines that are congruent with Vermont’s overarching planning goals. The Commission’s Town Plan Review and Approval process helps ensure that all elements of renewed or amended town plans are compatible with Vermont state regulations and policies of the Regional Plan, thereby supporting congruence of local, regional, and state planning policies.

The WRC will develop strategies designed to assist member towns in defining and managing growth and development that have cumulative impacts14 as required by 24 V.S.A. § 4345a (10).

Furthermore, the WRC assists member towns with both inter- and intra-town coordination using programs and policies embedded within its Regional Plan to help towns cooperatively address regional issues.

In addition to assisting selectboards and planning commissions to renew or amend town plans, the WRC staff can help town managers, auditors, listers, road commissioners, and other municipal officials address issues or develop projects that will enhance effective local government. The WRC encourages selectboard feedback to guide its annual Work Program and other efforts to support our member towns.

WRC FUNDING AND CONSTRAINTS

This plan articulates the aspirations for future activity in the region and the WRC’s role in providing support to its towns. However, like any organization, the WRC is constrained by its financial and human resources. The WRC relies heavily upon its Commissioners to accomplish its work. It is the Commissioners who guide the policy of the WRC, including its work program and budget. Staff provide support to the Commission and implement the work program. Virtually all of the WRC’s revenue sources

14 ‘Cumulative impacts’ are discussed in greater detail in the Project Review section.
Implementation

are tied to contracts with scopes of work, guidelines and/or performance measures. The exception is the assessments we receive from towns. For example, for the 2014 fiscal year, the WRC’s total projected revenue of approximately $1.58 million dollars was derived from 76 percent regional project grant funding, 3 percent municipal project grant funding, 16 percent state performance contract funding, and 5 percent from town assessments. Of this funding, only the funding provided through town assessments did not have pre-conditions for use. This means that the WRC has limited control over how it chooses to use the vast majority of its funding. Funding received through town assessments is particularly important as that revenue source provides us with the greatest latitude to respond to WRC-identified needs in the region. Town assessments, and the funding received through the WRC’s performance contract with the state, are also necessary to provide matching funds required by grantors. The grants that the WRC receives enable work with member towns on areas such as transportation, emergency planning, community development, brownfields redevelopment, energy, and natural resources. Revenue from virtually all federal and state grantors requires matching funds, and typically non-federal matching funds. Required match ranges from 10 percent (Transportation Planning Initiative) to 50 percent (Emergency Management Planning Grant).

REGIONAL ISSUES AND PROJECTS

GENERAL

Throughout the term of this Regional Plan, the Commission will continue to work with its member towns on both current and future municipal projects as well as overarching regional issues. In addition, it may sponsor programs that address region-wide issues, targeting outcomes that further the goals and policies of its Regional Plan, while concurrently fulfilling the collective needs of its member towns. Other regional work that implements the plan, not presently anticipated, will also be undertaken. In addressing any such broad regional issues, state agencies, community organizations, or private sector entities may become engaged.

LAND USE AND DEVELOPMENT PLANNING

The Commission will continue to assist its member towns in employing regulatory and non-regulatory tools that direct growth to regional centers, villages, industrial/commercial centers, and other appropriate areas where growth is encouraged. The WRC will work on developing water and wastewater infrastructure assessments and real estate analyses, as resources permit, to identify regional needs and barriers to growth in appropriate areas. The WRC will develop a comprehensive Open Space Plan for the Windham Region.

ENERGY

The Commission will work with the State, member towns, and other entities to increase and address issues concerning the stability, affordability, and reliability of energy through support of regulatory and non-regulatory tools that support energy programs, educational resources, and appropriate siting and development of energy facilities.
RESILIENCY PLANNING

The WRC will work with the State, member towns, and other regional commissions to more fully integrate emergency, land use, mitigation, and capital improvement planning. Such planning will emphasize mitigation efforts that result in avoidance of new development that poses risks to public health, safety and welfare, and that improves the safety and resiliency of at risk development that already exists.

WATER QUALITY

Water quality and watershed-based planning have become increasingly important in regional planning throughout Vermont, and regulations being developed to improve water quality in the Lake Champlain Watershed, as well as Long Island Sound, will affect Windham Region municipalities. As appropriate, the Commission will adjust future programs to maintain a focus on watershed planning and regulatory and non-regulatory implementation, and will cooperate with communities, local watershed groups, state and federal agencies and others to maximize water quality for our member towns.

ECONOMIC DEVELOPMENT

To improve the economic health of the region, the Commission will collaborate with state, regional, and local entities to support skills training programs, creation of an entrepreneurial environment, and appropriate commercial and industrial development, particularly that which capitalizes on the region’s existing assets. The WRC will assist the Brattleboro Development Credit Corporation in the implementation of the Comprehensive Economic Development Strategy (CEDS). As the region adapts to a post-Vermont Yankee Nuclear Plant future, the WRC will work with the State and other entities to mitigate the economic and social impacts of the Plant’s closure.

HOUSING AND COMMUNITY DEVELOPMENT

Over the next several years, in conjunction with state, private development and financial interests, and community non-profit groups, the Commission will sponsor or support regional housing and community development projects. Such projects may include natural resource-based business development, existing business assistance, tourism planning, new housing and housing rehabilitation projects, with support from Vermont’s Community Development Program and other state agencies with housing-related responsibilities. As resources allow, the WRC will develop a village water and wastewater needs assessment, a wastewater feasibility plan, and a real estate market analysis. The WRC will also continue to use its brownfields program to assist with community development projects as resources permit.

LAND CONSERVATION

In concert with the State, Land Trusts and other organizations, as well as its member towns, the Commission will endeavor to preserve recreational areas, scenic resources, farmlands, productive forests, critical riparian areas, and important wildlife habitat which together imbue our region and its
Implementation

communities with their distinctive rural character. Towns are encouraged to identify these areas and include conservation area maps in their town plans. Cooperative intra-community projects could focus on land that each town plan designates worthy of conservation, while inter-community projects might include protection of regional farmland, implementation of the Molly Stark, Scenic VT 100, and Connecticut River Byways, preservation of continuous wildlife corridors, and connection between conserved habitat blocks. The means to attain these objectives might include establishing local partnerships and land trusts, including land purchases and easements for conservation, recreation, and scenic preservation.

INFORMATION AND TRAINING

Historically, promotion and expansion of its information and training programs has proven especially effective in fostering the Commission’s Regional Plan. WRC’s Resource Center, monthly newsletters, sponsored public forums, and workshops together inform citizens and town officials of current and emerging issues and of opportunities to engage in WRC-sponsored programs to better understand and address them. The WRC maintains a website (www.windhamregional.org) which serves as a forum for distributing news and information and providing access to Town Plans and maps. Such efforts have increased participation of citizens and town officials in WRC programs that benefit their individual communities, and ultimately, the region overall. The Commission maintains a Geographic Information System (GIS) Service Center to offer data and mapping analysis to support our member towns, our own programs, and other projects. To ensure that data offered to its member towns is both accurate and current, the staff at our Center communicates and coordinates with corresponding state agencies, and with other Regional Commissions having corresponding GIS technology.

PLANNING COORDINATION

The following guidelines govern the Windham Regional Commission in its planning endeavors:

The WRC will participate in reviews of state agency plans if and as requested by member towns, WRC committees or staff, and state agencies, giving particular attention to their compatibility with this plan and the approved town plans of member towns.

1. Under Title 30, § 248, it will participate in state review processes, such as Public Service Board hearings, focusing primarily on the policies of the Regional Plan and the approved town plans of our member communities.

2. As resources allow, the Commission will review federal projects and participate in environmental impact assessments under the National Environmental Policy Act. It will assess short- and long-term effects of federally-supported public investment projects on the regional economics, settlement patterns, human and natural resources and public facilities and utilities. It will determine compatibility of these federal projects with both the Regional Plan and the approved town plans of affected member communities.
3. The WRC will work for an effective state public investment planning and review process that provides meaningful participation in the review of state projects and the review of development activities supported by state funds.

4. The WRC will continue its Public Policy and Legislative Committee to address legislation and other important public policy issues. At the start of each year, this committee will identify regionally important public policy issues for review and discussion with participating legislators. Selectboard members are encouraged to actively participate in regionally important issues and Public Policy and Legislative Committee meetings.

5. The WRC endorses and will support coordination of periodic gatherings of member town selectboards and offers to sponsor similar meetings of our member town planning commissioners, treasurers, town clerks, listers, etc.

6. The WRC supports the Act 250 development review process by:
   a. Coordinating state agency Act 250 application reviews involving issues relevant to WRC and its member towns.
   b. Working with the District Environmental Commission to ensure that applications completely address all criteria including town and Regional Plan conformity. When all criteria have been addressed, development review should occur in a timely and efficient fashion without protracted reviews.
   c. Working with towns and other regional planning commissions to propose and review new legislation that would improve permit processes, increase permitting consistency and timeliness, and encourage appropriate development in designated growth centers.
   d. Working with developers to ensure that development projects comport with the vision and intent articulated in this plan and those of municipalities.

7. The WRC will assist member communities seeking regional approval of town plans through its peer review process.

DEVELOPMENT REVIEW

GENERAL

Town and regional plans include provisions that address major projects, new development and land development issues. Usually, as one of the criteria for the issuance of a permit decision, proposed developments must conform to town and regional plans. In the process of development review, the WRC will assist decision-makers regarding regional issues addressed in this plan.
The State of Vermont and various federal agencies have a number of proceedings where town plans and the Regional Plan are used in making land use and resource decisions. State law provides that regional plans are relevant to permit applications as provided below (24 V.S.A. § 4348):

“(1) The provisions of the Regional Plan shall be given effect to the extent that they are not in conflict with the provisions of a duly adopted municipal plan;

(2) To the extent that such a conflict exists, the Regional Plan shall be given effect if it is demonstrated that the project under consideration in the proceedings would have a substantial regional impact.”

DEVELOPMENT REVIEW GUIDELINES

The WRC will conduct its development review process in accordance with the following guidelines:

1. The Commission will review projects of regional importance, giving consideration to provisions of town and regional plans. Aided by a checklist, the Commission maintains a systematic, equitable approach to determine projects of regional importance. Such projects include those that require regional resources, services, or facilities, as well as projects that, because of their size, location, or type, will benefit the region as a whole, be necessary to the well-being of the region, be responsible for impacts to regional resources, services, or facilities, affect more than one town, or have cumulative regional impacts as the result of multiple projects or ongoing development. Other regionally important projects include those that affect the region despite being located outside its borders and those that cause ongoing concern to the region or its communities.

2. Upon request, the WRC will assist towns in determining whether to provide local permits for projects having regional implications.

ROLE OF THE WRC PROJECT REVIEW COMMITTEE

1. The Commission’s Project Review Committee, composed of a core group of commissioners, will seek assistance from the commissioners representing the town in which the project is proposed and other involved towns. A Project Review is undertaken when a proposal is thought to have regional importance, or could be precedent-setting or might generate cumulative regional impacts. Some proposed projects may be directed to the committee for review by WRC staff or accepted for review at the request of a member town.

2. A primary focus of the review will be to consider the provisions of town plans and the Regional Plan. The committee will identify information needs, issues and areas of non-conformance with the Regional Plan and town plans as necessary.

3. The committee will also consider the cumulative impacts that may occur. The WRC may initiate cumulative impact review by requesting, coordinating and reviewing cumulative impact studies. The scope of each cumulative impact study 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 should be borne by the applicant.

4. During an evaluation, should the Project Review Committee discover a significant conflict between town and regional plans, the Commission will then work with town officials to resolve or minimize the incongruity. If a conflict between a town’s plan and the regional plans cannot be resolved, then the town plan shall prevail, except as provided below. Should the Review Committee discover a conflict between provisions of the applicable town plan and the Regional Plan with respect to the development under consideration, then it shall, with the assistance of WRC staff, prepare a Substantial Regional Impact report that addresses the following:

   a. Is the alleged conflict both clear and distinct? Is the conflict significant? What elements of the proposal appear to conflict with the provisions of one or more applicable plan(s)? Do the provisions of the applicable plan(s) specifically and clearly address the conflicting element(s) of the proposal?

   b. If permitted to proceed under the auspices of one plan, would this process have a significant detrimental impact on the relevance or application of those applicable provisions in the conflicting plan?

   c. Would the issues upon which the associated plans appear to conflict have significant negative or positive effects on more than one town? Would the issues have significant negative or positive effects upon regionally important resources, facilities, infrastructure, services, or other factors?

   d. Have reasonable efforts been exhausted to resolve the conflicting issues, such as, but not limited to, amendment of the development proposal?

   e. Will the development proposal, if constructed, cause the implementation of one plan to significantly reduce the desired effect of the implementation of the other plan?

   f. What other factors or information, if any, does the committee deem relevant to determine if a “substantial regional impact” exists?

The WRC shall review the Project Review Committee’s report, with interim action taken by the Executive Board if necessary (as provided by Article VI.H.3 in WRC Bylaws); the report may be amended. Thereafter, the Board or Commission shall vote to determine whether or not the provisions of the Regional Plan, conflicting with those of the town plan, shall be given precedence. The outcome of this vote, a copy of the Project Review Committee’s report, and any amendments shall be transmitted to the regulatory body conducting the review and to the town involved.

The committee’s report, and the result of the Executive Board’s or Commission’s voting shall provide the basis for determining whether "substantial regional impact” exists as required by 24 V.S.A., § 4345a (17), and shall be given "due consideration, where relevant, in state regulatory proceedings" as provided therein.
2014 Windham Regional Plan

Existing Land Use/Land Cover

- Regional center
- Village
- Hamlet
- Resort center

Note: This map should be used for general reference and planning purposes only.

Sources (refer to appendix): 18, 45; also 1, 3, 45.

March 2014; u:\gis\RegionalPlan2014\LandCov_8x11.mxd

139 Main St    Suite 505    Brattleboro, VT 05301
(802) 257-4547    www.windhamregional.org
Regional Development Pattern

This map attempts to show the pattern of development across the Region by displaying structures, roads, and railroads. While features other than the structures and roads displayed here can constitute development, defining these other feature and then mapping them would be difficult. By showing roads and structures, the map, taken in a regional context, should give the viewer a general idea of where in the Windham Region the majority of human activity and land modifications are located.

Note: This map should be used for general reference and planning purposes only.
Sources (see appendix): 17, also 1, 2, 3
2014 Windham Regional Plan

Public and Conserved Lands

- Publicly-owned land:
  - Federal
  - State
  - Town

- Land owned by a conservation organization
- Privately-owned land with a conservation easement

Note: This map should be used for general reference and planning purposes only.

Sources (see appendix): 21, also 1, 2, 3

March 2014; u:\GIS\RegionalPlan2014\PubCons.mxd
Note: This map should be used for general reference and planning purposes only.

Sources (refer to appendix): 38, 46; also 1, 2, 3.
2014 Windham Regional Plan

Note: This map should be used for general reference and planning purposes only.
Sources (see appendix): 37, also 1, 2, 3

Miles

March 2014; u:\GIS\RegionalPlan2014\Basins_watersheds.mxd

WINDHAM REGIONAL COMMISSION
139 Main St, Suite 505, Brattleboro, VT 05301
(802) 257-4547 www.windhamregional.org
Note: This map should be used for general reference and planning purposes only. On-site investigation is required to verify the existence of these soil classes.

Sources (see appendix): 22, 23, 24, 25, 26, also 1, 3, 45.

Note:
- Waste management zones and Special Flood Hazard Areas have been enlarged slightly to improve visibility.
Impaired waters as shown on this map are those that are listed in the State of Vermont Year 2012 List of Waters in the 303(d) list, or in Parts B or D.
Black bear travel corridors, according to Forrest Hammond, biologist with the Vermont Department of Fish and Wildlife, are forested habitats that are regionally important and are used by large numbers of bears to access critical seasonal foods or to link bear ranges and sub-populations. Travel corridors are comprised of bear travel routes and may include one or more road crossing areas.
2014 Windham Regional Plan

Steep Slopes

Note: This map should be used for general reference and planning purposes only.

Sources (see appendix): 36, also 1, 2, 3

March 2014; u:\GIS\RegionalPlan2014\Slopes.mxd

March 2014; u:\GIS\RegionalPlan2014\Slopes.mxd

March 2014; u:\GIS\RegionalPlan2014\Slopes.mxd

Note: This map should be used for general reference and planning purposes only.

Sources (see appendix): 36, also 1, 2, 3
Important Farmland Soils

The soils shown on this map have been given an important farmland rating of "prime" or "statewide" by the USDA Soil Conservation Service (now the Natural Resource Conservation Service). Such soils may qualify as "Primary Agricultural Soils" as defined by Vermont's Land Use and Development Law, Act 250.

Note: This map should be used for general reference and planning purposes only. On-site investigation is required to verify the existence of these soil classes.

Sources (see appendix): 4, also 1, 2, 3
Note: This map should be used for general reference and planning purposes only. On-site investigation is required to verify the existence of these soil classes.
Sources (see appendix): 5, also 1, 2, 3

March 2014; u:\GIS\RegionalPlan2014\SandAndGravel.mxd
Utilities

Electric utility franchise area:
- Village of Jacksonville Electric Dept
- Green Mountain Power

Groundwater source protection area
Surface water source protection area
Public water supply source

- Closed landfill
- Transfer station
- Electric transmission line
- Boundary of 10-mile Emergency Planning Zone

Electric generation facility:
- Nuclear
- Hydro
- Methane
- Wind

Municipal sewer system
Municipal sewer and water system

Note: This map should be used for general reference and planning purposes only.

Sources (see appendix): 6, 7, 8, 9, 10, 11, 12, 13, 14, also 1, 2, 3

March 2014; u:\GIS\RegionalPlan2014\Utilities.mxd

Utilities

2014 Windham Regional Plan

WINDHAM REGIONAL COMMISSION

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Village of Jacksonville Electric Dept
Green Mountain Power

Groundwater source protection area
Surface water source protection area
Public water supply source

- Closed landfill
- Transfer station
- Electric transmission line
- Boundary of 10-mile Emergency Planning Zone

Electric generation facility:
- Nuclear
- Hydro
- Methane
- Wind

Municipal sewer system
Municipal sewer and water system

Utilities

2014 Windham Regional Plan

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Village of Jacksonville Electric Dept
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Groundwater source protection area
Surface water source protection area
Public water supply source

- Closed landfill
- Transfer station
- Electric transmission line
- Boundary of 10-mile Emergency Planning Zone

Electric generation facility:
- Nuclear
- Hydro
- Methane
- Wind

Municipal sewer system
Municipal sewer and water system

Utilities
Note: This map should be used for general reference and planning purposes only.

Sources (see appendix): 19, 20, also 1, 2, 3
Health and Social Service Facilities

- Teen center
- Adult day center
- Senior center
- Health care facility
- Facility for care of aged or disabled, level 1 or 2
- Facility for care of aged or disabled, level 3 or 4
- Child care center

The facilities on this map may not be positioned at their actual location. For clarity, symbols have been moved slightly. All known facilities, however, are represented on this map and shown within one mile of their actual location.

Note: This map should be used for general reference and planning purposes only. On-site investigation is required to verify the existence of these soil classes.

Sources (see appendix): 40, 41, 42, 43, also 1, 2, 3

March 2014; u:\GIS\RegionalPlan2014\Agsoils.mxd
Historic Districts

Note: This map should be used for general reference and planning purposes only.
Sources (see appendix): 44, also 1, 2, 3
Note: This map should be used for general reference and planning purposes only.

Sources (see appendix): 39, also 1, 2, 3

- This shows the location of basic governmental services. Buildings that support these services include fire and police stations, highway garages, and town offices. Several services shown on this map may originate from the same building.
- The facilities on this map may not be positioned at their actual location. For clarity, symbols have been moved slightly. All known facilities, however, are represented on this map and shown within one mile of their actual location.
Existing Transportation Network

This map displays the major features of the transportation network of the Windham Region. The proximity and connection between these features is represented, but the true locations are approximate. Features and locations outside the Region are not exactly located and simply shown to illustrate their connection to features within the region.
Future Transportation Network

This map displays the major features of the transportation network of the Windham Region. The proximity and connection between these features is represented, but the true locations are approximate. Features and locations outside the Region are not exactly located and simply shown to illustrate their connection to features within the region.
CHAPTER 1

WINDHAM REGION PROFILE

This chapter provides snapshots of where the region has been and where it is now. In addition to providing a geographic and historical portrait, this chapter contains an insert profile depicting trends in the Windham Region in topic areas of population, economy, housing, and transportation. Trend analysis plays an important role in the planning process as it points to patterns of change and areas that need particular attention in the future. As such, this chapter provides some of the framework for decisions that will guide the future. Other chapters in the plan contain data that are more specific to the topic discussed, but data in this chapter is meant to be a regional overview.

GEOGRAPHY

Situated in Vermont’s southeastern corner, the Windham Region consists of 23 towns in Windham County, the neighboring towns of Readsboro, Searsburg, and Winhall in Bennington County, and Weston in Windsor County. The region is bordered by Massachusetts to the south and New Hampshire to the east. At over 920 square miles (590,000 acres), the region accounts for roughly 9.6% of the State’s total land area. The Windham Region has several distinctive identities, largely defined by the diverse natural environment.

The present day Connecticut River Valley, characterized by relatively flat or gently rolling land, is a result of the immense glacial forces of previous eras. These glacial processes left boulders and scraped and scarred bedrock ledges, leaving behind deposits of clay, sand, and gravel. This process also included the formation of Lake Hitchcock, an extensive and valley-filling water body that contributed to the fertile agricultural soils now present in the region. In more recent times, the Connecticut River and its tributaries have been instrumental in shaping the valley’s settlement pattern of villages and towns separated by fields and forests.

The Green Mountains are the principal element of physical geography in the western part of the region with Stratton Mountain (at 3,936 feet) being the highest point in the region. The high elevation of this land area gives rise to headwaters that flow into narrow valleys to join the larger tributaries. This part of the region, with its higher elevations, generally receives more precipitation and experiences lower temperatures. As a result of this the main concentration of historic regional development is along valley corridors with outlying areas mainly consisting of large woodland areas on high rising land. This topography also led to the development of ski areas and tourist resorts. In the northern and extreme western parts of the region, agriculture has not been a major activity because of bedrock ledges, steep
slopes, and thin and stony soils. However, large expanses of forested land have led to forest-based industries.

In addition to the Connecticut River, the other major rivers in the region are the Deerfield, Green, North, Saxtons, West, and Williams rivers, all of which are tributaries of the Connecticut. There are two major flood control reservoirs on the West River, the Ball Mountain and Townshend Dams. Somerset and Harriman are two major water storage reservoirs for hydropower generation on the Deerfield River.

Several significant transportation routes provide access to the Windham Region. There are two active rail lines in the region. The New England Central Railway line parallels the Connecticut River, and the Green Mountain Railroad connects Bellows Falls to Rutland. Interstate 91 and Route 5 traverse north/south in the Connecticut River Valley. Route 100 runs north/south through the Green Mountains near the western edge of the region. Route 9 provides east/west access from Brattleboro to Bennington and between New Hampshire and New York. Route 30 runs north and west from Brattleboro through the West River Valley towns of Dummerston, Newfane, Townshend, Jamaica, and Winhall.

HISTORY

The region’s history has helped shape today’s cultural landscape. Ancient carvings, stonewalls, cellar holes, railroad beds, abandoned quarries, buildings, and barns are all a part of the region’s heritage.

NATIVE AMERICANS

Archaeological evidence has confirmed the early presence of Native Americans in the Windham Region, from whom present day Abenaki claim descent. The Abenaki depended on seasonal hunting, fishing, gathering, and some agriculture. Lowland settlement sites located in the floodplains of rivers, particularly at the confluence of rivers, were useful for growing crops and accessing the water for fishing and transportation. With the coming of European settlement, conflict and disease had devastating effects on the native population and their culture nearly disappeared.

EUROPEAN SETTLEMENT

Early European settlers came to a heavily timbered region with abundant wildlife, a land of pure wilderness compared to their former homes. Early forestry focused on efforts to clear the land for homesteads and agricultural use. Harvested trees were used primarily for building and fuel; secondary uses were manufacture of potash, tannin, and other commodities. By the late 1700’s, timber industries made important contributions to the region’s economy from both domestic and international sales.

15 Historical Society of Windham County.
SETTLEMENT PATTERNS

Physical limitations have played a dominant role in the region's development pattern. European settlement first occurred in the Connecticut River Valley where water, rich soil, and access to a natural transportation routes were available. Towns and villages evolved at the confluences of streams, as exemplified by Brattleboro and Bellows Falls in the Connecticut River Valley, and Wilmington and Jamaica in the region's interior.

A linear pattern of development was the natural response to the river and stream valleys as was the establishment of a road system along those streams, linking village nodes in each major valley. These roads encouraged a land use pattern of mixed residential and commercial uses radiating from villages. The resulting pattern, readily apparent today, is one of small villages located in stream valleys with expansion along connecting roads.

AGRICULTURE

During the first half of the 19th century agriculture shifted from subsistence farming to market-based production. In the early 1800’s, Vermont became a world leader in wool production with prized Merino sheep imported from Spain. The Town of Westminster was one center for wool production in Vermont and during the height of wool production, many carding, spinning, and weaving mills were established in small towns. The Vermont sheep industry peaked in 1840 and declined dramatically after the Civil War, when demand for wool declined and global competition arrived in the form of wool from Australia and New Zealand. Eventually, dairy farming replaced sheep operations as the dominant form of agriculture.

POPULATION CHANGES

In the mid 1800's, Vermonter’s began to move around. Many hill farms were abandoned by their owners after years of clearing, grazing, and cultivating took their toll on the thin soils and steep slopes. Some people moved west, heading for more fertile land, encouraged by the opening of the Erie Canal in 1825, the California gold rush in 1849 and the Homestead Act of 1862. Other hill farmers moved to larger, nearby towns for jobs in growing industries. In the smaller villages, businesses that relied on hill farmers subsequently failed, and in some cases the villages themselves were abandoned. The Civil War also contributed to Vermont’s population decline, as soldiers who had seen more fertile lands in the Ohio Valley and other areas emigrated after the war. While the period of 1790 to 1830 had seen significant growth within the region, that growth then leveled off for more than a hundred years until the around the 1950s when resort development in the region led to a boom in population growth through the 2000 Census. During the time period between 1850 and 1930, 77% of the region’s towns saw steady declines in population. The only towns to see relatively steady growth during this time period were Brattleboro, Rockingham, and Readsboro.
MANUFACTURING AND OTHER INDUSTRIES

The region’s plentiful rivers and streams provided power for woolen mills, paper mills, and other industries as well as transportation. Log drives occurred on the larger rivers until early in the twentieth century. Roads and railroads, themselves an important industry for the region, utilized river corridors and included routes along the Connecticut, West, and Deerfield Rivers. Railroads played an important role in shaping the region and encouraging the development of Brattleboro and Bellows Falls as regional centers. The railroads carried freight and passengers, bringing more people to the region and facilitating commerce with Boston, New York and points south and west.

BRATTLEBORO AND BELLOWS FALLS

Prior to the arrival of the railroads to Vermont in the mid-nineteenth century, commerce largely depended on Vermont’s waterway transportation on rivers and canals. Bellows Falls was the site of the first canal in the State to initiate construction. Roads at the time tended to be marginally passable, or worse. Brattleboro and Bellows Falls benefited significantly as a result of the railroad expansion into Vermont between 1848 and 1870. At the same time, population of the outlying towns withered, especially in the hills. Brattleboro hosted a range of industries, including organ manufacturers, an iron foundry, a hospital, print shops, and a cigar factory. Bellows Falls also was an industrial center that included paper mills, a farm machinery company, lumber mills and marble works. The industries in both towns provided jobs and appealed to many who left farms to work in factories. In the latter part of the twentieth century, the development of Interstate 91, as part of an extensive national highway system, allowed Brattleboro and Bellows Falls to emerge as major warehousing and trucking centers.

TOURISM

In the late 1800’s, tourists were attracted to the Windham Region for its heritage, natural beauty, and recreational activities. In the 1950’s, the ski industry began to play a significant tourism role as alpine skiing and accommodations brought increasing numbers of skiers and visitors during the winter months. The development of the Interstate Highway System in the 1960s began a new era characterized by easy and convenient access to the region from large metropolitan areas, resulting in explosive growth in vacation homes and related facilities. In the 1980s and 1990s, the region’s ski resorts focused on expansion and development of other winter recreation such as snowmobiling, as well as activities such as golf and mountain biking to attract visitors year-round. Agri-tourism activities that bring the farm experience to visitors (such as bed and breakfasts, educational farm tours, and hay and sleigh rides) have become important components of tourism in the region.
WINDHAM REGION PROFILE

The following pages provide a summarized profile of the status and trends on a range of characteristics of the region. The profile contains a wealth of information regarding the Windham Region's population, economy, housing, and transportation indicators. The information is gathered from the most current available data from the U.S. Census Bureau and other agencies. References for all information can be found at the end of the profile insert.

An important note on the data cited in this plan: The most extensive and reliable source for a large portion of the data relevant to planning comes, directly or by reference, from U.S. Census Bureau. Complete data surveys are performed on a ten-year cycle. The Regional Plan is updated on an eight-year cycle. At the time of writing, the most recent full census was collected in 2010. The Census Bureau’s Population Estimates Program does issue annual estimated updates of selected data, and since the 2000 census has initiated the American Community Survey (ACS), which provides annual, three year, and five year estimates. These two programs use different methods to arrive at their figures. The Bureau’s estimating program uses housing unit information, birth and death records, and other information. The ACS program uses a sampling method employing the same survey questions as those used in the full census. These methods should be kept in mind when analyzing the source of the data as presented. All ACS data is a general estimate of the existing circumstances, and margins of error should be referenced when this data is used in further analysis. Additionally, in many cases town level data is not collected for certain characteristics. When this is the case, this plan references county or state level data, as it is more readily available.
Population Growth

The population of the 27 communities that make up the Windham Region, as reported by the 2010 US Census, totals 46,720 (Figure 2-1). Since 1950, the Windham Region has experienced uninterrupted population growth (see Figure 2-1A). The greatest population growth occurred from 1980 to 1990 with a 12.5% increase in population. The statewide growth during that same time period was 10%. From 1950 to 2000, the average ten year growth in population was 7.9%. However, the most recent decade has seen a substantial decrease in the rate of population growth. The decade from 2000 to 2010 saw only a 0.6% increase in population for the Region. No decade in the last seventy years had seen such a low rate of growth.
Table 2-1 shows the town, village, and census designated place (CDP) population changes that have occurred in the Region from 1960-2010. Towns and villages highlighted in green have shown the greatest percentage increase in population over the last fifty years, while ones highlighted in yellow have seen the smallest percentages in population change. Stratton and Brookline have seen both large population increases over the last fifty years and over the last decade. Somerset and Weston have seen the smallest population change over the last fifty years and over the last decade. Of particular note is the relatively small population growth in all of the villages and CDPs located within the Region, in spite of strong goals and policies to direct growth to villages and downtowns.
Figure 2-2 better illustrates the context of the data presented in the previous table. From 2000 to 2010, the towns that experienced significant growth in the Region were Stratton (58.82%), Athens (30.00%), and Windham (27.74%). Searsburg (13.54%), Brookline (13.49%), and Marlboro (10.22%) followed with moderate growth rates for the decade. The majority of the towns in the interior of the Region saw some growth to some loss. Clearly evident from this graphic is the relatively little change in population for towns along the Connecticut River Valley. Towns with moderate losses over the last decade were Dover (-20.28%), Wilmington (-15.69%), and Weston (-10.16%). While the town of Somerset did have a significant percentage loss of population (-40.00%), the entire population of the town is only three people. As such, the town of Somerset was not categorized in the graphic to the right because of the misleading nature of this characterization. In actuality, the town’s population only changed by a loss of two individuals.

In summary, what this figure shows is that the population numbers are relatively stable in the historically industrial towns along the Connecticut River Valley. The Deerfield Valley towns of Wilmington and Dover saw moderate losses in population, and this pattern mirrors that found in other Vermont ski towns such as Ludlow and Killington. Many of our more rural towns saw population growth, with the highest rates being in the towns with some of the smallest population numbers: Stratton, Athens, Windham and Brookline. Also significant is that while Stratton does have a development hub with the Stratton Mountain Ski resort, the towns of Athens, Windham, and Brookline lack dense village or downtown districts, and thus growth in these towns continues to signify lack of development in areas of traditional development centers.
Figures 2-3 and 2-4 illustrate this major trend in population shift throughout the Region. The percentage of the total population of the Region located within the two major population centers of the Region, Brattleboro and Rockingham, has dropped significantly from 1950 to 2010. Over the same time period, the total percentage of the population found in all other towns throughout the Region has increased, except for the towns of Readsboro and Somerset. This trend can be seen even more clearly in Figure 2-4, which shows the average population change over the last thirty years in all of the regional towns, villages and census designated places. All of the major population centers, also known as the villages and census designated places, have seen decreases in population except for Newfane Village. This trend has a significant impact on land uses of these towns.
Age Characteristics

In 2010, about 19.8% of the population was under the age of 18. The working age population, those aged 18 to 64, accounted for 63.7% of the population, and about 16.5% were senior citizens age 65 years and older. Figure 2-5 shows the age distribution in the Windham Region in 1990, 2000, and 2010. In 2010, there is a significant dip in the population of residents ages 20 to 40 years old. The previous plan surmised that this trend indicates that a substantial proportion of young adults leave the area, to attend college or for other reasons, after completing high school. In 2010, only about 8% of the population was between the ages of 18 to 24.
As seen in the charts on the previous page, and in Figure 2-6 below, the overall population of the Region is aging. The population age groups from 0 to 44 years have all seen reductions in population over the last twenty years, while the age groups 45 years and older have seen increases. The fastest growing age groups since 2000 are 55 to 59 and 60 to 64, which continues the trend seen in the previous Plan. The aging of the resident population and in-migration are contributing to the increases in these age groups. By contrast, the number of people aged 35 to 44 experienced a 30.5% decrease.

Overall, the following observations can be made from the data:

- There has been a significant increase in the population of those people approaching retirement age. At the same time, the age groups entering the working population (late teens and early twenties) are small and the population of people in the childbearing ages has generally decreased. This trend has not changed since the previous plan.

- There is a significant dip in the working age population from ages 20 to 40 within the Region.

- Since the 1990’s, there has been a continual decline in the number of school-aged children.

Figure 2-6 shows a comparison of percentage of the population over 65 in Windham Region towns and in the surrounding towns in Vermont, New Hampshire, and Massachusetts. While the Region is aging, Windham Region towns overall have a lower percentage of population over 65 than do adjacent towns in Bennington and Southern Windsor Counties. The mountain towns above Manchester (Weston, Andover, Landgrove, Peru, and Winhall), have some of the highest rates in the State.

However, when the Windham Region is compared with towns in New Hampshire and Massachusetts, the Region appears to have a comparatively higher percentage of individuals 65 and over than the regions to the east and south. This information is important note as the Region looks to attract working-age populations to the area.
Household Populations

In the year 2010, there were 20,275 households in the Windham Region. The average household size in Windham County was 2.23 persons. This compares to 19,329 households in the region in 2000 with an average household size of 2.35 persons in Windham County.

As categorized by the 2010 Census, 59.5% of the total households in the Region were considered family households and 40.5% were non-family households. Of the subdivisions of these two classifications, the most common type of household in the Windham Region was householder living alone, non-family households (31.73%) and husband-wife family households without children (30.29%). As of the 2010 Census, there were more than twice as many households with a female householder and no husband present than male households with no wife present. There were also more than twice as many single-parent female households with children than single-parent male households with children.

Between 2000 and 2010, the number of one person households increased at a rate of 13.33%, much faster than the 4.89% growth in the overall number of households, but slower than the rate of increase in the previous decade. Husband and wife family households with children saw the greatest decline of all divisions with a 25.16% decrease in total households. Households where the householder was 65 years or older saw the greatest increase of the subdivisions (17.07%), which is in keeping with the aging trend of the Region. Changes in composition for other categories of households can be seen in Figure 2-7 on the next page.
Economic Characteristics

Income

Figure 2-9 summarizes changes in Windham County’s median household, median family and per capita incomes between 1979 and 2009. Over time, inflation changes the value of income in real terms. Therefore, the 1979-1999 incomes have been adjusted to 2009 levels to provide for a more revealing comparison. Between 1979 and 1999, there was a slight increasing trend in all three indicators for Windham County income levels. The per capita income continued to increase at about the same rate from 1999 to 2009. However, from 1999 to 2009 median household income increased by more than $10,000, adjusted for 2009 rates. This appears to be a significant rise from previous trends, and is most likely a result of the correspondingly high median incomes of the town of Stratton for 2009 (see Figure 2-10). It should be noted at this point that these are county indicators, and a review of town level data indicates that this increase would not be as dramatic if the entire Region were factored into the median household income indicator. Median family incomes saw a slight decrease in 2009 from 1999 levels, which altered the trend of previous decades. The divergence of the median household and median family income trends may be a result of the ever increasing non-family households in the Region, and correspondingly decreasing family incomes.

When comparing County and State income indicators, Figure 2-10, the Windham County indicators varied in their position comparatively for all indicators in 2009. It should be noted that the divergent trends of median household and family incomes are reinforced in this comparison, with Windham County median household incomes being higher than the State’s median household income and the county’s median family income being lower than the state’s median. The next page breaks down the income indicators by town for a deeper analysis.
FIGURE 2-10: MEDIAN INCOME OF THE COUNTY AND STATE, 2009 (VT HOUSING DATA)
Eleven of the region’s twenty-seven towns had a median household income that exceeded the state’s median. Some of those towns, Stratton and Winhall, are located in the ski resort areas where there has been tremendous growth in population, mostly due to in-migration. Other towns, such as Vernon, Westminster, Newfane, Guilford, and Dummerston, are located close to Brattleboro, the largest town in the region, and as such are a short commute to a business and job center. Interestingly, Stratton has by far the highest median household and family incomes of the towns in the region, but is surpassed in median per capita income by Grafton, Halifax, Weston, and Winhall.

Town based poverty indicators, as shown in Figure 2-12, provide additional information regarding the wide variation in income and poverty at the local level. Figure 2-12 shows how the percent of individuals below the poverty level has either increased or decreased from 1999 to 2009. The towns of Marlboro and Readsboro have seen significant increases in the percent of their populations below the poverty line. Conversely, Halifax and Wilmington have seen decreases in the number of individuals in their towns below the poverty line. It should be noted here that this indicator is a five-year estimate, and that the margins of error for these estimates are large. As such, results should be continuously monitored, year to year.
Congress created the NMTC program in 2000 to spur investment of private capital for economic development in both rural and urban low-income communities. Individuals and corporations receive a tax credit against federal income taxes for making investments in certain low income properties or businesses when those investments are made through a “community development entity” (CDE).

In 2000 only one census tract in the Windham Region was considered New Market Tax Credit eligible (Brattleboro). On May 1, 2012, the U.S. Department of Treasury released updated NMTC program eligibility based on the 2006-2010 American Community Survey (ACS). Based on this information the Windham Region now has five (5) eligible census tracts.

New Market Tax Credit projects tend to be larger in scope than the typical community development project. For example, the first NMTC project in the Windham Region was Commonwealth Yogurt in Brattleboro. The Brooks House project, downtown Brattleboro, has recently been deemed eligible for NMTC.
Labor Force

The Region’s labor force experienced a significant decrease from 2000 to 2010, similar to labor decreases across the country as a result of the “Great Recession” that began in 2008. The labor force shrank by 5.3% from 2000 to 2010, losing 1,369 people. This more than halved the increase from 1990 to 2000, and put the 2010 labor force at only 661 people larger than the 1990 labor force. In both 1990 and 2000, approximately 70% of the population over age 16 participated in the labor force, as compared with 62.8% by 2010. Unemployment statistics indicate that unemployment is finally on a downward trend in the Region, but the industry statistics for the Region still show large losses across many fields.

In 2011, Service Providing industries accounted for 70.63% of the employment in the recorded industries, while Goods Producing industries accounted for 15.97% and the Government sector accounted for 13.97% (See Table 2-2). The leading industries in Windham County were the trade, transportation, and utilities industry (21.3%), education and health services industry (20.61%) and leisure and hospitality industry (14.51%). Retail trade made up over a half of the trade, transportation, and utilities industry, while health care and social assistance made up over 60% of the education and health services industry and accommodation and food services made up a full 95% of the leisure and hospitality industry employment. Health care and social services experienced the largest growth between 2001 and 2011 with an increase in employment of 495. This was followed by the Government sector which increased by 313 in employment. All of the highlighted industries in Table 2-2 experienced a decrease in employment between 2001 and 2010. The trade, transportation, and utilities industries experienced the largest decrease in employment with a loss of 1,083 in employment. The largest percent change in employment was the growth of the state government sector by 76.9%. It should be noted that certain industry data was not available for analysis (in Table 2-2, (c) indicates that the information is confidential, while (s) indicates the data is suppressed to protect confidential information).

Since 2009, the unemployment rates for Windham County have begun to decline from their peak of 6.6%. The state of Vermont had experienced unemployment rates as high as 8.1% in 2010, but that rate has seen a sharp decline from 2010 to 2011. Overall, Windham County unemployment has consistently been lower than the State unemployment rate, and 2010 and 2011 saw unemployment rates lower than the last historical peak of 6.4% unemployment, which occurred in 1991.
<table>
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<td>Total Covered - all ownerships</td>
<td>1,948</td>
<td>23,421</td>
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<td>383</td>
<td>4,154</td>
<td>$33,478</td>
<td>372</td>
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<td>$45,088</td>
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<td>Natural Resources and Mining</td>
<td>43</td>
<td>351</td>
<td>$23,242</td>
<td>33</td>
<td>278</td>
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<td>Agriculture, forestry, fishing and hunting</td>
<td>42</td>
<td>(s)</td>
<td>(s)</td>
<td>31</td>
<td>(s)</td>
<td>(s)</td>
<td>-</td>
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<td>1</td>
<td>(c)</td>
<td>(c)</td>
<td>2</td>
<td>(c)</td>
<td>(c)</td>
<td>-</td>
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<td>Construction</td>
<td>225</td>
<td>969</td>
<td>$31,161</td>
<td>240</td>
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<td>Manufacturing</td>
<td>116</td>
<td>2,833</td>
<td>$35,517</td>
<td>99</td>
<td>2,127</td>
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<td>Durable Goods</td>
<td>74</td>
<td>1,806</td>
<td>$34,464</td>
<td>70</td>
<td>1,443</td>
<td>$47,479</td>
<td>-20.1%</td>
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<td>Non-Durable Goods</td>
<td>41</td>
<td>1,027</td>
<td>$37,369</td>
<td>30</td>
<td>684</td>
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<td>Service Providing</td>
<td>1,440</td>
<td>16,599</td>
<td>$28,455</td>
<td>1,441</td>
<td>15,347</td>
<td>$36,632</td>
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<td>Trade, Transportation, and Utilities</td>
<td>406</td>
<td>5,728</td>
<td>$35,247</td>
<td>387</td>
<td>4,645</td>
<td>$42,181</td>
<td>-18.9%</td>
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<td>Wholesale trade</td>
<td>71</td>
<td>1,557</td>
<td>$45,028</td>
<td>92</td>
<td>1,144</td>
<td>$44,579</td>
<td>-26.5%</td>
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<tr>
<td>Retail trade</td>
<td>283</td>
<td>2,969</td>
<td>$21,558</td>
<td>248</td>
<td>2,420</td>
<td>$26,361</td>
<td>-18.5%</td>
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<td>Transportation and warehousing</td>
<td>46</td>
<td>(s)</td>
<td>(s)</td>
<td>42</td>
<td>(s)</td>
<td>(s)</td>
<td>-</td>
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<tr>
<td>Utilities</td>
<td>7</td>
<td>(c)</td>
<td>(c)</td>
<td>4</td>
<td>(c)</td>
<td>(c)</td>
<td>-</td>
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<td>Information</td>
<td>40</td>
<td>398</td>
<td>$30,191</td>
<td>47</td>
<td>267</td>
<td>$50,201</td>
<td>-32.9%</td>
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<td>Financial Activities</td>
<td>137</td>
<td>900</td>
<td>$33,320</td>
<td>137</td>
<td>848</td>
<td>$47,724</td>
<td>-5.8%</td>
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<td>Finance and insurance</td>
<td>61</td>
<td>645</td>
<td>$37,191</td>
<td>58</td>
<td>549</td>
<td>$56,432</td>
<td>-14.9%</td>
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<td>Real estate and rental and leasing</td>
<td>76</td>
<td>255</td>
<td>$23,540</td>
<td>79</td>
<td>299</td>
<td>$31,738</td>
<td>17.3%</td>
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<td>Professional and Business Services</td>
<td>246</td>
<td>1,337</td>
<td>$36,697</td>
<td>288</td>
<td>1,176</td>
<td>$47,923</td>
<td>-12.0%</td>
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<td>Professional and technical services</td>
<td>158</td>
<td>(s)</td>
<td>(s)</td>
<td>170</td>
<td>574</td>
<td>$55,631</td>
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<tr>
<td>Management of companies and enterprises</td>
<td>2</td>
<td>(c)</td>
<td>(c)</td>
<td>4</td>
<td>(c)</td>
<td>(c)</td>
<td>-</td>
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<tr>
<td>Administrative and waste services</td>
<td>86</td>
<td>676</td>
<td>$31,866</td>
<td>115</td>
<td>(s)</td>
<td>(s)</td>
<td>-</td>
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<td>Education and Health Services</td>
<td>172</td>
<td>3,865</td>
<td>$28,351</td>
<td>193</td>
<td>4,496</td>
<td>$39,081</td>
<td>16.3%</td>
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<td>Educational services</td>
<td>28</td>
<td>1,511</td>
<td>$28,297</td>
<td>46</td>
<td>1,647</td>
<td>$36,425</td>
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<td>Health care and social assistance</td>
<td>144</td>
<td>2,354</td>
<td>$28,385</td>
<td>147</td>
<td>2,849</td>
<td>$40,616</td>
<td>21.0%</td>
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<td>Leisure and Hospitality</td>
<td>231</td>
<td>3,602</td>
<td>$15,311</td>
<td>224</td>
<td>3,165</td>
<td>$18,885</td>
<td>-12.1%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arts, entertainment, and recreation</td>
<td>32</td>
<td>157</td>
<td>$13,161</td>
<td>28</td>
<td>149</td>
<td>$20,921</td>
<td>-5.1%</td>
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<td>Accommodation and food services</td>
<td>199</td>
<td>3,445</td>
<td>$15,409</td>
<td>197</td>
<td>3,016</td>
<td>$18,785</td>
<td>-12.5%</td>
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</tr>
<tr>
<td>Other services, except public administration</td>
<td>208</td>
<td>769</td>
<td>$19,023</td>
<td>165</td>
<td>750</td>
<td>$27,390</td>
<td>-2.5%</td>
<td></td>
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</tr>
<tr>
<td>Government total</td>
<td>125</td>
<td>2,668</td>
<td>$27,313</td>
<td>118</td>
<td>2,981</td>
<td>$39,851</td>
<td>11.7%</td>
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<td>Federal Government</td>
<td>47</td>
<td>187</td>
<td>$38,707</td>
<td>35</td>
<td>153</td>
<td>$51,830</td>
<td>-18.2%</td>
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<tr>
<td>State government</td>
<td>9</td>
<td>182</td>
<td>$29,300</td>
<td>13</td>
<td>322</td>
<td>$44,757</td>
<td>76.9%</td>
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<tr>
<td>Local government</td>
<td>69</td>
<td>2,299</td>
<td>$26,228</td>
<td>70</td>
<td>2,506</td>
<td>$33,732</td>
<td>9.0%</td>
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</table>
Employment Centers

Brattleboro remains a regional employment center. About 30% of the Region’s residents who are employed reported working at businesses located in the town of Brattleboro. Businesses along the Connecticut River in Rockingham and Westminster, in the Deerfield Valley towns of Dover and Wilmington, and the ski resort industry around the town of Londonderry provide employment to about 19.7% of the Region’s workforce (with each town providing between 3-6% of the workforce). The remaining 22 towns in the Region provide employment for only about 15% of the workforce, which is a significant decrease in employment from the previous plan. However, the population growth of towns is still mostly occurring in the 22 towns that are not the significant job centers. Of the towns that do provide significant employment, population growth over the last ten years was between -20.28% (Dover), and 3.51% (Londonderry).

The census tool, OnTheMap, allows employee data to be analyzed at the county level for destination information. As evident from the maps in Figure 2-15 below, a large number of Windham County residents are employed outside the Windham Region. The map on the left indicates that Windham County residents are employed in counties from Chittenden and Washington Counties to the north, to Grafton and Hillsborough Counties, New Hampshire, to the east. The majority of Windham County residents who work outside of Windham County are employed in Windsor and Bennington Counties, Vermont, and in Cheshire County, New Hampshire.

In terms of where Windham County employees reside, this range spans from as far north as Chittenden and Washington Counties, to as far south as Franklin County, Massachusetts. A relatively high number of employees in Windham Country are coming from Cheshire County, New Hampshire, and Windsor and Bennington Counties in Vermont.

FIGURE 2-15: LIVE/WORK LOCATIONS FOR WINDHAM COUNTY RESIDENTS AND EMPLOYEES, 2010
FIGURE 2-16: EMPLOYMENT CENTERS WITHIN THE WINDHAM REGION, 2010

The maps to the left and continued at the bottom of the page illustrate the approximate locations for employment centers located within the Windham Region. Within Windham County, the major employment centers (378-919 jobs) occur within the towns mentioned previously, Brattleboro, Rockingham, Westminster, Dover, Wilmington, and Londonderry. The town of Vernon also contains a significant employment center with Vermont Yankee being located in that town.

Smaller nodes of employment (120-377 jobs) occur within the towns of Townshend, Newfane, Guilford, Marlboro, Dummerston and Putney. Dummerston and Putney also have a scattering of small employment centers located throughout the town boundaries. The remaining towns have sporadic scattering of smaller employment centers.
Figure 2-17 provides some final employment statistics for Windham County, as reported by OnTheMap for 2010. The majority of the workforce in the County is between the ages of 30 and 54, accounting for 54.1% of the workforce. Of particular note, the workforce above the age of 55, including individuals of retirement age, accounts for a higher percentage of the workforce in the Region than the workforce of 29 years and younger. This fact coincides with other characteristics already covered in this profile.

The distribution of earnings for Windham County is divided almost equally into thirds of $1,250 per month or less, $1,251 to $3,333 per month, and more than $3,333 per month. The race of the workforce is almost entirely white, with workers of Black or African American race and Asian race accounting for about 1% of the workforce each.
Housing

Housing Unit Growth

The majority of housing units in the Windham Region are single family homes (see Figure 2-18). From 1990 to 2000, the proportion of single family homes increased from 66% to 72%. However, by 2010, that percentage had decreased back down to 66%. The remainder of the housing stock in the Region consists of 29% multi-unit housing and 5% mobile housing, with a negligible amount of housing that falls within the Boat, RV, Van, etc. category. Within the category of multi-unit housing, the subdivisions of unit categories are evenly distributed, each ranging between 3% and 6% of the total housing. In general, the categories with a greater number of units, 10 to 19 units and 20 or more units, accounted for the smallest percentage of housing in the Region.

Between 2000 and 2010, the Region’s housing stock grew by about 8.8% with the addition of about 2,802 housing units. This rate of growth is an increase from the 5% growth rate in housing stock that occurred from 1990 and 2000 in the Region. However, this rate is still nowhere near the growth rate the Region experienced between 1980 and 1990, when the number of housing units grew by nearly 32%.
Growth in total housing units within the Region’s towns has varied (Regional Profile). Somerset is the only town that experienced a decrease in housing units, from 28 in 2000 to 21 in 2010. Interestingly, the towns with the greatest rate of growth in housing stock in the last ten years were not the towns that saw highest percent of increase in population. The town of Stratton had the largest increase in housing stock with a 32.6% increase, and saw an increase in population of 58.82% from 2000 to 2010. However, the next three towns with the largest percentage increases in housing stock, Vernon (17.9%), Townshend (17.4%) and Whitingham (14.5%) saw population increases of only 3.04%, 7.22%, and 4.55% respectively. The same holds true if one looks only at numeric increases. The towns with the greatest addition of total housing units were Stratton (356), Brattleboro (312), Dover (305), and Wilmington (261). The towns with the greatest number of added residents were Athens (102), Marlboro (100), Windham (91) and Jamaica (89). This is a new development since the last Regional Plan, and may indicate a shifting of occupancy make-up in the new and existing housing stock. Additionally, three of these towns are resort towns with high seasonal housing ratios, which could also explain occurrences of increased housing without significant increases in population.

Housing Occupancy

In 2010, the Windham Region had about a 62% occupancy rate of its housing stock, which was similar to rates in 2000. About 42.6% of the housing stock in the Region was owner occupied. A total of 19.5% of the housing stock was categorized as renter occupied, and the remainder was given a vacant status (which includes seasonal housing stock). The average homeowner vacancy rate in the region is 2.57%, while the average renter vacancy rate is 9.61%.
A significant factor in the Region in terms of occupancy is seasonal housing. Between 1980 and 1990, 92 percent of all new housing units in the Region were built for vacation or seasonal use (6,347 new seasonal out of 6,866 total new units). The construction boom of the 1980’s came at a time when many of the Region’s resorts expanded their facilities to prolong the ski season and accommodate four-season use. This can be seen in Figure 2-20, especially in the towns of Stratton, Wilmington, and Wardsboro during this decade. Some towns, such as Somerset, Dover, and Winhall, had a significant portion of seasonal housing even before 1980, and this has remained true through 2010. Between 1990 and 2000, there was a net gain of 75 seasonal homes, followed by a net gain of 1,626 from 2000 to 2010. Regardless of these fluctuations in development surges, vacation housing continues to be an influencing factor throughout the Region, accounting for one-third of the housing stock within the Windham Region.

FIGURE 2-20: PERCENT OF SEASONAL HOUSING UNITS, BY TOWN

<table>
<thead>
<tr>
<th>Percent of Seasonal Housing by Town, 2010</th>
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<tbody>
<tr>
<td>Windham Region</td>
</tr>
<tr>
<td>Brattleboro</td>
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<tr>
<td>Vernon</td>
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<tr>
<td>Rockingham</td>
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<td>Brookline</td>
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<td>Newfane</td>
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<td>Halifax</td>
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<td>Londonderry</td>
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<td>Wardsboro</td>
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<tr>
<td>Dover</td>
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<td>Somerset</td>
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<td>Stratton</td>
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<table>
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<tr>
<th>Percent of Seasonal Housing by Town, 1980-2010</th>
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<tr>
<td>Stratton 1980</td>
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<table>
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<tr>
<th>Windham Region 1980-2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Windham Region 1980-2010</td>
</tr>
</tbody>
</table>
Housing Value

Looking at Windham County housing values in comparison to surrounding counties and the State, they fall in the middle. The median home value in 2010 in Windham County was $209,200 (Figure 2-21). This value is lower than the median home value for Vermont, but higher than some of the counties in the immediate vicinity to the Windham Region. Franklin County, Massachusetts had the highest home values in the vicinity, with median home values over $225,000. Of the counties included in the Windham Region, Windham County fell in the middle.

The towns with the highest home values in the Region are Weston, Winhall, and Stratton. As seen on the previous page, these are also towns with high percentages of seasonal housing. The town of Stratton also has the highest median monthly mortgage value at over $2,000, while the majority of towns in the Region fall between $1,000 - $1,500 median mortgage values (Figure 2-22). The highest gross rent values are found in Brookline, Windham and Marlboro. Interestingly, the town of Stratton has the lowest gross rent value in the Region.
Personal vehicle trips are well documented as accounting for the largest proportion of transportation in this country, and similarly so in the Region. Commuting methods provide strong documentation of this fact. Since 1980, driving to work alone has held the overwhelming majority as the method of choice for regional commuters, having remained above 70% since 1990. This is followed by 10% of commuters carpooling to work, and 8% walking to work. Carpooling as a method of commuting has been declining since 1980, while walking has see a slight uptick after declining through 2000.

The commuter destination has also seen a shift from 1980 to 2010 (Figure 2-24).
The percentage of commuters working outside the state has increased dramatically as compared to the number of workers working within their county of residence or working from home. This trend of Windham Region residents commuting outside their state of residence is seen more clearly in the maps below. As displayed previously in the Economics section, Windham County residents are employed throughout the state, and within four counties in New Hampshire, to the east. The majority of Windham County residents who work outside of Windham County are employed in Windsor and Bennington Counties, Vermont and in Cheshire County, New Hampshire.

Employees that work within Windham County commute from counties as far north as Chittenden and Washington Counties, and from Franklin County, Massachusetts to the south. A relatively high number of commuters to Windham Country are coming from Cheshire County, New Hampshire, and Windsor and Bennington Counties in Vermont. While this data is limited to an analysis of Windham County, it supports the trends illustrated in the previous figure for the whole Region.

This dispersion of live/work locations has a direct effect on the distance and time required to arrive at one’s employment location. For residents of Windham County, the mean travel time to work increased from 18.9 minutes to 20.5 minutes to 20.6 minutes in 1990, 2000, and 2010 respectively. Figure 2-25 illustrates how the data displayed in the maps to the left translates into miles of travel for commuters.

Overall, a greater percentage of Windham County residents travel greater than 50 miles to get to work (15.9%) than employees that work outside the County and commute into Windham County to reach their employment destination (12.3%).
Additionally, those driving further than 50 miles from Windham County are generally heading to an employment destination to the north, whereas employees commuting into the County are coming from long distances from both the north and the south. In total, just over half of both commuters living in Windham County and coming to Windham County to work drive less than 10 miles. About a quarter of commuters who either live or work in Windham County travel between 10 and 24 miles.

After reviewing this data at the county level, an additional level of assessment was undertaken to further determine the direction and routes that commuters were taking into and out of the Windham Region. While Figures 2-25 to 2-27 provided broad overviews of transportation patterns, the analysis on the following page will begin to assess what this distribution of living and working locations means in terms of transportation and commuting patterns for the Region. The analysis is meant to inform further work on viable public transportation and mode-sharing routes within the Region.
The diagram in Figure 2-28 depicts commuter connections between the major employment centers in and around the Windham Region. The table in the bottom left corner shows the top twenty towns in terms of total employment for the year 2010 in immediate proximity to the Windham Region. This table includes towns located in New Hampshire and Massachusetts, as well as other towns located outside the Windham Region in Vermont. As evident from the table, the largest employment center in the Windham Region is the town of Brattleboro. The next largest employment center located within the Windham Region is the town of Dover at number fourteen, followed by the towns of Putney, Vernon, Wilmington, and Westminster, all highlighted in yellow. The orange circles in the diagram represent the relative number of jobs located in each town, relative to the largest employment center, Keene, New Hampshire.

After determining the largest employment centers in and around the Region, an analysis was run using data from the census website, OnTheMap. This tool provides data on the employment and residence locations of individuals working or living in a particular area. By collecting the data for the top employment center cities, towns, villages, and CDPs, a connection map was compiled to show the number and direction of commuters working in and around the Region. This diagram shows connections between the employment nodes for any commuter count that was equal to or greater than twenty-five people. The arrows indicate the direction of travel and magnitude of count. Town centers represented by a grey dot were nodes that were not among the top twenty employment centers but still generated twenty-five or more connections between the centers.

In assessing this diagram, it is clear that the largest web of connections occurs between Brattleboro, CDP, Keene, city, and the town of Chesterfield. It can be assumed that the majority of commuters traveling between these locations use Route 9 at some point in their commute, given that this is the only major east-west connection between these three locations. The connections generated by these three locations total an estimated 1,220 links. This high travel potential created by commuter trips would indicate that this corridor is suitable for a public transportation route. Currently the Deerfield Valley Transit Association serves the Region along Route 9 west of Brattleboro, to the town of Bennington. In 2011, DVTA transported 290,867 people through its services. This ridership could potentially be increased through connected services with public transportation routes serving Chesterfield center and Keene, or by expansion of the DVTA service area to include all of the Route 9 corridor from Bennington, Vermont to Keene, New Hampshire.

The highest connection total occurs between the town of Vernon and Brattleboro, CDP, with an estimated 408 commuters living in the town of Vernon and working in downtown Brattleboro. Hinsdale, CDP has an estimated total of 190 commuters traveling to Brattleboro, CDP, and the city of Greenfield has about 115 commuters traveling to Brattleboro, CDP. The web of transportation connections in this corner of the Windham Region provides strong evidence that public transportation routes could be viable between these large employment centers. However, the terrain and roadway network in this area would necessitate three individual routes to provide these connections.

While not generating as many connections, the clustering of employment centers along the Connecticut River Valley also provides a strong web of commuting routes to support public transportation service. Connecticut River Transit (CRT) serves much of this area, and in 2010 transported 208,093 individuals throughout the Southern Windsor and Windham Regions. The high number of connections between the city of Claremont, New Hampshire and cities and towns within this area of Vermont lends to the idea that CRT could benefit from partnering with a public transportation provider that services this region of New Hampshire, or by extending their own service into this area of New Hampshire. The connections in this area should continue to be tracked to see if commuting trips increase over the coming years.
FIGURE 2-28: COMMUTING LINKS BETWEEN THE MAJOR EMPLOYMENT CENTERS IN AND AROUND THE WINDHAM REGION, 2010

REGIONAL EMPLOYMENT CENTERS

<table>
<thead>
<tr>
<th>Location</th>
<th>Employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Keene, NH</td>
<td>18,661</td>
</tr>
<tr>
<td>Brattleboro</td>
<td>10,956</td>
</tr>
<tr>
<td>Greenfield, MA</td>
<td>9,961</td>
</tr>
<tr>
<td>Bennington, VT</td>
<td>9,744</td>
</tr>
<tr>
<td>Claremont, NH</td>
<td>5,817</td>
</tr>
<tr>
<td>Springfield, VT</td>
<td>4,225</td>
</tr>
<tr>
<td>Manchester, VT</td>
<td>3,990</td>
</tr>
<tr>
<td>Bellows Falls</td>
<td>2,311</td>
</tr>
<tr>
<td>Swanzey, NH</td>
<td>2,093</td>
</tr>
<tr>
<td>Charlestown, NH</td>
<td>1,883</td>
</tr>
<tr>
<td>Ludlow, VT</td>
<td>1,877</td>
</tr>
<tr>
<td>Chesterfield, NH</td>
<td>1,369</td>
</tr>
<tr>
<td>Walpole, NH</td>
<td>1,318</td>
</tr>
<tr>
<td>Dover</td>
<td>1,121</td>
</tr>
<tr>
<td>Putney</td>
<td>1,073</td>
</tr>
<tr>
<td>Vernon</td>
<td>1,056</td>
</tr>
</tbody>
</table>

Wilmington 941
Northfield, MA 901
Westminster, VT 784
Hinsdale, NH 743
One final assessment for transportation provided in this section is an analysis of vehicle ownership. The majority of households in the Windham Region continue to own two vehicles, hovering around 40% of households since 1990. Figure 2-29 shows the increasing trend of vehicle ownership that has been developing in this Region from 1980 to 2010. Ownership of two vehicles per household jumped from 32% to 40%, which demonstrated the largest increase, while households with zero vehicles fell to 7% from 12% in 1980. While the percentage of households that do not own a vehicle is small, that percentage is higher for some groups such as seniors and renters. Over 16% of households that are headed by a senior aged 65 or older do not own a vehicle. Additionally, over 17% of renter households have no vehicle available, as compared to 3.5% of owner occupied households.

As shown in Figure 2-30, centralized villages and downtowns have a lower average vehicle ownership per household when compared to overall ownership for the towns in the Region. Six of the eleven villages/downtowns/census designated places in the Region have an average vehicle ownership of 1.5 vehicles or less per household. This provides an obvious distinction from the towns in the Region as a whole, of which only one, Brattleboro, has an average vehicle ownership below 1.5 vehicles per household. Densely populated areas provide more opportunity for transportation options, including walking, biking, or taking public transportation. As such, the need for personal vehicle ownership is reduced. However, because development in recent decades has continued to move away from historic downtown patterns, the need for personal vehicle ownership has increased.
FIGURE 2-30: AVERAGE NUMBER OF VEHICLES PER HOUSEHOLD BY TOWN, 2010 (5 YR ESTIMATES)
REFERENCES

POPULATION

FIGURE 2-1: WINDHAM REGION POPULATION, 1790-2010
1790-2000 DATA SOURCE: VERMONT INDICATORS, HTTP://WWW.VCGI.ORG/INDICATORS/
2010 DATA SOURCE: 2010 CENSUS, DEMOGRAPHIC PROFILE SF, HTTP://FACTFINDER2.CENSUS.GOV/

FIGURE 2-1A: WINDHAM REGION POPULATION, 1960-2010
2010 DATA SOURCE: 2010 CENSUS, DEMOGRAPHIC PROFILE SF, HTTP://FACTFINDER2.CENSUS.GOV/

TABLE 2-1: WINDHAM REGION POPULATION TRENDS, 1960-2010
2010 DATA SOURCE: 2010 CENSUS, DEMOGRAPHIC PROFILE SF, HTTP://FACTFINDER2.CENSUS.GOV/

FIGURE 2-2: WINDHAM REGION TOWN POPULATION CHANGE, 2000-2010
2010 DATA SOURCE: 2010 CENSUS, DEMOGRAPHIC PROFILE SF, HTTP://FACTFINDER2.CENSUS.GOV/

FIGURE 2-3: TOWN POPULATION AS PERCENT OF REGIONAL POPULATION
2010 DATA SOURCE: 2010 CENSUS, DEMOGRAPHIC PROFILE SF, HTTP://FACTFINDER2.CENSUS.GOV/

FIGURE 2-4: AVERAGE CHANGE IN POPULATION, 1980-2010
2010 DATA SOURCE: 2010 CENSUS, DEMOGRAPHIC PROFILE SF, HTTP://FACTFINDER2.CENSUS.GOV/

FIGURE 2-5: WINDHAM REGION POPULATION BY AGE COHORT, 1990, 2000 & 2010
2010 DATA SOURCE: 2010 CENSUS, DEMOGRAPHIC PROFILE SF, HTTP://FACTFINDER2.CENSUS.GOV/

FIGURE 2-6: PERCENT POPULATION OVER 65 BY TOWN, 2009 (5 YR ESTIMATES)

FIGURE 2-7: WINDHAM REGION HOUSEHOLD COMPOSITION, 2010
2000 DATA SOURCE: 2000 CENSUS SF1 100% DATA, HTTP://FACTFINDER2.CENSUS.GOV/
2010 DATA SOURCE: 2010 CENSUS DEMOGRAPHIC PROFILE SF, HTTP://FACTFINDER2.CENSUS.GOV/

FIGURE 2-8: WINDHAM REGION CHANGE IN HOUSEHOLD COMPOSITION, 2000-2010
2000 DATA SOURCE: 2000 CENSUS SF1 100% DATA, HTTP://FACTFINDER2.CENSUS.GOV/
2010 DATA SOURCE: 2010 CENSUS DEMOGRAPHIC PROFILE SF, HTTP://FACTFINDER2.CENSUS.GOV/

FIGURE 2-9: MEDIAN INCOMES FOR WINDHAM COUNTY, 1979-2009 (5 YR ESTIMATES)
CPI FROM CONSUMER PRICE INDEX HISTORY TABLE, BUREAU OF LABOR STATISTICS, FTP://FTP.BLS.GOV/PUB/SPECIAL_REQUESTS/CPI/CPIA1.TXT

ECONOMICS
REFERENCES

ECONOMICS cont.

FIGURE 2-10: MEDIAN INCOMES OF THE COUNTY AND STATE, 2009 (VERMONT HOUSING DATA)

FIGURE 2-11: INCOME INDICATORS BY TOWN, 2009 (5 YR ESTIMATES)

FIGURE 2-12: PERCENT OF INDIVIDUALS BELOW POVERTY LINE (5 YR ESTIMATES)

FIGURE 2-13: WINDHAM REGION ELIGIBLE CENSUS TRACTS FOR NEW MARKET TAX CREDITS (NMTC), 2012
WINDHAM REGIONAL COMMISSION NEWSLETTER, AUGUST 2012

FIGURE 2-14: UNEMPLOYMENT RATES, 2000-2011 (1991 INCLUDED FOR COMPARISON)

TABLE 2-2: WINDHAM COUNTY EMPLOYMENT BY INDUSTRY, 2001 AND 2011

FIGURE 2-15: LIVE/WORK LOCATIONS FOR WINDHAM COUNTY RESIDENTS AND EMPLOYEES, 2010
2010 DATA SOURCE: HTTP://ONTHEMAP.CES.CENSUS.GOV/

FIGURE 2-16: EMPLOYMENT CENTERS WITHIN THE WINDHAM REGION, 2010
2010 DATA SOURCE: HTTP://ONTHEMAP.CES.CENSUS.GOV/

FIGURE 2-17: WINDHAM COUNTY EMPLOYEE CHARACTERISTICS BY AGE, EARNINGS, AND RACE, 2010
2010 DATA SOURCE: HTTP://ONTHEMAP.CES.CENSUS.GOV/

HOUSING

FIGURE 2-18: NUMBER OF HOUSING UNITS BY CATEGORY IN THE WINDHAM REGION, 2010 (5 YR ESTIMATES)
2010 DATA SOURCE: 2010 ACS 5-YEAR ESTIMATES, DP04 SELECTED HOUSING CHARACTERISTICS, HTTP://FACTFINDER2.CENSUS.GOV/

FIGURE 2-19: HOUSING UNIT GROWTH BY TOWN, 2000 TO 2010
2000 DATA SOURCE: 2000 SF1 100% DATA, PROFILE OF GENERAL DEMOGRAPHIC CHARACTERISTICS, HTTP://FACTFINDER2.CENSUS.GOV/
2010 DATA SOURCE: 2010 SF1 100% DATA, PROFILE OF GENERAL DEMOGRAPHIC CHARACTERISTICS, HTTP://FACTFINDER2.CENSUS.GOV/
REFERENCES

HOUSING cont.

FIGURE 2-20: PERCENT OF SEASONAL HOUSING UNITS, BY TOWN
2010 DATA SOURCE: 2010 SF1 100% DATA, PROFILE OF GENERAL DEMOGRAPHIC CHARACTERISTICS,
HTTP://FACTFINDER2.CENSUS.GOV/

FIGURE 2-21: SOUTHERN VERMONT REGION MEDIAN VALUE OF HOUSING, 2010 (3 YR ESTIMATES)
2010 DATA SOURCE: DP04: SELECTED HOUSING CHARACTERISTICS, 2008-2010 AMERICAN COMMUNITY SURVEY 3-YEAR
ESTIMATES, HTTP://FACTFINDER2.CENSUS.GOV/

FIGURE 2-22: MEDIAN MORTGAGE & MEDIAN RENT OF HOUSING BY TOWN, 2010 (5 YR
ESTIMATES)
2010 DATA SOURCE: DP04: SELECTED HOUSING CHARACTERISTICS, 2006-2010 AMERICAN COMMUNITY SURVEY
5-YEAR ESTIMATES, HTTP://FACTFINDER2.CENSUS.GOV/

FIGURE 2-23: WINDHAM REGION COMMUTING METHOD (5 YR ESTIMATES)
2010 DATA SOURCE: DP04 SELECTED HOUSING CHARACTERISTICS 2006-2010 AMERICAN COMMUNITY SURVEY 5-YEAR
ESTIMATES, HTTP://FACTFINDER2.CENSUS.GOV/

FIGURE 2-24: WINDHAM REGION COMMUTER DESTINATION, 1980-2010 (5 YR ESTIMATES)
2010 DATA SOURCE: B08007 SEX OF WORKERS BY PLACE OF WORK--STATE AND COUNTY LEVEL UNIVERSE: WORKERS 16
YEARS AND OVER 2006-2010 AMERICAN COMMUNITY SURVEY 5-YEAR ESTIMATES, HTTP://FACTFINDER2.CENSUS.GOV/

FIGURE 2-25: COMMUTING TRENDS FOR WINDHAM COUNTY, 2010
2010 DATA SOURCE: HTTP://ONTHEMAP.CES.CENSUS.GOV/

FIGURE 2-26: COMMUTING DISTANCES FOR WINDHAM COUNTY, 2010
2010 DATA SOURCE: HTTP://ONTHEMAP.CES.CENSUS.GOV/

FIGURE 2-27: WINDHAM CO. NET INFLOW / OUTFLOW, 2010
2010 DATA SOURCE: HTTP://ONTHEMAP.CES.CENSUS.GOV/

FIGURE 2-28: COMMUTING LINKS BETWEEN THE MAJOR EMPLOYMENT CENTERS IN AND AROUND THE
WINDHAM REGION, 2010
2010 DATA SOURCE: HTTP://ONTHEMAP.CES.CENSUS.GOV/

FIGURE 2-29: WINDHAM REGION AVERAGE NUMBER OF VEHICLES PER HOUSEHOLD, 1980 & 2010 (5
YR ESTS)
1980 DATA SOURCE: VERMONT INDICATORS WEBSITE, HTTP://WWW.VCGI.ORG/INDICATORS/
2010 DATA SOURCE: DP04 SELECTED HOUSING CHARACTERISTICS 2006-2010 AMERICAN COMMUNITY SURVEY 5-YEAR
ESTIMATES, HTTP://FACTFINDER2.CENSUS.GOV/

FIGURE 2-30: AVERAGE NUMBER OF VEHICLES PER HOUSEHOLD BY TOWN, 2010 (5 YR ESTIMATES)
2010 DATA SOURCE: DP04 SELECTED HOUSING CHARACTERISTICS 2006-2010 AMERICAN COMMUNITY SURVEY 5-YEAR
ESTIMATES, HTTP://FACTFINDER2.CENSUS.GOV/
CHAPTER 2

LAND USE

EXISTING LAND USE/LAND COVER

Because they serve as the foundation for future development and conservation efforts, an examination of the region’s natural features, built environment, public infrastructure and current land use patterns provides a basis for future land use planning. The Existing Land Use/Land Cover Map illustrates the distribution of general land uses and land covers in the region. It is essentially a birds-eye view of what is occurring on the land.

The Windham Region is predominantly rural, the vast majority of the region’s land being undeveloped. Almost 86 percent of the total land area is forested and only 6 percent is open. Less than 5 percent of the region falls into urban or built up areas that include residential, commercial, industrial, and public and semi-public uses. The remaining 3 percent is covered by water or wetlands.

BUILT ENVIRONMENT

Physical limitations have played a dominant role in the region’s development pattern. Historically, a linear pattern of development was the natural response to the river and stream valleys and led to the establishment of today’s road system along those streams linking village nodes in each major valley (refer to the Regional Development Pattern Map). These roads have encouraged the pattern of mixed residential and commercial uses radiating from villages, and the traditional settlement pattern of small villages located in stream valleys with expansion along connecting roads. Today’s built environment is composed of regional centers, commercial/industrial centers, rural commercial, resort centers, villages, hamlets, and residential development, each which have a distinctive development pattern and purpose.

Regional centers have a dense development pattern with the highest concentration and diversity of commercial services. They also provide a diversity of institutional, governmental, cultural, and recreational uses. The area’s two regional centers, Brattleboro and Bellows Falls, are located in the region’s two largest towns, Brattleboro and Rockingham, respectively. These regional centers, including their immediate surroundings, serve the population of the entire Windham Region as well as adjacent areas in New Hampshire and Massachusetts. They are fully served by municipal water supply and wastewater treatment facilities and contain a full range of services supporting development, including transportation, solid waste, and communications.
Villages, smaller in size than regional centers, have a relatively dense development pattern. They serve an important function as the social, economic, historic, and civic cores of their respective communities. This plan recognizes twenty-three villages: Algiers, Bondville, Grafton, Jacksonville, Jamaica, Londonderry, Newfane, Putney, Readsboro, Saxtons River, South Londonderry, South Newfane, Townshend, Vernon, Wardsboro, West Dover, West Halifax, West Brattleboro, Westminster, Weston, Whitingham, Williamsville, and Wilmington. Infrastructure varies from village to village and tends to be based on the community size. Some villages have public and/or private investments in wastewater treatment facilities, water systems, sidewalks, lighting, and recreational lands. While much of the region still follows the traditional settlement pattern of compact villages surrounded by rural countryside, the boundaries, in many cases, are becoming blurred. For various reasons, trends show that development is expanding outside of traditional village boundaries.

Though sometimes referred to as villages, hamlets are smaller than villages and generally lack the infrastructure found in Villages. Hamlets are characterized by small clusters of structures and include primarily residential and some civic use buildings. Existing structures are close together with relatively small setbacks, creating a compact settlement pattern.

Large-scale commercial/industrial centers are areas characterized by moderate to heavy commercial and industrial activity. Such areas in the region are located on US 5 north of Bellows Falls and Brattleboro and south of Brattleboro on US 5 and VT 142.

Rural commercial areas are areas of mixed-use development, are often dominated by commercial service industries, and are laid out in a spread out pattern. Such areas are concentrated along US 5, VT 9, VT 30, and VT 100.

Large-scale resort centers are located in the western part of the region in the Green Mountains. This plan recognizes four resort centers: Mount Snow, Stratton Mountain, Magic Mountain, and The Hermitage Club at Haystack Mountain, each of which provides recreational facilities and services and contributes to the region’s seasonal housing stock. Resort centers in the region have invested in private wastewater treatment facilities or have access to municipal facilities. Route 100, the state’s interior North/South travel corridor, together with Routes 9, 11, 30, 103, and 112 provide access to these resorts.

Rural residential includes low-density housing development, usually scattered in small subdivisions (less than 10 lots) or on individual single lots, taking advantage of existing frontage on public roads. Residential development has generally followed town secondary roads. Ski resort development has had

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17 Not all of the Villages identified in this Plan are separately incorporated. Seven villages are incorporated: Bellows Falls, Jacksonville, Newfane, North Westminster, Saxtons River, Townshend, and Westminster.
a large impact on regional land use, including rural residential areas. Wilmington, Dover, Stratton, Winhall, and Londonderry all have dense residential development that is, in part, attributed to nearby resorts. Related growth has also occurred in Wardsboro and Jamaica where there are a large number of seasonal homes.

FORESTS

There are approximately 516,000 acres of forested land in the Windham Region. Most is in non-industrial private ownership, held by many individuals with an average holding of less than 100 acres. Forests are valuable as a timber resource; as wildlife habitat; for recreation, including hiking, hunting, trapping, fishing, and winter sports; as a retreat; as a natural buffer that protects against the impacts of soil erosion, stormwater runoff and climate change; and as a scenic resource. The Green Mountain National Forest comprises a large expanse along the western edge of the region, running from Weston in the north to Readsboro in the south.

Since its inception in 1980, the Current Use Program (more properly called “Use Value Appraisal”) has increased awareness of the value of conservative timber management by providing state funded tax relief for landowners who agree not to develop their land and to practice forestry according to state-approved forest management plans. At this time there are approximately 140,000 forested acres, or 27.6 percent of forests in the Windham Region enrolled in the Use Value Appraisal Program, which is nearly 50 percent of the land that is eligible. More information about this program can be found in the Natural Resource Chapter.

As illustrated on the Public and Conserved Lands Map, nearly 25 percent of the land area in the region is conserved through the combined effects of private easements and local, state and federal government actions. Many of the remote lands in the western part of the region are under some form of conservation protection, most notably as public lands in the Green Mountain National Forest. These federal lands represent the largest contiguous area of conserved lands in the region. Seventeen of the region’s 27 towns own parcels of undeveloped land—mostly as municipal forests—used for watershed protection, recreation, and/or forestry.

OPEN LANDS

The region’s open lands include agricultural lands, fields, ski trails, utility corridors, and other large clearings. The lands in agricultural use are primarily located in the Connecticut River Valley, with another concentration in the Deerfield River Valley. Agricultural lands remain an important and defining component of the region’s landscape. While the Connecticut River Valley has the largest amount of prime farmland in the region, other farmed lands are found scattered throughout the region, generally in the river and stream valleys. With regards to areas suitable to agricultural use, Windham County contains the smallest segment of prime soils, and the second smallest portion of soils of statewide
importance in Vermont. The working agricultural landscape not only contributes to the regional economy but also provides scenic backdrop to the developed landscape.

**PROPOSED REGIONAL LAND USE**

The proposed regional land uses, as defined below and delineated on the Proposed Land Use Map, create a framework for decisions related to growth, development, and conservation throughout the region. These designations recognize existing settlement patterns, availability of existing and planned public infrastructure (water, sewer, and roads), and land use policies established in existing town plans. It is important to note that the density of development exists along a continuum, so that the distinction between each of the proposed land use designations may be unclear at times. Figure 2-1 shows a graphic representation of where each of the proposed land use designations falls along the spectrum of development.

**FIGURE 2-1: PROPOSED LAND USE DESIGNATIONS DEVELOPMENT SPECTRUM**

![Proposed Land Use Designations Development Spectrum](image)

*Source: WRC*

The proposed land use categories represent a vision for the use and development of the lands in the region. The Proposed Land Use Map depicts the land use categories that are described below. The purpose of establishing land use categories is to complement, support and reflect town land use planning by presenting a regional structure for settlement patterns and planning for future growth. Much work has been done by town planning commissions to develop local land use plans, and those plans provide a significant basis for the land use planning, vision, and structure presented here.

**REGIONAL CENTERS**

The Regional Plan encourages development, redevelopment and infill in the current regional centers of Brattleboro and Bellows Falls. Regional centers include the core civic/business district as well as the surrounding mixed-use neighborhoods. These areas provide services, shopping, housing, and employment opportunities to residents both within the Windham Region and in the surrounding regions and states. They are served by public infrastructure, including public water and wastewater systems, multi-modal transportation systems, and communications infrastructure, which support the highest population densities in the region. As population centers, both Brattleboro and Bellows Falls are home to relatively large local governments and to a variety of public facilities and services.
A high-density mix of uses such as commercial, residential, institutional, civic, light industrial, and public gathering spaces should be concentrated in these areas. The highest development densities should occur in the core of the regional downtowns, and diminish as distances from the core increase. Multi-storey buildings that mix retail uses with residential and/or professional offices are typical. A variety of residential uses should also be present in regional downtowns, with particular attention paid to attracting young professionals to the region and to accommodating an aging population. Opportunities for housing should be available in single and multi-family buildings, with options for both renting and ownership across the entire income spectrum. 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 appropriate streetscaping, trees and public gathering spaces provided in order to create a functional and pleasant urban environment. Adequate on- and off-street parking should be provided, and seamless access between all transportation modes should be fostered.

A principal objective of this plan is to promote the economic vitality the region’s downtowns. The Brattleboro and Bellows Falls regional centers offer a number of opportunities for creative actions that can make shopping and living downtown more desirable. The adaptive reuse of buildings and the development of riverfront parks are two ways to use existing resources to provide needed facilities while enhancing the attractiveness of the urban centers. Historic preservation and design control regulations may be enacted by towns to ensure the retention of the unique character of important districts and individual buildings. It may also be appropriate for towns to provide for planned unit and mixed-use developments in their regional centers; such regulations permit flexibility in the application of zoning restrictions if a development furthers certain community goals and provides public amenities. However, planned unit developments should be managed appropriately to avoid development outcomes that lead to unintended “big box” retail and strip development.

**LARGE-SCALE COMMERCIAL/INDUSTRIAL**

The commercial/industrial designation for the Regional Plan is primarily concerned with large-scale activities, and development of industries in close proximity to each other that are either complementary or that coexist easily without significant land use conflicts. Within this land use category, existing and future commercial and industrial activities are encouraged, including new development, redevelopment, and the conversion of previous non-industrial uses. Examples of these types of redevelopments include...
manufacturing facilities, large-scale distribution centers, and business campuses that employ a high number of individuals. The areas designated by this plan for future commercial/industrial land use have been selected due to their potential for concentrated commercial and industrial development. This potential is supported by access to infrastructure such as suitable transportation opportunities, water and wastewater facilities, and broadband/communications technology. It is acknowledged that commercial activity and small scale, individual industrial activities will take place in other parts of the region as directed by town plans, which can address the town needs with more specificity.

Major commercial or industrial development can have a high potential for conflict with surrounding land uses. As a first step towards mitigating the potential impact of such projects, these developments should be directed to areas designated as appropriate for commercial or industrial use. Thoughtful planning for growth in such areas is intended to provide jobs for residents and increase municipal tax bases. Because jobs development is expected in these areas, growth in them should consider proximity and access to adequate housing stock. A critical aspect of this designation is rail access, which should be preserved in these areas. When feasible, businesses and industries with high freight demands should locate within the rail corridor, improving mobility of goods by rail.

The designation of commercial/industrial sites allows for location of these types of businesses without creating adverse impacts on adjacent land uses. Large-scale commercial/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 visual and auditory screening should be provided between industrial uses and abutting incompatible land uses and major roadways. Environmental impacts of developments within this designation need to be thoroughly reviewed and adequately addressed in the early stages of project development.

RURAL COMMERCIAL

An intensive pattern of development exists along segments of US 5, VT 9, VT 30, and VT 100 in the region. These areas are mixed-use, primarily containing service industries such as gas stations and retail operations ranging in scale from restaurants to automotive dealerships outside of regional centers, downtowns or villages. Development has occurred as a result of landowners independently deciding to develop along these routes, resulting in a spread out land use pattern that is automobile dependent.
The intent of defining “rural commercial” as a proposed land use category is to transform these existing commercial areas into higher-density, compact, mixed use settlements through infill and redevelopment. These areas should be designed and scaled to be pedestrian-oriented rather than dominated by the automobile. It is important that these areas maintain clear boundaries so that development is discouraged from sprawling beyond the area that has already been developed. By utilizing proper growth management techniques, including transportation corridor and land use planning, the negative impacts of strip development can be mitigated.

RESORT CENTER

The Regional Plan recognizes resort development, generally concentrated around ski area base facilities, as “resort centers”. This plan recognizes four resort centers: Mount Snow, Stratton Mountain, Magic Mountain, and The Hermitage Club at Haystack Mountain. Growth in the vicinity of these resort centers which has been stimulated by resort development and expansion is sometimes termed secondary development. Seasonal homes are perhaps the most discussed form of secondary development, but lodging and restaurants are also prevalent near the region’s resort centers. Some of this secondary development, frequently slightly above one house per acre in density, has occurred in places having sewer systems and is located along major routes. Other development is associated with the resort centers but is located farther away, usually in productive rural or resource lands, and often takes the form of rural sprawl. This spread out pattern is inherently auto-oriented, while lacking the density to support efficient transit services or to be redeveloped as a new village center. In such developments, residents have few options other than drive to services.

Resort centers tend to place more intense pressure on the surrounding rural areas than is found in the rest of the region, in part due to the economic resources typically available to the resort center demographic. Although rural sprawl is an issue that should be addressed and mitigated region-wide, the issue is particularly important for towns impacted by the resort centers. In all cases, the resort centers are located either in or adjacent to the region’s resource lands designation where soils are often shallow and slopes are steep. Many streams and rivers originate from these lands, and some are productive forestlands and valuable wildlife habitat. Because of these fragile natural conditions, paired with other economic and development pressures, master planning for any proposed expansion is a critical step in managing the incremental and cumulative impacts that resort development has on the region.
This plan recognizes the potential for expansion or redevelopment of these areas. Any expansion or redevelopment should be conducted in a planned, orderly manner. Expansion or redevelopment of recreation facilities, commercial services, and housing in resort centers must be balanced with careful environmental management, and should result in improvements to stormwater management, water quality and quantity, and impacts such as traffic and traffic safety. Successful resort centers will provide year-round recreational activities for residents and visitors. Linear expansion of commercial and retail areas should be contained, and infill development should occur as an alternative to radial or linear expansion. While secondary homes are recognized as a component of resort development, residential development in these areas should be designed to conserve the greatest amount of resource land and significant natural area as possible.

Given the remote locations of these resorts and the need for an extensive seasonal workforce, provision of affordable workforce housing is critical. High-value resort and second-home properties increase surrounding property values, reducing the continuum of housing affordability. To that end, there needs to be a balance of housing options to enhance the overall vitality of a resort community. The responsibility of providing affordable workforce housing should not fall solely on the towns and region, but instead should be a joint responsibility with resort owners/companies. Similarly, public facilities must not be overburdened, nor should natural resource protection be compromised by either primary or secondary development at resort centers. New development proposals at resort centers should always include effective mitigation measures to minimize impact on sensitive natural areas.

Resort centers need continued, cooperative comprehensive planning by towns, resort managers, State agencies and the WRC. It is appropriate that the results of such coordinated planning be incorporated in town and regional plans and be reflected in programs and decision-making at all governmental levels. This planning should reflect and address the relationship between resort based areas, related recreation and facility developments, natural resources, transportation corridors, and historic village and settlement patterns.

FUTURE SKI RESORT DEVELOPMENT

There are four ski areas in the Windham Region that are not currently operational. These include Hogback (Marlboro), Maple Valley (Dummerston), Snow Valley (Winhall), and Timber Ridge (Windham). As of 2014, there were discussions of redeveloping Snow Valley into an active ski area. New or redeveloped ski areas could spur future development similar to the resorts identified on the Proposed Land Use Map. Any resort development should be planned and reviewed with the same attention to planning and cumulative impacts as described in the resort center designation.
VILLAGE

Most of the Windham Region's towns have villages that provide for a mix of residential, commercial, service, small industry, and community facilities (church, school, post office, town hall, etc.). This plan recognizes villages as future growth areas.

Villages offer many goods and services for local residents, present opportunities for local businesses and employment, and provide rural towns with a sense of place. Many villages are also important historically and contribute to the aesthetic appeal of the entire region. Vermont villages are the core of the historic and cultural allure of the region. Infrastructure improvements vary from village to village partially based on the size of the community. Most villages provide a modest network of paved roads and some have invested in wastewater treatment facilities, water systems, sidewalks, lighting, communications infrastructure and recreational lands. Villages not served by public water or wastewater services must limit densities to what existing soil conditions allow. The future provision of water and wastewater services is encouraged, and well-designed and maintained privately owned community water and/or wastewater systems may provide one avenue for achieving this goal.

Development in villages should include concentrated areas of moderate-density residential uses mixed with commercial, institutional, and civic uses, such as neighborhood stores, places of worship, medical and care-giving facilities, recreational facilities, primary and/or secondary schools and higher learning institutions. Village commercial districts are points for individuals to connect with other people and services, and for customers to connect with businesses. This requires providing safe and convenient modes of transportation to the villages, be it pedestrian, bicycle, transit, or automobile travel. Automobiles and trucks are essential in the villages and must be effectively accommodated, but their functions and presence must also coexist with the human and economic functions for which the villages exist. Towns can better accommodate this coincidence of use through implementation of Complete Streets principles and infrastructure (See Transportation Plan, Chapter 1 Land Use and Development).

Additionally, functional conflicts that arise from incompatible transportation uses need to be addressed effectively, such as when a road functions simultaneously as both a village street and an arterial highway. Sidewalks or paths should be considered along major roadways or connecting to important destinations, including schools, recreation facilities and civic buildings. Towns should assess the growth potential of villages, determine whether suitable areas for development or expansion can be found in

FIGURE 2-5: READSBORO VILLAGE, VERMONT

Source: WRC Stock Photos
and around existing village districts, and evaluate the appropriateness and feasibility of newly
developing or expanding the capacity or geographical extent of public water, sewer, and road systems.

HAMLET

Though sometimes referred to as villages, hamlets are a distinct land use that is primarily—and
sometimes exclusively—residential. A hamlet is either an existing historic cluster of residential
development within a rural area or an area proposed to allow for the development of a small
concentrated settlement within a rural area. A hamlet allows for a mixture of land uses that are
consistent with the traditional settlement pattern and that will not unnecessarily duplicate services offered in
the village or other commercial areas. Appropriate land uses include small scale civic, educational, service,
retail, and in-home businesses mixed with the residential land uses. The principal land use for hamlet
areas should be residential. Hamlets provide an area for rural residential growth that maintains the historic
settlement patterns and densities. In order to achieve traditional hamlet densities, it may be necessary to
have shared water supply or sewage disposal systems.

In addition to, or as an alternative to, further development of existing villages, some towns may
want to consider establishing new village areas. In some situations it may be appropriate to encourage additional growth around existing hamlets. Prior to
promoting concentrated village-type development in a rural area, towns should consider factors such as
proximity to existing neighborhoods, the adequacy of roadways in the vicinity, soil conditions, and water supply potential. Zoning regulations, which may include provisions for site plan review, performance standards, and historic preservation, must be written to help encourage appropriate growth while ensuring that these areas retain their scale and unique character.

RURAL RESIDENTIAL

These areas include lands already committed to residential development or in proximity to already
developed lands. They generally do not have access to municipal sewer and water infrastructure, and
are easily accessible by the existing road system. These lands do not contain significant amounts of high
value natural resources, and may accommodate moderate density mixed use development that is
compatible with existing land uses and sensitive to the limitations of the land. Small general stores
(“country stores”), service stations, and similar uses that provide goods and services for nearby
residents may be located in rural residential areas.
Despite difficult access, rough topography, or lack of wastewater treatment facilities and/or water systems, many rural areas have attracted increasing residential development. Residential development is an appropriate use at low densities in many areas, but it will encourage rural sprawl if it becomes the dominant settlement pattern and consumes significantly more land per residential unit than higher density development. This rural sprawl has involved the fragmentation of large land parcels containing significant, productive rural lands and resource protection areas. As such, growth must be planned to avoid diminishing the region’s rural character, degrading environmental quality, and creating excessive costs for municipalities.

New subdivisions should incorporate design characteristics such as walkable layouts, community identity, public open spaces, and preservation of economically important resources (such as agricultural soils). Many of these objectives can be realized by clustering lots to create a hamlet-type character around homes, while setting a significant percentage of the project area aside as open space reserved for agriculture, forestry, or public recreation. Such developments also are economically efficient because road and other infrastructure requirements are less extensive and costly to construct and maintain. When development does occur in rural residential lands, it should only be done using conservation development models and should only occur where there is existing infrastructure to support the planned future use.

**PRODUCTIVE RURAL LAND**

Productive rural lands are low density and very low density residential areas containing land-based resources that, when in productive use, contribute to the region’s working landscape and have significant economic value. These productive resources include forestlands, active agricultural lands, sand/gravel/mineral deposits and high-value forest and agricultural soils. Productive rural lands contribute significantly to rural areas by providing open space and lands suitable for rural occupations and lifestyles. These lands are the traditional rural working landscape of the region, and for this reason require a high level of stewardship. Generally, they are not located near municipal sewer and water. Low density mixed use development can be appropriate,
but it must be compatible with traditional land uses, in scale with its surroundings and sensitive to the limitations of the land. Certain small-scale industries, especially those related to the region’s agricultural and forest resources (e.g., dairy production, saw mills), may be compatible with, and most appropriate in, outlying rural areas. However, an essential quality of the rural landscape is that the land has the capacity to be worked or used, and preserving the “working landscape” helps to protect its components.

RESOURCE LANDS

Resource lands require special protection or consideration due to their uniqueness, irreplaceable or fragile nature, or important ecological function. Resource lands include lands over 2,500 feet in elevation, identified bear travel corridors, areas hosting significant plants, animals and ecological communities as designated by Vermont’s Nongame and Natural Heritage Program, or by federally identified endangered and threatened species, unique and fragile natural areas, riparian areas and their buffers, wetlands, floodplains, shore lands, steep slopes over 25 percent, and finally, scenic corridors or vistas as identified in town plans. Resource lands should be preserved and protected to the greatest extent possible. Any development or land use in these areas should be designed to have a minimal impact on natural resources and should include effective mitigation measures that will protect natural resource values. The most appropriate uses for Resource lands are conservation and management of natural resources and limited, low impact, very low-density rural uses.
**LAND USE MANAGEMENT TECHNIQUES**

To assist the region in implementing this vision for proposed land uses, both regulatory and non-regulatory techniques will be necessary. Regulatory approaches are implemented at the state and municipal level. Regulatory approaches include such actions as adopting zoning bylaws, subdivision regulations, flood management ordinances, impact fees, curb cut permits, noise ordinances and junkyard ordinances. Non-regulatory approaches, which can be developed at both the regional (across town boundaries) and municipal level, can include, but are not limited to: infrastructure projects, community development, historic preservation, planning and conservation.

**CHARACTER AND DENSITY OF DEVELOPMENT**

Clustering development promotes traditional New England settlement patterns: structures grouped closely together on small lots surrounded by open space, farmland and forest. Clustering buildings on the most appropriate portions of a parcel with the simultaneous protection of important resource lands is a viable alternative to traditional single-lot zoning. Even for some commercial establishments, clustering can reinforce the rural townscape and encourage the efficient use of roads and other utilities, thereby reducing costs. Architectural styles and building materials also affect the character of development, and the use of traditional New England styles and materials that blend with existing settlement should be encouraged. Commercial sprawl, often characterized by large, boxy one-story buildings, detracts from the character of the region's traditional landscape and should be discouraged.

**CRITICAL RESOURCE AREAS**

In this Plan, the WRC has created a new designation, critical resource areas, in order to ensure conservation of the Region’s most notable natural assets. Critical resource areas consist of specific sites that need the highest level of protection due to the significance or fragility of their features and/or ecological services. Within these areas, no development should occur. A subcategory of resource lands, these critical resource areas have features or characteristics, either singularly or in combination, that make them irreplaceable and especially critical for protection.

Critical resource areas have not yet been specifically delineated and mapped; however, the WRC encourages towns to begin identifying and making provisions to protect these areas in their Town Plans. The Commission will continue identifying and mapping them region-wide for its next plan update.
Density ranges and averages, where applicable, allow for more flexibility than do standard minimum lot sizes in zoning bylaws. Density targets can allow small lots to be developed in order to maintain significant resources in larger tracts. Recommended dwelling unit density ranges and average densities should be based on existing and desired land use patterns in a particular area. The density of development should be determined using the following as guiding factors: physical site limitations, character of the area, availability of water supply and wastewater treatment facilities, impact on the land's resources, effect on adjacent land uses, and the services that will be required to accommodate such densities.

Dense development is often rejected because of the perception that it overburdens infrastructure, is too crowded, or that it will change the character of the town. To address these issues, the Windham Regional Commission has assisted with density visualization presentations in towns such as Putney and Marlboro. The goal of these efforts is to identify issues, concerns, and opportunities that the town has for growth in its village. Many times high density in the village is desired, as long as it is in keeping with the scale and dimensions of existing development.
OPEN SPACE PLANNING

Open spaces are public and private lands that are undeveloped and contribute to the natural and scenic landscape of the region. Open space planning is a part of shaping growth. Just as it is important to identify areas desirable and capable of handling development and then working to direct growth to those areas, it is also important to identify places where development should be discouraged. Towns often do this as part of the local planning process; however, efforts should be undertaken at the regional level to create a comprehensive open space plan that looks beyond municipal boundaries and targets conservation efforts to areas that will provide the maximum amount of public benefit.

Undeveloped and undisturbed areas along rivers and streams are an important part of open space planning. The Windham Regional Commission (WRC) recently completed the *Undeveloped Waters of Southeastern Vermont Study* to identify and characterize undeveloped rivers, streams, lakes, and ponds in southern Windham County and eastern Bennington County. This type of initial report can help inform a future regional Open Space study.

RESOURCE PROTECTION

Areas and resources requiring extra protection and preservation efforts include aquifers, drinking water source protection areas, wetlands, floodplains, important forest resources, pristine waters, important fish habitats, shorelands, prime agricultural soils, steep slopes, areas prone to erosion, habitat areas for threatened or endangered plant and animal species, other critical and necessary wildlife habitats, historical and archaeological resources, and scenic vistas. The protection of these areas can be accomplished through an eight-part effort:

1. Improving resource mapping and identification;
2. Incorporation of mapping into town plans and the Regional Plan;
3. Protecting resources through local land use controls (including clustering and transfer of development rights) and state regulations;
4. Enforcement of local and state regulations fully and fairly;
5. Minimizing the impacts of adjacent development on these areas;
6. Encouraging landowners to place conservation easements on important lands;
7. Encouraging and educating landowners to manage their lands in ways that protect and enhance the valuable resources on their lands; and
8. Proposing techniques to compensate landowners for the public benefits provided by these lands.
COMMUNITY REVITALIZATION

Reinvestment in regional centers, villages, and neighborhoods can promote compact settlement and add to the vibrancy of communities. Revitalization can happen through investment in infrastructure, retaining local business and public services, and redeveloping brownfields and other underutilized properties, and can be assisted through participation in Vermont’s Community Revitalization designation programs. These programs include:

**DOWNTOWN DESIGNATION**

Downtown Designation provides communities with the technical assistance and resources they need to make downtown revitalization a community effort. There are three designated downtowns in the Windham Region: Brattleboro, Bellows Falls, and Wilmington.

**GROWTH CENTERS**

The Growth Center program designates areas that are planned for new development in keeping with historic development patterns.

**NEW TOWN CENTERS**

Some Vermont communities developed without a strong central core and this program supports the creation of an area that functions as a new downtown.

**NEIGHBORHOOD DEVELOPMENT AREAS**

The program offers incentives to create compact, walkable neighborhoods that attract more people and business to our existing community centers.

**VILLAGES CENTERS**

Village center designation supports small town revitalization with a variety of benefits to participating communities.

Both Brattleboro and Bellows Falls are Designated Downtowns under the Vermont Downtown Program. Participation in this program requires documentation of a viable downtown center, a commitment to enhancing and maintaining the downtown district and sound financial and administrative plans. The program provides resources to assist with downtown revitalization, including priority funding for state grant programs, downtown transportation and capital improvement funds and an income tax credit for rehabilitation of certified historic buildings.

Vermont’s village center designation is a tool that can be used to support economic vitality in the village core. Currently, the region has 15 state designated village centers (Algiers Village, East Dover, Jacksonville, Jamaica, North Westminster, Putney, Readsboro, Saxtons River, West Brattleboro, West
Dover, Westminster, Westminster Station, Westminster West, Weston, and Whitingham). Villages that receive this designation become eligible for a number of benefits, including tax credits for building rehabilitation and improvements as well as priority consideration for state programs.

The lack of existing infrastructure to support additional growth in some of the region’s villages is a concern. State regulations regarding water and wastewater systems can make it difficult to facilitate development without having centralized systems. The cost of building centralized systems can be high, but infrastructure planning is an integral part of encouraging infill development and compact settlement patterns. This is an important issue for the region and will be a major action item for the duration of this plan’s term.

Public buildings are important components of vibrant downtowns and villages. Many communities have seen economic and social benefits when the post office, the municipal building, the public library, the schools and other important public buildings stay or expand downtown. Conversely, when they leave, the fabric of the downtown and village can begin to unravel.

An example of this issue, in particular for villages, is the local post office and its place in the community. In recent years, the United States Postal Service (USPS) has implemented new or renovated post office projects that had significant negative effects on villages, whether with architectural misfits or by relocating facilities outside their historic settings. Whenever similar projects are proposed, the USPS needs to cooperate actively and effectively with the affected community, the WRC, the Vermont Division for Historic Preservation, and other interested parties, particularly historic preservation trusts and not-for-profit organizations.

Brownfield redevelopment is another important village and downtown revitalization tool because the region hosted a range of industries over the years, including organ manufacturers, print shops, paper mills, lumber mills and marble works. Even some small businesses such as gas stations or dry cleaners may have left a site with contamination that inhibits further development. Many of these former buildings/manufacturing sites have been left vacant or underutilized, often on the real estate market for years. Such abandoned or under-used sites, known as brownfields, are both eyesores and potential threats to public health and are usually found in downtowns or village centers. Often the perception that a site may be contaminated may be enough to limit interest in redevelopment. In 2000, the WRC established the Windham Region Brownfields Reuse Initiative (WRBRI) to help communities address these land use challenges. The program, funded mainly with EPA grants, conducts site assessments, cleanups and related activities at brownfield sites. The WRBRI also provides landowners with a better understanding of the funding sources, benefits, tax incentives available to redevelop such sites, as well as the liabilities and insurance issues related to their redevelopment. The brownfields program has been a success in the Windham Region and will continue as long as there is a need and funding is available.
CONSISTENCY IN MUNICIPAL PLAN AND ZONING ORDINANCES TERMINOLOGY

Town plans in the region contain many different land use designations. While often called by different names, many such land use designations are similar in nature. It is acknowledged that planning at the local level generally includes more specificity and nuance than the designations proposed in this Regional Plan; however, the proposed land use categories in this plan should be considered in local level planning efforts. Towns are encouraged to use these designations and definitions as a way to improve consistency and coordination among municipal plans, and to manage more effectively the region’s lands so that local and regional the goals may be achieved.

ENERGY AND LAND USE PLANNING

Effective land use planning can and should promote energy conservation. Targeting new development toward areas located close to a community’s major roads and existing settlements will minimize the energy consumed by commuting and reduce the energy required to deliver essential services to residents and businesses. Decisions concerning capital expenditures on roads and other municipal infrastructure should be mindful of energy conservation.

Promoting revitalization and infill in downtowns and villages will lead to compact development. Such higher density development would provide more opportunities for alternative transportation such as public transit, walking and bicycling and lessen dependence on the automobile.

The siting, design, and construction of buildings strongly influences the amount of energy needed for heating as well as the amount of electricity needed for lighting. Proper subdivision design, building orientation, construction and landscaping provide opportunities to influence energy conservation both in homes and places of work and as people travel between them.

One final item that will have an effect on the transportation needs and on the energy use of future development is the expansion of broadband and communications technologies and the ability of residents to work remotely. The number of residents working from home has been steadily increasing, and this trend will reduce the travel requirements for residents able to take advantage of this opportunity. This may also mean that individuals will have less need to live in proximity to where they work. This trend is still developing, and the impacts should be monitored for opportunities to improve energy efficiency.
CHAPTER 3

ENERGY

BACKGROUND

Regional energy planning is both relevant and important. While many energy issues are national or global in reach, land use decisions and the way in which the region develops has a direct and lasting impact on the types of energy needed and amount of energy input necessary to sustain the function of that development. 

The Windham Region can lead by example by increasing the efficiency of the region’s energy dependent systems, analyzing its current energy usage, looking for critical areas of improvement, and supporting local energy options that benefit its communities. A reliable supply of energy is critical to our society and way of life. The continuing major theme of this Regional Plan is energy: the diversity and reliability of the energy supply, the short and long-term financial costs to obtain it, and the broad scale environmental impacts and mitigation considerations.

For the purposes of this chapter, energy is defined as usable power that is derived from fuel sources such as transportation fuel, heating fuel, electricity generation sources, etc. Vermonters use a variety of fuel sources to meet their energy needs, all of which present tradeoffs regarding societal and environmental concerns. Most of that energy is imported—all of the petroleum that is used for transportation and space heating, for example, is imported from outside the state, and much of that from outside the United States. Most of Vermont’s hydroelectric power is imported from Canada. The only fuels that are not imported to Vermont are locally grown wood used for heating, and small amounts of locally produced wind, hydroelectric and solar power.

Energy is a global commodity. A reliable supply requires global actions; however energy use is local, as are both the positive and negative impacts of how it is used. State and local governments, businesses and individuals can best prepare for the future by taking action to diversify energy sources, to improve the efficiency of energy use, to stimulate the use of renewable energy resources, and to implement land use strategies that foster and support sustainable energy.

A key premise underlying this energy discussion is the need for significant progress on several fronts:

1. Greater diversification of energy sources, in order to reduce dependency on foreign sources and to increase stability in the event of supply interruptions or cost fluctuations;
2. *Reduced environmental impacts*, especially regarding greenhouse gas emissions, other air quality impacts and subsequent impacts on water quality and other natural resources;\(^\text{18}\)

3. *Increased conservation and efficiency* in all energy uses in order to reduce costs and environmental impacts, and to reduce the region’s vulnerability to energy disruptions;

4. *Ongoing public education* regarding the region’s energy future and what individuals and towns can do to influence it; and

5. *Enhanced local self-sufficiency* in all public policy areas so that the region’s quality of life will be resilient to potential supply disruptions or significant cost increases.

Energy conservation and energy efficiency remain prime areas for investment to realize significant savings in energy use. The region should lead by example to increase energy efficiency and to reduce overall energy consumption. Energy efficiency and conservation should be a primary consideration in all development projects, especially with regards to:

- designing and building housing and commercial structures to capture passive heat and light and to use energy more efficiently and conserve it more effectively;
- fostering the development of local and renewable energy sources;
- encouraging federal and state polices that support more local and distributed electricity generation; and
- accepting local and state regulations that would encourage more energy-efficient land use patterns, or that would require more aggressive and longer-range energy planning.

Reducing the rate of growth in energy consumption for transportation, our primary energy use, will also have positive economic and environmental effects. The relationship between the use of transportation resources on one hand, and land use decisions and subsequent development patterns on the other, are undeniable, yet trends over time have tended toward less efficiency. Sprawl, discussed in the Land Use section of this plan, is scattered development that increases traffic, increases pressure on local resources and consumes open space, turning farms and forests into rural subdivisions that serve cars better than people. The automobile-based American culture has made this possible. To the extent that society has continued to allow and, in some cases, even encourage sprawl development, society is forcing itself and future generations to spend more money and consume more energy for automobile transportation than would otherwise be necessary. Conservation and efficiency measures may present

\(^{18}\) Some impacts originate elsewhere, such as acidification and mercury deposition in surface waters from electric power plants to the west of New England, and some locally, such as air impacts of carbon monoxide and soot from gasoline and diesel engines.
the greatest—and closest to home—new energy “sources,” and interact with transportation policies in many ways, including:

- the extent to which people drive private motor vehicles instead of using public transportation or walking or cycling;
- the extent to which people design and develop communities to favor automobiles over other modes of transportation; and
- the extent to which people choose energy-efficient vehicles when driving.

While transportation does account for a significant segment of the state’s energy use, that topic is covered in detail in the Windham Region Transportation Plan. Therefore, this chapter will focus primarily on the remaining sectors of energy use, residential, commercial, and industrial. The following sections of the chapter will cover the current energy use and projections for the State, energy efficiency and conservation, energy sources, and siting of energy generation projects.

**STATE AND REGIONAL ENERGY USE**

This section discusses the ongoing and developing trends in energy use in the State and in the Windham Region. Because energy information is generally collected on a statewide basis, the information provided at the beginning of this chapter will primarily be statewide data, but can be interpreted as closely mirroring regional trends in energy use.

**NOTE ON ENERGY TERMINOLOGY**

A significant technical note should be made here, and that is the distinction between energy measured at the point of consumption, called “end-use,” and energy measured as generated, called “primary-use.” End energy use is measured at the point of use, as it enters—or is delivered to—the consumer’s home, building or vehicle. Primary energy use includes the delivered energy plus the energy that is lost in generation, transmission and distribution. This is especially important in the case of electric generation because thermal power plants can shed up to two units of heat energy for every one unit of electric energy that is produced. End-use consumption is the measure most often used in reports of energy use because it provides a better baseline for comparison. It will be referenced here when that data is available.
ENERGY END USE AND COST TRENDS

In terms of end-use consumption, transportation accounted for an estimated 35 percent of the energy used in Vermont in 2010. This is a significantly higher percentage when compared to end-uses nationwide. Transportation accounted for only 27 percent of the energy used within the U.S. in 2010.

FIGURE 3-1: VERMONT END-USE SECTOR ENERGY CONSUMPTION ESTIMATES, 2010

In Vermont, transportation (Figure 3-1) eclipses all other end-use sectors by 5 percent or more. According to the Vermont Comprehensive Energy Plan (CEP) “[t]his difference can be attributed to Vermont’s higher dependence on automobile transportation due to the State’s rural character, as well as a proportionally smaller industrial base.” This characterization aptly describes the Windham Region, which primarily consists of rural lands and does not host many industries. The Windham Region Transportation Plan is an addendum to this plan and covers this topic in depth and lays out transportation energy policies for the region. The Transportation Plan can be referenced here: http://www.windhamregional.org/images/docs/trans-plan/01_transplan_policies.pdf.

Of the three sectors that are the focus of this chapter, residential, commercial, and industrial, the single largest consumption element in each of these sectors is electrical system energy losses. As described by the U.S. Energy Information Administration (EIA), these losses are “incurred in the generation, transmission, and distribution of electricity plus plant use and unaccounted for electrical system energy losses.” According to the EIA, annual national electricity transmission and distribution losses average about 7 percent of the electricity that is transmitted in the United States. For Vermont in 2010, the estimated transmission and distribution losses were 4.92 percent.

The remainder of electrical system energy losses are attributed to generation and to “and unaccounted for electrical system energy losses.” One measure of the efficiency of power plants that convert a fuel into heat and the heat into electricity is the “heat rate”, which is the amount of energy used by an electrical generator or power plant to generate one kilowatt-hour (kWh) of electricity. For 2011, the efficiencies for coal, petroleum, natural gas, and nuclear power plants were estimated at 32.7 percent, 31.5 percent, 41.9 percent, and 32.6 percent, respectively. The EIA does not have estimates for the efficiency of generators using hydro, solar, and wind energy. This amount of energy lost due to generation and transmission is significant, and calls attention to the large amount of energy wasted through system inefficiencies.

When the fuel sources seen in Figure 3-1 are combined into an aggregate fuel use chart; the breakdown is shown in Figure 3-2.

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21 U.S. Energy Information Administration, “To calculate T&D losses as a percentage, divide Estimated Losses by the result of Total Disposition minus Direct Use. Direct Use electricity is electricity that is generated at facilities that is not put onto the electricity transmission and distribution grid, and therefore does not contribute to T&D losses.” http://www.eia.gov/electricity/state/vermont/

Based on current estimates, fossil fuel based energy sources accounted for 57.9 percent of the energy used in the State. Renewable energy sources accounted for 26.8 percent, while nuclear energy sources, undetermined sources, and market electric sources accounted for 15.3 percent. As of 2013, no Vermont utility company had power purchase agreements with Vermont Yankee Nuclear Plant; however nuclear power still remains a significant source of baseload energy for the New England grid (http://isoexpress.iso-ne.com/guest-hub). In 2012, the State of Vermont amended the Sustainably Priced Energy Economic Development (SPEED) goal (adopted in 2005) with the Total Renewable Energy Goal which states that starting in 2017, 55 percent of each retail electric utility's annual sales must be met by renewable sources, increasing by 4 percent every third year until 2032, when 75 percent of sales must be met by renewables (see Act 170). In 2011, the State has also adopted the Comprehensive Energy Plan (CEP) which sets a goal that by 2050, 90 percent of energy needs across all sectors come from renewable resources.
Compared with other states, Vermont ranked 41st in total energy consumption per capita in 2011. However, Vermont has the second highest per capita energy use in New England, following Maine, as well as a higher per capita energy use than New York. Nationwide comparisons show that Vermont, as well as the rest of the New England States, rank in the lowest categories for both total energy production and total net electricity generation (Figure 3-3).

**FIGURE 3-3: NATIONWIDE COMPARISON OF ENERGY DATA**

In 2011, the State of Vermont was 46th in terms of total energy production, and for September 2013, ranked 49th in total net electricity generation. These low production rates are coupled with high energy cost rates for the State. Figure 3-4 shows the cost comparison of Vermont energy to other New England States and to the U.S. Average.

**FIGURE 3-4: COMPARISON OF VERMONT/NEW ENGLAND ENERGY PRICES TO U.S. AVERAGE**

For the average retail price of electricity, the state of Vermont has the 3rd highest retail rate at 17.73 cents/kWh. High costs for energy are seen in the natural gas sector as well, where Vermont ranks fourth for highest costs in the nation for January 2013. While the Windham Region does not currently have a natural gas line supplying any part of the region, facilities for delivering compressed natural gas to businesses are beginning to come online, and could play a larger role in the region in the future. Overall, Vermont has the third highest cost for energy in the nation, across all sectors, at an average cost of $27.77 per million Btu, trailing Hawaii and Connecticut.

Comparing costs for residential propane in New England to the rest of the U.S., the average price for a gallon of propane tracks about $0.50 more than the national average. Diesel fuel costs in New England similarly track slightly higher than the U.S. average. Residential fuel oil and gasoline are the only fuel sources listed here that do not show a significant price disparity within New England and in comparison to the national averages. For the heating months from January 2011 to March 2013, the price of residential fuel oil in New England tracked almost exactly with the U.S. average. Vermont gasoline prices similarly followed the U.S. average fairly closely for monthly average price in 2012.

Looking at historical cost trends for energy in the state, adjusting for inflation (using the U.S. Consumer Price Index), the price of electricity has declined at an annual rate of 0.3 percent since 1990—that is, the price of electricity has increased less than the typical consumer basket of goods measured by the CPI (Figure 3-5). After accounting for inflation, distillate fuel costs have increased at an average annual rate of 1.9 percent, gasoline has increased 1.0 percent annually, and biomass has increased 1.7

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percent annually. It should be noted here that energy prices change quickly, and this data is only through 2009.

The high cost of energy in the State and in the Windham Region means that residents and businesses are paying much more for the energy they use in comparison to the surrounding States and the country on a per unit basis. Nowhere is this fact clearer than in the comparison of heating fuel options for the region.

Based on a per unit comparison, the most expensive heating fuel in January 2013 in Vermont was electricity, followed by propane, kerosene, and fuel oil (Figure 3-6). The remaining sources of heating fuel were between 43 percent and 67 percent less than the cost of these heating fuels.

This fact is especially significant when the primary home heating fuels are compared across Windham County, the State of Vermont, and the U.S. (Figure 3-7). Whereas nationwide the majority of homes are heated with utility gas, or natural gas, a comparatively small number of Vermont and Windham County homes are heated with this relatively inexpensive fuel source (16 percent and 1 percent respectively).

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24 This figure is calculated using the efficiency factor of electric resistance heaters. New technologies are being developed to allow heat pumps to be considered as far north as the Windham Region. These systems are markedly more efficient for heating than electric resistance heaters, and reduce the cost per MMBtu significantly.
Fuel oil is the heating source for 48 percent of Vermont homes, and for nearly 60 percent of Windham County homes. Compared with other options, this is a fairly expensive fuel source for heating homes. As natural gas is not currently available for homeowners in the region, the only other attractively priced alternatives are pellets and cordwood. This fact is reflected in the relatively high number of homes currently heating with wood as compared to the State and Country.

**ENERGY USE PROJECTIONS**

Demand for energy in Windham Vermont and in the region is driven largely by the size and growth of the population, the growth and structure of the state’s economy, and the transportation patterns of both Vermonters and visitors to the state. Overall energy demand grew to 158.1 trillion Btu (British thermal units) in 2009 from 135.4 trillion Btu in 1990, a 17 percent increase. Meanwhile, the leading drivers of energy demand—real gross domestic product, population, and vehicle miles driven—grew by 51 percent, 10 percent, and 31 percent, respectively. During this 19-year period, changes in annual energy use ranged from a drop of 4.9 percent during the recession year of 1990 to an increase of 8.7 percent in 2004, a year of above-average economic growth.
From 1990-1999, energy demand increased at a 1.8 percent rate of growth, but has been close to 0.0 percent for the past 10 years. The year 2010 end-use energy consumption levels were about equivalent to 2000 levels. This is a result of a steady decrease in energy use since 2004, as shown in Figure 3-8. The combination of both state energy efficiency programs and the recession impacted energy demand across most end-use sectors.

**FIGURE 3-8: TOTAL END-USE ENERGY CONSUMPTION ESTIMATES, 1960-2010, VERMONT**


The 2011 Vermont Comprehensive Energy Plan noted the following trends in each of the energy use sectors:

**Residential**—Residential energy demand has increased a total of 14 percent since 1990, a growth rate of only 0.7 percent per year despite the net increase in households. Notable is the declining trend in residential energy demand per household; demand has declined 0.28 percent annually since 1990.

**Commercial**—Commercial energy demand increased by 22 percent between 1990 and 2009, or 1.07 percent per year. This increase can be attributed largely to economic expansion in Vermont’s service sector—business and professional services, and travel and tourism sectors. On a per-employee basis, using employment in the non-agricultural, non-manufacturing sector, the trend in energy demand was slightly negative, −0.4 percent, between 1990 and 2009.
Industrial—Energy demand in the industrial sector has decreased 3.2 percent since 1990, or –0.2 percent per year, with most of the decline occurring in the 2007–09 recession years. The absolute decline in energy demand coincided with declines in the number of establishments and industrial employment (manufacturing and mining). Energy demand per industrial employee has increased 1.5 percent annually since 1990, perhaps a reflection of increased output and productivity per existing employee.

Transportation—The transportation sector posted the largest increase in state energy demand, increasing 27 percent between 1990 and 2009. Growing at 1.3 percent per annum, the transportation sector is Vermont’s fastest-growing end-use energy sector. Transportation-sector energy use is determined by vehicle miles traveled by residents, businesspeople, visitors to the state, and those driving through the state, as well as by aircraft travel demand. As stated before, the Transportation Plan addresses this topic with regards to energy planning and policy for the region. (Please refer to the Transportation Plan for more information on Energy in the Transportation sector.)

In terms of energy efficiency in producing goods and services, Vermont inflation-adjusted economic growth (Real GDP, 2005 dollars) increased 51 percent between 1990 and 2009. Additional employment, industrial output, and higher wages typically increase the demand for energy resources; however, the Vermont economy has been able to accommodate additional (real) economic growth with relatively less energy input. Over the same period of time, energy consumption for all end uses increased by only 17 percent. Figure 3-9 illustrates the trending relationship between Vermont real GDP growth and the total consumption of energy (in Btu).

A baseline target set by the 2011 Comprehensive Energy Plan is to extend the historic pattern of energy intensity through 2030. Based on current economic forecasts, the straight-line projection implies that Vermont’s inflation-adjusted GDP could grow by 60 percent by 2030, with only a 20 percent growth in total Btu energy consumption over that same time period.
Compared to other states, Vermont ranked 19th in energy intensity in 2009; that is, it consumed fewer Btu per dollar of GDP than 31 other states. However, within the New England region, Vermont ranked behind Connecticut (which was second nationally), Massachusetts (third), Rhode Island (seventh), and New Hampshire (ninth). Vermont’s transportation, commercial and industrial activity is different than activities in these more urban states; however, this relationship is important to note if Vermont is going to stay competitive in the regional market with other New England states.

The final discussion in this section addresses trends in greenhouse gas emissions. Vermont’s current energy demand relies heavily upon fuel combustion. The combustion of carbon-based fuels results in emissions into the atmosphere of air pollutants that degrade environment and health, and greenhouse gases (GHGs) that are altering the climate. Energy consumed for transportation, space heating, and electricity generation accounts for more than 80 percent of Vermont’s statewide GHG emissions annually, and will continue to do so in the future if substantial changes are not made to the way Vermont generates and use energy. As illustrated in Figure 3-10, Vermont has made progress in

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25 Gases that trap heat in the atmosphere are called greenhouse gases. More detail about greenhouse gas emissions can be found at http://www.epa.gov/climatechange/ghgemissions/gases.html.
reducing GHG emissions, 2010 levels were approximately 13 percent lower than the 2004 emissions peak, yet the state fell short of its 2012 goal of reducing GHG emissions to 25 percent below 1990 levels. Further steep emissions reductions will be required to meet the 2028 goal (50 percent below 1990 levels).

FIGURE 3-10: VERMONT HISTORICAL GHG EMISSIONS, GHG REDUCTION GOALS, AND DRAFT FORECAST OF FUTURE GHG EMISSIONS


Major reductions in the region’s reliance on fossil fuels will not happen overnight but, thoughtful use of energy (e.g., conservation, efficiency), coupled with greater reliance on existing clean renewable energy and efficiency technologies, can bridge the gap in the short term as Vermont makes the necessary larger shifts in energy supply and infrastructure that are summarized in the CEP. Among other strategies, the plan is to use more renewable sources of energy and fewer greenhouse gas–intensive sources through a shift toward more efficient and electric vehicles and renewable heating.

That shift is already visible in the primary energy consumption trend estimates through 2010 (Figure 3-11). From 2002 through 2010 (area highlighted in yellow on the chart), fossil fuel primary energy consumption tended to decrease, while renewable energy has seen an overall increase. In 2008, the use of renewable energy for primary energy consumption surpassed its previous peak in 1985 and continued its upward trend. The difference in the peaks is in the type of renewable energy that saw a major increase during each of these time periods. Whereas in 1985, an increase in wood and waste renewable energy was the major factor, in 2008 through 2010 it was due to a continuing increase in the use of wood and waste combined with a growth in hydroelectric energy use. Solar/photovoltaic and wind energy also grew to account for a combined 1.0 percent of the renewable energy consumed.
The State of Vermont has enacted several pieces of legislation aimed at reducing GHG emissions which are directly related to energy production and energy use. A summary of this legislation is found the sidebar text box. State and federal governments have more control of energy supplies, sources, and pricing than do municipalities, but regional efforts can play a role in energy efficiency, conservation, and development, particularly by influencing land use, infrastructure development, and energy generation siting decisions. Reducing the region's dependence on outside energy sources and increasing the energy efficiency in concert with overall population and economic growth will contribute positively to the regional economy and quality of life.
STATE POLICIES CONCERNING GREENHOUSE GAS EMISSIONS AND ENERGY

10 V.S.A. § 578(a): To reduce emissions of greenhouse gases from within the geographical boundaries of the state and those emissions outside the boundaries of the state that are caused by the use of energy in Vermont in order to make an appropriate contribution to achieving the regional goals of reducing emissions of greenhouse gases from the 1990 baseline by:

(1) 25 percent by January 1, 2012;

(2) 50 percent by January 1, 2028;

(3) if practicable using reasonable efforts, 75 percent by January 1, 2050.

10 V.S.A. § 580(a): To produce 25 percent of the energy consumed within the state through the use of renewable energy sources, particularly from Vermont’s farms and forests.

10 V.S.A. § 581: To increase energy efficiency of buildings

(1) To improve substantially the energy fitness of at least 20 percent of the state’s housing stock by 2017 (more than 60,000 housing units), and 25 percent of the state’s housing stock by 2020 (approximately 80,000 housing units).

(2) To reduce annual fuel needs and fuel bills by an average of 25 percent in the housing units served.

(3) To reduce total fossil fuel consumption across all buildings by an additional one-half percent each year, leading to a total reduction of six percent annually by 2017 and 10 percent annually by 2025.

(4) To save Vermont families and businesses a total of $1.5 billion on their fuel bills over the lifetimes of the improvements and measures installed between 2008 and 2017.

(5) To increase weatherization services to low income Vermonters by expanding the number of units weatherized, or the scope of services provided, or both, as revenue becomes available in the home weatherization assistance trust fund.
Energy

CONSERVATION AND EFFICIENCY

Conservation and efficiency may be our most readily accessible “sources” of additional energy. Just as avoided costs are equivalent to additional income, avoiding increases in energy demand through effective conservation measures is equivalent to discovering new sources. Energy efficiency generates economic activity largely through purchase and installation of energy efficient goods and services and through net energy savings to ratepayers. Households save on energy costs and can then spend those dollars money in the local economy. Businesses have lower energy costs that improve their bottom line and enable them to be more competitive. System benefits, such as reduced market clearing prices and avoided transmission and distribution investments, also have positive effects on the economy.

Energy efficiency remains the lowest cost resource available within energy portfolios. The Alliance Commission on National Energy Efficiency Policy estimates that the U.S. can double its energy productivity, or intensity, by 2030. Vermont has already begun to do this as shown earlier in Figure 3-8. According to a report put out by American Council for an Energy-Efficient Economy, Vermont led the nation in utility and public benefits programs and policies for energy efficiency from 2005 to 2011.

Local planning efforts that are sensitive to energy issues promote settlement patterns that minimize transportation requirements and encourage and development projects that conserve energy. Zoning bylaws, subdivision regulations, and the Act 250 process are primary vehicles municipalities can use to promote energy efficient development. The siting, design, and construction of buildings strongly influences the amount of energy needed for heating as well as the amount of electricity needed for lighting. Energy can be distributed and consumed more efficiently by concentrating housing in towns and villages and by minimizing dispersed settlement that is distant from existing power distribution systems. The Southern Windsor County Regional Planning Commission has developed a guidance document, Energy Policies and Standards: A Guide for Southern Windsor County Communities, to help towns and regions incorporate language in their plans and bylaws to promote energy efficient design.

As part of the effort to help increase the efficiency of the region’s municipal buildings, from 2010 through 2012 the Windham Regional Commission (WRC) worked with towns to identify areas where savings could be obtained through weatherization retrofit projects. Through both state and federal Energy Efficiency and Conservation Block Grants (EECBG), the WRC’s Energy Committee distributed funding to complete successfully fourteen energy audits in seven of the region’s towns, and awarded grants for weatherization retrofits to seven towns. The projects included the Newfane Town Office, Londonderry Town Offices, Grafton Town Hall, Marlboro Town Offices, Weston Town Garage, Putney Town Hall, Windham County Sheriff’s Office, Windham County Superior Courthouse, and Bellows Falls

Middle School. The largest investments in these projects were put towards insulation and air sealing improvements.

In February of 2013, a performance review was conducted on the seven thermal envelope retrofit projects completed in 2011. Post completion, the average reduction in fuel oil consumption for all projects was 30 percent. This equates to a total of approximately $14,190 in fuel oil cost savings for the first year of performance. These projects also saw a total energy savings of 570 MMBTUs for 2012, or an avoided 94,392 lbs of CO2 that would otherwise have been released into the atmosphere.\(^\text{27}\)

Based on the results of these projects, the WRC is currently seeing a 14.0 percent return on investment for the total cost of these seven projects, with an average payback period of about 7.1 years. To help promote additional weatherization projects in the future, the WRC is now publicizing the success of these projects through the publication of *Weatherizing Town Buildings: What Local Officials and Energy Committees Need to Know*.

The [Vermont Home Energy Challenge](http://www.epa.gov/chp/documents/fuel_and_co2_savings.pdf), spearheaded by Efficiency Vermont, is another effort to significantly increase the energy efficiency of buildings in Vermont. Under this campaign, town energy committees and other local partners will participate in an “Energy Challenge” to compete with other towns within their region to achieve a target of weatherizing 5 percent of the homes within their community in a one-year period.

**ELECTRICAL ENERGY EFFICIENCY**

Driven by modest gains in population and overall economic growth, Vermont’s annual demand for electricity has had an historical growth rate of 1.5 percent over the last 20-year period; however, since 2005, annual electricity consumption has seen a decline. This pre-recession decline can be attributed in part to the state’s electric efficiency investment and programs.

Figure 3-12 depicts the historical summer peak load and 20-year extreme weather, or 90 /10, forecast adjusted for demand-side management (energy efficiency) effects and demand response. The forecast projects load levels in 2021 and 2031 of 1075 MW and 1160 MW, respectively. The growth rate during this 20-year period is approximately 0.5 percent, down from the historical growth rate of 1.5 percent over the last 20-year period.

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\(^{27}\) CO2 Emissions Factor for Residual Fuel Oil #6, 165.6 lbs/MMBtu, [http://www.epa.gov/chp/documents/fuel_and_co2_savings.pdf](http://www.epa.gov/chp/documents/fuel_and_co2_savings.pdf)
Since 2000, the energy efficiency utilities (EEUs) have acquired important electric efficiency resources that have met a significant portion of Vermont’s electric needs at a lower cost than would have otherwise been paid by ratepayers. In 2007, Vermont became the first state to offset fully its projected underlying load growth through energy efficiency program activities. Vermont continues to acquire savings at a pace that leads the nation. Figure 3-13 shows the cumulative impact of electric energy savings achieved by the EEUs through 2011. Recent savings translate into an annual load growth savings of more than 1.5 percent per year.

Electric energy efficiency investments not only reduce annual electric consumption, they reduce peak consumption as well. Peak consumption can be costly to cover in the market; it also affects the Regional Network Service rate charged to all Vermonters for pooled transmission facility projects and is more likely to contribute disproportionately to GHG emissions. Peak reduction has the additional benefit of reducing the need for transmission and distribution infrastructure—if it occurs in areas where the system is constrained by load growth.
Smart Grid infrastructure and digital meters have significant potential to increase system reliability and energy efficiency. Digital meters will increase system reliability by allowing utilities to resolve outages more quickly or possibly avoid them, to improve power quality (correcting voltage irregularities), and to provide consumers data about their electricity use patterns. This data can empower consumers to manage their energy choices more closely, though anecdotal data at this time stresses that such information has not yet been supplied in a usable format. For this information to have the greatest impact, it needs to be easily accessed, understood, and referenced.

Source: Efficiency Vermont, Annual Report, 2011
STATE ENERGY POLICIES AND PLANS

Energy generation and supply is a complex process, and requires constant collaboration and planning between multiple entities including towns, regional authorities, utilities, power suppliers, and State and Federal agencies. Below is a list of the programs and plans currently involved in managing Vermont’s energy supply:

THE ENERGY EFFICIENCY UTILITY

Efficiency Vermont (EVT) provides technical assistance, rebates, and other financial incentives to help Vermont households and businesses reduce their energy use.

COMPREHENSIVE ENERGY PLAN

The Vermont Comprehensive Energy Plan (CEP) reviews all forms of energy used in Vermont and establishes plans for addressing the State’s energy needs in ways that improve environmental quality, affordability, and reliability.

TRANSMISSION PLANNING

Every three years, VELCO, the owner and operator of Vermont’s transmission system must publish a three-year update of its 20-year Vermont Long-Range Transmission Plan. The plan identifies reliability concerns and the transmission alternatives to address those concerns. The Plan also serves as the basis for considering whether alternatives, including new generation and energy efficiency, can meet Vermont’s reliability needs.

REVIEW OF ACT 250 APPLICATIONS FOR ENERGY EFFICIENCY

The standard for permit review under Act 250, Vermont’s land use statute, requires applicants to use the “best available technology” for energy design and equipment.

BUILDING ENERGY STANDARDS

The Vermont Residential Building Energy Standards (RBES) applies to all new residential construction, including additions, alterations, renovations, and repairs. The Commercial Building Energy Standards have been revised as of October 3, 2011. Revisions took effect January 3, 2012 and apply to construction commenced on and after the date they became effective. CBES applies to all new commercial construction, including additions, alterations, renovations, and repairs.
ENERGY SOURCES

This plan has been referring to the various energy sources available in the following categories: fossil fuel based energy sources, nuclear energy sources, and renewable energy sources. The following discussions of available energy sources to the region will be grouped according to these categories. The categories are addressed in order of magnitude based on the size of their contribution to Vermont’s energy supply: fossil fuels, nuclear energy, and renewable energy sources.

FOSSIL FUEL BASED ENERGY SOURCES

PETROLEUM

An estimated 47.5 percent of all energy used in Vermont is from petroleum products, including motor gasoline fuel, distillate fuel oil, liquefied petroleum gas (LPG), jet fuel, and residual fuel oil. Petroleum is used primarily for transportation, but heating is also significant, with petroleum accounting for an estimated 70 percent of all home heating energy used in Windham County. Inefficient land use patterns and the related growth in vehicle miles traveled, even with fairly stable heating needs, contribute to maintaining or increasing the dependency on this fuel source. A number of tradeoffs accompany our high reliance on oil:

- It has been readily available and affordable for over 100 years, but continued dependence upon it becomes a liability when supplies fall or prices rise significantly;
- It has fostered the automobile-based—and automobile-dependent—dispersed land use patterns that increasingly alter the landscape; and
- Oil combustion, along with use of other fossil fuels, has a significant negative impact on both air and water quality.

The general public is increasingly concerned about the potential consequences created by such a high reliance on fossil fuels, and in particular on petroleum. Some are concerned about the “peak oil” phenomenon, which suggests that nearly 50 percent of the earth’s oil supply has been consumed and as sources easiest to access are consumed, the remaining oil will become increasingly difficult and expensive to obtain. With petroleum net imports to the United States at 40 percent in 2012,28 others suggest that, even if supplies are much greater than some fear, the nation’s heavy reliance on foreign oil can lead to the same circumstance as a result of political and economic unrest. Possible implications include not only the price of motor fuel and heating oil, but also impacts on manufacturing processes, water quality.

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28 Energy Information Administration, How Dependent are We on Foreign Oil? May 10, 2013
http://www.eia.gov/energy_in_brief/article/foreign_oil_dependence.cfm
retail supply deliveries, costs of fertilizers and industrial chemicals, and others. The technique of hydraulic fracturing has made previously unavailable continental oil reserves now available, but there still remain questions of the environmental impacts of this process and the impacts this greater availability will have on efforts to curb climate change.

FIGURE 3-14: U.S. CRUDE OIL FIRST PURCHASE PRICE ($ PER BARREL)


The cost per barrel of oil spiked to $94.04 in 2008, plummeted during the recession in 2008 and 2009, and peaked again in 2011 at $95.73 (Figure 3-14). The volatility and overall rapid increase in petroleum prices over the last decade had significant impacts throughout the US economy on personal and business expenses for both transportation and heating. It has become clear that other sources of energy must be further developed and utilized as a buffer against possible future disruptions in petroleum supplies and related price volatility. Energy efficiency measures and conservation are a first step, such as weatherizing buildings across all sectors. Electrification of the transportation system is another avenue for significantly reducing the region’s reliance on petroleum products. Installing alternative heating systems, or redundant heating systems such as backup pellet burning, will also help businesses and homeowners stabilize their heating costs. The WRC should continue to support legislation and policies that help the towns and their residents overcome financial and regulatory obstacles to reducing their reliance on petroleum based fuel sources.

NATURAL GAS AND LPG

Nationwide the cost of delivered natural gas has dropped about 23 percent since 2008 because of technical innovations in extraction related to the process of hydraulic fracturing (Figure 3-15). The price
Energy of natural gas in Vermont has dropped about 8 percent in that same time period. This significant decrease in price has positioned natural gas as a significant rival to other fossil fuel energy sources. As of June 2013, natural gas fuel generation is a major feedstock of the electricity supply in New England.  

**FIGURE 3-15: NATURAL GAS PRICE TRENDS ($ PER THOUSAND CU FT)**

![Graph showing natural gas price trends](http://www.eia.gov/dnav/ng/hist/n3010us3A.htm)


Currently, no natural gas pipelines provide gas to the Windham Region. Vermont has a single natural gas distribution company, Vermont Gas Systems, Inc. (VGS) based in Chittenden County. VGS's transmission line connects to the TransCanada Pipeline at Highgate Springs, and the Company presently serves customers only in Chittenden and Franklin Counties.

In March 2013, a Vermont company known as NG Advantage LLC began delivering compressed natural gas (CNG) to its first customer, Soundview Vermont Holdings LLC ("Soundview"), for its recycled tissue, towel, and napkin operations in Putney, Vermont. NG Advantage LLC plans to deliver natural gas to large industrial, commercial and institutional users not connected to a pipeline. Trucks from NG

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30 The "city gate" is generally the point where natural gas is transferred from an interstate or intrastate pipeline to a local natural gas utility. The "city gate price" is the sales price of the natural gas at this point: the price reflects the wholesale/wellhead price as well as the cost of transporting the natural gas by pipeline to the citygate. Citygate prices can show tremendous variation between regions, often reflecting regional usage patterns, weather trends and the number of competing interstate pipelines serving each region.
Advantage deliver CNG from the compressor station in Milton, Vermont. NG Advantage compresses natural gas from this existing pipeline into specialized trailer-mounted containers and delivers it via public highways directly to customer facilities. The trailers are monitored and replaced before they are depleted.

LPG, or propane, is not used for electricity generation, but is utilized as a combustion fuel for heat generation and vehicle engines. LPG accounted for an estimated 5.3 percent of Vermont’s overall energy consumption in 2010 and provided an estimated 13 percent of the homes with primary heating fuel for Windham County in 2011. LPG is also used for cooking and hot water. Overall, the use of LPG in Windham County has remained constant from 2000 to 2011.

Among fossil fuels, natural gas generally emits the lowest levels of almost all pollutants per unit of energy used. \(^{31}\) Carbon dioxide emissions per unit of energy used are significant; however, CO\(_2\) from natural gas is emitted at the lowest level of any fossil fuel energy source, followed by LPG (Table 3-1). Nitrogen oxide emissions from natural gas and LPG are nearly the same and are higher than the level of NO\(_x\) emissions from distillate fuel or wood use. Natural gas emissions are very low in sulfur oxides and low in particulates, carbon monoxide, and volatile organic compounds. Natural gas and LPG are both classified as alternative fuels for vehicles and both exemplify clean burning, characteristics with minimal harmful emissions. Additional environmental issues related to natural gas can include drilling and pipeline construction impacts and gas leakage from distribution systems (usually in small amounts). These impacts include both short- and long-term disruption of wetlands, streams and rivers, water supplies, fields, woodlands, and endangered species habitats. Methane leakage from natural gas

\[\text{TABLE 3-1: CARBON DIOXIDE EMISSIONS FROM FOSSIL FUEL SOURCES}\]

<table>
<thead>
<tr>
<th>Fuel</th>
<th>Lbs of CO(_2) per Million Btu</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural gas</td>
<td>117</td>
</tr>
<tr>
<td>Propane</td>
<td>139</td>
</tr>
<tr>
<td>Gasoline</td>
<td>157.2</td>
</tr>
<tr>
<td>Diesel fuel &amp; heating oil</td>
<td>161.3</td>
</tr>
<tr>
<td>Coal (bituminous)</td>
<td>205.7</td>
</tr>
<tr>
<td>Coal (subbituminous)</td>
<td>214.3</td>
</tr>
<tr>
<td>Coal (lignite)</td>
<td>215.4</td>
</tr>
<tr>
<td>Coal (anthracite)</td>
<td>228.6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fuel</th>
<th>Lbs CO(_2) per kWh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural gas</td>
<td>1.12</td>
</tr>
<tr>
<td>Distillate Oil (No. 2)</td>
<td>1.55</td>
</tr>
<tr>
<td>Residual Oil (No. 6)</td>
<td>1.67</td>
</tr>
<tr>
<td>Coal</td>
<td></td>
</tr>
<tr>
<td>Bituminous</td>
<td>2.03</td>
</tr>
<tr>
<td>Sub-bituminous</td>
<td>2.1</td>
</tr>
<tr>
<td>Lignite</td>
<td>2.13</td>
</tr>
</tbody>
</table>


distribution systems can have serious environmental consequences because methane is a potent greenhouse gas. However, the leakage rate of methane from natural gas pipelines is estimated to be very small in most U.S. cities. In Vermont, VGS has replaced all its cast-iron and bare steel mains, elements that are a significant source of leaks in other states.

Despite the important concerns about its environmental impacts, if regulations are put in place to help control methane leaks into the atmosphere, the utilization of additional natural gas to replace other fossil fuels can result in an improved environmental profile for Vermont.

COAL

Statewide, coal provides an insignificant amount of the total energy use. Windham County’s use of coal for home heating was estimated at 1 percent for 2011. Nationwide, an equal share of electric power was generated from coal and natural gas in April 2012, however most recent preliminary data through March 2013 show coal has generated 40 percent or more of the nation's electricity each month since November 2012, with natural gas fueling about 25 percent of generation during the same period. Nonetheless, the coal share of total generation has remained well below its typical range prior to 2009 (48 percent to 51 percent).³²

The high use of coal as for electricity generation nationwide has a direct impact on Vermont and on the Windham Region through the harm done to air and water quality by deposition of mercury and acid rains from coal-fired power plants.

NUCLEAR ENERGY SOURCES

The Windham Regional Commission has always maintained a neutral position on the question of the continued operation of the Entergy Nuclear Vermont Yankee power station located in Vernon. The WRC has taken this position so it could facilitate discussion among those on all sides of the issue. The Commission has, however, been very involved in Vermont Public Service Board dockets since 2007, arguing not for whether or not the plant should continue operation, but rather for what is in the best interest of the region when the plant does eventually cease operation, whenever and for whatever reason that occurs. The WRC interests are to mitigate to the greatest extent possible the economic, employment, cultural and social impacts of the plant’s closure on the region; to advocate for the fiscal well-being of towns; and to advocate for the restoration of the Vermont Yankee site to greenfield status as soon as possible so that it may be reused. These positions were most recently stated in the WRC’s Initial Brief filed on August 16, 2013 in Public Service Board docket 7862. The following summarizes those positions excerpted from the brief:

³² EIA, http://www.eia.gov/todayinenergy/detail.cfm?id=11391
We ask that whether or not a Certificate of Public Good is granted, the Public Service Board consider the following:

- Recognize the value of the Station to the region and state while it is operating, and that the general good would be best served if, upon cessation of operations, the Station is promptly decommissioned with complete site restoration so that the site can be reused and serve the orderly development of the region and state.

- Require that ENVY (Entergy Nuclear Vermont Yankee), ENO (Entergy Nuclear Operations), and Entergy Corporation be held jointly and severally responsible for all costs associated with operations, decommissioning, spent fuel management, and site restoration.

- Require the prompt and complete decommissioning and site restoration of the VY Station after shutdown (whenever that occurs) and prohibit the use of SAFSTOR. The best way to accomplish this is to ensure the decommissioning trust is adequate.

- Recognize the Decommissioning Cost Analysis prepared by TLG is inadequate. The Board should specifically recognize the Decommissioning Cost Analysis and Decommissioning Trust Fund do not adequately account for the costs of removing all structures, reasonable property taxes, and additional elements identified by other parties. The Board should require that Entergy VY fully fund the decommissioning trust to cover all potential costs associated with radiological decommissioning, spent fuel management, and complete site restoration without the use of SAFSTOR.

- Require Entergy VY to meet its MOU (memorandum of understanding) commitment to remove “all structures” as part of site restoration, rather than just removing structures to three feet below grade.

- Require Entergy VY to establish separate and adequate funds to cover radiological decommissioning, spent fuel management, and site restoration, and require substantial additional payments into those funds.

- Require Entergy VY to identify a suitable location for a second ISFSI (independent spent fuel storage installation).

- Require Entergy VY to consider shifting spent fuel from wet to dry storage, or alternatively require a payment-in-kind into the decommissioning trust as if fuel had been moved. Additionally, the Board should require that Entergy VY provide funding to the decommissioning trust to cover all the costs of managing spent fuel derived from any period of extended operations after March 21, 2012.
Require specific actions from Entergy VY to comply with its commitment to use its “commercial best efforts” to have the spent fuel removed from Vermont.

The WRC feels that these positions are in the best interest of the region and the state. What Entergy Nuclear Vermont Yankee intends to do upon closure is on the record, under oath, before the Public Service Board. The Commission’s position was developed in response to what has been entered into the record. The Public Service Board docket remains open, and the WRC believes that these positions should serve as the primary point of negotiation between the State and Entergy going forward. This filing, and other information related to the Commission’s work on Vermont Yankee, can be found on the WRC website at http://windhamregional.org/vermont-yankee.

Additionally, at the request of the Town of Vernon and using a Municipal Planning Grant, the WRC prepared a study titled, Resiliency Action Plan for the Town of Vernon in Preparation for the Eventual Closure of the Vermont Yankee Nuclear Power Station. This plan, completed in June 2012, explains the closure and decommissioning process and what actions the town can take to prepare. It is available here: http://windhamregional.org/images/docs/vy/exhibits/wrc-cross-35.pdf. As noted in the plan, federal law and regulations do not require Entergy Nuclear Vermont Yankee to work with the town or the region as they prepare for closure and decommissioning, but the WRC hopes they will voluntarily do so. The WRC is prepared to assist in this effort and has reached out to its counterparts in New Hampshire and Massachusetts to engage them in preparing for the closure of the plant as well.

The WRC recognizes the significant and diverse impacts the closure of the plant will have on the region, including its towns, families, friends, neighbors, businesses, and economy. The WRC has invested considerable staff and volunteer resources over the last six years in preparation for the plant’s eventual closure in order to understand its impacts and develop mitigation strategies. The WRC stands by to assist its towns with planning for a post-Vermont Yankee future, to lead a regional resiliency planning effort, and to provide support in statewide response and recovery efforts. Mitigating the impacts on the region’s economy will require region-wide solutions, and the WRC will continue to participate in and support the Southeast Vermont Economic Development Strategy and the development of a Comprehensive Economic Development Strategy, led by our regional partner, the Brattleboro Development Credit Corporation. The Commission will also encourage Entergy to voluntarily work with the region and our towns to establish a working group through which there will be clear communication about what the plant intends to do and what those actions mean for our communities. We all must work together to plan for resiliency as the region loses not only a major employer and economic engine, but also many plant workers and their families.

**RENEWABLE ENERGY SOURCES**

Vermont has established the goal of meeting 20 percent of its electricity needs with Sustainably Priced Energy for Economic Development (SPEED) program resources by 2017; 75 percent by 2032; and 90 percent of its energy needs across all sectors from renewable resources by 2050. Thirty states, including
all New England states except Vermont, now have mandatory Renewable Portfolio Standards. Seven states, including Vermont, have voluntary goals for renewable generation.

In addition to portfolio standards and goals, there are many tax incentives for installing renewable energy facilities. The American Recovery and Reinvestment Act of 2009 extended many consumer tax incentives originally introduced in the Energy Policy Act of 2005 (EPACT) and amended in the Emergency Economic Stabilization Act of 2008. Consumers who install solar energy systems (including solar water heating and solar electric systems), small wind systems, geothermal heat pumps, residential fuel cell and microturbine systems can receive a 30 percent tax credit for equipment placed in service before December 31, 2016. In addition to the Federal tax credit, Vermont’s Small Scale Renewable Energy Incentive Program, initiated in June 2003, provides funding for new solar water heating, solar electric (photovoltaic), wind, and micro-hydro energy system installations. The program is available to single- and multi-family residences, commercial and industrial businesses, farms, schools, builders/developers, and local & state governments.

RENEWABLE ENERGY INCENTIVES

While most energy production is distant and outside the direct control of individuals and local governments, it remains true that energy use results from a mix of government policies and individual choices. Federal and state policies, such as tax incentives for purchasing and installing renewable energy systems, play a significant role and influence individual energy decisions. Some online databases that list Federal and state incentives available are:

- [http://energy.gov/savings](http://energy.gov/savings) (State)
- [http://www.dsireusa.org/](http://www.dsireusa.org/) (State)
- [http://www.dsireusa.org/incentives/?State=US](http://www.dsireusa.org/incentives/?State=US) (Federal)

HYDROELECTRIC POWER

It is estimated that following Vermont Yankee’s 2014 closure, hydroelectric power will account for approximately 10.8 percent of the total energy consumed in Vermont in 2016, equivalent to an estimated 27 percent share of all renewable energy consumed that same year. A total of 21 percent of Vermont’s in-state electricity generation in 2011 was from conventional hydroelectric power.\(^{33}\) As of

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\(^{33}\) EIA, [http://www.eia.gov/state/?sid=VT](http://www.eia.gov/state/?sid=VT)
May 2012, Vermont had approximately 676 MW of installed hydroelectric capacity. Windham County ranked second in the state for installed capacity.  

The major supplier of hydropower for Vermont is Hydro Québec (HQ), a Canadian company. The Public Service Board approved the previous HQ contract in 1990; a 30 year agreement between a group of eight Vermont utilities, known as the Vermont Joint Owners (VJO) to purchase long term baseload power from HQ and to make it available at wholesale to the rest of Vermont’s utilities. In 2010, 20 Vermont utilities signed a 26-year power contract with HQ to purchase up to 225 MW of electricity from January 2012 through 2038. In addition, HQ and the Vermont utilities agreed to share any future revenues related to environmental attributes of HQ power generation flowing into Vermont.

Vermont has 46 utility-owned hydro sites and approximately 35 independently owned hydro sites. In the Windham Region, TransCanada operates hydroelectric stations and associated storage reservoirs and dams on the Connecticut and Deerfield Rivers. The Bellows Falls Dam and Vernon Dam are located on the Connecticut River. The Bellows Falls Dam and has a generating capacity of 49 MW. The Vernon Dam is the oldest dam, in service since 1909, and had a generating capacity of 37 MW. The Searsburg Dam and Station, located on the Deerfield River, is rated at 5 MW. The Harriman Dam and Station, located in Wilmington and Whitingham, VT, includes three generating units capable of producing 41 MW of electric power. Sherman Reservoir lies mostly in Vermont but its electric generation occurs in Massachusetts, with a capacity of 6 MW. Smaller, privately owned facilities also exist around the region.

All hydro facilities of significant size are licensed by the Federal Energy Regulatory Commission (FERC). New projects may also require a permit from the U.S. Army Corps of Engineers. These federal permits trigger state review delegated under the federal Clean Water Act. The FERC permitting process can take two to seven years to complete. Periodically these plants have to renew their licenses. Generally, the relicensing process results in permit conditions that require plant owners to sacrifice some operating flexibility in order to mitigate the environmental impacts of their facilities. For some hydro facilities, this has resulted in a 10-20 percent loss of energy production.

The current licenses for each of the Wilder, Bellows Falls, and the Vernon Hydroelectric Projects (TransCanada) and the Turners Falls Hydroelectric Project and Northfield Mountain Pumped Storage

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Project (FirstLight) are set to expire in April, 2018. All projects utilize water from the Connecticut River to generate hydroelectric power. The licenses were issued by the FERC for terms of 30-50 years, and TransCanada and FirstLight are seeking relicensing for these dams using FERC's Integrated Licensing Process (ILP).

According to assessments completed by the State, it is clear that the best hydropower sites have already been developed. There are very few undeveloped sites that could support capacity greater than 1 MW, and relatively few in the 500 kW to 1 MW range. There are many potential smaller community and residential-scale sites sized below 200 kW. Incentives such as net metering, group net metering, and the Standard Offer Program are necessary to facilitate the development of smaller sites. The Agency of Natural Resources (ANR) has recently approved sites with generation capability as low as 15 kW.  

According to the ANR, the hydro resource is already heavily developed in Vermont. Further development would likely result in intermittent manipulation of stream flows and water levels, a possible increase in flood hazards resulting from the disruption of natural river processes, some loss of riverine aquatic habitat, and barriers to movement of fish and other aquatic life. ANR’s 2008 Report The Development of Small Hydroelectric Projects in Vermont identified the following criteria as necessary for any new hydroelectric generator to have acceptable environmental impacts:

- No new dam or other barrier to aquatic organism movement and sediment transport.
- Run-of-river operation.
- Bypass flows necessary to protect aquatic habitat, provide for aquatic organism passage, and support aesthetics.
- Fish passage where appropriate.
- No change in the elevation of an existing impoundment or in water level management.
- No degradation of water quality, particularly with respect to dissolved oxygen, temperature, and turbidity.
- No change in the upstream or downstream flood profile or fluvial erosion hazard.

Because there are few undeveloped sites that are candidates for new hydroelectric plants, three effective ways to increase capacity by improving efficiency and output at existing hydroelectric facilities include: installing more efficient turbines, installing small turbines at the dams that utilize bypass flows, and installing new turbines that can operate efficiently over a wider range of flows. These upgrades are

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often possible without changing current operating requirements, i.e., power production can be increased without additional environmental impacts. In addition, existing municipal water supply and wastewater treatment pipelines could capture the energy in these systems by installing hydro turbines to the pipelines without otherwise altering the regular operation of the system. Such in-pipe hydroelectric systems have minimal environmental impact.

**BIOMASS**

In Vermont, biomass power accounted for an estimated 9.4 percent of energy consumed in 2010, and the majority of renewable energy consumed (53.7 percent). In January 2013, cord wood and pellet fuels, which are classified as types of biomass, were the least expensive fuel sources for heating in Vermont. The relatively low costs of these fuels are reflected in the high percentage of homes in Windham County using wood as a primary heating fuel—an estimated 21 percent in 2010.

As of June 2013, there were five existing wood thermal facilities (i.e. facilities with wood or pellet heating) in the Windham Region: Brattleboro Union High School, Whitingham Elementary School, Westminster Center School, Leland and Grey Union High School, Putney Central School and the Keith Dewey site. There was also one facility co-generating heat and electricity (CHP) in the region at the Cersosimo Lumber Facility in Brattleboro. There are also several wood chip/pellet suppliers around the region.39

The Vermont 25 x ’25 Initiative, launched in 2008, determined that bioenergy fuels from our fields and forests have the technical potential to produce about 25 percent of the total energy consumed in Vermont by 2025. In addition to this initiative, it is very likely that rising oil and electric costs will continue spur growth in the use of wood as a home heating fuel, both in the form of traditional cordwood and as processed wood fuel pellets.

**MANY TYPES OF BIOMASS**

Biomass refers to biologically-based feedstocks such as algae, food waste, grasses, methane, oilseed crops, and wood that can be converted into energy sources such as biodiesel, ethanol, and wood chips / pellets, which can run vehicles, heat buildings, or generate electricity. Biomass has provided concentrated solar energy for heating, lighting, and cooking, as well as concentrated sustenance in the form of food crops and animals for all of human history. Biomass currently provides the largest slice of renewable energy generation in the United States.

The Windham Region has a very high concentration of low-grade woody biomass available as a potential fuel source as shown in Figure 3-16. The 2010 Update to the Vermont Wood Fuel Supply Study, published by the Biomass Energy Resource Center, estimated that

“...for the moderate scenario, there is currently slightly less than a million green tons of NALG [Net Available Low-grade Growth] wood from within the fourteen counties of Vermont. However, if the surrounding counties of NH, MA, and NY are included the amount of NALG wood increases dramatically to more than three million green tons annually. Based on the data used, key assumptions applied, and the methodology employed, the results indicate Windham and Rutland Counties contain the highest concentrations of NALG wood.”

The term “biomass” is often used in relation to commercial or institutional systems that often co-generate heat and electricity (CHP). A Biomass CHP Analysis, completed by the National Renewable Energy Laboratory (NREL) for Putney Basketville, estimated biomass resources available in the region using the Renewable Energy Atlas of Vermont (REAVT), the Northern Forest Biomass Project Evaluator model (BPE), and the Biomass Energy Resource Center’s (BERC) Vermont Wood Fuel Supply Study. The REAVT predicted an availability of 380,000 Green Tons/year 40 (GT/yr) in the southern half of Vermont. The REAVT accounts for biomass within Vermont, and for biomass projects within the state. The BPE predicted available values of tops and limbs, low-grade bole wood, and high-value bole wood for each year within a 30-mile radius of the Basketville site. The BPE estimated accessible tops and limbs at a constant 78,000 green tons per year, low-grade bole wood starting near zero, but increasing to about 200,000 GT/yr. These would be the primary feedstocks used for a biomass plant. The BERC Vermont study predicted an availability of 166,000 GT/yr in Windham County, and 880,000 GT/yr in Windham plus surrounding counties.

Solid waste is also categorized as a source of biomass fuel. When solid waste is disposed of at landfills, it decomposes and produces gases that include methane, a flammable gas. One of the nation's first commercial landfill gas-to-electricity projects was constructed in Brattleboro in 1982. Vermont Energy Recovery Systems uses the methane produced at the Windham Solid Waste Management District's Brattleboro landfill to generate and sell electricity to Green Mountain Power (GMP). The project generates approximately four million kilowatt hours annually.

Methane is also emitted from volatile solids or animal waste. Anaerobic digesters produce electricity from the methane recovered from cow manure and/or other organic matter. In addition to producing energy and reducing the amount of methane emitted into the atmosphere, this process also reduces

40 A green ton is equivalent to 2,000 pounds of undried biomass material.
water pollution and produces a high quality fertilizer as a by-product. As of 2013, there was only one methane digester facility in the Windham Region at Westminster Farms, Inc. The Windham Solid Waste Management District is considering several other potential sites that have been identified throughout the region.

Green Mountain Power’s (GMP) Cow Power™ program (previously Central Vermont Public Service) has been a deciding factor in a number of farm methane installations in the state. For every kilowatt-hour requested by customers and provided by a Vermont farm, GMP will pay the farmer the market price for energy plus the GMP Cow Power™ charge of 4 cents for the environmental benefits of the energy.

Environmental impacts must also be considered with biomass power. The combustion of wood produces heat and emissions including hazardous air pollutants (HAPs), fine particle pollution (ash), and volatile organic compounds (VOC). The pollutant of greatest concern to human health is fine particles (10 microns or less in diameter), which may be inhaled and cause a number of respiratory illnesses. Several other emissions are also of concern to air and water quality, including carbon monoxide (CO), carbon dioxide (CO2), sulfur oxides (SOx), and nitrogen oxides (NOx). Emissions of NOx (if kept below 1300 Celsius) and SOx from burning wood are significantly lower than coal and petroleum and are comparable to those of natural gas. Particulate levels in wood emissions are similar to those from burning coal and petroleum and substantially higher than the levels in the emissions from natural gas. Particulate emissions can be controlled to acceptable levels with smoke stack equipment such as scrubbers, bag filters, and electrostatic precipitators; however this equipment is only cost effective on large commercial-sized combustion

systems. Particulate emissions from smaller equipment, especially residential-sized units can be a concern.41

The CO2 in wood combustion emissions is considered by some to be “carbon-neutral” because it is basically equivalent to the amount of CO2 trees need to grow the same quantity of wood. Hence the combustion of wood does not contribute to the net increase in atmospheric levels of CO2 (a greenhouse gas) as does the combustion of fossil fuels. However, because this concept is not universally accepted, the impacts of this power source must be considered as carefully as those of other combustion fuel sources.

**SOLAR**

Solar energy is categorized by the Energy Information Administration (EIA) as an “other renewable,” a category that provided only about 0.2 percent of the energy used in Vermont in 2010, almost entirely in the residential sector. Solar energy can be used either to generate electricity or to generate heat. As of May 2012, Vermont had approximately 30 MW of installed photovoltaic capacity. Windham County ranked seventh among Vermont’s fourteen counties for installed capacity.42

In 1998 the Legislature enacted a Net Metering law (30 V.S.A. § 219a), requiring electric utilities to permit customers to generate their own power using small-scale renewable energy systems of 15 kW or less. The excess power generated by these systems can be fed back to the utility, basically running the electric meters backwards. The 2008 amendments to this statute lifted certain restrictions, increased the permissible size per installation to 250 kW, established a simplified permitting process for systems under 150kW, and raised the ceiling on total system installed capacity from one percent to two percent of peak load. In 2011, the Legislature further expanded the permissible size limit per installation to 500 kW, simplified the administration for net metering groups, and allowed a registration process for photovoltaic (PV) systems 5kW and under. In 2014, the Legislature increased the overall net metering capacity cap per utility from 4 percent to 15 percent of the 1996 utility system peak or previous year’s peak (whichever is higher), and created a solar credit payment for all customers who have installed PV net metered systems. The solar credit payment has the effect of increasing the value of generation to net metered customers up to 20 cents per kWh in the year the system is installed. During the 2012 session the registration process was expanded to PV projects 10 kW and under, and the process for group net metering billing and monetization of credits was clarified.

According the Vermont Energy Atlas, in 2013 the Windham Region had a total of 164 net-metered sites and 1,507 kW of installed capacity (Figure 3-17). The region also had two non-net metered sites. Additionally there were 51 solar hot water systems installed in the region with total capacity of 146 MMBTUs. Finally, there were 12 combined solar/thermal sites with a total capacity of 60 MMBTUs.


A potential drawback of PV power is cost. When compared to the current market price forecast for electricity, the price of PV remains high. There is data that suggests that state and federal incentives have served as major drivers in the rate of solar facilities installation. In 2004-2006 there were only 329 permitted net-metered systems in Vermont, with an installed capacity of net-metered systems of 749.3 kW. From 2007-2010 the number of installed systems has climbed to 1319 systems with an installed capacity of 10,923 kW. Despite cost issues, PV power has several advantages that make it a power source that the state should continue to support. PV is largely a peak electric load-following resource, meaning that during peak summer loads, the PV systems are at their highest production, resulting in peak shaving and grid reliability benefits. In addition, PV power is generated without noise, requires low levels of maintenance, emits no pollution, and is extremely distributable.

While there is relatively little controversy about solar energy as a source of power, potential conflicts arise with the siting of solar installations. Ground-mounted systems tend to be larger in scale than roof mounted systems, and generally are sited on undeveloped or agricultural land. These systems are relatively benign once installed; however, the region has relatively little prime agricultural soil. Installations covering large acreage should provide mitigation in the form of retained agricultural soils on site, or conserved agricultural land of equal value elsewhere in the region. Roof top systems have the advantage of requiring zero additional development of open land, though conflicts can arise if these systems are installed in areas with historic district overlays, or where neighboring trees may shade out the system for a substantial period of the day. Towns should consider these issues and address them in their plans and zoning codes.

Wind energy is categorized by the Energy Information Administration (EIA) as an “other renewable,” a category that provided only about 0.2 percent of the energy used in Vermont in 2010. Wind energy is used primarily to generate electricity, but not as a source for heat. As of May 2012, Vermont had approximately 121 MW of installed wind capacity. Windham County ranked tenth among Vermont’s fourteen counties for installed capacity (Bennington County ranked fourth in the state primarily because of the Searsburg station).43

In 1997, Green Mountain Power developed Vermont’s first modern, commercial wind-generating station in Searsburg, consisting of 11 turbines with combined total power rating of 6 MW. The Vermont Public Service Board approved the project, despite its relatively high cost due to its perceived value as a demonstration project. In 2009 the Public Service Board granted a Certificate of Public Good permitting Deerfield Wind to construct a 30 MW facility, consisting of 15 wind turbines, in Searsburg and Readsboro.

Small-scale net metered installations that serve homes, businesses, and communities are also located throughout the region. Small-scale wind facilities are most often represented by a single turbine, which can generate from less than 1 kW up to 100 kW for a small commercial machine. A number of factors affect the success of a small wind project. To harness the best wind spectrum, turbine siting is absolutely critical within the microclimate of the landscape. Turbines must be positioned so they extend as high as possible above obstacles like trees. Technical expertise to maintain the system is also essential. As of May 2013, there are a total of 12 net metered wind facilities, and 2 non-net metered, in the region with a combined capacity of 47 kW (Figure 3-18).

Wind power is considered a complement to solar in a renewable energy portfolio. When solar power is low or unavailable, during cloudy days or at night, the wind is often more potent. For example, during Vermont’s winter, when sunlight is diminished, average wind speeds measure at their annual high. Wind power is intermittent in nature, like many other renewable sources of power; thus, resource planning for effective power grid integration is essential.

Wind power is clean and renewable, but turbine placement can be difficult and controversial because of natural resource impacts, aesthetics, noise, and the need for turbine placement elevations between 2,500-3,300 feet, locations in Vermont that tend to be sensitive with thin soils and steep slopes. The windiest areas in the region are most often on the higher-elevation ridgelines that are sensitive habitats for plants and wildlife, and are the source of the region’s most pristine headwaters. In areas where road access does not exist, new permanent roads must be built to service the wind facility. Other potentially negative environmental impacts include bird and bat mortality, habitat disruption and fragmentation, erosion, pollution from facility maintenance, turbine noise, and visual flicker.

**RENEWABLE ENERGY CREDITS (RECS)**

Beginning in 2004, legislatures in various New England states required that their load serving utilities obtain a certain percentage of their energy needs from renewable sources. To comply with this mandate, load servers were allowed to purchase the renewable attributes of various qualified sources. Each MWH generated by a qualified facility earns one Renewable Energy Certificate. Since Vermont currently does not require its utilities to retain these attributes, several have been selling these certificates to out of state utilities. As a result of selling the renewable attributes, a Vermont utility can no longer claimed them as renewable in its own power portfolio. To reflect this, a category called “System B” power was created which represents power from which the attributes have been sold.

**SITING OF ENERGY PROJECTS**

The State of Vermont has adopted aggressive goals to create a renewable energy future. In 2011-2012 the Legislature amended the Sustainably Priced Energy Economic Development (SPEED) goal (adopted in 2005) with the Total Renewable Energy Goal which states that starting in 2017, 55 percent of each retail electric utility’s annual sales must be met by renewables, increasing by 4 percent every third year until 2032, when 75 percent of sales must be met by renewables (see Act 170). Additionally, in 2011, the Public Service Department (PSD) promulgated the Comprehensive Energy Plan (CEP) with a goal to
satisfy 90 percent of energy needs across all sectors from renewable resources by 2050. The question of where these renewable energy sources will be installed will be a topic of debate in coming years.

On October 2, 2012, Governor Peter Shumlin created the Governor’s Energy Generation Siting Policy Commission through Executive Order No. 10-12. The charge of the Commission is to survey best practices for siting approval of electric generation projects (all facilities except for net- and group-net-metered facilities) and to encourage public participation and representation in the siting process, and to report their findings to the Governor and the Vermont Legislature. The formation of this Commission was an outgrowth from the feeling that the current Certificate of Public Good (“CPG,” or Section 248) process does not always provide sufficient opportunity for local input or give adequate weight to local interests and concerns. The Siting Commission recommended greater weight be given to local and regional plans based on a specific planning process that is an extension of the process already in place at the local and regional level. The expectation is that this improved energy planning at the local and regional level will provide greater certainty to all parties involved in the siting process so that projects are pursued in the most advantageous locations while areas posing significant environmental or social concerns are avoided. The Siting Commission recommends that regional plans, and the local plans that are subject to RPC review, be improved so that they offer clear guidance on the siting of electric generation facilities.

The WRC participated in most of the Siting Commission’s deliberative sessions, and provided feedback. The Commission released its final report in April of 2013 containing five core recommendations:

- Increase emphasis on energy planning at state, regional, and municipal levels, and provide funding and tools for such planning
- Simplify the existing tiered approach to siting, improve predictability and timing in the permitting process, and provide incentives for community-led projects
- Expand opportunities for public engagement
- Implement procedural changes to increase transparency, efficiency, and coordination
- Update environmental, health, and other protection guidelines

This report is the beginning of a process, and there still remains much deliberation about which, if any, of these recommendations are to be put into effect. In many cases, these recommendations will require changes to existing statute, as well as appropriations. WRC intends to be actively involved throughout the entire process.

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44 Public Service Department [http://publicservice.vermont.gov/topics/renewable_energy/state_goals](http://publicservice.vermont.gov/topics/renewable_energy/state_goals)
While an this chapter does not cover all of the many facets that must be considered in the ultimate siting of energy facilities, several tools and resources exist currently for the region and its member towns to consider when framing their land use and energy discussions. As already mentioned, Southern Windsor County Regional Planning Commission has developed a guidance document, Energy Policies and Standards: A Guide for Southern Windsor County Communities, to help towns and regions incorporate energy policy language into their plans and bylaws.

To aid siting of all types of energy projects, ANR and the Vermont Sustainable Jobs Fund have developed online resource identification and mapping websites. The Natural Resource Atlas provides geographic information about environmental features and sites that the Vermont Agency of Natural Resources manages, monitors, permits, or regulates. The Vermont Energy Atlas is a tool for identifying, analyzing, and visualizing existing and promising locations for renewable energy and energy efficiency projects. This Energy Atlas also includes layers from the BioFinder interactive map. BioFinder is a map and database identifying Vermont's lands and waters supporting high priority ecosystems, natural communities, habitats, and species. By combining the information from all of these sources, and comprehensive analysis can be completed throughout a town or region for siting of energy generating facilities.

The WRC supports energy planning at the regional level, and has advocated for State support and training to accomplish a regional Energy Plan. The WRC has also advocated for the creation of statewide energy development siting criteria as essential to effective state energy plan implementation. The plan, coupled with siting criteria, would inform regional and municipal plan development and should remove some uncertainty associated with energy generation development review. The State is currently completely a Total Energy Study to assess steps for moving forward with the goals of the Comprehensive Energy Plan, and the WRC will remain engaged throughout this process. The WRC will also advocate for future updates to the Comprehensive Energy Plan that reflect changes in technology, demand, supply, transmission, economics, and environmental impact and benefit.
CHAPTER 4

REGIONAL ECONOMY

The WRC recognizes the valuable contributions and professional economic development expertise the Southeastern Vermont Economic Development Strategies (SeVEDS) offers to the Windham Region. SeVEDS, established in 2007, is a non-profit organization with legal affiliation to the Brattleboro Development Credit Corporation (BDCC). The mission of SeVEDS is to reverse the economic decline of the Southeastern Vermont region. WRC is a member of the SeVEDS Board of Directors and partners with BDCC on economic development issues that overlap both organizations’ responsibility. In January 2014 SeVEDS completed a 2014 Comprehensive Economic Development Strategy (CEDS) for the Windham Region. The CEDS is incorporated into this Regional Plan by reference (see Addendum). This means that the Commission will refer to the CEDS in the development and implementation of its plans; however the policies of WRC supersede the CEDS.

EXISTING ECONOMIC CONDITIONS

The region’s economy is influenced by many external forces such as conditions in the global marketplace, demographic trends, transportation infrastructure, local and state regulations, communications technology, and the cost and availability of energy. The Windham Region Profile provides detailed data on the economic characteristics of the region.

In the period between 2008 and 2012, the American Community Survey estimated that the median household income was 5.6 percent lower in Windham County (at $51,113) than for the State of Vermont ($54,168). Generally, average wages in Southeastern Vermont are lower than nearby markets. For example college graduates earn 18 percent more in Cheshire County, New Hampshire and 23 percent more in Hampshire County, Massachusetts than in Windham County, VT. Median household income in only ten towns in the region exceeded the state median. Eleven percent of individuals in Windham County had incomes below the poverty level in 2011. Generally, higher levels of poverty were found in the more rural areas of the region.

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In an effort to support economically challenged areas, Congress created the federally-funded New Market Tax Credit Program in 2000. It is designed to provide economic incentives for business and property investment in lower income communities to support community revitalization. Brattleboro used New Market Tax Credits to support the recent Commonwealth Yogurt and Brooks House projects.

The Windham Region’s labor force decreased significantly from 2000 to 2010, similar to labor decreases across the country, as a result of the “Great Recession” that began in 2008, shrinking by 5.3 percent, or 1,369 people, during that period. This more than halved the increase the region experienced from 1990 to 2000, and put the 2010 labor force at only 661 people larger than the 1990 labor force. In both 1990 and 2000, approximately 70 percent of the population over age 16 participated in the labor force, compared with 62.8 percent in 2010. Unemployment statistics finally indicate job growth in the region, but the industry-specific statistics still show large losses across many fields.

Threatening recent job growth and improvements in the local economy is the scheduled closing of the Vermont Yankee (VY) nuclear plant in the fourth quarter of 2014. VY has over 600 well-paid employees, representing 2 percent of Windham County’s population, many of whom will be seeking new employment following the plant’s closure. One of the region’s greatest assets is its human capital—the people who each contribute their knowledge, skills, and creativity to the region’s culture and economy. This capital can be supported and enhanced through investments in education and training programs and the creation of an entrepreneurial environment that fosters innovation. Recent trends show that the region’s population is becoming older as more people reach retirement age and fewer young people enter the job market. This has led to a decline in the region’s human capital, which could, over time, threaten its economic sustainability. The VY closure will result in the lay-off of a large, skilled workforce. It is important for the region’s economy that this valuable source of human capital is redirected into new industries and jobs. Recognizing the potential and value of the region’s human capital is critical toward supporting a vibrant local economy.

**ECONOMIC SECTORS**

In 2011, Service Providing industries accounted for 70.6 percent of the region’s employment, while Goods Producing industries accounted for 16.0 percent and the Government sector accounted for 14.0 percent (See Windham Region Profile). The leading employers in Windham County were the trade, transportation, and utilities industry (21.3 percent), education and health services industry (20.6 percent) and leisure and hospitality industry (14.5 percent). Retail trade made up over a half of the trade, transportation, and utilities industry, while health care and social assistance made up over 60.0 percent of the education and health services industry. Accommodation and food services made up a full 95.0 percent of the leisure and hospitality industry employment. The region's continued long-term economic shift away from agriculture, natural resources and manufacture of durable goods to the service industries reflects a statewide trend that began in the 1970's.
LAND-BASED INDUSTRIES

Land-based industries include not only agriculture and forestry, but also specialty foods and food processing, fiber products, wood products, and stone industries. The agriculture and timber industries make up a large portion of the sector.

AGRICULTURE

Agriculture plays an important role in defining the region's lifestyle and landscape, and has long contributed to the stability and diversity of the Windham Region’s economy. The trend in agriculture throughout Vermont is for new farmers to seek smaller-scale, diversified opportunities; specifically, small-scale non-dairy and organic and artisanal dairy farms have increased in number. An exception to this trend is that conventional dairy operations are becoming fewer in number with remaining farms becoming larger.47 In the Windham Region over the past decade, the there has been an increase in the total number of farms, from 305 in 1997 to 428 2007, an increase of 40 percent.48 49

However, the average total sales-per-farm has trended downward. In 1997 the average total sales per farm was $66,775 compared to $46,150 in 2002. Average total sales per farm increased moderately to $50,018 in 2007, but are still well below 1997 levels. In 2007, approximately 47 percent of the farms had less than $2,500 in sales, compared to 59 percent of the farms in 2002. While farms are becoming smaller in scale, over half (52.2 percent) of the principal operators of farms in Windham County have a primary occupation other than farming, a percentage that has remained relatively stable since 2002. At the same time, many Vermont farmers are seeking opportunities to market directly to consumers and increase sales of value-added products. The number of farms that sold agricultural products directly to consumers rose from 96 in 2002 to 124 in 2007, a 29 percent increase. The value of these direct-sale agricultural products increased 23.5 percent to over $2.1 million.

While the number of large farms (over 500 acres) remained relatively steady in Windham County, increasing from 14 farms in 1997 to 16 farms in 2007. Farms ranging from 180 to 499 acres dropped moderately from 84 in 1997 to 75 in 2007. Meanwhile, the region saw a dramatic increase in the number of small farms (49 acres or less) from 106 to 199 during the same time period. Similarly, the number of medium-sized farms with 50 to 179 acres rose 37 percent to 138. As a result of these trends, the average acres per farm dropped from 154 acres in 1997 to 119 acres in 2007. As percentages


48 Agricultural data is from the USDA 2007, 2002, and 1997 Census of Agriculture.

49 These data can be confusing. For example, for the purpose of the census, the USDA defines a farm as any place from which $1,000 or more of agricultural products were produced and sold, or normally would have been sold, during the census year. The State of Vermont, for the Current Use Program, defines a farmer as a person who earns at least one-half of his annual gross income from the business of farming. Directly comparable federal/state data are not available.
approximately 46 percent of farms are under 50 acres and 50 percent are between 50 and 499 acres, leaving less than 4 percent of farms above 500 acres. Overall, land in farming increased 3,946 acres or about 8 percent, to 50,764 acres in the County between 1997 and 2007.

In 2007, 247 farms sold crops, including nursery and greenhouse products, a number that remained relatively steady from 2002. These farms reported a total market value of agricultural products sold at over $8.5 million. Farms selling livestock, poultry, and their products numbered 194 in 2007, a 17 percent increase from 2002 numbers. These farms reportedly sold nearly $13 million in market value of livestock and their products, an increase of 21 percent from 2002.

Production of fruits and vegetables has historically brought significant commercial returns. The 2007 US Census of Agriculture reported a 50 percent increase in the number of farms selling berries, orchard fruits, and tree nuts in Windham County since 2002, resulting in a sales increase of nearly 30 percent to nearly $3 million. During the same time period, the County saw a 42 percent drop in the number of nurseries and farms selling greenhouse products with a corresponding 21 percent drop in sales to just over $1.6 million. The County saw a 15 percent drop in the number of farms selling vegetables; however, there was a 12 percent gain in the total sales to nearly $1.8 million. The number of farms selling other crops, including hay, increased 9 percent, while sales increased 26 percent to nearly $2 million.

The number of Windham County farms in livestock, poultry, and related products increased overall from 166 farms in 2002 to 194 farms in 2007. By far, this market is dominated by dairy production from cows which is served by 52 farms in 2007 (46 farms in 2002). These farms reported market value sales of nearly $11 million in 2007, an increase of 17 percent since 2002. Cattle and calves make up the second largest sector of livestock and poultry farming with 72 farms earning over $1.5 million in direct sales. Although the markets for poultry, sheep, and goats are small by comparison, there have been significant increases in the number of farms marketing these animals and their products regionally. There is also anecdotal evidence that non-farm scale raising of poultry and smaller livestock, such as sheep and goats, is on the increase.

**FORESTRY**

Forests are one of the region’s most important economic resources. Approximately 86 percent of the region is forested and all but a small percentage of that land is considered commercial because it supports periodic harvest. It has been estimated that annual tree growth in Windham County exceeds 20 million cubic feet. These forests provide a livelihood for many people through wood harvesting, wood products, hunting (which brings significant income to the region), and maple products.

The region’s forest industry is threatened by a number of trends. The industry is becoming less economically viable due to global market competition, including the outsourcing of furniture production.
and to rising business costs. This has contributed to the 43 percent decline in the number of sawmills in Vermont from 185 in 2002 to 105 in 2008.\(^5^0\) Windham and Windsor have the highest number of sawmills in the state with 15 each.\(^5^1\) Increasingly, hardwood is exported as a raw material causing a loss of jobs in value-added manufacturing.

Other threats to the region’s forests and timber industry include a rise in property values and the conversion of forested lands into housing development, invasive species, such as the emerald ash borer and the hemlock woolly adelgid, diseases that threaten the survival of many native species and over-browsing by deer and moose. Changing climatic conditions may make it more difficult for some native species to survive.\(^5^2\)

Timber industries have played an important role throughout the region’s history. The commercially important forest species in the region are sugar maple, white pine, white ash, red oak, and birch. In 2008, property owners in Windham County earned $3.8 million from the sale of forest products.\(^5^3\) It was reported that over 100 million board feet of hardwood lumber is produced in Vermont annually. In 2010, Windham County ranked first in the state for total sawlog and veneer log harvest with 22.996 million board feet. The county is typically ranked in the top four counties for overall sawtimber harvest, leading the state in 2010 in the harvest of red oak (2.807 million board feet) and second in the state in white pine (8.310 million board feet), two important species for the State in terms of value and yield.\(^5^4\)

A number of secondary wood-related industries including construction materials, furniture and toy manufacture, cabinetry, boat building, and musical instruments are located in the region. There may be opportunities to expand on the production of low-grade wood for energy. While paper mills have declined in the region, there has been a growing demand for heat and electricity production from biomass. Presently, about half of the homes in the Windham Region have a wood-based heating system, including woodstoves, fireplaces, and furnaces. Cersosimo Industries, a major lumber producer based in Brattleboro, recently brought online a wood chipping facility to produce wood chips for heating use. The strength of the industry is directly related to the availability and good management of forestlands. A more detailed description of the importance of forestlands is in the Natural Resources Chapter. In 2013, students at The Conway School produced a report for the WRC entitled *Our Working Landscape:*


\(^5^3\) Morin, Doug, *The Forest Products Industry of Windham County, Vermont: Status, Challenges and Opportunities,* March 2012.


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Windham Regional Plan 131

Adopted September 30, 2014
Woodlands of the Windham Region. The report explores how the working landscape may be maintained amidst recent economic, social, and environmental trends.

MANUFACTURING

The manufacture of intermediate and finished goods was the sector of largest employment in the region from 1930 until the 1980's, when it fell behind both service and trade sectors. In 2012 manufacturing accounted for less than 10 percent of the region’s employment, a decrease of over 22 percent from 2002. Although no longer providing the highest wage rates in the region, manufacturing continues to provide relatively high-paying jobs with an average annual wage of $45,794 in 2012.55 Despite declines in the manufacturing sector employment, it is still important to the region’s economy, offering notable companies in precision manufacturing and optical filters. The region boasts several successful value-added food product companies, such as Commonwealth Dairy, which is directly attributable to and dependent upon the strength of the region’s agricultural industry.

Manufacturing activity has taken place primarily in Brattleboro and Rockingham. Each town has improved land available with municipal water and sewer service and convenient access to I-91 for new or expanding manufacturing enterprises; in Brattleboro the Exit One Industrial Park offers 92 acres and in Bellows Falls the Industrial Park has 31 acres.

The Brattleboro Development Credit Corporation and the Bellows Falls Area Development Corporation encourage and support manufacturing industries in the region. These organizations have worked with state and federal financing sources to secure aid for industrial development. In support of the manufacturing sector, both the WRC and BDCC recognize the need to plan for and provide locations for new and expanding industries in appropriately-sited industrial parks and locations that support historic settlement patterns.

WHOLESALE/RETAIL TRADE

Between 2002 and 2012, the number of trade sector employees in the region decreased by almost 25 percent. In 2012, retail trade amounted to 11 percent of jobs in Windham County, making it the second largest sector of the economy. Average annual wages for retail jobs are among the lowest of all sectors ($27,109 in 2012), while wages for the wholesale trade sector, constituting less than five percent of employees, are among the highest ($54,898 in 2012).56

Most of the service and trade establishments are located in Brattleboro and Bellows Falls, in the region’s villages, and in resort areas. Brattleboro and Bellows Falls have undertaken both public and private initiatives to improve the physical and financial conditions in the central business districts. In addition,

commercial development has occurred in conjunction with expansion of recreational facilities for four season use at the region’s ski resorts.

SERVICES

The service sector includes the health, education, arts, entertainment, and recreation industries. While the service sector is important in terms of providing stable employment, its wage levels are generally lower than other sectors. In 2012 in Windham County the average retail sector wage was 29 percent less and leisure/hospitality sector wage was 52 percent less than the overall county average wage.\(^{57}\) Generally, employment in the leisure/hospitality sector is seasonal in nature. It is also common for service sector jobs to have non-traditional work schedules, which may include early morning, longer shifts, weekend, and/or evening hours.

Some of the largest service employers in the region are health care providers, including: The Brattleboro Retreat, Eden Park Nursing Home, Brattleboro Memorial Hospital, and the Carlos G. Otis Health Care Center. Some of these service providers are among the fast growing and high-wage employers in the region’s economy, in part because of growth in the health service industry.

As an industry, education accounted for over seven percent of Windham County employment (1,628 jobs) in 2012, an increase of nearly 9 percent since 2002.\(^{58}\) Public school Supervisory Unions and several independent primary and secondary schools provide K through 12 educational services, while a number of small private colleges and public college branch campuses provide post high school educational services, both for local use and for export. In 2013 it was announced that the Brooks House in downtown Brattleboro would host a new campus for the Community College of Vermont and Vermont Technical College, which is expected to create new employment opportunities in the education sector. The wide array of educational services offered in the region draws students and families from all over the world, which contributes to the demand for lodging, dining, transportation, and retail industries. Some area schools occupy unique market niches: Landmark College and Greenwood School in Putney serve learning disabled students, while the Austine School provides for deaf and hard of hearing children and their families. World Learning Inc. focuses on international studies and training. The potential for growth in this sector is great, especially considering increased access through distance learning technologies. The technology-oriented Marlboro Graduate Center offers training opportunities for current residents of the region and serves as a magnet to new technology-based business.

The Windham Region has attracted tourists for generations. With the construction of Interstate 91 and the development of the ski industry, the region experienced a tremendous growth in tourism over the last half century. Its location in Southeastern Vermont brings it within convenient range of travelers

\(^{57}\) Vermont Department of Labor, 2014. [http://www.vtlmi.info/indareanaics.cfm](http://www.vtlmi.info/indareanaics.cfm)

\(^{58}\) Vermont Department of Labor, 2014. [http://www.vtlmi.info/indareanaics.cfm](http://www.vtlmi.info/indareanaics.cfm)
from large urban and metropolitan areas. Brattleboro is at the junction of Interstate 91 and three major state highways, making it a gateway for travelers headed to other parts of the region and state.

The three major components of the region’s tourism and recreation industry are ski resorts, summer and fall tourism, and second homes. Each affects the economy in different ways and provides different types of employment. The first two are primarily seasonal industries and the last has year-round effects on the economy and cost of housing. Many of the current full-time residents of the region first came to Vermont as seasonal tourists. Businesses that have benefited from growth related to tourism and recreation include the arts, entertainment, lodging, restaurants, gasoline stations, retail and outdoor equipment shops, construction and building-related industries, and maintenance and repair services.

Because the past decade has not seen a great increase in skiers, the industry is searching for new markets such as the younger snowboarding generation. Sparse snow during some winters and industry changes have challenged the capital-intensive ski business and contributed to a decrease in the total number of operating ski areas. The surviving ones have grown in size and in scope of services to the point that in peak seasons, the resort area populations rival the region’s two traditional centers.

A 2011 tourism study published by the Vermont Department of Tourism and Marketing\(^5\) revealed that:

- Visitors to Vermont spent $1.7 billion for goods and services, and contributed $274.5 million in tax and fee revenue to the State. Their spending supports almost 38,000 jobs in Vermont, approximately 11.5 percent of all employment.

- Visitors made 13.95 million person trips.\(^6\) Spring visitors (April-May) accounted for only 17 percent of total person trips, while the number of person trips in the summer, winter, and fall each fell within the range of 26-30 percent. The highest visitor spending of over $577 million occurred during the winter months (December-March).

- Food and beverage expenditures were the largest spending category for visitors (23 percent), followed by lodging (21 percent), gasoline (17 percent), and retail shopping (13 percent). Amusement and recreation account for 7 percent of expenditures.

The region’s heritage and culture create further tourism opportunities. They have the advantage of using existing assets and encouraging the preservation of the very attributes that distinguish Vermont.

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\(^6\) A ‘person trip’ counts each individual in a travel party. If an individual makes multiple trips, he or she is counted as a visitor on each trip.
Heritage tourism, according to the National Trust for Historic Preservation, “means traveling to historic and cultural attractions to learn about the past in an enjoyable way.” With its wealth of historic sites, traditional villages and cultural attractions, the Windham Region is well positioned to promote heritage tourism. Vermont has also established an African American Heritage Trail, which includes important sites in Grafton. The Connecticut River Byway, Molly Stark Trail Scenic Byway, and Scenic Route 100 Byway are examples of coordinated heritage tourism projects among towns in the Windham Region. All three byways provide opportunities to enhance and support economic development, and particularly the historic agricultural economy.

One aspect of the cultural heritage of Vermont is its long history of family-based farms and agriculture. Agri-tourism not only draws tourists, but also provides markets for Vermont’s agricultural products and thus helps to keep farming viable. The success of the region's travel and tourism industry is linked to the viability of its agriculture industry. Urban dwellers are drawn to the area's rural environment, viewing farms as scenic centerpieces within the surrounding countryside. Tourism is a wealth provider for the region’s economy as a source of employment and a market for products from the farm community. Each farm that goes out of production and into development diminishes the landscape and makes it less appealing to residents and to visitors.

The arts and culture industry is a thriving part of the economy and contributes to the quality of place identified by many residents and visitors. The Windham Region draws people, including many professional and amateur artists, from throughout the northeast to visit and/or relocate to participate in the region’s art and cultural opportunities. A 2011 study, funded by America for the Arts (AFTA), explored the economic contribution of the arts industry in Vermont. Drawing on the responses from 39 non-profit arts organizations and 600 audience members, the study compiled the reported expenditures for the year 2010, finding that the organizations had direct spending of over $7.5 million, nearly $5.9 million of which was paid as income to the equivalent of 228 full-time employees. These organizations paid $116,000 in taxes to town governments and $399,000 to the State of Vermont. Audience expenditures contributed over $3.2 million to the state economy, over $1.5 million of which was paid as wages to 102 full-time equivalent employees. Audience generated taxes contributed $100,000 to town governments and $203,000 to the State government. In total, the combined expenditures for organizations and audience were nearly $10.8 million.\\n\\n**PRIVATE**

The private sector, including private non-profit organizations, employs 86 percent of the workforce in Windham County. In 2002 there were 20,614 individuals employed in the private sector. By 2012 this number had dropped 8.5 percent to 18,852 individuals. There were likely a number of factors that

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contributed to this decline, most significantly the “Great Recession” of 2008, the outmigration of industry and manufacturing, and demographic changes as the population ages and fewer youth enter the labor market.

**NON-PROFIT**

The non-profit sector plays a major role in community development in the region as well as the State. This is evidenced by the fact that some of the top employers in the Windham Region are non-profit organizations, including educational institutions and hospitals. Non-profit organizations are also leading the region in the redevelopment of brownfield sites, the construction of affordable housing units, and the creation of art and cultural opportunities, all of which contribute to community vibrancy and the revitalization of regional centers and downtowns. The National Center for Charitable Statistics reports that in December 2013 there were 533 registered non-profit organizations in Windham County. The reported revenues of these organizations exceeded $540 million and their assets reached over $858 million.\(^{62}\)

**GOVERNMENT**

There were 3,019 individuals employed within the government sector in Windham County in 2012 as compared to 2,796 in 2002, representing an 8 percent increase. Of those employed in the government sector nearly 85 percent were employed by local governments, nearly 11 percent were employed by the State, and less than 5 percent were employed by the federal government. The average annual wage for local government employees was $33,072, which is significantly below that of state ($45,751), federal ($51,154) and private sector employees ($38,703).

**ISSUES AND OPPORTUNITIES**

The **2014 Comprehensive Economic Development Strategy** (CEDS) lays out numerous challenges to the region’s economy, which include:

- Southeastern Vermont is getting older.
- Job creation has been stagnant since the early 1990s.
- Non-wage income is driving gains in prosperity.
- Average wages in Southeastern Vermont are lower than nearby markets.

The CEDS also lays out numerous assets and opportunities for improving the regional economy and lists the following goals:

- Reverse population decline.
- Increase the number of well-paying jobs.
- Improve workforce quality.
- Raise household income relative to surrounding areas.

SEVEDS will use the CEDS objectives and strategies to address the regional challenges and opportunities and to improve the regional economy. The WRC will work with towns to update the economic development elements of their town plans to reflect local opportunities and assets that may be built upon.

- Vermont Yankee will close in December 2014. This plant employs approximately 2 percent of the population of Windham County, and accounts for approximately 5 percent of compensation earned within the County. As noted in the CEDS, the region must continue to plan for a post Vermont Yankee economy with approximately 230 fewer high wage jobs and for the related economic impact.

- While large businesses tend to be very visible, and their expansion or contraction grabs headlines, small businesses are a very significant component of the region’s economy. In 2013, 78 percent of Windham County businesses employed nine or fewer persons. Traditionally, the small business sector tends to be where some of the most dynamic growth occurs. Having the majority of workers employed in numerous and diverse businesses also makes the region less vulnerable to the economic impacts from changes in any single business sector.

- One visible challenge to economic growth may be a shortfall in the availability of affordable workforce housing. This condition is common throughout much of the northeastern U.S.

- A trend that has been seen in recent years, and will likely continue into the future, is for most major developments to rely upon partnerships between the private and public sectors. One such example is the renovation of Brooks House after a fire swept through the approximately 70-unit commercial and residential structure in April 2011. Due to its location and size, this large structure is critical to the vibrancy of Brattleboro’s downtown. Five local investors created a partnership to restore the nineteenth-century building. After securing financial assistance from many local, state, and federal programs, local investors, and banks, the building was under redevelopment with plans to house the Vermont Community and Technical Colleges upon

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completion. Another example is Commonwealth Dairy, a Brattleboro-based yogurt company, which received financial and technical assistance through a partnership with the German company, Erhmann AG. The establishment of Commonwealth Dairy was aided by participation from multiple banks and community development groups as well as financial assistance from local, state, and federal programs, including federal New Market Tax Credits. Since opening in 2011, the company has grown to employ 145 people.

- Large development projects, particularly affordable housing developments, are frequently led by non-profit organizations. For example, the community of Algiers Village in Guilford has been revitalized largely through housing development, which was a collaborative effort primarily by Friends of Algiers Village and the Windham and Windsor Housing Trust, both of which are non-profit organizations. The project, like all recent housing development projects in the region, relied heavily upon public and private funding sources. The need for private/public partnerships led by non-profit organizations is likely a result of a shortfall in the available capital for for-profit companies and/or their willingness to assume the financial risks. The for-profit sector in the State tends to be small in scale, which limits its ability to invest in large development projects.

- Often located in or near downtowns and villages, brownfields[^64] are frequently blights to their communities, but they are also potential assets. With basic infrastructure already in place, brownfields offer valuable opportunities for redevelopment. Their renovation and repurposing can be an effective strategy for supporting community revitalization; however, whether real or merely perceived, they are often overlooked due to the complexities and costs associated with testing and mitigation of pollution. Since 2000, the WRC has been operating the Windham Region Brownfields Reuse Initiative Program aimed at revitalizing brownfield sites in villages and downtowns.

- As the Windham Region strives for social equity, it is important that it address environmental justice.[^65] Within the region, environmental inequality may be seen in the pattern of brownfields found frequently in low income areas.

- Many of the region’s communities are interested in community economic development strategies. Community economic development encourages local economic activity to maximize the investment and wealth can be retained in the community.

[^64]: Brownfields are defined by the Environmental Protection Agency (EPA) as “real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant.”

[^65]: The EPA defines Environmental Justice as “the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.”
The absence of public or community wastewater and drinking water systems in a majority of the region’s villages is a limiting factor, not only to continued business growth, but also to business retention is often limited by private on-site wastewater system capacity.

In recent years there has been renewed interest in economic development opportunities for Vermont’s working landscape. In 2011 the Vermont Council of Rural Development published a report called *Vermont’s Working Landscape – Investing in our Farm and Forest Future*. The Vermont Legislature, in 2012, passed the Working Lands Enterprise initiative for the management and investment of $1 million into agricultural and forestry based businesses. Some of the goals of the Working Lands initiative are to;

- Stimulate a concerted economic development effort on behalf of Vermont’s agriculture and forest product sectors by systematically advancing entrepreneurism, business development, and job creation;

- Increase the value of Vermont’s raw and value-added products through the development of in-state and export markets;

- Attract a new generation of entrepreneurs to Vermont’s farm, food system, forest, and value-added chain by facilitating more affordable access to the working landscape; and

- Increase the amount of state investment in working lands enterprises, particularly when it leverages private and philanthropic funds.
The day-to-day cost of energy frequently is a wide concern, though perhaps tending to be on a short-term basis in response to current events. But the concern about energy reliability and cost over the long term is at the root of such issues.

There are three major reliability issues that influence the region’s energy future. First, New England has few local sources of energy. As a result, energy must be imported from other places, increasing costs and making the region more vulnerable to price and supply fluctuations. Second, the newly deregulated structure of the electricity market may not provide the right incentives for companies to make needed long-term investments. Consequently, maintaining older systems with less relative capacity is likely to be less reliable. Third, even with other incentives in place, communities are increasingly concerned about safety, security, and economic and environmental impacts related to energy developments of all kinds. That concern, coupled with a fragmented local decision-making process, makes it difficult to site new generation and transmission facilities in New England.

Personal and business transportation constitutes about 34 percent of Vermont’s energy use. The service industry, particularly tourism, is very dependent on people driving to their destinations making gasoline costs and supplies a major concern. Space heating and cooling also represent large shares of the energy budget and may, along with more energy efficient appliances of all types, offer potential for significant reductions in the region’s rate of growth in energy demand.

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67 The report cited above also notes that “higher prices do not necessarily translate one-for-one into higher expenditures. New England consumes less energy per capita than other regions—an average of 257 million Btus per capita each year versus 338 million for the United States as a whole. In the end, New Englanders pay an average of $2,473 per capita for their energy needs annually, only slightly higher than the US average of $2,433.”
CHAPTER 5

NATURAL RESOURCES

Natural resources are elements such as forests, mineral deposits, or fresh water, which are necessary or useful to humans. A natural resource’s value is derived through either an economic use or through its conservation for continued future access and public benefit. Beneficial use and conservation of natural resources begins with an understanding of the complex balance of energy, ecosystems, and all living organisms. This interconnected web of life-support systems makes the sustainability of natural resources both a global and a local issue. Rapid consumption, misuse, or degradation can deplete and destroy both renewable and non-renewable natural resources.

The Windham Region is fortunate to have a wealth of valuable natural resources. Extensive forested lands, prime agricultural soils, river valleys, upland streams, and wetlands create an ecosystem in the region that sustains numerous plant and animal communities in addition to supporting human habitation. This interconnected ecosystem of humans, animals, plants, earth, air, and water can be sustained through careful resource use and conservation.

FOREST RESOURCES

REGIONAL OVERVIEW

Approximately 516,000 acres (86 percent) of the Windham Region is forested. The region’s forestry industry is one of the state’s leading producers, especially of high quality northern hardwoods and white pine. Windham County also has the most standing timber, 3.46 billion board feet, in the State. Seventy-two percent of the region’s forests are in private, non-industrial ownership, with industrial firms and Federal, State and local governments sharing the rest. The headwaters of the region’s major streams and rivers are heavily buffered by forestland, preserving soils, and water purity at the source. Nevertheless, steady population growth, dispersed settlement patterns, and second-home development have increased development pressure in forested areas.

The timber industry in Vermont is part of a worldwide market. This connection, coupled with a vigorous Canadian market for softwood and hardwood sawlogs, has placed Windham Region forestland owners in a tempting position to send a substantial volume of logs out of the region, and out of Vermont, to wood processors elsewhere. With about 30 million board feet of sawlogs and veneer logs harvested annually, the condition of the timber industry and its markets have significant regional economic effects.
Vermont’s forests have recovered from a time when agriculture dominated a largely treeless landscape, followed by heavy logging of the young forests that first colonized the unused farmlands. These habitat changes have altered the relative abundance of various plant and animal species. With the maturing of today’s forest, a mosaic of fields, pastures and woodlots in rural portions of the region has been shifting to a forested landscape punctuated by residential and recreational development, roadways and powerline corridors. By contrast, in and around villages and other settled areas, an expansion of suburban development onto former farms and farm woodlots is reducing forest acres and lowering their productivity.

A MULTI-VALUED RESOURCE

Forests play a major role in the ecological, economic, and social health of the region. As a major component of our landscape, forests form the environmental setting for human activity, furnish habitat for wildlife, contribute to water and air quality, and make a significant contribution to reducing climate change effects through carbon sequestration. They provide employment to foresters, loggers, truckers, artisans, and forest-product manufacturers, and also support a thriving recreation and tourism industry. In an increasingly populous and urban world, the region’s forests offer reminders of Vermont’s heritage and a traditional, rural lifestyle that appeal to residents and visitors alike.

Forestland values include:

- Productive forest soils;
- Timberlands;
- Plant and wildlife habitats;
- Riparian areas and wetlands;
- Unique and fragile sites;
- Recreational opportunities;
- Scenic quality; and
- Historical/cultural/archeological sites (stone walls, foundations, stage roads, etc.).

These multiple and inter-related values create the potential for conflict and a need for thoughtful management that embodies sound silvicultural practices while permitting multiple, compatible uses and for some fraction set aside as permanently protected natural areas. While it is clear that economic pressures can threaten many forested lands with conversion to non-forest uses, it is important to acknowledge that forest resource values are also threatened or degraded if these lands cannot be maintained in large, interconnected blocks. Fragmentation of large woodlots into smaller parcels with
multiple owners decreases the practicality of commercial timber harvest, and diminishes the ability to use sound sustainable forest management practices.

FOREST ECONOMICS

Forests make a significant contribution to the economy of the Windham Region, leading the State not only in growing stock and standing timber, but also in lumber manufacturing and hardwood kiln drying. The forest products industries as a group lead the regional manufacturing sector in number of establishments and number of employees; however these industries have slipped behind other types of manufacturing in the region in terms of payroll and average wage. Recent economic hardship, caused by a slowing economy, resulted in some forest owners cutting timber intensively without regard for good forest management practices, leading to forest land that will not produce high quality timber for many years to come. Other forestland in the region has been sold for development. Research suggests, however, that the private owners of the great majority of the region’s forests are not motivated by economic pressures alone, but value highly the non-economic resource attributes of their land. Nevertheless, the typical forestland owner is of mature age, and the potential for permanent conversion to non-forest uses looms large when ownership passes to the next generation. Two strategies have proven effective over time in keeping forestland intact, the Use-Value Appraisal Program in the short-term and the purchase of conservation easements in the long-term. Each of these programs should be supported and used in appropriate situations to help maintain the forest economy in Windham Region.

THE FORESTS’ SOCIAL VALUE

The region’s forests offer a rich selection of recreational options. Skiing and snowboarding, snowmobiling, mountain biking, hiking, hunting and fishing, wildlife observation and photography, and foliage appreciation all are popular in their seasons. Many view forestlands as valuable as a precious natural environment and a source of solitude, as well as a host for recreation and forest-based employment. The resource accommodates and satisfies this wide range of values, although some competing uses may at times be in conflict. State and Federal public lands offer opportunities for a backcountry wilderness experience that individual private lands in smaller block sizes cannot match, and they also support the most concentrated commercial recreation in the form of ski resorts. In spite of this, private lands do dominate the forested landscape, and their contribution to recreation and aesthetics is essential. As such, it is important to work with landowners to help preserve the value their important resource adds to the region. Attempts should be made to try to develop strategies to keep as much private land as possible open to public recreation.

ISSUES FACING THE REGION’S FORESTS

FRAGMENTATION

Fragmentation of the forested landscape can be caused by any number of development activities. Subdivision of land and construction of new homes and businesses, and their attendant infrastructure, create smaller, separated, even isolated parcels that are too small or inaccessible to be managed or harvested efficiently. Sales by long-term industrial owners may add to this trend. Even if these lots are not developed, there is often a change in attitude of the landowners and a decrease in the land base available for management. This can affect people employed in the forest products industry and decrease opportunities for recreational activities.

Fragmentation is especially harmful to wildlife as habitats and habitat elements are eliminated or separated. With multiple owners and smaller woodlots the consistency of management practices that favor wildlife, and the connectivity among tracts of land is lost, with a result that can be detrimental to wildlife diversity and species vitality. Fragmentation also relates to climate change impacts influencing how animals will move and adapt as temperatures warm and forest tree species composition changes. Figure 5-1 characterizes the existing condition of the forests in the region, compared with the amount of forested land in conservation or in the Use Value Assessment program by Town.

Forest uses directly serving economic ends must be reconciled with the need for large, undeveloped and relatively undisturbed, and interconnected blocks of forest that can meet the habitat needs of wide-ranging wildlife while minimizing human-wildlife conflicts. Forested sites of special natural value need identification and may require protection. Education aimed at improving understanding and appreciation by landowners and by the general public of the natural communities within the forest is essential to striking the right balance between natural, economic, and social uses of those resources. Conservation programs, such as the Forest Legacy Program or placing lands into conservation through an organization such as the Vermont Land Trust help ensure that large tracts of forested land will remain off limits to development and ensure the multiple productive, wildlife and scenic values of this resource.
**DIMINISHED ECOLOGICAL DIVERSITY**

Forested lands contribute to ecological diversity that will allow a healthy mix of plant and animal communities to thrive. Reduced plant diversity and change in forest structure (elimination of the mid-story and expansion of ferns) negatively affects wildlife diversity. One factor working against such diversity is the impact of deer herd browsing on saplings. Deer favor certain species of young trees and, when or where the deer population is overly abundant, their intensive, selective browsing limits the regeneration of species such as red oak, white ash, and sugar maple. Deer browsing not only affects plant diversity, it also dramatically affects the long-term viability of the timber resource. Of interest is the fact that another forestland value, hunting, is one approach that is used to manage the deer population.

Another factor working against such diversity is the increasing numbers of invasive plant and animal pest species that displace native plants and animals.
The changing demographics of the Windham Region, particularly in woodland ownership, are beginning to have an effect on forest management practices, as well as on public perceptions, attitudes and influence on regional forestry policies. Some research indicates that new woodland owners in the Windham Region, and in Vermont in general, are younger and less traditionally “land-connected” than historic owners, and that these younger owners are more likely to sell or subdivide their woodlands.

### MAINTAINING THE REGION’S WOODLAND LEGACY

Approximately two-thirds of the land area in the Windham Region remains in parcels larger than 50 acres. Stronger policies can be enacted to promote the viability of forestland, especially on intact parcels between 50 and 100 acres. Some natural resource protection tools available to towns include:

- Designating a forest zoning district ([24 V.S.A. § 4414, (1)(B)(ii)](24_V.S.A._§_4414,_(1)(B)(ii))

- Requiring large lots in agricultural and forest districts to limit development density in natural areas (Minimum 27-acre parcels allow 2 acres for a home and 25 acres of farm or forest land for Use Value Appraisal eligibility)

- Requiring new developments to have smaller road setbacks, small lot sizes, clustered development, and land in conservation helps minimize forest fragmentation

- Encouraging development in existing growth centers to help prevent further fragmentation of natural resources

- Enacting overlay districts to restrict development in buffer areas near lakes, ponds, streams, rivers or steep slopes

- Developing subdivision bylaws that require development be kept away from sensitive areas as a requirement for obtaining subdivision approval. It is important to note that “sensitive areas” should be identified and defined prior to enactment of the subdivision bylaws.

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LEGISLATIVE INTERVENTION

Legislative intervention in forest-management practices and changes in forestland taxation under the Use Value Appraisal (Current Use) Program have affected both industrial and private ownership. In particular, private owners have created or inherited long-term management plans that are professionally monitored. At this time there are approximately 140,000 forested acres, or 27.6% percent of forests in the Windham Region, enrolled in the Use Value Appraisal Program, which is nearly 50% of the land that is eligible.

The Use Value Appraisal program offers a moderate amount of protection for forestland; however, owners can always withdraw from the program by paying a penalty fee, and then are free to develop their land. Permanent protection of forest land is best achieved through increased public land acquisition, an effort that is adding incrementally to conservation of forestland in the Windham Region. Land Trusts are also very effective in permanently conserving land and have been adding steadily more forest to the Windham Region’s inventory of lands protected through conservation easements.

In 1997 the Legislature enacted a “Heavy Cutting” law to limit clearcutting and severe highgrading (cutting only the best quality trees and leaving the worst quality trees). A permit is required for a heavy cut that exceeds 40 acres, or 80 acres within a two-mile radius. The nature of timber harvesting in the Windham Region tends to be on a smaller, lighter scale, and since the law’s inception there have been only a very few “Heavy Cutting” applications submitted. The forestry standards written into this legislation have helped to slow large-scale, indiscriminate liquidation and clearcutting, but tree quality in the residual stand can be quite low and yet still be in compliance.

A Working Lands Enterprise Bill was passed in 2012 to spur new forestry and agricultural business start-ups, to support growing businesses in these fields, and to build infrastructure to support jobs, communities, and the landscape of Vermont. The Working Lands Enterprise Fund invests in the working lands economy by:

- Giving grants to small and start-up working lands businesses
- Supporting working lands service providers that are starting up or are in a growth phase
- Investing in infrastructure to support the working lands enterprise economy
EDUCATION

The education of woodland owners in the Windham Region has been enhanced by the requirements of the Current Use program and, during the past fifty years, by the continued efforts of the Vermont Woodland Owners’ Association. In addition, woodland owners have become more aware of management options that combine timber improvement and utilization with enhancement of wildlife habitat through statewide educational programs sponsored by Vermont Coverts and other organizations, and by cooperation between woodland neighbors. Some such management options are demonstrated in Figure 5-2. Vermont policy makers have increased public interest as they worked to begin regulatory efforts to improve forest management practices. Professional programs for loggers and other forest workers (for example, the Logger Education to Advance Professionalism program and the Game of Logging program) have increased safety levels and improved forestry practices. Recreational use of forestland is enhanced by a variety of educational programs, such as those offered by the Bonnyvale Environmental Education Center of Brattleboro and the Nature Museum of Grafton.

FIGURE 5-2: DIAGRAM OF SUSTAINABLE FOREST MANAGEMENT PRACTICES

“People need to understand where things come from,” says Windham County forester, Bill Guenther. Whether it’s farm to plate or forest to table people need reminding where everyday wood and paper products originate. That’s the first step in managing them wisely.

**SURFACE WATERS**

Surface waters are prominent landscape features that throughout the region have often determined both the location and form of regional settlement. Surface waters include lakes and ponds (both natural and impounded), rivers and streams (permanent and intermittent), vernal pools, and wetlands (see Water Resources Map). The region’s abundant surface waters are valuable resources providing:

- Aquatic and wildlife habitat;
- Recreational opportunities;
- Scenic enjoyment;
- Riverine aquifer recharge;
- Water for drinking and irrigation;
- Hydroelectric generation;
- Stormwater accommodation and discharge;
- Assimilation of properly treated waste;
- Industrial uses such as snowmaking, process water, etc.

**RIVER BASINS AND WATERSHEDS**

The majority of the Windham Region is located within the Connecticut River basin with small portions located in the Hudson River and Lake Champlain basins. These basins contain many rivers and tributaries, each with their own unique values and uses. Table 5-1 shows the Windham Region’s major watersheds and their respective acreage. Figure 5-3 illustrates the boundaries of these basins and watersheds. A full size version of this map is available in the map section, Basins and Watersheds Map.
TABLE 5-1: WINDHAM REGION WATERSHEDS

<table>
<thead>
<tr>
<th>Watershed</th>
<th>State Watershed Basin Number</th>
<th>Acreage in Region</th>
<th>Percent of Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connecticut River Basin</td>
<td>--</td>
<td>582,598</td>
<td>99.0%</td>
</tr>
<tr>
<td>West River</td>
<td>11</td>
<td>306,150</td>
<td>52.0%</td>
</tr>
<tr>
<td>Deerfield River</td>
<td>12</td>
<td>172,221</td>
<td>29.0%</td>
</tr>
<tr>
<td>Lower Connecticut River</td>
<td>13</td>
<td>104,237</td>
<td>18.0%</td>
</tr>
<tr>
<td>Lake Champlain Basin</td>
<td>--</td>
<td>660</td>
<td>0.1%</td>
</tr>
<tr>
<td>Otter Creek</td>
<td>3</td>
<td>660</td>
<td>0.1%</td>
</tr>
<tr>
<td>Hudson River Basin</td>
<td>--</td>
<td>6,630</td>
<td>1.0%</td>
</tr>
<tr>
<td>Batten Kill</td>
<td>1</td>
<td>6,630</td>
<td>1.0%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>589,888</strong></td>
<td><strong>100.0%</strong></td>
</tr>
</tbody>
</table>

Source: Windham Regional Commission GIS Department

The principal surface water planning issues are:

- The protection of water quality from point and non-point sources of pollution;
- Remediation of waters identified as impaired by the state water quality assessments;
- Elevated water temperatures;
- Stream channel stability and floods;
- Public access and recreation;
- Public education on water issues;
- Dams, their construction, management and removal;
- Regulation of hydroelectric generating facilities;
- Use of waters for snowmaking;
- On-site septic management;
- The management of waters to accommodate competing uses; and

71 Basin 11 also encompasses the Saxtons and Williams Rivers.
Protection of aquatic habitats from impacts created by stream channel modification, migration of invasive species and management of appropriate stream bank buffer areas.

FIGURE 5-3: WINDHAM REGION BASINS AND WATERSHEDS
LAKES AND PONDS

Within the watersheds of the Windham Region, there are 33 lakes and ponds over 20 acres in area (see Table 5-2). These water bodies provide their own special habitats and recreational opportunities, as well as conservation and water quality issues. Some of the issues particularly pertinent to lakes and ponds are exotic invasive species such as Eurasian watermilfoil, competing recreational uses, dam management, and extraction of water for snowmaking and other commercial uses.

The Vermont Watershed Management Division’s Lakes and Ponds Section developed the Lake Score Card (See Figure 5-4) to provide a method for conveying the large amount of data gathered through their monitoring efforts. The Score Card answers the commonly asked question “how is my lake doing?” Monitoring data is analyzed and reported in a simple, visual interactive format. The Score Card rates Vermont lakes in terms of water quality, aquatic invasive species, atmospheric pollution, and shoreland and lake habitat. The Lake Score Card uses three simple colors to convey the meaning of complex data sets and the status of Vermont lakes for each category. More information about what each score means can be found at: http://www.vtwaterquality.org/lakes/htm/lp_lakescorecard.htm. Most of the lakes within the Windham Region are in good condition for water quality and invasive species parameters. Atmospheric pollution has the most negative influence on surface water conditions. Very few lakes in the region have shoreland and lake habitat scores at this point.
## Natural Resources

### TABLE 5-2: WINDHAM REGIONAL LAKES AND PONDS OVER 20 ACRES

<table>
<thead>
<tr>
<th>Lake/Pond Name</th>
<th>Town</th>
<th>Outlet Type</th>
<th>Dam Height (in Ft)</th>
<th>Lake Score Card</th>
<th>Water Quality Classification</th>
<th>Water Quality/Atmospheric Pollution</th>
<th>Invasive Species</th>
<th>Habitat</th>
<th>Shoreland Habitat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Athens</td>
<td>Jamaica</td>
<td>Natural with control</td>
<td>21</td>
<td>B</td>
<td>Good</td>
<td>Good</td>
<td>No Data</td>
<td>Fair</td>
<td>No Data</td>
</tr>
<tr>
<td>Ball Mountain Reservoir</td>
<td>Windham</td>
<td>Artificial</td>
<td>85</td>
<td>A</td>
<td>Good</td>
<td>Good</td>
<td>No Data</td>
<td>Fair</td>
<td>No Data</td>
</tr>
<tr>
<td>Burke Pond</td>
<td>Jamaica</td>
<td>Artificial</td>
<td>50</td>
<td>B</td>
<td>Good</td>
<td>Good</td>
<td>No Data</td>
<td>Fair</td>
<td>No Data</td>
</tr>
<tr>
<td>Cole Pond</td>
<td>Jamaica</td>
<td>Natural</td>
<td>41</td>
<td>B</td>
<td>Good</td>
<td>Good</td>
<td>No Data</td>
<td>Fair</td>
<td>No Data</td>
</tr>
<tr>
<td>Deer Park Pond</td>
<td>Jamaica</td>
<td>Artificial</td>
<td>22</td>
<td>B</td>
<td>Good</td>
<td>Good</td>
<td>No Data</td>
<td>Fair</td>
<td>No Data</td>
</tr>
<tr>
<td>Gale Meadow Pond</td>
<td>Winhall/Whitingham</td>
<td>Artificial</td>
<td>195</td>
<td>B</td>
<td>Good</td>
<td>Good</td>
<td>No Data</td>
<td>Fair</td>
<td>No Data</td>
</tr>
<tr>
<td>Gates Pond</td>
<td>Whitingham</td>
<td>Natural with control</td>
<td>30</td>
<td>B</td>
<td>Good</td>
<td>Good</td>
<td>No Data</td>
<td>Fair</td>
<td>No Data</td>
</tr>
<tr>
<td>Grout Pond</td>
<td>Stratton</td>
<td>Natural</td>
<td>84</td>
<td>B</td>
<td>Good</td>
<td>Good</td>
<td>No Data</td>
<td>Fair</td>
<td>No Data</td>
</tr>
<tr>
<td>Grout Pond</td>
<td>Stratton</td>
<td>Natural</td>
<td>84</td>
<td>B</td>
<td>Good</td>
<td>Good</td>
<td>No Data</td>
<td>Fair</td>
<td>No Data</td>
</tr>
<tr>
<td>Harriman Reservoir</td>
<td>Winhall/Whitingham</td>
<td>Artificial</td>
<td>2,040</td>
<td>B</td>
<td>Good</td>
<td>Good</td>
<td>No Data</td>
<td>Fair</td>
<td>No Data</td>
</tr>
<tr>
<td>Haystack Pond</td>
<td>Winhall/Whitingham</td>
<td>Artificial</td>
<td>27</td>
<td>A</td>
<td>Good</td>
<td>Good</td>
<td>No Data</td>
<td>Fair</td>
<td>No Data</td>
</tr>
<tr>
<td>Howe Pond</td>
<td>Readstown</td>
<td>Natural</td>
<td>52</td>
<td>A</td>
<td>Good</td>
<td>Good</td>
<td>No Data</td>
<td>Fair</td>
<td>No Data</td>
</tr>
<tr>
<td>Jacksonville Pond</td>
<td>Whitingham</td>
<td>Artificial</td>
<td>20</td>
<td>B</td>
<td>Good</td>
<td>Good</td>
<td>No Data</td>
<td>Fair</td>
<td>No Data</td>
</tr>
<tr>
<td>Kenny Pond</td>
<td>Whitingham</td>
<td>Natural with control</td>
<td>26</td>
<td>A</td>
<td>Good</td>
<td>Good</td>
<td>No Data</td>
<td>Fair</td>
<td>No Data</td>
</tr>
<tr>
<td>Lily Pond</td>
<td>Winhall/Whitingham</td>
<td>Artificial</td>
<td>21</td>
<td>B</td>
<td>Good</td>
<td>Good</td>
<td>No Data</td>
<td>Fair</td>
<td>No Data</td>
</tr>
<tr>
<td>Little Mud Pond</td>
<td>Winhall/Whitingham</td>
<td>Artificial</td>
<td>109</td>
<td>B</td>
<td>Good</td>
<td>Good</td>
<td>No Data</td>
<td>Fair</td>
<td>No Data</td>
</tr>
<tr>
<td>Minard's Pond</td>
<td>Rockingham</td>
<td>Natural with control</td>
<td>46</td>
<td>A</td>
<td>Good</td>
<td>Good</td>
<td>No Data</td>
<td>Fair</td>
<td>No Data</td>
</tr>
<tr>
<td>North Pond</td>
<td>Brattleboro</td>
<td>Artificial</td>
<td>20</td>
<td>A</td>
<td>Good</td>
<td>Good</td>
<td>No Data</td>
<td>Fair</td>
<td>No Data</td>
</tr>
<tr>
<td>North Pond</td>
<td>Brattleboro</td>
<td>Artificial</td>
<td>25</td>
<td>A</td>
<td>Good</td>
<td>Good</td>
<td>No Data</td>
<td>Fair</td>
<td>No Data</td>
</tr>
</tbody>
</table>

**Source:** Vermont Lake Score Card, [http://www.vtwaterquality.org/lakes/htm/lp_lakescorecard.htm](http://www.vtwaterquality.org/lakes/htm/lp_lakescorecard.htm)
<table>
<thead>
<tr>
<th>Lake/Pond Name</th>
<th>Water Quality Classification</th>
<th>Water Quality</th>
<th>Dam</th>
<th>Outlet Type</th>
<th>Height (in Ft)</th>
<th>Acreage (Surface Area)</th>
<th>Town</th>
<th>Shoreland and Lake Habitat</th>
<th>Water Shor</th>
<th>Lake Score Card</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lake Raponda</td>
<td>B</td>
<td>Good</td>
<td>B</td>
<td>Natural with</td>
<td>121</td>
<td>121</td>
<td>Wilmington</td>
<td>No Data</td>
<td>Reduced</td>
<td>Good</td>
</tr>
<tr>
<td>Sadawga Pond</td>
<td></td>
<td>Good</td>
<td></td>
<td>Artifical</td>
<td>194</td>
<td>194</td>
<td>Whitingham</td>
<td>No Data</td>
<td>Reduced</td>
<td>Good</td>
</tr>
<tr>
<td>Stearnsberg Reservoir</td>
<td></td>
<td>Good</td>
<td>B</td>
<td>Natural</td>
<td>25</td>
<td>25</td>
<td>Searsmburg</td>
<td>No Data</td>
<td>Good</td>
<td>Good</td>
</tr>
<tr>
<td>Shippee Pond</td>
<td></td>
<td>Good</td>
<td></td>
<td>Artificial</td>
<td>117</td>
<td>117</td>
<td>Readington</td>
<td>No Data</td>
<td>Good</td>
<td>Good</td>
</tr>
<tr>
<td>Stowe Reservoir</td>
<td></td>
<td>Good</td>
<td></td>
<td>Artifical</td>
<td>1,568</td>
<td>1,568</td>
<td>Whitingham</td>
<td>No Data</td>
<td>Good</td>
<td>Good</td>
</tr>
<tr>
<td>South Pond</td>
<td>A1</td>
<td>Good</td>
<td></td>
<td>Natural</td>
<td>68</td>
<td>68</td>
<td>Marlboro</td>
<td>No Data</td>
<td>Good</td>
<td>Good</td>
</tr>
<tr>
<td>Stratton Pond</td>
<td>A1</td>
<td>Good</td>
<td></td>
<td>Natural</td>
<td>46</td>
<td>46</td>
<td>Stratton</td>
<td>No Data</td>
<td>Good</td>
<td>Good</td>
</tr>
<tr>
<td>Sunset Lake</td>
<td>A2</td>
<td>Good</td>
<td></td>
<td>Natural</td>
<td>96</td>
<td>96</td>
<td>Marlboro</td>
<td>No Data</td>
<td>Good</td>
<td>Good</td>
</tr>
<tr>
<td>Sweet Pond</td>
<td>A2</td>
<td>Good</td>
<td></td>
<td>Natural</td>
<td>20</td>
<td>20</td>
<td>Guilford</td>
<td>No Data</td>
<td>Good</td>
<td>Good</td>
</tr>
<tr>
<td>Tenant Pond</td>
<td>A3</td>
<td>Good</td>
<td></td>
<td>Natural</td>
<td>108</td>
<td>108</td>
<td>Townshend</td>
<td>No Data</td>
<td>Good</td>
<td>Good</td>
</tr>
<tr>
<td>Waitsaquet Pond</td>
<td></td>
<td>Good</td>
<td></td>
<td>Natural</td>
<td>22</td>
<td>22</td>
<td>Weston</td>
<td>No Data</td>
<td>Good</td>
<td>Good</td>
</tr>
<tr>
<td>Weatherhead Pond</td>
<td></td>
<td>Good</td>
<td></td>
<td>Natural</td>
<td>33</td>
<td>33</td>
<td>Guilford</td>
<td>No Data</td>
<td>Good</td>
<td>Good</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>Good</td>
<td></td>
<td></td>
<td>5,440</td>
<td>5,440</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

RIVERS AND STREAMS

Rivers and streams are dynamic systems that are constantly shifting in response to streamflow and ecological conditions making them complicated to understand. As a result, thorough study is required to understand how different sections of a stream relate to each other. Rivers and streams are critical waterways provide vital breeding, resting, and feeding areas for fish, birds, and other wildlife species as well as critical habitat for plants, including rare, threatened, and endangered species. Rivers and streams provide water for drinking and domestic use, for generating electricity, for powering machinery, for irrigating crops, and for transporting goods. They enhance the beauty of the landscape and the quality of scenic and recreational experiences in the region. Healthy rivers and streams also provide vital ecological services such as helping to purify water, transport water and nutrients through the region, and moderate floods and droughts.

Undeveloped and undisturbed land along rivers and streams (riparian buffers) and along the shores of lakes and ponds (lacustrine buffers) are important for a number of reasons. They provide water quality values in terms of shade (temperature), pollutant filtration, and bank stability. They also provide habitat values both in the water, including direct sources of food and shelter for fish, and on shore, including viable habitat for plants and feeding, foraging, and travel corridors for wildlife. Finally, undeveloped watershorelines provide a direct benefit to society in terms of scenery, recreation, and in many cases, buffering of flood waters. The WRC analyzed spatial data using Geographic Information System (GIS) software to identify and characterize undeveloped rivers, streams, lakes, and ponds in southern Windham County and eastern Bennington County to aid in the preservation of these riparian and lacustrine buffer areas for their water quality, habitat and societal benefits.

FLOODPLAINS

Floodplains are lowlands along rivers, streams, and lakes that periodically become inundated with water during periods of high rainfall or spring runoff. They are important for temporarily retaining waters that might cause damage or destruction downstream. Floodplains are often the best agricultural lands because of their thick glacial deposits, minimum slope and proximity to surface water. Floodways are stream channels and any adjacent floodplain areas that carry the bulk and force of the river’s flow, and must be kept free of encroachment.

Nearly three-quarters of Vermont streams have lost connection with their historic floodplains during the typical annual flood. A stream’s lack of access to its floodplain, including many wetland areas, creates an unstable condition in which the stream no longer has its “release valve” or ability to dissipate energy out of the stream channel and onto the surrounding landscape. Excessive streambank erosion,
depositing of sedimentation and damage to infrastructure are all potential outcomes of a stream or river that has lost connection with its floodplain.72

**FLUVIAL EROSION HAZARD ZONES**

Fluvial (or river-related) erosion hazards (FEH) refer to major streambed and stream bank erosion associated with the often catastrophic physical adjustment of stream channel dimensions (width and depth) and location that can occur during flooding. Fluvial erosion becomes a hazard when the stream channel that is undergoing adjustment due to its instability, threatens public infrastructure, houses, businesses, and other private investments.

Rivers and streams are not static in the landscape. The shape of a river channel, including its width, depth, pattern, and slope, changes over time due to the action of water, sediment, and debris from the surrounding watershed as shown in the example (Figure 5-5). Rivers in “dynamic equilibrium” carry water, sediment, and debris, even during high water, without changes occurring in the depth, width, length, or slope of the channel. The channel may move and shift position within the landscape, but these other factors remain relatively constant. Human land uses, especially within river corridors, that significantly alter the runoff patterns of water and sediment can disrupt the equilibrium of a river system. When development changes the relationship of the river with its floodplain or constrains the river from maintaining or re-establishing equilibrium conditions, the result is often costly losses due to erosion. This erosion can also contribute to increased sediment and nutrients that can compromise water quality and aquatic habitat.

**FIGURE 5-5: WHITE RIVER CHANNEL OVER TIME**

![White River Channel Over Time](source: Agency of Natural Resources DEC Watershed Management Division)

The degree of adjustment many streams will go through to establish and maintain equilibrium (having a dimension, pattern, and profile where erosion is minimized) will be significant. It is not safe or environmentally sound to encroach within 15, 30, or in some cases even 100 feet or more of the riverbank. Consideration of stream geomorphology and long term river dynamics in land-use decision-making can protect and restore water quality and habitats, and mitigate damages and economic losses incurred as a result of floods and fluvial erosion.

**FLOOD RESILIENCY**

The Windham Region is vulnerable to the destructive impacts of the region’s surface waters as demonstrated by Tropical Storm Irene. Although flooding is common in this area, the severity of Tropical Storm Irene’s destructive impacts raised considerable public awareness and community discussions about the need to address flood resiliency. Resiliency is the ability of a community to respond and adapt to natural and human-caused disasters. Potential flood damage in this region is exacerbated by a combination of frequent intense storm events and traditional settlement patterns which historically placed road networks, villages, and other development along river and stream corridors, often within the floodplain and fluvial erosion hazard (FEH) areas. In response to recent storms, the Vermont Statutes require that as of July 1, 2014, regional plans include a flood resilience element that identifies flood hazard and FEH areas, designates those areas for protection, recommends policies and strategies to protect them, and mitigates risks to public safety and infrastructure. While this plan recognizes the need to more fully address flood mitigation, the maps and data were not available at the time of plan adoption to adequately address this issue. The WRC will amend the Regional Plan before the next update cycle to more adequately address floodplain and FEH area protection and hazard mitigation. Issues related to flooding are further discussed in the Emergency Services section of Utilities, Facilities, and Technology.

Flooding is a natural ecological process, and in this region, is frequently occurring (see Figure 5-6). While river and stream channels serve to convey water downstream, floodplains and wetlands are critical for the temporary storage of water during large storm events, thereby reducing peak flows and mitigating flooding downstream. Each of these ecosystems fulfills critical functions that can have significant downstream impacts and thus should be preserved to the greatest extent possible. Experience has
repeatedly demonstrated that development in floodplain and river and stream corridor areas, and especially in floodways, is inherently dangerous, due both to the immediate hazards associated with flood water inundation and to the increased flooding that may occur downstream when developed floodplains are no longer capable of retaining flood waters. Such development can also interfere with the function and quality of waterways, floodplains, and wetlands. While engineering techniques may mitigate the consequences of development within river and stream corridors, the fact that development can take place in these areas does not mean that development should occur in these areas. Development in river and stream corridors fundamentally places life and property at risk, and may exacerbate problems downstream. Towns are encouraged to develop policies and regulatory and non-regulatory strategies to identify where development within the river and stream corridors represents an acceptable risk. The WRC will assist in the development of such.

There are many tools available to the region and towns for assessing their waterways and for promoting development that will allow existing waterways and future development to co-exist in a manner respectful of each other’s needs. These tools include stream geomorphic assessments, river corridor planning tools, streamflow protection mechanisms, and bridge and culvert assessments. The Vermont Watershed Management Division has multiple guidance documents and reports available to towns and groups interested in pursuing this type of assessment. The WRC will provide technical assistance to towns to help accomplish such assessments while also undertaking research on the region’s waterways. The WRC also helps complete region-wide studies of the area’s waterways such as the recently completed Undeveloped Waters in Southeastern Vermont, which helps identify undeveloped waterways within the region that may be critical for future flood protection and management (Figure 5-7).

Tropical Storm Irene in particular increased public recognition of the need to link regional and municipal land use planning, development planning, mitigation planning, and capital improvement planning. Communities can improve their resiliency through comprehensive planning that addresses flood

![FIGURE 5-7: UNDEVELOPED WATERS OF SOUTHEASTERN VERMONT STUDY](image)

mitigation in each of these four aspects of planning. For example, consideration of stream geomorphology and long-term river dynamics in land-use decision-making can protect and restore water quality and habitats, and mitigate damages and economic losses incurred as a result of floods and fluvial erosion. Towns are strongly encouraged to mitigate risks to public safety and public and private investments by protecting flood-prone areas and addressing flood issues in their town land use plans and capital improvement plans. These municipal plans as well as the Regional Plan are key planning documents for mitigating loss of life, property and community infrastructure, and improving community response and adaptation to dynamic environmental conditions.

NATIONAL FLOOD INSURANCE PROGRAM

Under the National Flood Insurance Program (NFIP), the Federal Government makes insurance available to communities that implement and enforce measures that reduce future flood risks to new and existing development, usually through the community's zoning bylaws. A major purpose of the NFIP is to alert communities to the danger of flooding and to assist them in reducing potential flood related property losses. No federal assistance is provided for the repair or replacement of insurable structures located in flood hazard areas in communities that choose not to participate in the program.

Flood Hazard Areas are officially designated on Federal Insurance Rate Maps (FIRM), prepared and published by the Federal Emergency Management Agency. The flood hazard areas in most Vermont communities are generally associated with the larger rivers; however in many instances FIRM mapped flood areas do not reflect the true extent of flood prone areas. Communities can adopt requirements that are more stringent than the minimum measures acceptable for NFIP participation.

VERNAL POOLS

Vernal pools are small wetlands resulting from the persistence of standing water for a portion of the year, characterized by a lack of vegetation, though they may support some herbaceous wetland species. Vernal pools are perhaps best known as important breeding habitat for amphibians. Typical Vermont species that rely on vernal pools for reproduction include the Spotted Salamander, Blue-spotted Salamander, the Jefferson Salamander), the Eastern Four-toed Salamander, and the Wood Frog. Other animals use pools as well, such as fairy shrimp, fingernail clams, snails, eastern newts, green frogs, American toads, spring peepers, and a diversity of aquatic insects.

Vernal pools and the organisms that depend on them are threatened by activities that alter pool hydrology and substrate, as well as by significant alteration of the surrounding forest. Construction of roads and other development in the upland forests around vernal pools can negatively affect salamander migration and mortality. Adjacent timber harvesting can have significant effects on vernal pools, including alteration of the vernal pool depression, changes in the amount of sunlight, leaf fall, and coarse woody debris in the pool, and disruption of amphibian migration routes by the creation of deep ruts. The Vermont Fish and Wildlife Department offers suggested planning goal and policy language for protecting these important water resources.
WETLANDS

The region’s wetlands are vital for their role in recharging groundwater, regulating and filtering surface water flow, storing water, mitigating floods, and providing significant aquatic and wildlife habitat. For example, several Windham Region wetlands are host to a federally listed endangered plant species, the northeastern bulrush. Consequently, they require careful protection. The Vermont Agency of Natural Resource’s Natural Resources Atlas provides an inventory map showing Class I and Class II wetlands. There are currently no Class I wetlands in the Windham Region. Class III wetlands are not mapped and are usually less than ½ to ¼ acre in area.

WATER QUALITY

Under Section 305(b) of the Federal Clean Water Act, States are required to monitor surface water quality and to publish the results periodically (Figure 5-8). The most recent State of Vermont 2012 Water Quality Integrated Assessment Report (May 2012), shows the great majority of surface waters in the Windham Region to be in good condition. The VT ANR’s Natural Resources Atlas also provides ranked water quality information based on biomonitoring and chemical assessment of the waters.

Based on the results of the Vermont Lake Score Card the most common issue found in lakes and ponds in the Windham Region is atmospheric pollution. The region also has several waters on the State of Vermont 2012 303(d) List of Impaired Surface Waters. The most common pollutant for this region are acid and sediment, and the most common use impaired is aquatic life support.

FIGURE 5-8: IWIS BIOMONITORING SITES

As a result of the damage to stream channels caused by Tropical Storm Irene in August of 2011, additional assessment of surface water quality is necessary. Based on data in the 2010 Water Quality Integrated Assessment Report, the region’s subwatersheds that experienced in-stream habitat impacts following Tropical Storm Irene:

<table>
<thead>
<tr>
<th>Watershed</th>
<th>Subwatershed</th>
<th>Major impact (feet)</th>
<th>Minor impact (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saxtons River</td>
<td>Mainstem</td>
<td>42,767</td>
<td>0</td>
</tr>
<tr>
<td>West River</td>
<td>Mainstem</td>
<td>2,165</td>
<td>1,903</td>
</tr>
<tr>
<td></td>
<td>Ball Mountain Brook</td>
<td>21,877</td>
<td>1,641</td>
</tr>
<tr>
<td></td>
<td>Flood Brook</td>
<td>150</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Greendale Brook</td>
<td>225</td>
<td>2,000</td>
</tr>
<tr>
<td></td>
<td>Rock River</td>
<td>14,000</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Turkey Mountain Brook</td>
<td>0</td>
<td>390</td>
</tr>
<tr>
<td></td>
<td>Utley Brook</td>
<td>75</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Wardsboro Brook</td>
<td>24,332</td>
<td>370</td>
</tr>
<tr>
<td></td>
<td>Winhall River</td>
<td>5,795</td>
<td>711</td>
</tr>
<tr>
<td>Watershed total</td>
<td></td>
<td>68,619</td>
<td>7,015</td>
</tr>
</tbody>
</table>

Source: 2010 Water Quality Integrated Assessment Report

While many things affect water quality, the following factors cause the greatest impacts in the Windham Region. For regional context, see the [Dams and Impaired Waters Map](#).

**POLLUTION**

The five sources of pollution identified as causing the greatest stresses on the region’s rivers and streams are: streambank erosion/de-stabilization, agricultural land uses and activities, removal of riparian vegetation, developed land runoff including road runoff, flow alteration from hydroelectric facilities, snowmaking water withdrawals, and channel instability/confined streams. Riparian buffers are important for mitigating many of these pollution sources, preventing them from entering surface waters.

**DAMS**

There are numerous dams of various sizes constructed on streams and rivers in the Windham Region as noted in Table 5-2, providing a variety of benefits including power generation, flood control, and recreational opportunities such as swimming and boating. However, these structures can have significant negative environmental impacts, contributing to stream siltation, altered water levels and flow fluctuations, increased water temperature, decreased dissolved oxygen and impeded fish passage. This is of particular concern to efforts to restore certain anadromous species including American shad,
American eel, river herring, and shortnose sturgeon in the Connecticut River. Dams used for power generation impact rivers in many ways beyond those listed above. Storage and release cycles of water for generating power need to be monitored to ensure aquatic habitats are not adversely impacted, generator turbines must be situated and designed to minimize damage to passing fish and storage capacities of dams holding water for future release and power generation must be monitored to ensure dam structural safety.

Dams whose removal might provide substantial or unique environmental restoration potential or that produce very little in terms of cost-effective renewable energy might be candidates for removal. The removal decision must be made with full consideration of the benefits derived (improved water quality, restored fisheries, increased water flow), as well as the costs of removal and for replacement power that would be passed on to power companies and consumers. Evaluation on a case-by-case basis, use of appropriate guidelines and agreement on a replacement value is important. New guidelines have been developed to evaluate dams and to aid property owners with the removal of small private dams or their improvement for fish passage.

**RESORT INDUSTRY**

Ski area expansion may consume additional water for snowmaking. State regulations require ski areas to bring their water withdrawals for snowmaking into compliance with minimum flow regulations as part of any expansion of snowmaking. Ski areas in the region have also become heavily involved in the construction of resort housing, causing significant demands for potable water supplies and sewage disposal. Economic, safety and environmental factors should all be given due consideration in the construction of impoundments for snow-making and for fire ponds. An additional concern is the removal of water from one watershed for snowmaking with the resulting melt and flow returning the water to a different watershed. Climate change is another factor to consider for future water needs of ski resorts. Low-snow years have more resorts depending on snow-making to supplement natural snowfall. However, warming temperatures mean that higher nighttime temperatures could even limit those snow-making capabilities in the future.

**MANAGEMENT OF SURFACE WATER RESOURCES**

Improved watershed management and cooperation among towns, state and federal agencies, and area residents will be required to meet competing uses of the region’s rivers, lakes and ponds. The Basin Planning process outlined in the [2011 Vermont Water Quality Standards (WQS)](http://example.com) set forth a process for developing management plans for the waters of the state. In 2008, the Vermont Department of
Environmental Conservation and the West River Watershed Alliance, in cooperation with WRC and the Windham Natural Resources Conservation District drafted such a plan for the West and Saxtons Rivers (State Basin 11), which should serve not only this watershed basin, but is further expected to provide a model for the other state-designated watershed basins in the region. As shown in Table 5-4, the greatest concerns in Basin 11 are: 1) thermal modification or a change in temperature from the natural condition of the stream, 2) sedimentation, 3) habitat alteration, 4) flow alterations, and 5) pathogens. In 2012, ANR released a Water Quality and Aquatic Habitat Updated Assessment Report for Basins 12 and 13. Issues in these basins are similar to those issues found in Basin 11. Additional reports on Basins 12 and 13 can be found at the Basin Planning website for the Vermont Watershed Division. A list of recommendations for mitigating these issues is found on the next page.

The WQS also categorized all surface waters into classes, either A or B, with management subsets in each. Once classified, the waters must be managed to obtain and maintain the designated classification. Class A waters are specifically identified in the WQS; all other waters are Class B and have not yet been assigned to a particular management type.

Management subsets include the following: Class A(1) Ecological Waters are to be managed to achieve and maintain waters in a natural condition; Class A(2) Public Water Supplies are to be managed for public water supply purposes; Class B waters "shall eventually be designated as either Water Management Type 1, Type 2, or Type 3 by amending these rules." These management subsets refer to allowable departures from reference conditions for a variety of criteria, such as aquatic biota, aesthetics, public water supply, irrigation, and recreation. The lower classification types may vary further from the desired reference condition.

Efforts should be made to protect all surface water in the region (lakes, ponds, streams, vernal pools, wetlands) by maintaining their riparian zone in an undisturbed (or minimally disturbed) vegetated state, preferably in woodland, the recommended width depending upon various factors. When area for this type of protection is not available, such as in downtown areas, other best management practices (BMPs) should be implemented to slow the rate of runoff from a site, such as through the use of minimized development footprints, bioswales, or green roofs. Of special concern is the West River including the Rock River, Winhall Brook and Wardsboro Brook which are a Special Focus Area of high concern in the Silvio O. Conte Fish and Wildlife Refuge.

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73 Further information is available in the Windham Regional Report on Riparian Zones: Their Relevance to Town Plans and Zoning Ordinances in the Windham Region of Vermont (April 8, 2003).
<table>
<thead>
<tr>
<th>Thermal Modification</th>
<th>Sedimentation</th>
<th>Habitat Alterations</th>
<th>Flow Alterations</th>
<th>Pathogens</th>
</tr>
</thead>
<tbody>
<tr>
<td>* planting riparian buffers</td>
<td>* reducing gravel road erosion</td>
<td>* conducting stream geomorphic assessments</td>
<td>* completing assessments of all dams in the basin to identify potential candidates for removal</td>
<td>* identifying surface waters with elevated levels of pathogens and disseminate this information to the public</td>
</tr>
<tr>
<td>* educating agriculture and forest industry personnel on the positive water quality impacts of AAPs and AMPs</td>
<td>* replacing the Ball Mountain dam gates to enable “run of river” flows</td>
<td>* implementing streambank restoration and preservation projects</td>
<td>* removing obsolete and non-essential impoundment structures</td>
<td>* working with towns, local agencies and organizations to eliminate sources of potentially harmful pathogen influx</td>
</tr>
<tr>
<td>* increasing the amount of forestland being managed sustainably with water quality protection as an integral goal</td>
<td>* reducing sediment that enters surface waters from urban and residential areas</td>
<td>* establishing or increasing buffers along surface waterways</td>
<td>* conducting studies to determine water resource capacity and capacity limits</td>
<td>* reducing pathogens that enter surface waters from agricultural land uses from the application of manure</td>
</tr>
<tr>
<td>* investigating, educating on and promoting low impact development solutions</td>
<td>* implementing streambank restoration and preservation projects</td>
<td>* increasing awareness of maintenance measures that will reduce back road erosion</td>
<td>* monitoring compliance and enforcement of the West River flood control dams with coordination plan in place with VARN and USFWS</td>
<td>* reducing pathogens that enter surface waters from urban and residential areas</td>
</tr>
<tr>
<td>* removing obsolete and non-essential impoundment structures</td>
<td>* investigating, educating on and promoting low impact development solutions</td>
<td>* determining the impacts of flood control dams on aquatic biota and physical habitat upstream and downstream from the USACE dams</td>
<td>* providing public outreach and river stewardship education pertaining to the adverse impacts of rapid releases from flood control dams on stream habitat, biota and water quality</td>
<td>* seeking increased funding opportunities for water quality BMPs and implement these BMPs on willing farms</td>
</tr>
</tbody>
</table>

* coordinating the efforts of Federal, State and local agencies to address fish passage issues and natural flow regimes at dams in the West and Williams Rivers | * continuing outreach to farmers about new AAPs and cost-share programs |

* working with the Town of Londonderry to investigate and remediate bacteriological inputs into the West River | * installing composting toilets along the Rock River access trail to prevent untreated human waste from being washed into the river |
GROUNDWATER

Groundwater provides the primary supply of potable water for most of the region. Despite its high resource value, it remains a poorly understood resource. Groundwater moves beneath the ground through aquifers, which are underground water-bearing formations of sand, gravel and fractured rock. 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 quickly in unknown directions for long distances, or break out to the surface in a short distance.

Groundwater occurs in the unconsolidated sediment of streams and buried valleys and in bedrock fractures. While groundwater potential in areas of unconsolidated sediment is generally favorable, wells producing water from rock fractures usually have low yields (ranging from two to fifteen gallons per minute). The region's mountains and uplands have either exposed bedrock or bedrock covered by a thin layer of glacial till with low permeability; in these areas bedrock fractures are the primary source of groundwater.

GROUNDWATER CLASSIFICATIONS

There are four groundwater classes defined in 10 VSA, Chapter 48 Groundwater Protection, Subchapter 2, § 1394, as follows:

Class I  Suitable for public water supply. Character uniformly excellent. No exposure to activities that pose a risk to its current or potential use as a public water supply.

Class II  Suitable for public water supply. Character uniformly excellent but exposed to activities that may pose a risk to its current or potential use as a public water supply.

Class III  Suitable as a source for individual domestic water supply, irrigation, agricultural use, and general industrial and commercial use.

Class IV  Not suitable as a source for potable water but suitable for some agricultural, industrial and commercial use.

The Vermont Agency of Natural Resources (ANR) has a program to prepare detailed groundwater maps and to classify groundwater. In 2008, the Vermont Geological Survey was asked to compile and assess existing datasets related to groundwater in Vermont. In addition, VT ANR contracted with the USGS to produce a groundwater use study and identify future growth areas. The ANR also contracted a well interference study to evaluate public water supply pump tests and determine any cumulative impact areas. Maps from this study are available on the Vermont Geological Survey Statewide Groundwater Analysis website, and an example map is shown in Figure 5-10. Technical assistance is also available through VT ANR to help towns analyze the groundwater potential within town boundaries. The towns of Londonderry and Rockingham have undertaken such studies. These types of studies are especially
important in the siting of landfills and in planning for village centers that need a public water supply to accommodate village expansions. (Note: For further discussion on potable water supply, wellhead protection areas, and source protection areas see Chapter 8: Utilities, Facilities and Technology).

FIGURE 5-10: VERMONT GEOLOGICAL SURVEY ESTIMATED WELL YIELD MAP


By statute, all groundwater of the state is classified as Class III water unless reclassified by the Secretary of ANR under provisions of 10 V.S.A., Chapter 48 Groundwater Protection, Subchapter 2, § 1394. The groundwater beneath the Windham Solid Waste Management District landfill in Brattleboro has been reclassified to Class IV, as has the Southern Windsor/Windham Counties Solid Waste Management District landfill in Rockingham. All other groundwater in the region remains Class III.

In the fall of 2011, the Water Supply Division and parts of the Wastewater Management Division of ANR merged to become the Drinking Water & Groundwater Protection Division (DWGWPD).

Regulatory programs managed by the Division include, but are not limited to:
- Public Drinking Water Supply
- Groundwater Withdrawal (water)
- Wastewater System and Potable Water Supply (Regional Offices – drinking water and wastewater)
GROUNDWATER QUALITY

Groundwater generally moves through soils very slowly. As a result of its characteristic slow movement, the cleansing processes that occur through dilution and movement in surface water do not take place underground. When an aquifer becomes polluted, simply removing the source of contamination does not clean up the groundwater. A contaminated aquifer may remain polluted for many years and practically forever in some cases. Groundwater occurring in rock fractures is highly susceptible to contamination. While unconsolidated sediment can usually filter out organic pollution contained in water, the same water can travel for miles through rock fractures without appreciable purification. Once contamination occurs, control and abatement are extremely difficult. Consequently, one of the most important challenges of environmental planning is to prevent pollutants from entering rock fractures.

Potential groundwater pollutants include septage from improperly designed or malfunctioning septic tanks and leaching fields, leakage from underground gas and oil tanks, from commercial fuel, cooling and supply pipes, and from improper disposal of chemicals, both stable and radioactive. As of 1992, a Public Community and Non-Transient, Non-Community Water System must have an approved Source Protection Plan (SPP). This Plan addresses the actions the public water system operators will perform to minimize the contaminant risks to their drinking water supply source(s). This is also necessary in order to receive an Operating Permit and Phase II/V Monitoring Waiver. The water system is required to submit an updated plan to the Division every three years for approval.

SOILS AND TOPOGRAPHY

Soil characteristics impact farming, forestry, mineral extraction, and commercial development. Prime agricultural soils that are rated high for crop production potential are very limited in the region and are located primarily in the river valleys. Since most primary agricultural soils are flat and well drained, they are also desirable for many other uses. Soils suitable for sand and gravel extraction, found primarily in the Connecticut River Valley, are also limited. Many of the region's soils are shallow, unstable, highly erodible, wet, and/or poorly drained. Wet soils may cause basement flooding and failure of footings, foundations, underground piping and septic systems. Road construction on wet sites can be damaging and prohibitively expensive. Drainage of excessively wet soils is often not an acceptable solution because of expense, rate of failure and potential for environmental damage. Any of these features alone, or in combination with steep slopes (see the Steep Slopes Map) and/or high elevations, are potentially critical factors in determining appropriate land use in the region.
PRIME AGRICULTURAL SOILS

Vermont has over 250,000 acres (21 percent of total acres in agriculture) of “prime” soils and almost 650,000 acres (54 percent of total acres in agriculture) of “farmland of statewide importance.” The characteristics of these soils include:

- The best combination of chemical and physical characteristics for the production of crops.
- Favorable soil temperature and growing season.
- Adequate soil moisture to sustain crops 7 out of 10 years.
- Easy water transport.
- An appropriate pH balance.
- Infrequent flooding.
- Slopes generally less than 8 percent.
- Depth of bedrock greater than 40 inches.

The amount of high-quality agricultural soil varies considerably by county, with more than a quarter of the statewide total found in Addison and Rutland counties. As seen in Figure 5-11, Windham County contains the smallest portion of prime soils, and among the smallest amount of soils of Statewide Importance. Within the Windham Region, prime agricultural soils are primarily located within the Connecticut River Valley (see Important Farmland Soils Map). Agricultural soils are both a vital and limited resource in this region, and for that reason must be protected from development pressures either through conservation or effective mitigation practices.

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74 Farm to Plate Strategic Plan, http://www.vsjf.org/assets/files/Agriculture/Strat_Plan/3.2_Farm%20Inputs_Soil_2_V2.pdf
SEWAGE DISPOSAL

Development in the region has traditionally been encouraged on soils suitable for in-ground sewage disposal systems; however because permeable soils are often closely associated with sites having high potential for aquifer recharge, their development may result in pollution of subsurface and surface waters. The “travel time” of liquid wastes, the rate of absorption and the location of groundwater and surface waters are all important factors to consider when planning development on permeable soils. Installation of public waste water systems, especially in villages located in close proximity to rivers and streams, would help alleviate this issue.

MINERAL RESOURCES

Mineral resources in the Windham Region include deposits of sand, gravel and other minerals, such as granite, slate, limestone, sulfide, uranium, iron ores, and ultramafics (sulfide, talc, soapstone, and serpentine). With the exception of sand and gravel operations, extractive industries have steadily declined in the region. This decline and abandonment of mining industries is primarily due to decreasing
demand, changes in economic value, and local opposition to mining operations, rather than to exhaustion of the region's reserves. Public and private interests often are in conflict over extraction of mineral resources, making the balance between the need to use these resources with public's right to minimize potential nuisances an increasingly visible issue.

Sand and gravel deposits of varying quality, as shown on the Sand and Gravel Resource Map, are scattered throughout the region and are the principal mineral resources being extracted. Sand occurs in good quality deposits with large reserves along the Connecticut River and near most of its larger tributaries. Deposits of good quality gravel, however, are usually small. The region's good quality, accessible gravel reserve is low.

Sand and gravel are economically important regional resources and significant portions of them occur in only a few towns: Brattleboro, Dummerston, Vernon, Halifax, Guilford, Newfane, and Jamaica. Few towns own and operate their own gravel pits, even though they experience a steady demand for highway construction and maintenance of unpaved roads. In resort towns, during periods when vacation housing and commercial construction are taking place, demand for sand and gravel significantly increases. The increased excavation activity at the pits and the transport of material is known to bring about impacts that negatively affect community resources (roads and bridges), neighborhoods, water quality and air quality, which in turn may generate or renew local opposition to the utilization of the resources. During the reconstruction period following Tropical Storm Irene large quantities of gravel were trucked in from out of state, supplemented by gravel extraction from impacted streams as local gravel pits could not keep up with demand. As the region grows, sand and gravel deposits will continue to be extracted for construction, fill, erosion control, and highway maintenance.

In recent years, the limited availability of aggregate, in the form of gravel, sand, and stone, has drawn the attention of State as well as town highway officials. Rising costs and the future prospect of decreasing availability impacts maintenance and construction costs of all road improvements, whether paved or unpaved. In 2009, all of Vermont's Regional Planning Commissions conducted an Aggregate Availability and Cost Survey of their member towns. Around the state, towns reported having to travel farther and pay more to acquire decent grades of aggregate. In our region, towns farther from the aggregate sources in the Connecticut River Valley were the hardest hit. Survey responders often indicated that local suppliers of aggregate were shutting down due to increasing difficulty of operating their facilities. Some towns either owned or were considering purchasing and developing local gravel pits. This prospect caused some controversy among town citizens. Another trend identified in this study was the increasing use of crushed stone rather than washed and graded bank run gravel. In coming years, a significant issue in land use planning may be standards, regulations, and community acceptance of aggregate facilities.
Natural areas, fragile areas, and wildlife resources are landscape features with ecological, educational, scenic, and contemplative value. Some areas are unique and considered rare. They provide ecological preserves of relatively unaltered environments that are important to wildlife, biological diversity and the natural heritage of the region.

DESIGNATED NATURAL OR FRAGILE AREAS

Vermont law enables the State to designate Natural Areas (10 V.S.A. § 2607) and Fragile Areas (10 V.S.A. § 6551). Designated Natural Areas are owned by the Vermont Department of Forests, Parks and Recreation. Any party can own a Fragile Area, but it must have been determined to be of statewide significance. These designations provide protection and the assurance that the areas will be managed to maintain their natural integrity. Hamilton Falls, on Cobb Brook in Jamaica State Park, and Terrible Mountain on the eastern border of Weston are the Windham Region's only state-registered Natural Areas. Hamilton Falls consists of a 40-50 foot high steep cascade with pools above and below and a mile-long chain of smaller cascades, falls, and pools. The site is exceptional for its geology, botany, setting and pristine water. Terrible Mountain is a 2,864 foot mountain summit in Windsor County, The protected base of this mountain extends into the town of Weston.

The only state registered Fragile Area is the J. Maynard Miller Memorial Forest (the Black Gum Swamps) in Vernon. Black gum is a tree species typically found in more southern latitudes; this unique forest community is probably a relic from a warmer postglacial climatic period (between 3,000 and 5,000 years ago) when many southern plants extended their ranges into Vermont.

LANDS ABOVE 2,500 FEET

Although not formally designated as such, areas above 2,500 feet in elevation are often fragile areas in Vermont (See the Ecological Resources Map). Lands above 2,500 feet are especially vulnerable natural environments because of their generally thin soils, steep slopes, sensitive vegetation, important wildlife habitats and often greater than average precipitation and wind. Some 24,800 acres (4 percent) of the Windham Region are above 2,500 feet in elevation. By state law, all waters above 2,500 feet are classified A1 – Ecological Waters.

WILDLIFE RESOURCES

The Windham Region is rich in areas of high ecological value. The Vermont Nongame and Natural Heritage programs track native rare animals and plant communities that are threatened or endangered. These species and communities are considered rare because they have particular habitat requirements, are at the edge of their ranges, or are vulnerable to disturbance or collection. The general locations of these species and habitats are mapped using Geographic Information Systems (GIS). Descriptions of
threatened or endangered species are available through the state program. The Windham Region is home to numerous Natural Heritage sites and species that deserve an extra level of protection. The *Silvio L. Conte Fish and Wildlife Refuge Environmental Impact Statement* has identified four areas in the Windham Region as nationally important fish and wildlife habitats: the West River including the Rock River, Winhall River and Wardsboro Brook tributaries, primarily due to the potential for Atlantic salmon restoration (this program will no longer be funded after 2014); Westminster Flats, for its waterfowl habitat; the Retreat Meadows, for its high value wetland ecology; and the Putney Mountain unit for its northeastern bulrush habitat. In 2013 the State created a new natural area in Grafton and Athens called the Turner Hill Wildlife Management Area, to be managed by Vermont Fish and Wildlife Service, that is host to the federally endangered northeastern bulrush.

**BEAR HABITAT**

Eastern black bears require forest territory for survival. Stands of oak and beech trees are especially important in that these trees produce nuts for food in summer and fall. Bears also need wetland forest habitat, where they get food in spring. Because bears use different habitats seasonally, they must also have a way to move between them. Bears travel through "corridors" to move across roads or through developed areas from one habitat area to another.

Bears are large animals, and they require large, unbroken areas of habitat. Habitat fragmentation causes many problems for bears by restricting their movement within their home ranges, by reducing food supplies, and by increasing the chance of collisions with automobiles. It also increases the frequency of contact with humans, a situation that often ends badly for the bears. Fragmentation of bear habitat should be minimized and bear travel corridors should be protected.

**DEER WINTERING AREAS**

Deer wintering areas or "deer yards" are a critically important habitat type for deer to survive through the winter. Only 7-8 percent of Vermont's forests make up such wintering areas. An important part of a deer yard is the evergreen trees that catch the snow in their branches, thus reducing snow depth underneath and making deer travel easier and less energy intensive when food is relatively scarce. The trees also provide thermal cover that gives the deer protection from the wind. Deer may move 10 to 15 miles to go to a yard and stay in the protection of the area all winter.

**FISH HABITAT**

Most of the region's rivers and streams provide important cold-water fish habitats. Shaded stream banks, clean gravel and rocky bottoms, and clean, cool water are necessary to maintain these cold-water fisheries (e.g. brook trout). Lakes, ponds, and larger, slower moving rivers provide warm-water fish habitat. Healthy fisheries are important for both their ecological and economic value. Sedimentation from runoff, bacteria from septic systems, clearing of streambank vegetation, damming of rivers and streams, development of on-stream ponds and lowering in-stream water flows all negatively impact important fish habitats. Stream crossings that do not provide aquatic organism passage and/or are not
geomorphically compatible can also have negative impacts. Wetlands, vernal pools and other surface waters also provide specialized habitats for fish, reptiles, amphibians, mammals and migratory birds. Vegetated stream buffers and corridors provide important wildlife travel corridors, help maintain cooler water temperatures and stabilize stream banks from erosion. Additionally, connectivity both laterally and vertically is important for the ecologically health of the waterway. (Note: For further discussion of fish and wildlife resources, see also Surface Waters in this Chapter)

**REMOTE FORESTED AREAS**

The mountainous, forested landscape remote from community centers is the stronghold and haven for the region's large mammals, including black bear, moose, deer, bobcat, fisher, coyote, otter, and beaver. Large populations of deer and coyotes can also be found in the less remote areas. Completing the forest ecosystem are the smaller mammals, reptiles, amphibians, game birds, raptors, and many valued songbirds, insects and a network of plants, fungi, mosses and micro-organism working together to create a diverse forested landscape. A critical State and regional issue is the maintenance of large tracts of connected forestland to support these species. Certain deer wintering areas, bear habitat and wetland complexes are regionally necessary wildlife habitat (those habitats needed for a species to continue to thrive within that area). For wintering deer, low-lying softwood stands with southern exposures provide critical shelter from deep snow and cold temperatures. Stands of mature beech and oak, accessible wetlands, and newly regenerated soft mast areas provide important feeding habitats for the black bear. Bear travel corridors supply a necessary link between feeding and breeding areas. These areas are particularly important since food sources and supplies vary from season to season and from year to year. New roads, guardrails, and construction of homes and other forms of development, as well as indiscriminate timber cutting, outbreaks of tree disease and replacement of native vegetation with invasive plant species, endanger both the quantity and quality of these important wildlife habitats.

**RARE, THREATENED OR ENDANGERED SPECIES**

A rare species is one that has only a few populations in the state and that faces threats to its continued existence. Rare species face threats from development of their habitat, harassment, collection, and suppression of natural processes, such as fire. The Vermont Fish and Wildlife Department uses a ranking scheme that describes the rarity of species in Vermont. The range is from S1 (very rare) to S5 (common and widespread).

The term “endangered” generally refers to species whose continued existence as a viable component of the state's wild fauna or flora is in jeopardy, while “threatened” species are those whose numbers are significantly declining because of loss of habitat or human disturbance, and unless protected will become an endangered species. The Vermont Fish and Wildlife Department maintains the list of endangered and threatened species.

In the Windham Region the Town of Vernon and the Connecticut River Corridors have high occurrences of rare, threatened or endangered species.
CRITICAL NATURAL AREAS (HIGH LEVELS OF BIODIVERSITY)

Critical natural areas are zones that can support a high level of biodiversity because of their natural characteristics. The Biofinder is a map and database identifying Vermont's lands and waters supporting high priority ecosystems, natural communities, habitats, and species. The BioFinder was developed by the Agency of Natural Resources and its partners to further collective stewardship and conservation of these areas. Within the Windham Region, Stratton and Somerset mountains, Vernon, Weston, and the West River all have areas supporting high levels of biodiversity.

INVASIVE SPECIES

Invasive species, also called invasive exotics or simply exotics, are "non-indigenous" or "non-native" species that adversely affect the habitats and bioregions they invade economically, environmentally, and/or ecologically. Such invasive species may be either plants or animals and may disrupt the native habitat by weakening or eliminating natural controls such as predators or herbivores. In the Windham Region the most notable invasive species are Knotweed, Parsnip, Water Chestnut in the Connecticut River above the Vernon dam, and Eurasian watermilfoil throughout the Connecticut River.

AIR QUALITY

The Clean Air Act (CAA) requires the Environmental Protection Administration to set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment. The Clean Air Act identifies two types of national ambient air quality standards. Primary standards provide public health protection, including protecting the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards provide protection against decreased visibility and damage to animals, crops, vegetation, and buildings. Six pollutants are measured: particulate matter, sulfur dioxide, carbon monoxide, nitrogen dioxide, lead, and ozone. The only State air quality monitoring station currently located within the Windham Region is positioned at Mt. Snow in West Dover. Should it be found that an area does not meet any one of these air quality standards, the area is deemed to be a “non-attainment area.” Vermont has been classified as “in attainment” or “indeterminate” under national air quality standards since 1988; however the NAAQS are on a five-year revision schedule, and if they were to become more stringent, and if the region were found to be a “non-attainment area”, under federal law the EPA could impose additional environmental regulations.

Aside from national air quality standards, outdoor air pollution in significant concentrations can raise aesthetic and nuisance issues such as impairment of scenic visibility; unpleasant smoke or odors; atmospheric impacts to water quality; and can also pose human health problems, especially for more sensitive populations like children, asthma sufferers, and the elderly. The region’s air quality is impacted by both local and distant sources of air pollution. Local sources include discharges from industries, combustion of fuels for residential heating, and significantly from non-point sources such as automobile operation (see Air Quality Chapter of the Transportation Plan for additional information on this topic).
As in other parts of New England, the topography, prevailing wind and weather patterns also bring air pollution to southeastern Vermont from other areas of the country.

**NOISE POLLUTION**

Unpleasant or otherwise unwanted sound that travels through the air is another type of pollution that may be caused by traffic, airplanes, snowmobiles & all terrain vehicles, construction and industrial activity such as mining, quarrying and logging, personal sound equipment, and yard equipment. Noise pollution can negatively affect both humans and wildlife. One often-discussed noise problem is the vehicular and truck traffic passing through the region’s villages.

Noise Impact Assessments model the potential impact of noise from a particular project on the surrounding environment. These assessments are essential for evaluating the impacts of projects that will emit significant sound levels, either during construction or through ongoing activities. The assessments identify vulnerable areas and evaluate the effectiveness of possible mitigation measures in reducing the decibel level of sound reaching surrounding areas. Towns can further improve the outcomes of these noise impact assessments by predetermining noise standards for specific land uses or identified vulnerable areas. The Vermont Act 250 process has determined some baseline standards for certain uses, but towns should evaluate these standards based on their specific circumstances.

**SCENIC RESOURCES**

The region enjoys exceptional scenic quality. Mountain and farm landscapes, historic villages and towns, ridgelines, the night sky and nighttime landscapes, shorelines, and scenic corridors are all highly vulnerable to development. Scenic resource protection measures available to the region's towns include:

- Purchase of scenic lands;
- Scenic easements, or acquisition of development rights;
- Review of the scenic impact of public investment activities;
- Designation of scenic roads;
- Public education; and
- Regulation through zoning and subdivision regulations and the Act 250 development review process.

Outstanding Resource Water designation for:
- The presence of gorges, rapids, waterfalls, or other significant geologic features.
- The presence of scenic areas and sites.
the presence of rare and irreplaceable natural areas.

- the presence of known archeological sites.

Maintaining scenic quality requires coordination of these techniques. Structures such as utility poles, telecommunication towers, wind turbines, cleared powerline rights of way, large-scale signage, and streetlights are considered by many to be incongruous with our scenic landscape. Careful planning and design will often provide development opportunities without adversely affecting the scenic value of the landscape. Some towns in the region have developed specific zoning or policies related to ridgeline development, such as limiting residential, commercial or industrial development on certain ridgelines. It is important for towns to identify the specific scenic resources that they deem significant and to clearly delineate those resources in their plans. Scenic resources can be a highly subjective topic in review processes, which is why it is important to be proactive about clarifying the scenic resources the town wishes to preserve.

SKY GLOW

Light pollution or “sky glow” is a cumulative and increasing problem, especially near the urban clusters along the region’s eastern border and near major resort development centers. Light projecting upwards from these areas produces a glow near the horizon that diminishes the natural quality of the nighttime landscape and night sky. As these urbanized areas continue to expand, special consideration needs to be given to lighting design in order to minimize this cumulative adverse effect. Automatic shut-off mechanisms and down-shielding of light sources should be considered for any development with outdoor lighting.
## ENERGY AND NATURAL RESOURCES

Energy—its predicted supply, its cost, and the environmental impacts of how it is obtained and used—all have a direct relationship to our stewardship of the land and its resources.

Energy generation always has environmental implications. Air quality is a major concern whenever fossil fuels are used, whether to generate electricity, for space heating, or for transportation. Water quality and aquatic life are affected by hydroelectric dams. The management of used nuclear fuel has ultra-long term implications. Most thermal electric power plants, not including cogeneration plants, waste about two units of heat energy into the water or air for every one of electrical energy produced, regardless of the fuel. It is therefore highly desirable that people use conservation and efficiency measures to reduce the rate of growth in the amount of energy consumed in the region.

Regional fuel sources also deserve consideration in a number of ways. Wood harvested for fuel represents an important part of the working landscape and of the regional economy, but its combustion presents some immediate air quality concerns; energy generation facilities using biomass fuel must ensure sustainable and air quality-neutral sources and processes. Hydropower from existing dams presents clean and renewable electric power, but solar heating of pooled water and obstructed fish passageways present significant drawbacks. Wind powered electric generation is poised to expand across much of New England, but it carries with it potential impacts on wildlife, soils and groundwater, and on scenic resources. In order to help weigh the natural resource impacts against the need for energy generation, the WRC should develop and Energy Resources Plan in order to identify appropriate locations for energy generation in the region.
CHAPTER 6

HOUSING

EXISTING HOUSING CONDITIONS

Demographic trends, land use regulations, economic conditions, and local and state property taxes all have an effect on the issue of housing within the Windham Region. This chapter focuses specifically on housing information. Additional information about factors affecting housing can be found in the Windham Region Profile, Land Use, Economy, and Utility, Facility and Technology chapters.

HOUSING TENURE STATUS AND GROWTH

In 2010, a total of 42.6 percent of the housing stock in the Windham Region was owner occupied, and 19.5 percent of the housing stock was categorized as renter occupied. The remaining 37.9 percent of the housing stock was given a status of vacant. Table 6-1 provides a detailed breakdown of how vacant housing is categorized within the region. The vast majority of “vacant” housing is grouped as “For seasonal, recreation, or occasional use” and comprises 33.4 percent of the region’s housing stock. The occupancy rates seen in this table are similar to rates reported in 2000.

TABLE 6-1: WINDHAM REGION HOUSING TENURE STATUS, 2010

<table>
<thead>
<tr>
<th>HOUSING OCCUPANCY</th>
<th>Total</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total housing units</td>
<td>32,638</td>
<td>100.0%</td>
</tr>
<tr>
<td>Occupied housing units</td>
<td>20,275</td>
<td>62.1%</td>
</tr>
<tr>
<td>Vacant housing units</td>
<td>12,363</td>
<td>37.9%</td>
</tr>
<tr>
<td>For rent</td>
<td>615</td>
<td>1.9%</td>
</tr>
<tr>
<td>Rented, not occupied</td>
<td>43</td>
<td>0.1%</td>
</tr>
<tr>
<td>For sale only</td>
<td>309</td>
<td>0.9%</td>
</tr>
<tr>
<td>Sold, not occupied</td>
<td>23</td>
<td>0.1%</td>
</tr>
<tr>
<td>For seasonal, recreational, or occasional use</td>
<td>10,916</td>
<td>33.4%</td>
</tr>
<tr>
<td>All other vacancies</td>
<td>457</td>
<td>1.4%</td>
</tr>
</tbody>
</table>

Source: 2010 Census, U.S. Census Bureau
From 2000 to 2010, an additional 2,792 housing units were added to the Windham Region’s housing stock, yielding a 9.4 percent increase in total housing units in the region from 2000 figures. Vermont saw an overall increase of 9.6 percent in total housing units over this same time period. Table 6-2 provides a summary of the region’s housing tenure status in 1990, 2000 and 2010. Seasonal housing saw the largest increase in total number of housing units and is the only category to have its overall share of the housing units increase in 2010.

**TABLE 6-2: WINDHAM REGION HOUSING TENURE STATUS, 1990-2010**

<table>
<thead>
<tr>
<th>Unit Type</th>
<th>1990 Housing Units</th>
<th>1990 Percent</th>
<th>2000 Housing Units</th>
<th>2000 Percent</th>
<th>2010 Housing Units</th>
<th>2010 Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Owner occupied</td>
<td>11,004</td>
<td>38.9%</td>
<td>13,213</td>
<td>44.3%</td>
<td>13,915</td>
<td>42.6%</td>
</tr>
<tr>
<td>Renter occupied</td>
<td>6,031</td>
<td>21.3%</td>
<td>6,115</td>
<td>20.5%</td>
<td>6,360</td>
<td>19.5%</td>
</tr>
<tr>
<td>Seasonal</td>
<td>9,318</td>
<td>32.9%</td>
<td>9,290</td>
<td>31.1%</td>
<td>10,916</td>
<td>33.4%</td>
</tr>
<tr>
<td>Total</td>
<td>28,314</td>
<td></td>
<td>29,846</td>
<td></td>
<td>32,638</td>
<td></td>
</tr>
<tr>
<td>% Change from Previous Decade</td>
<td>+ 5.4%</td>
<td></td>
<td>+ 9.4%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Source: 1990, 2000, & 2010 Census, U.S. Census Bureau**

The homeowner vacancy rate in 2010 for Windham County was 2.1 percent, while the renter vacancy rate was 8.4 percent. The homeowner vacancy rate is similar to surrounding counties, including those in Massachusetts and New Hampshire, and the State. The renter vacancy rate is slightly higher than rates seen in surrounding counties and the State, with the exception of Windsor County, which has a renter vacancy rate of 10.2 percent. The U.S. homeowner and renter vacancy rates for 2010 were 2.4 percent and 9.2 percent, respectively.

Growth in total housing units within the region’s towns has varied (see [Windham Region Profile](#)). Somerset is the only town that experienced a decrease in housing units, from 28 in 2000 to 21 in 2010. Of note, the towns with the greatest rate of growth in housing stock in the last ten years were not the towns that saw highest percent of increase in population. The town of Stratton had the largest increase in housing stock with a 32.6 percent increase, and saw an increase in population of 58.8 percent from 2000 to 2010. However, the next three towns with the largest percentage increases in housing stock, Vernon (17.9 percent), Townshend (17.4 percent) and Whitingham (14.5 percent) saw population increases of only 3.04 percent, 7.22 percent, and 4.55 percent respectively. The same holds true if one looks only at numeric increases. The towns with the greatest addition of total housing units were Stratton (356), Brattleboro (312), Dover (305), and Wilmington (261). The towns with the greatest

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75 Note this table does not include information on other types of vacant housing. For a more detailed breakdown, see Table 6-2.
number of added residents were Athens (102), Marlboro (100), Windham (91) and Jamaica (89). Figure 6-1 illustrates this trend across the region.

**FIGURE 6-1: WINDHAM REGION CHANGE IN TOTAL POPULATION VS TOTAL HOUSING UNITS, 2000 TO 2010**

![Population Change and Housing Stock Change](image)

*Source: 2010 Census, U.S. Census Bureau*

This is a new development since the last Regional Plan, and may indicate a shift in occupancy make-up in new and existing housing stock. Additionally, three of the towns with the highest increases in housing are resort towns with high seasonal housing ratios, which could explain occurrences of increased housing without significant increases in population; however, this does not explain the correspondingly sharp decrease in population in the towns of Dover and Wilmington.

Dramatic losses of population were recorded for resort towns around the State, and may be caused by a shift in procedure for how seasonal residents are counted. Windham & Windsor Housing Trust noted this same anomaly in the data collected for the resort towns of Wilmington and Ludlow in their recent study:
“In contrast to the Census drops in population [for Wilmington and Ludlow], state labor market data indicates that both communities showed moderate increases in resident employment, as well as sharp rises in unemployment over the course of the decade. Taken together, they suggest more residents live in the communities than the Census indicates.”

While difficult to explain at this juncture, the overall disconnect between housing development and population growth should be monitored in future plans and explored in the regional housing assessments.

**TYPES OF HOUSING**

**SINGLE-UNIT DETACHED HOMES**

Single-unit detached homes continue to be the predominant form of development. Illustrating this fact, Figure 6-2 shows that all of the region’s towns have more than 70 percent of their housing units in single-unit detached homes, except for the regional centers of Brattleboro and Rockingham and the resort towns of Stratton and Dover.

Most of this new development of single-unit detached housing has occurred along existing road frontage and has been built on a lot-by-lot basis, as opposed to being developed as part of larger subdivision projects. New homes, including high-priced homes in particular, tend to be distributed outside the compact settlement areas of villages and downtowns. An increasing number of homes are being built in sensitive environments such as on ridgelines and in wildlife corridors. There has also been a trend toward forest parcel subdivision for residential development by many individual owners. Use of tools such as conservation subdivision and development principles can help mitigate these negative effects.

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Based on data collected from the 2000 Census and the 2010 American Community Survey (ACS), an estimated 73 percent of all new housing units added between 2000 and 2010 in the Windham Region were single-unit detached homes. This contrast is striking when compared to changes in other types of housing within the region (Figure 6-3). This is a trend in the region that should be analyzed in future housing needs assessments. Nationwide analyses predict that the age cohort of teens through early thirties will gravitate more towards urban living, with less need for the individual space traditionally sought in single family housing development. The most recent WWHT Housing Assessment Study confirmed that this trend is already evident in Windham County, where the biggest demographic changes appeared to be a rapid concentration of the county’s young adults to housing within Brattleboro, and conversely, the spreading of the county’s elderly to more rural communities.77

**MULTI-UNIT HOUSING**

Multi-unit housing in the Windham Region can be found in a mix of different structure types (see Windham Region Profile Insert). About 29 percent of all housing units in the Windham Region are either attached units or part of multi-unit structures. The majority of large multi-unit structures (housing five or more units) are found in Brattleboro (1,463 units), Dover (761), Stratton (522 units) and Rockingham (249 units).

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77 Windham & Windsor Housing Trust, Housing Needs Assessment: Windham and Windsor County 2011
There has been very little construction of new multi-unit housing located outside the towns of Brattleboro, Stratton, Dover, Vernon and Wilmington. In fact, a full fourteen towns saw an overall loss in multi-unit housing between 2000 and 2010, with the town of Winhall seeing the largest loss (185). Of note is the significant number of two unit structures that were lost between 2000 and 2010 (Figure 6-3). An estimated 264 two-unit structures were lost during this timeframe, which accounted for the largest categorical loss of multi-unit housing. The towns of Rockingham (-153) and Wilmington (-100) experienced the highest losses. While these numbers are estimates, the region should be mindful of the losses occurring within the multi-unit categories, as these housing options generally supply much needed market-rate and affordable housing for the region, as well as contribute to the overall diversity of housing stock.

Structures housing ten or more units saw the greatest increase for multi-unit structures over this time period. The town of Dover contributed the majority of these units (530), followed by the town of Brattleboro (164). Resort area multi-unit development, such as seen in the town of Dover, tends to be higher priced housing projects, with little to no new affordable or workforce housing accompanying these developments.

**MOBILE HOME HOUSING**

Mobile homes and mobile home parks continue to be one alternative to high cost housing in the region. While mobile homes tend not to be the best financial solution in the long run due to reticence of mortgage lenders and types of financing available, they are one of very few choices for many low and moderate-income households. The region saw an overall estimated loss of mobile home housing from 2000 to 2010, with the largest losses of mobile home units occurring in Westminster (-88) and Putney (-67). Brattleboro added the largest number of units in the region during this timeframe (87).
Mobile home parks can achieve unit densities that reduce costs, however community sewer and water, whether public or private, are essential for a park’s viability. The costs involved in building and maintaining such infrastructure make mobile home park ownership unattractive as a business investment. Additionally, to save costs on property value, many times these parks are located in floodplains or other marginal parcel locations. This issue was brought to a front when many mobile home parks throughout the State were damaged by flooding in Tropical Storm Irene.

Increasingly, private parks in the Windham Region are becoming cooperatively owned. Often this is accomplished through the assistance of non-profit organizations as in the case of Windham & Windsor Housing Trust assisting the parks in Dummerston, Putney, and Westminster. Their involvement assures that these parks and homes will be maintained at Federal and State standards for safe, healthy housing that remains affordable. In the Windham Region, there are a total of eight mobile home parks with a total of 459 lots in non-profit or cooperative ownership.78

AGE OF HOUSING

Nearly one-third of the region’s housing was constructed prior to 1940 (Figure 6-4). While older housing units can add to the historic character of a community (see sidebar on Historic Overlay Districts), they also can present a challenge to property owners. Common problems in older housing include dated electrical wiring, poor energy efficiency, aging septic systems, and the possibility of lead-based paint, a health issue particularly in homes with small children. Lead levels in perimeter soils at pre-1950 Vermont homes commonly have tested at two to nearly four times EPA cleanup levels for play areas.79 Additionally, potential home-buyers may be weary of purchasing a home requiring significant investment in cosmetic and system upgrades.

The age of the housing supply in the region also means that many existing structures were built without a building code in place. Therefore, ensuring safe housing in the Windham Region includes making life safety improvements where necessary. These improvements include ensuring appropriate egress, fire and smoke separation, fire and smoke detection, and fire suppression systems. The National Fire Protection Association has established a residential standard to complement the commercial code for fire protection sprinkler systems. Encouraging these systems is a way to save lives and structures, especially historic landmarks.

It is noteworthy that within Windham County, according to the 2009-2011 ACS, 48.3 percent of the structures built in 1939 or earlier were renter occupied housing, while 25.9 percent were owner-occupied housing. Renters generally do not have the means or permission to maintain the structures they are living in, and issues develop when the building owners neglect this management as well. One way to get a more accurate picture of the housing stock in a region is to look at the “effective age” of the housing stock, based on relative upkeep and renovations. This housing stock characteristic would be important to include in future housing assessments in the region, especially given the high percentage of older housing in rental stock.

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HOUSING AFFORDABILITY

Housing affordability and affordable housing are two different concepts that tend to be confused in general discussion. Housing affordability refers to the ability of all residents within a community to find housing that matches their level of income. Traditionally, housing is considered affordable when a household spends no more than 30 percent of its gross income on housing. This section of the chapter reviews how well the spectrum of income and wages earned by residents within the Windham Region aligns with the region’s price spectrum of housing available.

Affordable housing is housing that, through various cost control mechanisms and in some cases subsidies, is kept within a specified price range and available only to individuals below certain levels of income. There are also other funding mechanisms, such as heating assistance, which are used to make housing more affordable. Affordable housing is addressed later in this chapter, under the section titled “Supporting Affordable Housing.”

When discussing housing affordability in the region, a wide range of costs associated with housing are included. Housing costs for renters include rent and utilities (including heat, hot water, electricity, and trash disposal where applicable). Housing costs for homeowners include mortgage principal and interest, property taxes, property insurance, and utilities. Since housing affordability is determined by monthly costs, qualities such as interest rates, the age of the home, and maintenance costs are also factored into the overall cost. According in the American Community Survey 5 Year Estimates for 2011 (Figure 6-5), 41.7 percent of people who owned their own home reported housing costs that totaled more than 30 percent of their monthly household income, while 44.7 percent of people who rented reported gross rent costs that totaled 30 percent of their monthly household income. This indicates a significant percentage of the households in the Windham Region residing in housing not considered to be affordable based on their income.

HISTORIC OVERLAY DISTRICTS

Some older housing units add to the historic character of a community because of their architectural significance or representation of period construction practices. One tool for preserving these community treasures is through the use of a historic overlay district (24 V.S.A. § 4414). Historic overlay districts allow municipal panel oversight of all demolitions, additions, renovations, and new construction within the historic overlay district.
Windham Region housing affordability tracks similarly to statewide trends. According to the 2011 update of the publication *Between a Rock and a Hard Place*, in Vermont 47 percent of renters and 38 percent of owners with mortgages pay more than 30 percent of their income for housing costs, ranking Vermont as the 17th worst state in the nation for housing affordability.81

One way to assess whether residents will be able to afford housing stock in an area is to analyze wages paid by jobs in the region. The “Livable Wage” is a calculation of the minimum earnings required to afford basic necessities for living and is one tool for measuring housing affordability. Housing is perhaps the most critical input to this calculation because everything else tends to get more difficult and expensive when a family lacks reliable housing. The 2009 Average Livable Wages for Vermont are shown in Table 6-3.

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TABLE 6-3: 2009 LIVABLE WAGE: BASIC NEEDS AND TAXES (ALL FIGURES PER WAGE WITH EMPLOYER-ASSISTED HEALTH INSURANCE)

<table>
<thead>
<tr>
<th>Family Unit</th>
<th>Rural</th>
<th>Urban</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hourly Wage</td>
<td>Annual Wage</td>
<td>Hourly Wage</td>
</tr>
<tr>
<td>Two adults, no children</td>
<td>$13.04 each</td>
<td>$54,246 HH $^{82}$</td>
<td>$13.10 each</td>
</tr>
<tr>
<td></td>
<td></td>
<td>income</td>
<td></td>
</tr>
<tr>
<td>Single person, no children</td>
<td>$16.41</td>
<td>$34,132</td>
<td>$17.08</td>
</tr>
<tr>
<td>Single parent, one child</td>
<td>$23.04</td>
<td>$47,923</td>
<td>$25.04</td>
</tr>
<tr>
<td>Single parent, two children</td>
<td>$28.58</td>
<td>$59,446</td>
<td>$31.37</td>
</tr>
<tr>
<td>Two parents, one wage earner, two children</td>
<td>$30.11</td>
<td>$62,629</td>
<td>$31.23</td>
</tr>
<tr>
<td>(assumes no childcare)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Two parents, two wage earners, two children</td>
<td>$18.75 each</td>
<td>$78,000 HH income*</td>
<td>$20.07 each</td>
</tr>
</tbody>
</table>

Source: Vermont Livable Wage Campaign, 2009, [http://www.vtlivablewage.org/faqs.html#What%20is%20a%20livable%20wage](http://www.vtlivablewage.org/faqs.html#What%20is%20a%20livable%20wage)

When reviewing commercial and industrial development occurring within the region, the WRC should be mindful of these thresholds because they will help predict the ease with which employees of those establishments will be able to find housing their income level can afford within the region.

**HOME OWNERSHIP AFFORDABILITY**

While the median selling price for both residential and seasonal properties saw a steady increase from 2000 to about 2007, costs of housing have come down in recent years, partially as a result of the subprime mortgage “housing crisis.” According to the Vermont Department of Taxes, in 2012 the median purchase price of a primary residential property of less than 6 acres in Windham County was $156,250, a decrease of 21.6 percent from the peak of $199,225 in 2007. Prices for seasonal homes on less than six acres have tracked very closely with residential properties of this size. While all residential and seasonal properties saw a rise and then fall in selling price from 2000 to 2012, mobile home properties prices have stayed relatively constant.

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82 HH=household
BUYING A HOME REMAINS A STRETCH FOR MANY

Even with a very slow economic recovery, Vermont’s homeownership market appears as if it has begun to turn a corner. The median home price for primary residences in Vermont was $195,000 in 2010, up from $190,000 in 2009, a 3 percent increase. Despite the recession, Vermont’s median home price is still 64 percent, or $76,000, higher in 2010 than in 2000 while incomes are an estimated 24 percent, or $10,000, higher during that time period.

A median priced home in 2010 would require an annual income of $58,000 and at least $16,000 in down payment, closing costs and fees. One measure of market balance is for a median priced home to be affordable to households earning the state’s median income. There remains a $6,000 gap in this measure, in terms of household income.

Prices of new homes were even less affordable to the average Vermonter. The median price of a newly constructed home was $290,000. A home buyer would need an income of $86,000 and down payment and closing costs of at least $23,000 to afford this home.

SOURCE: BETWEEN A ROCK AND A HARD PLACE: HOUSING AND WAGES IN VERMONT, 2011 UPDATE
Even with the recent fall in housing prices, wage increases have not kept pace, putting home ownership out of reach for many, even with relatively low mortgage rates. “Starter homes” are often priced too high for households earning at or below median income (Figure 6-6). Figure 6-7 illustrates this point aptly, showing that a full 80 percent of selected monthly housing costs fall in the range of at or above $1000 a month. For there to be an adequate supply of affordable housing in the Windham Region, at least half of the housing units would need to have monthly costs of $1250 or less. This issue is addressed further in the following sidebar.

**FIGURE 6-7: WINDHAM REGIONAL DISTRIBUTION OF SELECTED MONTHLY OWNER COSTS FOR HOUSING UNITS WITH A MORTGAGE, 2011**

*Source: 2007-2011 American Community Survey 5-Year Estimates*
Foreclosure rates in Windham County have also been historically high since 2009. Starting from that year, Windham County saw 172 foreclosures, accounting for 8.9 percent of all foreclosures in the State during 2009. Since then the total count dipped once to 130 in 2011, before rising again to 177 in 2012. In 2012, Windham County accounted for 9.7 percent of foreclosures in the State. As it does not appear that this trend has peaked yet, and this may be an area of focus for the coming years. Countywide, Windham County ranks 4th highest in terms of foreclosure activity as a percentage of housing units (0.62 percent compared to 0.53 percent statewide), with only Rutland, Franklin and Lamoille Counties having higher rates of foreclosure activity. However, to put these values in context, it should be mentioned here that Vermont had the lowest foreclosure rates in the country during the housing crisis.

### RENTAL HOUSING AFFORDABILITY

The median gross rent for a two-bedroom apartment in Windham County, as estimated by HUD for 2013, is $931 per month. This is approximately an 18.9 percent increase in monthly rent from 2006. While Vermont is no longer tied with New York as the least affordable state in the nation for two- and three-bedroom rental housing, according to the 2013 Out of Reach publication, Vermont ranks as the 16th most expensive state for two-bedroom housing. Vermont is also ninth of the top 10 most expensive jurisdictions for Combined Non-metro Areas for rental housing affordability. Figure 6-8 shows a comparison of the state of Vermont to the rest of the U.S. in terms of hourly wage necessary to afford a two bedroom unit at fair market rates.

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84 Windham & Windsor Housing Trust, Housing Needs Assessment: Windham and Windsor County 2011


87 National Low Income Housing Coalition, 2013 Out of Reach Publication, [http://nlihc.org/oor/2013](http://nlihc.org/oor/2013)
Broken down by county, the trends seen above are further illustrated for New England in Figure 6-9. Just over half of the New England region exceeds the 30 percent benchmark for housing affordability. Over half the nation does too, but in New England the range is greater. As shown in Figure 6-9, in Windham County between 46.6 percent and 50.5 percent of renters spent more than 30 percent of their income on gross rent. Percentages are even higher in northern Vermont, where Chittenden County has 58 percent of its residents spending more than 30 percent of their income on rent.

Figure 6-10 provides the estimated total of units falling into each gross rent subdivision. The vast majority of rental units in Windham County fall within the range of $500-$999 for monthly rent. The estimated median household income for renter-occupied housing in 2011 was $32,776. As illustrated in the graph, there is a significant drop-off in the availability of rental housing that is affordable for very low and extremely low income households (upper thresholds for these categories being calculated at $410 and $246 gross rent respectively).
SUPPORTING AFFORDABLE HOUSING

In the Windham Region, housing that is maintained at a certain price level, is addressed through a variety of local and regional programs. The Windham and Windsor Housing Trust (WWHT) develops and manages affordable housing that serves low and moderate income residents. WWHT also provides loan funding for low and moderate income homeowners to maintain safe and affordable housing. 

Southeastern Vermont Community Action and Bennington-Rutland Opportunities Council offer weatherization and crisis fuel programs to assist low income homeowners and renters. Several towns also offer home loan programs. Brattleboro Area Affordable Housing has funding available for homeowners wishing to add an accessory apartment.

According to the Vermont Directory of Affordable Rental Housing, there are approximately 1,200 units of State or Federally subsidized rental housing within Windham County. Figure 6-11 shows the distribution of this housing within the region and in the surrounding area. This searchable map is available at the following link: http://www.housingdata.org/doarh/mapAll.php

HUD also provides an affordable housing search engine which is available here: http://www.hud.gov/apps/section8/step2.cfm?state=VT%2CVermont
Housing subsidies come primarily from State and Federal programs. The largest federal housing subsidy, in terms of dollars, is the mortgage interest deduction. However, the mortgage interest deduction does not benefit low-income households or renter households. There are State and Federal programs specifically targeted at low and moderate income households. These include Housing Choice Vouchers as well as the Community Development Program, Vermont Housing and Conservation Board, and US Department of Agriculture (USDA) Rural Development programs. In recent years, there has been a decrease in Federal funding for Housing Choice Vouchers (also known as Section 8 vouchers) which has put a severe strain on housing programs.

DEFINITIONS OF AFFORDABLE HOUSING

The State of Vermont defines affordable housing as housing that is owned or rented by its inhabitants, whose gross annual household income does not exceed 80 percent of the county median income and whose household costs are no more than 30 percent of the household’s gross annual income. For households falling below the county median income, the terms low, very low, and extremely low household income levels are used. The Vermont Community Development Program, based on data from US Department of Housing and Urban Development (HUD), defines Low, Very Low, and Extremely Low Income Levels as below 80 percent, 50 percent, and 30 percent of median income respectively.

SOURCE: 24 V.S.A. § 4303, HUD,

FIGURE 6-11: DIRECTORY OF AFFORDABLE RENTAL HOUSING, WINDHAM REGION


Homelessness continues to be a problem in the Windham Region. The *Morningside Emergency Shelter* in Brattleboro reported 4,510 bed-nights in 2005. By 2013 this number had nearly doubled to 8,800 bed-nights, made possible by capacity increases through a new addition completed in 2010. Operating at full capacity, the Shelter maintains a waitlist of individuals and families seeking assistance.

Windham Region residents with serious mental illnesses also have a critical need for affordable housing. The [Department of Mental Health](https://www.cumh.org/) does provide housing grants for 10 percent of those with serious mental illness; however, this still leaves a substantial gap in what is needed in the region. Many live in substandard apartments, a higher percentage of their income on rent and utilities, or are homeless.

### Conversion of Brownfields to Housing Stock

There are few underutilized structures available for housing conversion in the Windham Region. Often the available locations are complicated by the presence or potential presence of contamination, also known as a brownfield site. The [Windham Region Brownfields Reuse Initiative](https://windhamvtbrownfieldsreuse.com/) has funding available to assess potential contamination on specific sites, develop remediation plans as needed, and complete cleanup actions. Programs at both the Federal and State level can also provide funding for cleanup. Where brownfield sites are appropriate locations for mixed housing and commercial services, it may be well worth the investment.

### Environmental Justice

It is critical that the Region address environmental justice through hazard mitigation planning. There is a strong correlation between environmental hazard areas and affordable housing. For example, mobile home parks and public housing are frequently found in floodways. Such practices are unacceptable in a Region that values social equity for all residents.

### Housing Trends for the Region

This chapter has shown several characteristic trends for housing throughout the region, and those trends will have impacts on residents’ ability to find suitable, affordable housing in this region in the future. While the rate of housing development has tracked with the average rate of development

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89 A bed-night is one person spending one night in a sheltered environment.
statewide, the mix of that development has been skewed towards single family dwelling units. Most multi-unit development has taken place within resort communities.

Although single-family homes may continue to be the preferred type of housing in the region, providing a mix of housing options can help meet the needs of various household and income levels, while attracting younger populations and allowing older populations to age in place. A recent report on national trends in real estate described these two age groups as follows:

- The largest demographic age cohort in the United States—ranging from the teens through the early thirties—is technologically savvy, highly mobile, and hungry to build careers while delaying families. They gravitate to more urban areas looking for jobs and interactive environments that nurture social diversity and fun. They prefer flexible working situations, desire to live in stimulating neighborhoods, and don’t mind dealing with less individual space. At the same time, new immigrants and less well-educated young people seek places that allow financial and cultural growth.  

- Cash-strapped seniors may need to work longer. Some 40 percent of Boomers say they don’t have enough savings for retirement. Many may not leave existing jobs or existing hard-to-sell homes to relocate to familiar retirement bastions in warm-weather Sunbelt locales. The momentum of the graying Boomers will ramp up the perceived demand for senior housing. The number of seniors over age 80 grows rapidly. As they live longer than ever before, their ability to afford their longer lives is problematic. So as the senior population grows faster than any other age group, the percentage of them able to afford dedicated facilities declines, and many more age in place by choice or move in with relatives.

The region’s villages and downtown centers can provide many of the desired amenities of these two age groups. Local groups have expressed concern for how the needs for both of these age groups will be met. Members of a local group called Continuum of Care stressed the need for denser housing development located in proximity to employment/economic development and transportation, ideally located in downtown areas. Additionally, providing more opportunities for ownership in downtown centers could also help meet needs in the region. Several inquiries were raised in housing discussions about the viability for condominium development within the region.

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One trend that was identified by WWHT for the region that may diverge from national trends is the draw of rural communities for the county’s elderly population. Nationwide trends have seen development of compact developments in urban and suburban areas for age-restricted living communities that are located close to amenities. If the preference for elderly Vermonters is to age in place in a rural setting, this may mean settlement in proximity to villages, conversion of second homes to primary homes, or construction of accessory apartments in family dwellings. Accessibility of units will be a key component for the habitability of these structures for an aging population.

Also contributing to this trend is Vermont legislation that was passed in 1996 that committed more state funding to home-based care in an effort to allow residents to age in place. As of the most recent report for this legislation, occupancy rates for nursing facilities for Bennington, Windham and Windsor Counties were 60 percent, 36 percent, and 33 percent respectively. This shift in state policy has resulted in nursing facilities housing only 3.3 percent of Vermonters age 65 and older and 12.5 percent of those age 85 and older. With more opportunity to receive care at home, aging Vermonters may choose to age in a more rural setting. This trend may have impacts on providing adequate public transportation options, and should be a key element of focus in future housing assessments for the region.

The report completed for Windham and Windsor Housing Trust also provided a snapshot of trends developing within the three largest population centers in the region: Brattleboro, Bellows Falls, and Wilmington. The following descriptions are excerpts from that report:

**BRATTLEBORO**

Over the past five years, housing prices have flattened and the market demand for small-scale rental properties has diminished. Job losses, stagnating wages, and increased demand for deep-subsidy rental units have accelerated. The income split between homeowners and renters, as well as the purchase of housing by newly relocated households, continues to grow. Overall, the rental housing market can be viewed as stable with vacancy rates well below that of the state and comparable communities. At the same time, key renter populations are slowly losing the means to pay for their apartments.

**ROCKINGHAM**

Rockingham has actually fared somewhat better than Brattleboro in terms of employment retention, wage gains, and rental price increases since 2006. It has a relatively large share of renters living in small multi-family properties compared to the other three comparable communities (Springfield, Windsor and Brattleboro) and also has the smallest share of its renters living in subsidized housing.

**WILMINGTON**

Conflicting data, resulting from changes in the way the Census counts residents in resort communities, makes it hard to interpret housing trends in this community. The underlying issues of seasonal employment, low wages, and a shifting seasonal rental market continue to exist. Housing prices are
elevated because of the competition from vacation owners. Currently, there is an inventory of properties for sale in this community equal to several years worth of homes at recent sales levels.

This level of assessment and information is needed for the region as a whole. One area in particular that would benefit from a more detailed assessment is the need for seasonal workforce housing in areas surrounding resort centers. A major action item for the region during the term of this plan will be to complete a housing assessment study for the Windham Region as a whole.

<table>
<thead>
<tr>
<th>Energy And Housing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy efficiency is a critical issue in terms of housing quality and affordable housing. The costs of heating and cooling a home are among the highest costs associated with homeownership, especially in New England. It is possible to reduce energy costs by measures such as siting buildings to maximize solar gains, using energy-efficient appliances, and undertaking weatherization improvements such as adding insulation and improving windows to reduce the loss of heat in winter and gains in the summer. This is especially relevant given that energy resource availability and costs are generally not within the control of homeowners. Increasingly new technology is allowing home-owners a greater amount of control over the sources of energy used to provide heat and electricity to their homes through photovoltaic panels, solar hot water heating, small scale wind installations, etc.</td>
</tr>
</tbody>
</table>

The State of Vermont has acknowledged the importance of energy efficiency in housing. The Vermont Residential Building Energy Code, updated in October 2011, establishes technical requirements for new home construction to ensure a minimum standard of energy-efficiency. Upon completion of home building, State law requires every builder to self-certify that the home as built complies with the Code. The Vermont Residential Building Energy Standards (RBES) Certificate must then be filed with the Vermont Department of Public Service and the local town clerk. Efficiency Vermont, the State’s energy efficiency utility, helps consumers identify cost-effective ways to reduce energy costs through technical assistance and financial incentives.

Efficiency Vermont also has ongoing programs to help encourage home-owners to invest in efficiency. During 2013 Efficiency Vermont, in collaboration with the Vermont Energy and Climate Action Network (VECAN) sponsored the Home Weatherization Challenge across Vermont with a goal of weatherizing 3 percent of homes. Additionally, the Property Assessed Clean Energy (PACE) program is expected to move forward in the near future. PACE provides an alternative financing option which allows eligible homeowners to invest in efficiency or renewable energy improvements to their homes through on a special assessment tied to the property. Each town must create a PACE district prior to resident participation in the program.
CHAPTER 7

EDUCATIONAL, CULTURAL, AND RECREATIONAL RESOURCES

The Windham Region is fortunate to have access to a variety of educational resources, a rich and vibrant arts and cultural heritage, and a wealth of natural recreational resources. These resources are foundational to fostering strong local community ties, and improving economic prosperity to the region’s communities.

SOUL OF THE COMMUNITY: RESEARCH ON WHY PEOPLE LOVE WHERE THEY LIVE

In 2010, the John S. and James L. Knight Foundation and Gallup released the Soul of the Community report. This study gathered insights from nearly 43,000 individuals in 26 cities across the United States over 3 years. It was designed to find out what emotionally attaches people to a community—What makes residents love where they live? What draws people to a place and keeps them there? In today’s challenging economic climate, community leaders are seeking new ways to attract and retain people, develop prosperous economies, add intellectual capital, and create jobs.

The study provides empirical evidence that the drivers that create emotional bonds between people and their community are consistent in virtually every city and can be reduced to just a few categories. Interestingly, the usual suspects—jobs, the economy, and safety—are not among the top drivers. When examining each factor in the study and its relationship to attachment, the same items rise to the top, year after year:

- **Social offerings**: Places for people to meet each other and the feeling that people in the community care about each other
- **Openness**: How welcoming the community is to different types of people, including families with young children, minorities, and talented college graduates
- **Aesthetics**: The physical beauty of the community including the availability of parks and green spaces

The study also showed that the communities with the highest levels of attachment had the highest rates of gross domestic product growth. Discoveries like these open numerous possibilities for leaders from all sectors to inform their decisions and policies with concrete data about what generates community and economic benefits.
EARLY EDUCATION AND CHILD CARE

The availability of high-quality child care is a concern for many parents, employers, and communities. Affordable, high-quality child care is essential in developing a full employment economy, raising income levels, and lowering the need for public assistance. High-quality child care can also have many positive benefits for a child’s social development.

In 2013, the Windham Child Care Association conducted a county-wide child care needs assessment. The following findings were identified:

- Most child care facilities are located in the two regional centers of Brattleboro and Rockingham. However, most of the overall population growth is occurring outside of the regional centers, making location a primary barrier to child care access. For parents who prefer to have their children at a child care facility near their home or whose employment is outside of these centers there are limited options. This issue will continue to be a problem in the future if the population growth continues along this same trend.

- The under age 18 population is 24 percent of total county population. Within this population, there are 24 percent in the 0-4 age group, 27 percent in the 5-9 age group, 30 percent in the 10-14 age group, and 19 percent in the 15-17 age group. Although the under age 5 population has decreased 8.2 percent in Windham County since 2002, the number of child care facilities also decreased in the same time period, remaining stagnant for at least the last 5 years. If current trends continue, changes to the county’s economic development trajectory will see the increased need for additional child care facilities.

- As of 2010, in Windham County, 27 percent of all households with children under age 18 were female-headed. This is a larger percentage than found throughout the State of Vermont (20 percent). Male-headed households with children under age 18 accounted for 12 percent (versus nearly 18 percent for the State). These numbers may translate into more working single parents in Windham County than other parts of the state and the need for increased availability of child care facilities.

- The number of available slots and hours of operation are not meeting the demands of the population, particularly those who work in the service sector. An overwhelming number of jobs in Windham County are in the service sector, which often have nontraditional hours and fluctuating weekly schedules. Generally, families working these ‘service industry’ hours have the most challenges in accessing child care. As the region moves forward with its economic development plan accessing these needs must be part of the conversation.
There is an overall need to increase the availability of high-quality child care. The primary barriers to accessing child care include location, hours, and ages served. In general, the population that appears to be most underserved is the 0-2 year olds (infants and toddlers). With flexible schedules to accommodate the needs of working families, there is a need for expanded hours of operation, including more full-day, full-week programs. In 2010, Windham Child Care Association assumed management of the Community Action Brattleboro Area (CABA) Evening Care, the State’s first licensed evening child care program. The center, now called Sprouts Early Learning Cooperative, is open from 7:30am to 9pm and provides flexible scheduling for parents who work both traditional and nontraditional hours.

Several components need to be factored into locating additional or expanding existing child care facilities. Transportation concerns, the rural nature of the region’s road network and existing commuting patterns, as well as the population growth patterns over the last ten years, all contribute to a unique environment for assessing specific child care facility location needs.

The Vermont Department of Children and Families has funding available for child care services. The Child Care Financial Assistance Program is available for eligible families that have an approved service need, meet the income guidelines and live in Vermont. Additionally, this department offers several search options for parents looking for child care services in their area.

Windham Child Care Association is a child care resource and referral agency of child care providers serving the Windham Region. Among other efforts, this association helps parents identify and locate quality child care in the community, helps parents access the state child care financial assistance program, and builds partnerships with the business community and other community service agencies to support the needs of families and children. The organization manages a licensed child care center for children age 6 weeks to 7 years and operates the Early Learning Express, the county’s bookmobile program.

**ELEMENTARY AND SECONDARY EDUCATION**

Each public school in the region is part of a regional supervisory union. There are five supervisory unions serving towns in the Windham Region: Windham Central, Windham Northeast, Windham Southeast, Windham Southwest and Windsor Southwest (see the Educational Facilities Map). Local school or district boards govern all public elementary schools. Some towns that do not have their own elementary school pay the tuition for resident children to attend nearby public or independent elementary schools. There are four public secondary schools in the region. Three are operated by union high school districts: Brattleboro Union High School District #6, Bellows Falls Union High School District #27 and Leland and Gray Union High School District #34. Wilmington and Whitingham formed the Twin Valley School District for the purpose of jointly providing secondary education for their towns. Towns which do not have their own high school, or which do not belong to a union high school district, pay tuition for their resident high school age students to attend nearby public or independent high schools. Some are public schools...
outside the region, such as Green Mountain High School (Chester), and Drury High School and McCann Technical School (North Adams, Massachusetts).

School enrollment figures have continued to fall consistently in the region over the last ten years. Total enrollment in Windham County has dropped by 12 percent, from a total of 6,562 in the 2003-2004 school year to 5,774 in the 2013-2014 school year. The largest segment of the population has passed out of their childbearing years (see Region Profile Insert: Population). Nonetheless, the consolidation of schools as well as aging facilities has led to school construction projects in the region. The location of a school does have an affect the environment. Building new schools on the edge of a community on large, undeveloped parcels of land not only abandons the village and downtown and existing facilities but also increases public expenditures, vehicle trips, pollution and loss of open space.92

INDEPENDENT HIGH SCHOOLS

Independent high schools in or near the Windham Region include:

The Long Trail School (Dorset)
Burr & Burton Seminary (Manchester)
The Academy at Charlemont (Charlemont)
The Austine School for the Deaf (Brattleboro)
Deerfield Academy (Deerfield)
Northfield Mount Hermon School (Northfield)
The Putney School (Putney)
The Compass School (Westminster)
Stoneleigh-Burnham School (Greenfield)
Stratton Mountain School (Stratton)
Vermont Academy (Saxtons River)

POST-SECONDARY EDUCATION

Three public post-secondary schools offer courses or programs, each located in Brattleboro. The Community College of Vermont (Brattleboro) offers Associates Degrees and provides a wide range of courses and workshops. The Vermont Technical College operates the Thompson School for Practical Nurses and the University of Vermont operates a regional Extension office and continuing education center. In 2013, it was announced that the Community College of Vermont and Vermont Technical Colleges will be moving their campuses to the Brooks House, a prominent structure in downtown Brattleboro.

The region also hosts the campuses or regional offices for four independent colleges. Marlboro College (Marlboro) is a small independent liberal arts college that also provides a diversity of cultural activities. Marlboro College Graduate School is located in downtown Brattleboro, and plans are currently

92 Schools for Successful Communities: An Element of Smart Growth, Council of Educational Facility Planners International and US Environmental Protection Agency, September 2004.
underway to expand the location to the Brooks House on Main Street. Landmark College (Putney) offers programs designed to meet the needs of students with learning disabilities. World Learning, through its School for International Training, offers undergraduate and graduate programs at its Brattleboro campus. The Experiment in International Living, part of World Learning, also offers exchange programs for college and high school students in foreign countries throughout the world. Union Institute and University offer bachelors and masters degree courses through its Brattleboro campus.

Students also have access to several public and private post-secondary institutions within commuting distance, including Castleton State College (Castleton), Bennington College (Bennington), Johnson State College (Johnson), College of St. Joseph (Rutland), Green Mountain College (Poultney), Keene State College and Antioch New England Graduate School (Keene, New Hampshire), Greenfield Community College (Greenfield, Massachusetts), and the University of Massachusetts and the affiliated 5-college system, which also includes Amherst, Hampshire, Mount Holyoke, and Smith Colleges in Massachusetts.

ADULT EDUCATION

There are several opportunities for adult education regionally. In addition to the various programs offered through community libraries and individual groups, the Community College of Vermont has a learning center in Brattleboro that offers associate degrees, career-related certificates, and credit and non-credit training programs. Vermont Adult Learning, which has an office in Brattleboro, can provide instruction in reading, writing, speaking, listening, math, reasoning and problem solving, occupational and workplace skills and information technology to adults 16 years and older who are not enrolled in secondary school and who lack basic educational skills.

Adult education and re-education programs have become a focal point of discussion for helping out-of-work individuals re-enter the workforce. These programs are also beneficial to adults looking to change career paths. Expansion of local adult learning opportunities would be beneficial to the economic development of this area. An additional piece of these programs is pairing the training programs with businesses in the region, and developing workforce training programs. One avenue for expanding adult education training may be through offering online course, webinars, and other internet-based education programs. The Economy Chapter and the Comprehensive Economic Development Strategy (CEDS) offer more information and suggestions for this area.

LIBRARIES

The region's libraries play an important role in serving the learning and information needs of its citizens, as well as providing community centers for meetings and cultural events. Story times, book discussions, lectures and films, internet access, and after-school programs are common programs at many of the region’s libraries. There are 21 public libraries in the Windham Region with seven towns not having any libraries within their borders. Brooks Memorial Library in Brattleboro and Rockingham Library are the region's largest libraries. Most libraries in the region are linked in an electronic network designed and
supported by the Vermont Department of Libraries to bring the entire state's resources, state library holdings, college, university and public libraries, to citizens of the region.

Adequate funding for libraries is a struggle for libraries in the region. Federal and state funds do not pay for basic local public library services. Local libraries must find funding to keep their doors open in order to take advantage of statewide services for their citizens. Many towns in the region depend on volunteers to operate the town library. Collaborations between local libraries and educational institutions may aid in providing other avenues for support. Additionally, as the role of libraries continues to expand and adapt to information technology advances, other opportunities for funding and collaboration may evolve, such as through creation of adult learning satellite facilities and telecommuting or video conferencing hubs. One such collaboration underway is through the Vermont Broadband Initiative. The VT Broadband Initiative targeted libraries as anchor institutions for expanding broadband internet service throughout the State.

MEDIA RESOURCES

The dissemination of news and information is critical to having an informed citizenry. Increasingly, educational, commercial, and cultural organizations require efficient access to news and information supported by modern communications systems. Communications infrastructure, including internet and telephone and cellular communications is addressed in Chapter 8: Utilities, Facilities, and Technology, while this section covers media resources that are used for the distribution of news and information, including television and videoconferencing and other media, including radio, local and regional news organizations, and local online websites. The distribution of information is vital to promote stronger connectivity within the region.

TELEVISION AND VIDEOCONFERENCING

Cable television is offered in a majority of towns in the region (Table 7-1), but there are still significant under-served pockets. The use of satellite dishes to receive television signals has been widespread for a number of years, particularly in rural areas, and digital (small-dish) satellite services are common, competing with cable television for subscribers.

The Windham Region is served by two public, educational and governmental (PEG) television stations that cover municipal meetings and provide public access services for residents. Brattleboro Community Television (BCTV) reaches subscribers in Brattleboro, Guilford, and Vernon via Comcast, as well as subscribers in Dummerston, Jamaica, Newfane, Putney, and Townshend via Southern Vermont Cable. BCTV is located in downtown Brattleboro in the Municipal Center. Falls Area Community Television

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93 State and federally funded services include online databases, online union catalog, catalog records and consulting to improve staff skill, as well as operation support for interlibrary loan.
FACT TV serves Rockingham, Bellows Falls, Westminster, Saxtons River, Athens, Grafton, and Brookline from a location at the Health Center in Bellows Falls. Duncan Cable Television operates a locally oriented program service in Wilmington and West Dover. BCTV and FACT TV are available online to anyone interested in accessing the programming and share programming statewide through the Vermont Media Exchange. Online archiving and streaming of live video will continue to increase in the coming years and public access to meetings and hearings will increase though this venue. Additionally, the use of YouTube Channels will also be a distribution channel for video media.

### TABLE 7-1: CABLE COMPANIES SERVING THE WINDHAM REGION[^94]

<table>
<thead>
<tr>
<th>Company</th>
<th>Towns Served</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comcast</td>
<td>Athens, Brattleboro, Grafton, Guilford, Londonderry, Putney, Rockingham, Stratton, Vernon, Westminster, Weston</td>
</tr>
<tr>
<td>Duncan Cable TV</td>
<td>Dover, Wilmington</td>
</tr>
<tr>
<td>Southern Vermont Cable Company</td>
<td>Dummerston, Jamaica, Newfane, Putney, Townshend</td>
</tr>
</tbody>
</table>

Source: Department of Public Service, Comcast in Vermont

Video networks are creating links both within and outside the region. Vermont Interactive Technologies (VIT) is a two-way, interactive audio and video telecommunications system that currently operates from thirteen sites in Vermont (including Brattleboro, Bennington, and Springfield in southern Vermont) offering videoconferencing for education, government, businesses, and non-profits between sites both within the system and around the world. VIT currently operates its Brattleboro site at the Brattleboro Union High School. One-way video, two-way audio satellite education and conferencing systems are also becoming increasingly common at the region's schools.

The Vermont Department of Libraries and Google provided a grant of video conferencing equipment and programming funds to 14 public libraries in Vermont, including Brooks Memorial Library in Brattleboro. The equipment consists of a webcam, 52-inch flat screen HD TV, conference microphone, PC laptop, HDMI cables, and headphone set. Offered at no charge, the program is available for the public (including non-cardholders) and may be used for hosting programs or for personal needs. A Google+ account is recommended so that Google Hangout may be used as the videoconferencing interface.

[^94]: Not all franchises serve entire towns
OTHER MEDIA

The Windham Region is served by several commercial radio stations located within the region as well as surrounding areas. Vermont Public Radio is broadcast on 88.9 FM in Brattleboro, and public radio stations from Concord, NH; Amherst, MA; and Albany, NY can also be heard in the region. WTSA is a local Brattleboro station and is broadcast on 96.7 FM. WOOL 91.5 FM, also known as Black Sheep Radio, is a member-owned and volunteer-run non-profit community station broadcasting to Vermont and New Hampshire.

Two daily papers, the Brattleboro Reformer and the Rutland Herald, are widely available and provide coverage of local and regional news. The Deerfield Valley News reports on events in the Deerfield Valley on a weekly basis. Towns in the southwestern corner of the region are served by the Bennington Banner and the North Adams Transcript (MA). The Vermont News Guide (Manchester Center) and the Message (Londonderry) serve the northwestern section of the region. Other area newspapers include the Commons (Brattleboro), the Keene Sentinel (Keene, NH) and the Upper Valley News (Claremont, NH). The Valley Advocate (Northampton, MA) and other free publications are widely available.

Residents are increasingly receiving their local news on town information online. This may either be through their local town paper website, or via town information and blog websites. Examples of these are the iBrattleboro and iPutney websites. These sites allow residents to post information and reply to stories in addition to reading the information. Additionally, social media sites such as Facebook, Twitter, and blog sites (Blogger, WordPress, etc.) allow for additional avenues of information exchange. These peer to peer exchange venues allow for a higher level of information exchange and connectivity, and will be increasingly influential in the coming years.

CULTURAL AND HISTORIC RESOURCES

ARTS

For an area of its size, the Windham Region is unusually rich in cultural resources. Nationally recognized musicians, artists, writers and craftspeople have chosen to make the region their home, and their presence has helped to attract a diverse and appreciative audience to the area. The presence of the arts community enriches the lives of residents and visitors and enhances the region's appeal as a place to live and do business. Cultural resources have a direct link to the economy through spending by arts organizations and by audiences attending events.

The Windham Region hosts many concerts, festivals, and performances. Summer concerts are held by the Yellow Barn in Putney, Guilford Friends of Music, and Marlboro Music. The Brattleboro Music Center also hosts a series of choral, symphonic, and chamber works. Mount Snow and Stratton resorts also sponsor summer musical festivals. The Weston Playhouse is well known for their summer theater productions.
Several other theater companies, such as the New England Youth Theater and Sandglass Theater, offer workshops and perform in the region. The Brattleboro Museum and Art Center offers exhibits of work in a variety of media, often coupled with lectures or performances. Bellows Falls and Brattleboro have instituted popular Gallery Walks held on a monthly basis, and many artists region-wide hold open studio events. Brooks Memorial Library (Brattleboro) and Rockingham Library (Bellows Falls) host film and lecture series, and provide gallery space. The Latchis Theater in Brattleboro, Opera House in Bellows Falls, and Memorial Hall in Wilmington are exceptional historic facilities that have undergone restoration and have been developed as performing art centers. There are several other small performance venues through the region including the Hooker Dunham Theater in Brattleboro and the Windham Hotel in Bellows Falls.

Craftspeople form a significant segment of the region’s culture and economy, and play a major role in the heritage tourism that continues to grow in the region. A number of art and craft festivals are held annually. The region also sustains professional storytellers, mime, puppeteers, traditional and folk musicians, and folk, contra and Morris dancers. The Arts Council of Windham County is a volunteer organization in the region whose mission is “to strengthen the environment for artists and arts organizations in Windham County.” The Arts Council does this through advocacy for the arts in community life, linking cultural organizations, individual artists, and the community, and nurturing startup ideas and organizations. In an effort to further bolster this regional asset, there is interest in developing an arts trail in the region, similar to the artisan trails in Virginia.

REGIONAL CULTURAL RESOURCES

Too numerous to list in their entirety, the following list highlights a few local organizations and venues:

- Bellows Falls Opera House (Bellows Falls)
- Windham Hotel (Bellows Falls)
- Brattleboro Museum and Art Center (Brattleboro)
- Brattleboro Music Center (Brattleboro)
- Brooks Memorial Library (Brattleboro)
- Latchis Theater (Brattleboro)
- Hooker Dunham Theater (Brattleboro)
- New England Center for Circus Arts (Brattleboro)
- New England Youth Theater (Brattleboro)
- Vermont Jazz Center (Brattleboro)
- Guilford Friends of Music (Guilford)
- Marlboro Music (Marlboro)
- Next Stage (Putney)
- Sandglass Theater (Putney)
- Yellow Barn (Putney)
- Rockingham Library (Rockingham)
- Main Street Arts (Saxtons River)
- Weston Playhouse (Weston)
HISTORIC RESOURCES

Historic structures and sites are an integral part of the Windham Region’s character and quality of life. They serve as a link to the past and help strengthen the local economy by promoting investment as well as tourism. It is in the public interest to preserve and enhance these historic resources. One way this is done is through support of local historic societies in the region, and collaborating with these societies on town projects when it is appropriate to the project (see list of regional Historical Societies).

There are a variety of preservation tools available at the local, state and federal level. The following are just a sampling of tools available to towns in Vermont:

- **National Register of Historic Places**: The National Register of Historic Places is the official list of the nation’s resources worthy of preservation. Resources may be nominated individually, or in groups, as districts or as multiple resource areas and must generally be older than 50 years. Over 100 of the region’s historic structures and districts are listed on the National Register of Historic Places. Inclusion on the National Register affords the property special recognition of its contribution to local resources, provides a review of effects which any federally funded project may have on the property (most notably highway projects), and may enable property owners to receive federal tax advantages for historically appropriate improvements.

- **Vermont State Register of Historic Places**: In the 1970’s the Windham Regional Commission undertook a survey of historic structures in the Windham Region. Sites listed on the State Register are given due consideration during Act 250 reviews. During the permit process the Vermont Division of Historic Preservation will make recommendations to the district environmental commission on the impact to the historic resource. In addition to the sites listed on the National Register, there are numerous other sites and structures are recognized in the State Register.

- **Vermont Designated Downtown and Village Program**: This program seeks to recognize and protect the cultural and economic investments in villages and downtowns by offering technical assistance and tax credits. Currently, there are three designated downtowns (Brattleboro, Bellows Falls and Wilmington) and 15 designated villages in the Windham Region.

- **Local Historic Districts**: Vermont State law (24 V.S.A. § 4414) allows towns to create and administer a local historic district (see the Historic District Map). The purpose of an historic district is to protect and preserve areas of outstanding architectural and historic value from inappropriate alterations and additions which might otherwise detract from the character. Towns may also designate historic landmarks and enact Design Review Districts.
Preservation Trust of Vermont: The Preservation Trust of Vermont is a charitable, non-profit organization that initiates and assists local and statewide efforts to preserve Vermont’s historic, architectural, and community resources. Through educational programs and technical and financial assistance, the Preservation Trust works to protect and restore significant historic properties, downtowns and community centers.

Certified Local Government (CLG) Program: The CLG Program is a federally funded program administered by the state. A local government can participate in the program once the Vermont Division for Historic Preservation certifies the municipality. Matching grants are made each year to CLGs for survey and planning projects, including National Register nominations and education and advocacy projects. Rockingham is the only CLG in the Windham Region.

RECREATION

In 2011 an Outdoor Recreation Demand Survey, administered by the Department of Forests, Parks, and Recreation, was released to Vermonter's. Nearly all respondents engaged in outdoor recreational activities. Twenty-eight outdoor recreational activities received participation rates above ten percent. Sixteen percent of survey respondents rated hiking as their favorite activity. This was followed by walking, hunting, and fishing at approximately 9 percent each. Skiing (all forms), swimming, and bicycling also rated well. Of the households surveyed, approximately 41 percent said that outdoor recreation was “very important” to them, while 32 percent said that it was “moderately important.” Statewide, the 2011 Outdoor Recreation Inventory revealed that the leading priorities for towns included parks and open space, bike/pedestrian trails, baseball/softball fields, hiking trails, and soccer fields.95

Within the towns of the Windham Region, there are varying levels of community facilities for recreation. Some communities, such as Brattleboro and Rockingham, have municipal recreation departments and provide a wide range of recreational activities for various ages. Other towns rely on volunteer groups to organize recreational leagues. Most of the region’s athletic fields are public and are located at school properties.

Ski resorts play an important role in the Windham Region by, among other things, providing recreation to residents and tourists alike. The ski resorts have become a destination for all four seasons, marketing sports such as mountain biking and golf, in addition to traditional winter activities, to attract visitors.

An important recreational resource to the Windham Region is its trail network. A wide variety of trails exists for a variety of recreational use. The Appalachian Trail, Long Trail, and Catamount Trail all pass

Educational, Cultural, and Recreational Resources

through the western part of the region, largely through the Green Mountain National Forest. New trails designed to meet the needs of various recreation users are being created, in large part by private and public non-profit groups. In the 2003, Pratt’s Bridge Trail, 1.7 miles of hard pack surface trail that is handicapped accessible, was completed as part of the West River Trail. This was developed in partnership with the Paralyzed Veterans of America.

Bicycling and walking are also expected to continue strong growth in popularity and with it, support for multi-use paths, trails, and linear parks or greenways. Several efforts are underway to create trails and paths including a 5-mile Valley Trail along the North Branch of the Deerfield River connecting West Dover and Wilmington and the West River Trail which connects 4,500 acres of public land in Jamaica, Townshend, and Londonderry. There is beginning interest in developing a Connecticut River Trail from Brattleboro to Bellows Falls. Class IV roads and legal town trails provide important recreational resources throughout the region’s communities. Hiking, biking, mountain biking, horseback riding, cross-country skiing and snowmobiling are just some of the recreational activities that take place on these roads and trails.

The Windham Region is rich in water resources. Residents and visitors utilize the many rivers, streams, lakes, reservoirs, and ponds for water recreation such as swimming, boating, and fishing. Thirty-three lakes and ponds in the Windham Region are over 20 acres; among these major water bodies, there are a total of 102.1 miles of shoreline (half of which are on just 2 lakes). Approximately 80 percent of this shoreline, 81.4 miles, is public or conserved. Nearly all of these water bodies have public access or road frontage. Many of them have developed public fishing access or boat launches. Water quality and shoreland protection must be maintained and enhanced as the demand for water recreation increases.

### ENERGY AND SCHOOLS

Schools are likely to be one of the biggest energy users in town. Energy inefficiencies unnecessarily strain the budget and the taxpayers. Energy-efficient lighting, heating, ventilation, and commercial kitchen equipment can help your school reduce the costs needed to operate and maintain the building, and reduce environmental impacts. A well-designed energy efficiency project can also significantly improve lighting and indoor air quality—features that are essential for learning, health, and the well-being of students and staff. Efficiency Vermont provides a guide to taking action and achieving energy efficiency in schools available here: [Making the Grade](#).

Efficiency Vermont, in partnership with the Vermont Energy Education Program (VEEP) and the Vermont Superintendents Association, has also launched the [Whole School Energy Challenge](#). The Challenge serves to engage the entire school - from the students to the facility staff to the administration - in a school-year long campaign to reduce the School’s use of energy and associated costs and foster greater energy awareness and improved long term energy management.
CHAPTER 8

UTILITIES, FACILITIES, AND TECHNOLOGY

This chapter examines the existing conditions, levels of service, and future needs of public and private facilities and services provided in the Windham Region. Broad categories covered in this chapter include water supply, wastewater treatment, solid waste management, radioactive waste management, emergency planning services, health care facilities, and communications infrastructure.

WATER SUPPLY

The quantity and quality of drinking water, drawn from surface and ground waters, are issues throughout the region. Ensuring access to safe and reliable water is critical to supporting existing development and encouraging growth.

PUBLIC WATER SUPPLY

The State of Vermont defines a public water supply as:

... any system(s) or combination of systems owned or controlled by a person, that provides drinking water through pipes or other constructed conveyances to the public and that has at least fifteen (15) service connections or serves an average of at least twenty-five (25) individuals daily for at least sixty (60) days out of the year. Such term includes all collection, treatment, storage and distribution facilities under the control of the water supplier and used primarily in connection with such system, and any collection or pretreatment storage facilities not under such control which are used primarily in connection with such system. Public water system shall also mean any part of a system which does not provide drinking water, if use of such a part could affect the quality or quantity of the drinking water supplied by the system. Public water system shall also mean a system which bottles drinking water for public distribution and sale (see also Bottled Water System). (Vermont Water Supply Rule, effective December 1, 2010)

Public water supplies may be owned and operated by a town, village or special purpose municipality, or they may be privately owned, either individually or cooperatively. Municipally owned public water
supply systems are often provided in the more densely settled sections of towns and villages that may not otherwise have access to a safe and reliable domestic water supply. Many of the region’s non-public water supplies serve vacation housing developments and some of the smaller villages. These centralized systems also allow residents to share in the cost of acquiring and maintaining their water supplies. Generally, public water supplies are easier to maintain and protect than individual water supplies in densely settled areas.

As noted in Table 8-1, Brattleboro, Bellows Falls, Guilford, Putney, Readsboro, Wilmington, and the Wilmington/Cold Brook Fire District own and operate public water supply systems in the Windham Region. These systems serve populations ranging from approximately 330 to 12,000 people. The water main extension policies for these municipal water supplies vary.

**TABLE 8-1: PUBLIC WATER SUPPLIES IN THE WINDHAM REGION**

<table>
<thead>
<tr>
<th>Town/System Name</th>
<th>Source Name/Type</th>
<th>Population Served</th>
<th>Average Demand (MGD)</th>
<th>Capacity (MGD)</th>
<th>Percent of Capacity Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bellows Falls/Bellows Falls Village Water Department</td>
<td>Minard’s Pond</td>
<td>3,500</td>
<td>0.3</td>
<td>1</td>
<td>30%</td>
</tr>
<tr>
<td>Brattleboro/Brattleboro Water Department</td>
<td>- Pleasant Valley Reservoir</td>
<td>12,000</td>
<td>1.2-1.4</td>
<td>3</td>
<td>40-47%</td>
</tr>
<tr>
<td>Guilford/Guilford Water System</td>
<td>Extension of Town of Brattleboro Water System</td>
<td></td>
<td>0.025</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Putney/Putney Water System</td>
<td>Sand Hill Well</td>
<td>600</td>
<td>0.04</td>
<td>0.1</td>
<td>40%</td>
</tr>
<tr>
<td>Readsboro/Readsboro Village</td>
<td>Howe Pond</td>
<td>400-500</td>
<td>0.03</td>
<td>0.08</td>
<td>40%</td>
</tr>
<tr>
<td>Wilmington/Cold Brook Fire District “Golf Tract”</td>
<td>Wells</td>
<td>330</td>
<td>0.01</td>
<td>0.04</td>
<td>25%</td>
</tr>
<tr>
<td>Wilmington/Cold Brook Fire District “Base Tract”</td>
<td>Wells</td>
<td>808</td>
<td>0.01</td>
<td>0.15</td>
<td>7%</td>
</tr>
<tr>
<td>Wilmington Village/Wilmington Water District</td>
<td>-Springs, Haystack Pond, Reservoir</td>
<td>1,500</td>
<td>0.06</td>
<td>Varies from 0.19-1.4</td>
<td>31%</td>
</tr>
</tbody>
</table>

*Source: Information supplied by water providers, contact town offices*
The most common problem facing communities, including unincorporated villages, that have or seek to have municipal public water supply systems and privately-owned public water supplies, is obtaining funding to acquire or upgrade water supply facilities. All of these systems rely on groundwater, springs or surface waters for their sources. Yields from their wells range from 12 to 300 gallons per minute.

Small-scale public water systems are regulated by the Vermont Department of Environmental Conservation (DEC) in the same manner as large systems. According to the Vermont Department of Health, there are over 200 public non-community water supply systems in the region. These systems are classified as either transient or non-transient systems, with over half of the systems classified as transient non-community systems. While almost every town in the region has at least one of these systems, the highest numbers of them are found in the towns with ski resorts (Dover, Londonderry, Wilmington). There are over 50 public community water systems in the region. Municipal water systems as well as water sources that serve condominium developments and mobile homes are included in this category. The majority of these systems are located in Dover.

Each public water system has an accompanying source protection area. The Vermont Water Supply Rule defines a Source Protection Area as:

\[\text{... a surface and subsurface area from or through which contaminants are reasonably likely to reach a Public water system source. (Vermont Water Supply Rule, effective December 1, 2010)}\]

Figure 8-1 illustrates the source protection areas in Saxtons River. Within the 200-foot radius of this primary collection area, contamination impacts are likely to be immediate and certain. Beyond that radius...
radius, source protection areas are tested and mapped to determine further sources of probable and possible contamination. Where there has been no mapping the State assumes a circular area with a 3,000-foot radius around the water source. Jurisdiction over the protection of public water supply sources rests with the DEC. Within these source protection areas, the DEC reviews Act 250 and wastewater facility applications. The DEC also requires that towns develop a plan for protecting source areas. Such protection may become part of a municipal zoning bylaw, though towns are not currently required to restrict land uses within these areas. Key Source Protection Areas in the region are identified on the Utilities Map.

Threats to groundwater and wells in the region include agricultural runoff, nearby salt storage areas, road salting, contaminated runoff from paved areas, flood events, and failing septic systems. Some private systems have been pumped at rates exceeding the aquifer’s capacity, resulting in yields that do not adequately meet the needs of users. Some systems have inadequate storage capacity, creating problems during power failures when homes may be without water.

PRIVATELY OWNED WATER SUPPLIES

The majority of the Windham Region is served by individual private water supplies, usually drilled or dug wells. Dug wells are susceptible to contamination from leachates that have reached the water table through soils. Drilled wells are susceptible to the same groundwater contamination as mentioned for public water supplies. Unlike source protection for public water supplies, private wells are not afforded specific levels of protection. The DEC does regulate potable water supplies under the Wastewater System and Potable Water Supply Rules. New wells do have required isolation distances from potential contamination, such as septic tanks and leach fields. Figure 8-2 shows an example of the distribution of well supply locations in Grafton.

Individual water supplies are located throughout the region, and this is why protection of groundwater quality is extremely important to maintaining potable water supplies. Individual wells can be affected by factors other than contamination. A new well drawing a high volume can deplete the groundwater

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FIGURE 8-2: APPROXIMATE PRIVATE WELL SUPPLY LOCATIONS, GRAFTON 2013

supply in an area creating yield problems for existing wells. For more information on groundwater, see the groundwater section of the Natural Resources Chapter.

**WASTEWATER TREATMENT**

Wastewater must be treated before being released to groundwater or surface water in order to ensure adequate removal of solids, destruction of pathogens, and removal of other pollutants, such as certain metals and organic compounds. Wastewater is generated from households and from commercial and industrial operations. There are three significant categories of wastewater to be treated:

- Domestic sewage, which originates from a residence or business and may be treated through onsite, soil based wastewater disposal systems or in municipally or privately-owned wastewater treatment plants;

- Domestic septage, pumped out of septic tanks used in onsite, soil based wastewater disposal systems and which typically is treated at municipally owned wastewater treatment plants; and

- Commercial or Industrial wastewater, which may involve pretreatment or treatment at the source, or may be incorporated into the flow of municipal sewage or disposed of onsite through the Underground Injection Control program.

The only large industrial sources of wastewater sludge in the region are paper mills. Paper mill wastewater is treated, on site, by its generators. The solid and liquid portions from that process must nonetheless be treated and/or disposed of, sometimes with wastewater treatment plant sludge and septage, so it is included in this section as well as in the Solid Waste Management section.

**WASTEWATER TREATMENT FACILITIES**

There are nine municipalities with publicly owned wastewater treatment plants providing secondary or tertiary treatment, as well as four privately owned treatment plants in the region (see Table 8-2). Facility types include lagoons, extended aeration and oxidation ditches, and rotating biological contactors. All of the facilities are in the Connecticut River Watershed, which is part of the Long Island Sound Watershed. The treatment of Nitrogen from these facilities will be under scrutiny for compliance with the Clean Water Act as Long Island Sound Total Maximum Daily Loads are being established.

Most municipal systems in the region are operating under hydraulic capacity. It should not be inferred, however, that the difference between design flow and current average flow represents available

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98 Secondary treatment involves the physical removal of solids as well as biological treatment of organic wastes by bacteria in a controlled system. Tertiary treatment provides a final stage, such as lagooning, micro-filtration, or disinfection, to raise the effluent quality to the standard required before it is discharged into the receiving environment.
capacity. Other factors, such as capacity already allocated and/or being held in reserve, the ability to safely and economically dispose of the sludge that results from the treatment process, the organic load on the treatment plant that may be presented by different materials, and local decisions regarding how close to the theoretical limit the plant should operate, all affect the potential to use any remaining capacity. Generally when a facility is operating at 80 percent capacity regularly, the plant may be required to upgrade. Federal regulations and future nutrient loading limits may also play a prominent role in affecting the potential use of remaining capacity.

Sludge disposal from municipal wastewater treatment plants is accomplished by land application, composting, landfills, or incineration. No sludge is incinerated in the Windham Region, but several small treatment plants in the region ship sludge to be incinerated in Connecticut and landfilled in Massachusetts. The State of Vermont regulates the levels of nitrates, phosphates, PCBs, and seven metals in each land application of sludge.

Effluent that remains after wastewater is treated and the solids removed is discharged to either surface waters or groundwater. Four plants in the Windham Region discharge their treated effluent by "spray irrigation," which involves spraying the effluent at controlled rates and at approved times of the year onto an area that is approved for that purpose and to which access by the general public is restricted. The remaining plants discharge effluent directly into one of the following streams: Connecticut River (four discharges), Deerfield River (three discharges), and one discharge each in Sacketts Brook, Saxtons River, East Branch North River, and No Name Brook. Discharges of effluent into surface waters are regulated by State and Federal agencies in accordance with regulatory requirements (tests of the pH, residual chlorine, dissolved oxygen, suspended solids, biochemical oxygen demand, bacterial counts, and the various metals and organic compounds that are regulated in sludge disposal).
### TABLE 8-2: WINDHAM REGION WASTEWATER TREATMENT FACILITIES

<table>
<thead>
<tr>
<th>Municipality</th>
<th>Facility Design Capacity (MGD)</th>
<th>Average Monthly Flow (MGD)</th>
<th>Percent of Design Hydraulic Capacity Remaining</th>
<th>Sludge Treatment or Disposal Technique</th>
<th>Effluent Disposal Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bellows Falls(^99)</td>
<td>1.4</td>
<td>0.536</td>
<td>66%</td>
<td>Compost</td>
<td>Connecticut River</td>
</tr>
<tr>
<td>Brattleboro</td>
<td>3</td>
<td>1.5</td>
<td>50%</td>
<td>Land Application</td>
<td>Connecticut River</td>
</tr>
<tr>
<td>Jacksonville</td>
<td>0.0501</td>
<td>0.289</td>
<td>42%</td>
<td>Landfill/Compost</td>
<td>East Branch North River</td>
</tr>
<tr>
<td>Putney</td>
<td>0.1</td>
<td>0.04</td>
<td>46%</td>
<td>Landfill/Incineration</td>
<td>Sacketts Brook</td>
</tr>
<tr>
<td>Readsboro</td>
<td>0.075</td>
<td>0.036</td>
<td>48%</td>
<td>Land Application</td>
<td>Deerfield River</td>
</tr>
<tr>
<td>Saxtons River(^100)</td>
<td>0.105</td>
<td>0.4</td>
<td>50%</td>
<td>Co-treatment</td>
<td>Saxtons River</td>
</tr>
<tr>
<td>West Dover</td>
<td>0.79</td>
<td>1.96</td>
<td>23.5%</td>
<td>Landfill</td>
<td>Spray-Deerfield River Basin</td>
</tr>
<tr>
<td>Whitingham</td>
<td>0.0123</td>
<td>0.0059</td>
<td>52%</td>
<td>Landfill/Compost</td>
<td>Deerfield River</td>
</tr>
<tr>
<td>Wilmington Village</td>
<td>0.135</td>
<td>0.799</td>
<td>69.6%</td>
<td>Compost</td>
<td>Deerfield River</td>
</tr>
<tr>
<td>Wilmington/Cold Brook FD, Golf</td>
<td>0.049</td>
<td>0.037</td>
<td>80%</td>
<td>Incineration</td>
<td>Spray-Deerfield River Basin</td>
</tr>
<tr>
<td>Wilmington/Cold Brook FD, Base</td>
<td>0.03</td>
<td>NA</td>
<td>--</td>
<td>Incineration</td>
<td>Spray-Deerfield River Basin</td>
</tr>
<tr>
<td>Winhall-Stratton Fire District</td>
<td>0.83</td>
<td>approx. .25</td>
<td>30%</td>
<td>Treatment</td>
<td>Erving WWTF, Erving, MA</td>
</tr>
<tr>
<td><strong>Private Non-Industrial</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flood Brook Union High School</td>
<td>0.009</td>
<td>0.00125</td>
<td>--</td>
<td>Incineration</td>
<td>No Name Brook</td>
</tr>
<tr>
<td>Magic Mountain</td>
<td>0.039</td>
<td>NA</td>
<td>93%</td>
<td>Incineration</td>
<td>Spray – Thompsonsburg Brook</td>
</tr>
</tbody>
</table>

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\(^99\) Serves Walpole & North Walpole, NH  
\(^100\) At the time of writing this plan, Saxtons River is in process of deciding whether to connect to the Bellows Falls system or upgrade its own plant.
PRIVATELY OWNED WASTEWATER SYSTEMS

Most of the region is served by on-site wastewater disposal systems (septic systems). The majority of new housing in southern Vermont is being built with septic systems, and not on municipal sewer systems. Appropriate isolation distances from streams and wells and separation from the high water table helps to prevent pollution of ground and surface waters from leachates. Since 2007, the State adopted Wastewater System and Potable Water Supply Rules, which regulate on-site wastewater systems, making the State the sole administrator of permits. A town may request to take over permitting of the Wastewater System and Potable Water Supply Rules; however, no towns in the Windham Region have done so.

Soil and topographic conditions play a major factor in on-site sewage disposal system design. The new State regulations incorporated several technical changes including allowing for less naturally occurring soil to the seasonal high water table. In addition, innovative technologies to handle the wastewater may be permitted.

Proper design, construction, and maintenance of onsite wastewater systems are important to keep them operating effectively, thereby preventing ground and surface water contamination. Many septic tanks and cesspools are pumped infrequently, and some not at all, which can increase their rate of failure. This creates concerns about potential groundwater and surface water pollution, and about public health risks. Commercial haulers pump septage from septic tanks, cesspools, or holding tanks and are then responsible for finding an approved facility for disposal of the material.

SOLID WASTE MANAGEMENT

Eighteen WRC member towns belong to the Windham Solid Waste Management District (Brattleboro, Brookline, Dover, Dummerston, Guilford, Halifax, Jamaica, Marlboro, Newfane, Putney, Readsboro, Stratton, Townshend, Vernon, Wardsboro, Westminster, Whitingham, Wilmington, and Winhall), two belong to the Southern Windsor/Windham Counties Solid Waste Management District (Grafton and Rockingham), and three (Londonderry, Weston, and Windham) belong to the Londonderry Cooperative Group. Searsburg operates its own municipal facility. Athens has a contract with Triple T Trucking for services and Somerset (an unincorporated town) has no waste management facility.

Under State law, solid waste is more than just discarded solid material of residential or commercial origin (10 V.S.A. § 6602(2)). It also includes special wastes such as batteries, used motor oil, wastewater
The disposal of hazardous waste occurs in two different ways. District facilities accept wastes such as antifreeze, waste oil and cadmium batteries for recycling. Other household hazardous waste items (and waste from conditionally exempt small quantity generators) are disposed during special hazardous waste collection days that are held several times each year. Federal and State regulations govern the management and disposal practices of all industries, businesses, and institutions that generate in excess of 100 kg (220 pounds) of hazardous waste or 1 kg (2.2 pounds) of acute hazardous waste per month.

Unwanted pharmaceuticals also pose safety, health, and environmental threats to the region. Unwanted medications can pose environmental risks when flushed or discarded in the trash as their residue may ultimately end up in-ground or surface water. As a result, consumers are encouraged to use year-round collection locations such as police departments and pharmacies or one-day collection events for proper disposal so that unwanted pharmaceuticals can be collected and then incinerated. Information on where to properly dispose of unwanted pharmaceuticals is available at the following websites: The Go-to-Guide from Product Stewardship Institute and DEA Resource: http://www.deadiversion.usdoj.gov/drug_disposal/index.html

### RADIOACTIVE WASTE MANAGEMENT

#### LOW LEVEL RADIOACTIVE WASTE

Most low-level radioactive waste (LLRW) generated in Vermont originates at the Vermont Yankee Nuclear Power Station (VY) in the Town of Vernon. Smaller amounts come from other sources such as hospitals. Most of the future LLRW to be generated in Vermont will result directly from the shut-down

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Utilities, Facilities, and Technology

Vermont has joined with the State of Texas to form the Texas Compact, which requires that all low level radiological wastes generated in the two states must be disposed of under Compact rules. A commercial facility operated by Waste Control Specialists (WCS) has been established in Andrews, Texas to serve as the final disposal site for low level radiological waste from Vermont and Texas, including material from the eventual decommissioning of the Vermont Yankee Station. The WCS facility will accept waste from other states, and radiological waste from Vermont can be disposed of elsewhere, but only if approved by the Texas Compact Commission.

HIGH LEVEL RADIOACTIVE WASTE

Spent nuclear fuel (SNF) is high-level radioactive waste that no longer contains enough useful material to economically sustain a nuclear chain reaction. It includes the fuel pellets themselves, the tubes that contain the pellets, and the assembly that connects and holds the tubes in place. Together, these components form a "fuel bundle" or "fuel assembly." Following its use in the reactor, the fuel assembly is intensely radioactive and, while some of the radioactive elements decay relatively quickly, it will remain extremely dangerous for many thousands of years.

Upon removal from the nuclear reactor, all SNF is stored for a minimum of five years in a spent fuel pool inside the reactor containment building, which is designed specifically for this purpose. After a five year period the fuel is sufficiently cooled that it can be removed from the pool and stored in dry casks outside of the reactor building. This process involves placing spent fuel assemblies into a “multi-purpose canister” (MPC) and placing each MPC into a steel and concrete cask. Each cask is designed to hold 68 assemblies. Casks are placed in a secure location outside the reactor building where they are passively air-cooled. In 2006 Vermont Yankee received a Certificate of Public Good from the Vermont Public Service Board to construct a single spent fuel storage facility designed to accommodate 36 casks.

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102 It is the WRC’s understanding that over the full life of the Vermont Yankee nuclear power station, approximately 75 percent of the total LLRW generated in Vermont is projected from dismantling the nuclear power plant.

103 Waste is classified according to the requirements as delineated in Title 10 CFR, Part 61.55. Class A is the lowest level followed by B and C. Radiological waste that exceeds class C is classified as Greater Than Class C (GTCC).

104 Vermont’s participation in the Texas Compact is regulated by 10 V.S.A., Chapter 162. The original language of the Compact is ratified and copied in 10 V.S.A. § 7069. The requirement to dispose of Vermont waste within the compact is contained in § 7069 Section 402, and the ability to petition for a waiver is contained in §7069 Section 305(7). The Waste Control Specialists (WCS) site is licensed by the Texas Commission on Environmental Quality under the Texas Health and Safety Code, Texas Title 2, § 401.202. The initial term of the WCS license is 15 years (Title 2, § 401.222), and expires on September 10, 2014. Subsequent license terms can be approved for 10 years. The WCS license is number RO4100.

105 Each fuel assembly in the VY reactor contains 64 tubes and measures approximately six inches by six inches square, and thirteen feet long.
The Vermont Yankee nuclear plant began operations in 1972 and is scheduled to cease operation in 2014. All of the fuel consumed during the 42-year operating life of the reactor is stored on site. There are approximately 3,879 assemblies currently under management in the spent fuel pool and dry casks. It is expected that when all the spent fuel is removed from the pool there will be a need to accommodate approximately 58 casks, which will require a second dry cask facility, or expansion of the existing facility.106 From the beginning of commercial nuclear plant operation in the US, the Federal Government and the industry have planned to provide for permanent storage of spent nuclear fuel at a single location, as opposed to keeping it on-site for an extended period. The United States Department of Energy (DOE) is contractually obligated to remove spent fuel from civilian reactor sites for consolidated storage elsewhere, and is responsible for the costs of on-site storage until the fuel can be relocated.

DOE had planned to consolidate the spent fuel from all civilian reactors at an underground storage facility beneath Yucca Mountain in Utah. The Yucca Mountain site was approved by Congress in 2002, but funding has since been withdrawn and there is no timetable for future development or completion. As a fallback to the Yucca Mountain project, DOE is considering establishing several temporary consolidated storage facilities around the country, but there are no consolidated facilities currently approved, and spent fuel is expected to remain at the Vermont Yankee site for the foreseeable future.

**EMERGENCY SERVICES**

**EMERGENCY PLANNING**

Vermont Emergency Management contracts with most Vermont regional planning commissions to assist with emergency planning. Statewide, this has changed emergency planning from a top-down system to a more locally and regionally coordinated process. The WRC is working with member towns, the Local Emergency Planning Committee District #6, the State Emergency Response Commission, the Vermont Agency of Transportation, the Vermont Department of Emergency Management and Homeland Security (DEMHS), the Red Cross, mutual aid organizations and other regional planning commissions to promote better emergency planning and disaster resistant communities.

Building disaster-resistant and resilient communities through sound land use planning is a primary goal of emergency planning. Emergency planning includes hazard inventory/risk assessment (HIRA), mitigation planning, recovery planning, and response preparedness. HIRA estimates the probability, extent, and severity of damage from predictable events. Mitigation planning employs sound land use practices and infrastructure management to protect and/or relocate public and private property away from predictable hazards. At the planning level, response preparedness involves a great deal of public education and coordination across many organizational boundaries. In short, accidents and natural

events will always happen; the extent to which they become emergencies or disasters is partly a function of readiness.

With the enactment of the Federal Emergency Planning and Community Right-to-Know Act (EPCRA) of 1986, Congress imposed upon state and local governments additional planning and preparedness requirements for emergencies involving the release or spill of hazardous materials. Provisions of this law require that facilities with hazardous materials stored on-site report these products to local fire departments, Local Emergency Planning Committees (LEPC) and State Emergency Response Commissions (SERC).

As designated by Vermont Department of Emergency Management and Homeland Security, LEPC District #6 serves Windham County towns, with LEPC District #7 serving Bennington County towns and LEPC District #3 serving Weston. Like all LEPC’s nationwide, these were formed under EPCRA to coordinate planning efforts related to accidents involving hazardous materials. Subsequently, the LEPC have evolved to be an “all hazards” planning group that meets monthly to coordinate planning for all types of natural disasters, hazardous material accidents, large-scale transit accidents, radiological emergency response, and others.

Response assistance for all types of emergencies may be provided by local and Vermont State Police, local fire companies, public works departments, state agencies, the local Red Cross Chapter and private contractors. Other disaster relief services, such as flood evacuation and emergency shelters, are provided by these same local response organizations, and may be coordinated with the Federal Emergency Management Agency (FEMA) or state agencies, as appropriate. The role of Regional Planning Commissions (RPCs) in disaster response and recovery is being defined through the development of a comprehensive memorandum of understanding (MOU) between the RPCs, DEMHS, and other state agencies. This MOU recognizes the essential and varied emergency response and recovery roles RPCs have assumed both within their own regions in support of their towns, in the provision of assistance to sister regions, and at the State Emergency Operations Center.

Each town within the emergency planning zones of Vermont Yankee (VY) and Rowe Yankee (a ten-mile radius around each site, designated by FEMA) has a local radiological emergency response plan that is coordinated with the other towns within the zone and with state plans. Development and maintenance of those plans are through Vermont Department of Emergency Management and Homeland Security. The emergency response plan for VY is funded by the State using VY funds. After Vermont Yankee’s projected closure in 2014, these funds may no longer be available. Local and state response to potential radiological emergencies is exercised and tested on an annual schedule that is overseen by FEMA and coordinated with agencies in Massachusetts and New Hampshire.
EMERGENCY PREPAREDNESS AND CROSS TOWN EFFORTS

There are many programs in Vermont to train local officials, road crews, planners and the public in the universal response guidelines that have been established for emergency planning and response by the National Incident Management System (NIMS). NIMS trains emergency responders from different jurisdictions and disciplines to work together effectively and efficiently in response to natural disasters and emergencies, including acts of terrorism. One of the major elements of the Command and Management component of NIMS is the Incident Command System (ICS). ICS is used to organize on-scene operations for, ranging from small to complex incidents, both planned (such as a parade or holiday event), and unexpected, such as the sudden onset of a natural or man-made disaster. ICS is structured to facilitate activities in five major functional areas: Command, Operations, Planning, Logistics and Finance/Administration. ICS is used by all levels of government – federal, state, tribal and local. Vermont’s Department of Emergency Management and Homeland Security provides training in ICS throughout the year. The emergency planner at WRC continually informs town officials, emergency responders and the public of training opportunities. WRC promotes the importance of training all public employees in ICS 100, which is the most basic level.

WRC has historically provided support to the Local Emergency Planning Committee (LEPC 6). The LEPC 6 is a county-wide organization of first responders, Tier II reporting industry, businesses, and various members of all entities of emergency management (RACES, CERT, 211, Schools, Health Department, Hospitals, EMD’s, Homeland Security, Red Cross, town planners). The primary function of the LEPC 6 is to provide education and training, outreach and emergency planning to assist in hazard response for the region. The focus and work of the LEPC 6 will continue to evolve to meet changing needs. The WRC also recently created an Emergency Planning Committee to provide an opportunity for commissioner engagement in the work of the WRC that is supported by funding through the Emergency Planning Grant Program, to develop effective strategies to support emergency planning within towns, and to develop a cadre of commissioners to supplement staff in the event of another large-scale disaster.

Every WRC member town is either in the process of developing a Hazard Mitigation Plan or of having their plan reviewed by FEMA Region 1. Hazard Mitigation Plans are critical in helping towns to identify their vulnerabilities to natural hazards, determine the level of risk and the potential impact of those hazards, and to ultimately develop strategies to mitigate the loss to property or lives which could result from those hazards. The WRC helps member towns understand the significance of natural land processes and how such knowledge should inform their land use decisions, i.e.: where to build, and

where not to build. Workshops with experts in various fields of emergency planning are held occasionally for town officials and interested members of the public. These workshops are a way of bringing officials from the region’s towns together to meet one another, develop cross-town communications networks, and come away with new knowledge about how to plan for and manage emergency events.

Tropical Storm Irene, in August of 2011, taught Vermonters many lessons about emergency preparedness. Towns now know how critical it is to have a consistent and thorough documentation mechanism in place to keep track of all recovery and repair work. Towns also realize the importance of keeping their emergency shelters ready and fully functional in the case of an event that displaces people from their homes. Many towns have taken advantage of the Vermont Red Cross Local Shelter Initiative which offers them permanent supplies of cots, blankets, and pillows, as long as the town recruits a separate pool of volunteers, not including town officials and first responders, who will be trained for emergency shelter operations. In many towns it is a challenge to find volunteers for this task. Towns are also tasked with finding and training people to staff town Emergency Operations Centers (EOC) in the case that an emergency lasts beyond three days. Other practical ways for towns to prepare for natural disaster events are: to develop interoperability of communications between fire, police and town officials; have hydraulic and hydrologic studies for road/culvert/bridge improvements done in advance; and create detailed capital improvement budget plans to implement the mitigation strategies in their Hazard Mitigation Plan.

FIRE

Most towns in the region have local fire-fighting capacity within their boundaries. The towns of Brattleboro and Wilmington and the villages of Bellows Falls and Saxtons River have fire departments which are also divisions of local government. The remaining towns are served by privately incorporated volunteer fire companies and some are partially staffed by paid firefighters. Many of these private fire companies receive a significant amount of their funding from the towns they serve, but they operate successfully because of the dedication of the fire company personnel who volunteer their services and a great deal of their time. Several towns have more than one fire company within their boundaries to better serve different areas. Only Athens, Searsburg, and Somerset do not have local fire companies. Athens is served by the Saxtons River fire department. Searsburg and Somerset are served by the Wilmington Fire Department.

All of the region's fire companies are members of mutual aid systems; associations that allow local fire
companies to receive fire-fighting assistance or back-up service from other member fire companies. There are five mutual aid systems that serve Windham Region towns: Southwest New Hampshire Mutual Aid, Tri-State Mutual Aid, Tri-Mountain Mutual Aid, Deerfield Valley Mutual Aid, and Connecticut River Valley Mutual Aid. Some towns belong to more than one mutual aid system.

Increasingly, the lack of volunteer fire-fighters and rescue personnel threatens to seriously compromise the effectiveness of the region's fire companies and emergency medical squads. As is true for many fire services nationwide, limited discretionary time at work, increased cost, increased training demands, and an aging population of fire service personnel combine to restrict volunteers' availability.

EMERGENCY MEDICAL SERVICES

First response squads respond to calls for emergency medical service by getting to the injured person as soon as possible and stabilizing the person's condition until a licensed emergency medical transport vehicle arrives. Many members of these local rescue squads also volunteer to use their own vehicles and equipment to respond to calls for emergency medical services when contacted by a mutual aid system or other dispatching service. The following towns maintain volunteer first response squads: Brattleboro, Dover, Dummerston, Grafton, Guilford, Halifax, Jamaica, Marlboro, Putney, Rockingham, Vernon, Wardsboro, Westminster, Whitingham, and Winhall.

Five ambulance/rescue squads provide emergency ambulance services between towns and health care facilities. The professional and private State-licensed ambulance services include Deerfield Valley Rescue (Wilmington), Ker-Westerlund Ambulance Service (Brattleboro), Rescue, Inc. (Brattleboro), Golden Cross Ambulance (Rockingham & Westminster), and Londonderry Volunteer Rescue Squad. Other entities outside of the region provide back-up service to these companies through mutual aid agreements. In addition, C&S Wholesale Grocers has a full-time rescue squad for its facility in Brattleboro which will respond to Mutual Aid calls as needed. Stratton Mountain Rescue functions during winter months only.

POLICE

Law enforcement is organized into town and village police departments, the Windham County Sheriff's Department, and the Vermont State Police. The Village of Bellows Falls and the towns of Brattleboro, Dover, Winhall, and Wilmington have municipal police departments. Towns are allowed by Vermont Statute to employ constables (17 V.S.A. § 2651a), although the level of activity and authority of constables varies. Typical duties of a town constable include patrolling at sporting and community events and serving court summonses.

The Windham County Sheriff's Department has contracts with towns for the provision of service. As of this writing, the towns of Athens, Brookline, Dummerston, Grafton, Guilford, Jamaica, Marlboro, Newfane, Putney, Rockingham, Townshend, Westminster, and Windham have contracts with the Windham County Sheriff. This Department also has contracts for police protection with organizations.
other than towns, including schools (Dummerston Elementary, Leland and Gray, and Windham Central Supervisory Union), and Newfane Village. The County Sheriff's Department responds to calls in towns that do not have contracts and which do not have their own police department; however, this service is provided only when staff is available and the Department is not responding to more urgent calls. The County Sheriff's Department also provides backup support to town police departments and the Vermont State Police when requested.

Troop D of the Vermont State Police maintains two stations serving the Windham Region: A station in Chester serves the northern towns of Rockingham, Westminster, Athens, Grafton, Windham, Londonderry, and Winhall. Except for Readsboro and Searsburg, which are served by Troup C of Shaftsbury, all other towns in the Windham Region are served by a station located in Brattleboro. Vermont State Police provide backup assistance to towns that have their own police departments (sometimes through contract) and often provide primary police service to towns which do not have their own police squads and do not contract with the Windham County Sheriff's Office for service. The Vermont State Police has primary responsibility for patrolling Interstate 91.

Law enforcement is a problem for many towns in the region, especially since only five municipalities have police departments. Traffic and speed enforcement continue to be issues that towns are struggling to address. Other concerns include slow response times and drug trafficking, especially along the Interstate 91 corridor.

**ENHANCED 911**

Although local emergency service providers are effective once on site, the rural pattern of development in the Windham Region presents frustrating and potentially life-threatening delays to callers, dispatchers and responders. The Vermont Enhanced 911 (E911) emergency calling system was developed to reduce these delays through a statewide system of street or road addresses linked to telephone numbers and to mapped locations.” Each town regularly updates its street address data and forwards the information to the State E911 board. After those data have been verified and entered at the State level, the WRC receives the updates and in turn makes corresponding changes to its geographic information data base. In addition, the WRC assists towns with questions related to road naming and address systems.

**HEALTH CARE FACILITIES**

**HOSPITALS**

Five hospitals serve most of the region’s general and emergency medical care needs. There is a great diversity among the region’s hospitals in the level of services provided. Brattleboro Memorial Hospital (Brattleboro), Southwestern Vermont Medical Center (Bennington), Rutland Regional Medical Center (Rutland), Springfield Hospital (Springfield), Mount Ascutney Hospital (Ascutney) and the Cheshire
Utilities, Facilities, and Technology

Medical Center/Dartmouth-Hitchcock Keene (Keene, NH), provide most of the region's acute medical care needs. These hospitals have facilities that provide surgery, X-ray, outpatient, laboratory, and physical therapy services. The focus of the Otis Health Care Center (Townshend) is primary and preventive care. The Center contains Grace Cottage Hospital, the smallest acute care hospital in Vermont, a nursing home, an outpatient clinic and a community care home. It also provides outpatient specialties and outreach programs serving the elderly and disabled. The Dartmouth-Hitchcock Medical Center in New Hampshire and hospitals in Massachusetts and New York provide tertiary care\(^{108}\) for the region.

The Mountain Valley Health Center (Londonderry), the Health Center at Bellows Falls, the Deerfield Valley Health Center and Green Mountain Healthcare (Wilmington), along with the region’s many medical offices, serve the day-to-day health care needs in the region. In order to provide immediate emergency health care, the Stratton and Mount Snow resorts provide health care facilities staffed by physicians during the ski season.

The financial condition of the region's hospitals is of primary concern. The level of service that the hospitals can provide is determined to a great extent by the resources available to the hospital to purchase new equipment, upgrade facilities, and attract and retain physicians. Rapidly changing technology in the health services industry requires hospital administrators to decide what new equipment would best serve the region's medical care needs and what is financially viable.

The health industry's shift toward providing greater levels of outpatient services is primarily a response to requirements by third party reimbursers. This has placed new demands on hospitals with facilities that were designed for providing in-patient care. Continued shifts toward outpatient services will require additional capital expenditures for new facilities.

Health care costs continue to rise faster than the rate of inflation. This has placed health care services out of the reach of many people at a time when a greater percentage of the population has no or inadequate medical insurance. With the passing of the Patient Protection and Affordable Care Act some States are opting to provide healthcare insurance programs to individuals meeting the eligibility requirements. Vermont is one of those States, and in October of 2013 Vermont began enrollment in its healthcare program. Information about the program, and its eligibility requirements, is available at the designated website Vermont Health Connect. Every plan offered through Vermont Health Connect must offer basic services. This includes checkups, emergency care, mental health services and prescriptions. The website will serve as a single information hub for public programs and financial assistance, such as federal tax credits and cost-sharing subsidies. Vermont Health Connect is administered by the Department of Vermont Health Access, a part of the Agency of Human Services.

\(^{108}\) Tertiary care is defined as highly specialized medical and surgical care for unusual and complex medical problems.
ELDER CARE

Several home health care agencies coordinate services in the Region. Southern Vermont Home Health Agency serves the southern half of the region, while the Visiting Nurse Alliance of Vermont and New Hampshire serves the northern half. Two others, Brattleboro Area Hospice Care and Bayada Home Healthcare are located in the Brattleboro area. Home health care service providers are Medicare certified by the Vermont Department of Disabilities, Aging and Independent Living.

In 1996, Vermont passed Act 160 which allows the State to create a better balance between institutional care and home and community based services. This legislation required Vermont to earmark saved dollars from reduced Medicaid nursing home utilization and invest those funds in the home and community based system. Prior to Act 160, Vermont spent only 12 percent of its public long-term care dollars on home and community based care leaving 88 percent for nursing facility care. As of 2008, 38 percent of all public long-term care spending goes toward home and community based care, while 62 percent is spent on nursing home care. In 2007, there was an average of 208 residents in nursing facilities in Windham County. That same year, the reported use rates for Windham, Bennington, and Windsor Counties were 36 percent, 60 percent, and 35 percent respectively. Bennington is the only county with an occupancy rate above the State average of 39 percent. Also according to the Vermont Department of Aging and Disabilities,

"Although nursing homes contribute significantly to the state’s long-term care system, they house only 3.3 percent of Vermonters age 65 and older and 12.5 percent of those age 85 and older. Individuals 85 years old and older have shown a precipitous drop in their use of nursing homes over the last 14 years."

State policy resulted in a shift from institutional care to home-based care for the elderly and disabled populations and as a result, the region experienced a decrease in the overall number of nursing home beds with the downsizing of Eden Park in Brattleboro and the closure of Stratton House in Townshend and McGirr’s in Bellows Falls. The new Valley Cares facility in Townshend provides both independent living and assisted living facilities, and is now expanding its capacity. As the population continues to age,

109 A ‘Use Rate’ is the percentage of Vermont residents 18 years or over with a disability who are served by a nursing facility.


there may be a growing need for nursing home care and a demand for these facilities that are convenient to resident’s family and homes.

MENTAL HEALTH

Mental health services are provided by Health Care and Rehabilitation Services of Southeastern Vermont and the Brattleboro Retreat. The Brattleboro Retreat is one of this country’s oldest and largest independent mental health organizations, and provides a full range of psychiatric in-patient care and a variety of out-patient services. Health Care and Rehabilitation Services of Southeastern Vermont has extensive outpatient programs in a number of towns in the region.

HUMAN SERVICES

Helping people meet their needs is essential to the social and economic well-being of the region. There are a variety of reasons why residents may need help; poverty, illness, language and cultural barriers, lack of education, physical and/or mental disability, and isolation are just a few of those reasons. Supporting approaches that prevent problems from developing and that meet the needs of residents in the region is critical.

Among the challenges to the region’s human service agencies are an aging population and poverty. As shown in Windham Region Profile Insert, the percentage of the population age 65 and older continues to increase. Also noted in the Profile, some towns in the Windham Region are experiencing wide economic disparity with a growing number of individuals living in poverty. In Windham County in 2011, an estimated 21.8 percent of the families with a female head of household and no husband present earned incomes below the poverty level for the previous 12 months. Of those, 30.1 percent had related children under the age of 18, and 48.2 percent had related children under the age of 5 in the household. This is a significantly higher rate of poverty than the overall 6.2 percent of total families that earned incomes below poverty level in 2011.112

Over 100 organizations and agencies provide a variety of programs to meet the region's human service needs including social services and nutrition programs for elders, energy assistance for low-income households, employment referral services, emergency food and shelter programs, and a range of programs for children. As in many rural areas, access to services can be a challenge for households that do not have a car or who cannot afford much gasoline. Access not only includes being able to physically reach the service but also includes outreach and technology that make people aware of the services. In 2005, the Vermont 2-1-1 caller hotline was launched so that Vermonters could have easy access to

specialized health and human service referral information. Several other telephone hotlines also provide immediate information and support.

**COMMUNICATIONS INFRASTRUCTURE**

Communications link the region’s residents with each other and with the rest of the world. Increasingly, the region’s educational and business organizations require efficient access to modern communications. This section addresses communications infrastructure, specifically internet and telephone and cellular communications. Media Resources, such as television, viderconferencing, radio, news organizations, and local websites are located in Educational, Cultural, and Recreational Resources Chapter. Development and maintenance of modern communications systems is vital to promote stronger connectivity within the region and provide quick and efficient connections with the rest of the country and world.

**INTERNET**

Internet services are vital for education, for business communications and marketing, as well as for modern lifestyles. Through the ConnectVT initiative, broadband deployment has increased in Vermont. The goal of this project is to provide broadband service to 100 percent of the homes and businesses in the state, where such service is available from at least one non-satellite provider at a speed of 768/200 kbps. This includes internet service delivered over DSL, coaxial cable, fiber optic lines, from a wireless internet service provider or from mobile wireless (cellular) providers. This initiative is the result of collaboration between private telecommunications providers and the Vermont Telecommunications Authority. Figure 8-4 displays the 2012 status of broadband deployment within the Windham Region.

Broadband (high speed) internet is now more readily available in several parts of the region, including the densely settled areas in the Connecticut River Valley, the resort areas, and along the northern border of the region; however, there continue to be large swaths of under-served areas running through the towns of Townshend, Wardsboro, Dover, Marlboro, and Halifax where no high speed service is available. The lack of high speed internet access availability in these towns is a concern to both residents and business owners. Many rural communities have been viewed by broadband providers as too sparsely populated to warrant investment, and, as a result, have little or no broadband service.

There are funded solutions in place designed to bring broadband to un-served addresses. The Vermont Rural Broadband Project assists rural communities in efforts to obtain or expand affordable broadband services by helping the community groups in documenting local broadband demand, building a business case, and locating potential service providers. Additionally, The Federal Government made broadband mapping and expansion a priority through the American Recovery and Reinvestment Act (ARRA). ARRA funding, $177 million dollars has been awarded to VTel Wireless called the Wireless Open World to

113 See Broadbandvt.org Interactive Map for current status of projects.
expand access. In addition, a mission of the Vermont Telecommunications Authority is to fill in the gaps where existing federally mandated or private expansion is not in place. The VTA has funded projects in Windham County towns of Brattleboro, Dummerston, Newfane, Putney, and Wilmington.

FIGURE 8-4: STATUS OF WINDHAM REGION BROADBAND DEPLOYMENT, ACCESSED JUNE 2012

For additional maps that show deployment by type of service please visit: http://www.broadbandvt.org/map/index.php?option=interactive&theme=BroadbandServiceStatus

In areas without high-speed internet, most users must rely on dial-up connections over telephone wires in order to access the internet. In areas where cell phone service is available, people can access the internet through mobile devices. Wireless internet is a growing technology that provides an alternative to digital subscriber line (DSL) and cable connections for high-speed connection. This technology has become the preferred method of reaching areas where it is not feasible to provide hard line high-speed internet service. As this method is deployed, the region will have to weigh the same issues faced with in cell tower deployment against the need for high-speed internet service expansion. In very remote
portions of the region, residents can access the internet through satellite services; however such service can be degraded by heavy weather or by usage that stresses system capacity.
VERMONT BROADBAND INITIATIVE

In January 2011, Governor Peter Shumlin launched an initiative to achieve statewide connectivity called ConnectVT. The Department of Public Service released a report outlining a roadmap to Vermont’s enhanced telecommunications future comprised of two fundamental elements: the desired outcomes and strategies necessary to achieve these outcomes.

The Vermont Telecommunications Plan 2011: Broadband outlines these elements as follows:

OUTCOMES

- Universal availability of mass-market broadband
- Universal availability of mobile service along roadways and near universal availability statewide
- Universal first responder communications
- Fiber broadband connectivity to all anchor institutions and large businesses
- Universal adoption and use of broadband at home and work
- Speeds and pricing for residential broadband on par with national urban areas
- All customer locations support smart electric meters

STRATEGIES

- Leverage electric utility telecommunications infrastructure planned to lower cost of backhaul and increase geographic availability of broadband
- Aggregate institutional demand and organize connections to institutions, broadband providers and cell sites
- Subsidize construction of key telecom infrastructure if it is not economically available from existing providers
- Continue expeditious permitting policies to improve affordability and availability of broadband deployment
- Accelerate adoption through digital literacy programs and expansion of electronic delivery of services

Source: Department of Public Service, Vermont Telecommunications Plan 2011: Broadband
The Vermont Telecommunications Authority (VTA), in partnership with Sovernet Communications, received funding for a 773-mile fiber-optic middle-mile network statewide called Vermont FiberConnect. Funded in large part by the National Telecommunications and Information Administration’s Broadband Technology Opportunities Program (BTOP), the federal stimulus program funds “middle-mile” fiber networks, which provide services for wholesale data transport to other service providers. Vermont FiberConnect will not bring last-mile fiber to private homes and businesses, but does connect “community anchor institutions” such as schools, libraries, municipal offices, healthcare facilities, and public safety communication networks. In Windham County it will serve community anchor institutions in Brattleboro, Brookline, Dover, Dummerston, Guilford, Halifax, Jamaica, Londonderry, Marlboro, Newfane, Putney, Rockingham, Somerset, Stratton, Townshend, Vernon, Wardsboro, Westminster, Whitingham, Wilmington, and Windham. As of early 2014, the project was nearly complete.

TELEPHONE AND CELLULAR COMMUNICATIONS

Telephone and cellular communications are a rapidly changing sector of the world economy, and new service providers are entering the market frequently. Digital switches serve the entire region, allowing providers to offer custom calling and call management features. Additionally, as cellular service becomes more popular, individuals are increasingly forgoing a landline and switching to cell as their primary method of communication.

Fairpoint Communications provides telephone service to most of the Windham Region, except Athens, Grafton, and portions of Rockingham, Westminster, and Windham, which are served by VTel. Through an ARRA grant, VTel is building fiber-to-the-premise (FTTP) service to all locations in their service territory, which will enable delivery of phone, internet, and television services.

Cellular phone service coverage varies widely in the region because some areas remain difficult and less practical to serve. The expansion of telecommunication facilities raises issues that include regulatory policies, health concerns, environmental quality, aesthetics, and historic resource protection. A concern for the WRC and for member towns is the impact that cellular towers and related facilities may have on a rural landscape and villages. Federal law regulates the placement of telecommunication facilities in a given community; however, emphasis has been placed on balancing the need for telecommunications infrastructure with a community’s desire to maintain community character. The Telecommunications Act of 1996 preserved state and local regulatory authority for the placement, construction or modification of wireless facilities. However, local zoning and other land-use regulations may not prohibit wireless services within the community or address the potential effects of non-ionizing electromagnetic radiation or unreasonably discriminate among providers of functionally equivalent services (Telecommunications Act of 1996, 47 U.S.C. § 332(c)(7)). In response to this, a majority of the towns in the region adopted telecommunications regulations either as part of zoning bylaws or as stand-alone ordinances. Additionally, the WRC has consistently supported the installation of tapered “monopine” cell towers in place of typical monopole designs in locations were the monopine design is more aesthetically fitting.
Utilities, Facilities, and Technology

The telecommunications industry frequently upgrades its services and deploys new technology. These emerging services may require new infrastructure, although not all will be conventional tower-mounted facilities. As the number of subscribers increases, pressure grows for expanding networks and capacity requirements in Vermont. The demand trend is not only for expansion of mobile voice services, but increasingly at a far higher rate for mobile broadband internet access. To increase capacity to meet the growing demand for wireless broadband access by smartphones and tablets, service providers are likely to increase the number of transmission sites they already have.

**ENERGY AND COMMUNITY RESOURCES**

Instituting energy-conservation measures on a community-wide scale can help local governments and citizens manage energy costs. Community energy programs can be designed to meet specific goals. In the Windham Region, Brattleboro is currently working with the Cities for Climate Protection to reduce energy consumption. Decisions made at both the regional and municipal level, such as providing multi-modal public transportation options, reducing street lighting and converting street lights to LED fixtures, making energy-efficient upgrades to buildings, and reducing the solid waste stream through recycling and composting can have a positive impact on the environment and provide financial savings to communities.

Note: Transportation is addressed in the Windham Regional Transportation Plan which contains the Transportation Synopsis & Policies. These two documents are addenda to this plan and the information and policies contained therein have the same standing as all other elements of the Windham Regional Plan, but are provided as separate documents.
Appendix

APPENDIX A: GEOGRAPHIC INFORMATION SYSTEM DATA SOURCES

1. Town boundaries are from the VGIS coverage TBHASH. This data set was developed from the best available town boundary sources. These sources include town parcel maps and USGS topographic maps.

2. Surface waters (rivers, streams, lakes, and ponds) data were derived from 1:100,000 US Geological Survey Digital Line Graph data. These source data were edited and annotated by Windham Regional Commission.

3. Roads data are from the VGIS coverage RDSnnnnn. These data originate at the Vermont Agency of Transportation (VTrans) and are based on data digitized from 1:5000 digital orthophotos.

4. Soils data were derived from the VGIS coverage SOAG, and is based on digitized county soil survey data. The SOAG data layer was developed by extracting those polygons with an Important Farmland Soil rating of Prime or Statewide.

5. Sand and gravel resources are from the VGIS data layer AGGRES. This data layer was derived from the series “Geology for Environmental Planning,” published by the Vermont Geological Survey.

6. Surface water source protection area data are from the VGIS data layer SURFACEWATER, developed by Vermont Agency of Natural Resources, Water Supply Division. These data are current to 2009.

7. Groundwater source protection area data are from the VGIS data layer GROUNDWATER, developed by Vermont Agency of Natural Resources, Water Supply Division. These data are current to 2011.

8. Public water supply source locations are from data developed by Vermont Agency of Natural Resources, Water Supply Division and generally based on locations determined using GPS technology, with a few locations from delineations on 1:24000-scale topographic maps. These data are current to 2005.

9. Electric transmission line locations are from the VGIS data layer ELTRN. These data were digitized from 1:5000 orthophotos.

10. Electric generation facility locations are from GIS data provided by Vermont Electric Power Company (VELCO). These data were updated by Windham Regional Commission in 2014.

11. Electric utility franchise area boundaries were developed by Windham Regional Commission, using information provided by the Village of Jacksonville Electric Department.
12. Data on transfer stations were developed by Windham Regional Commission. Locations were determined using 1:5000 VGIS base data.

13. Data on closed landfills were developed by Windham Regional Commission. Locations were determined using 1:5000 VGIS base data.

14. Data on municipal water and sewer service were developed by Windham Regional Commission. Symbols on the map are meant to identify the presence municipal water and sewer service in the area, but the symbols do not specifically locate the service areas.

15. Dam locations are from the VGIS data layer VDI, produced in 2009 by the Vermont Agency of Natural Resources. The data are based on the Vt. Dams Inventory. ANR states that “this data is not a digital representation of all dams in Vermont.”

16. Impaired waters are those that are listed in the State of Vermont Year 2012 List of Waters in the 303(d) list, or in Parts B or D. Data on this map are from the VGIS data layers WATER_PARTA303D_LINE, WATER_PARTSB-G_LINE, and WATER_PARTSB-G_POLY.

17. Structure locations are extracted from the VGIS data layer ESITE. These data originate with the Vermont Enhanced 911 Board. Locations were captured using GPS from information provided to the Board by individual town E911 coordinators. Data are current to 2013. Windham Regional Commission attempted to extract all primary residential, commercial, industrial, and public buildings to display on this map.

18. Base data for this land cover map are taken from the Windham Regional Commission’s GIS data layer REGION\LANDCOV, created in 1999. This data layer is a composite of existing data layer and newly created data. Data on wetlands are from US Fish and Wildlife Service's National Wetlands Inventory (NWI) maps. These maps show approximate locations of wetlands that are generally 3 acres or larger in size. Data on open lands have their origin in the VGIS data layer LCLU. This coverage was produced by Mount Holyoke College using Landsat Thematic Mapper satellite data. Additional spatial operations were performed by WRC to refine these data. Locations of urban/built-up lands depict those areas where structure density is generally greater than one structure every two acres, or those areas covered by public highways or railroads. Structure locations were derived from 1:5000 orthophotos but have not been verified. This delineation is intended to show areas of denser development on a regional scale only. Roads and railroads were digitized from 1989 1:5000 orthophotos.

19. The public and independent schools and colleges shown on this map are those that are listed with the State of Vermont, Department of Education. The facilities were located by the Windham Regional Commission using the VGIS data layer.

20. The libraries shown on this map are those listed with the State of Vermont Department of Libraries. The facilities were located by the Windham Regional Commission the VGIS data layer ESITE.
21. Public and private conservation lands data were obtained from the Vermont Conserved Lands Database developed by UVM Spatial Analysis Laboratory. Data are current to 2013.

22. Waste management zones were mapped by Windham Regional Commission by using information provided by Agency of Natural Resources in 2001, updated by WRC in 2006, and are current to 2014. A waste management zone in the Connecticut River from the Charlestown, N.H. waste water treatment plant is included.


24. Special Flood Hazard Areas for Bennington County are from FEMA (Federal Emergency Management Agency) Preliminary D-FIRM (Digital Flood Insurance Rate Map) data dated December 15, 2011. These data are tentatively expected to be effective March 2015.

25. Areas dominated by wetlands were delineated by Windham Regional Commission. These are areas generally greater than 25 acres that are predominantly wetland. This data layer was produced by processing National Wetlands Inventory GIS data using Spatial Analyst software, and is intended only to show a regional depiction of large wetland complexes.

26. Watersheds of Class A Waters are from the VGIS data layer CLASSA, developed by VT Agency of Natural Resources, and released in 2008. Class A waters are listed in the Vermont Water Quality Standards, effective December 30, 2011, and this data set is current to that date.

27. Boundaries for lands over 2500 feet in elevation are from the VGIS data layer CON2500. These data were digitized by Vermont Agency of Natural Resources from 1:24000-scale USGS topographic maps.

28. Locations of rare, threatened, and endangered species and significant natural communities are from the VGIS data layer RTENATCOME. These data were derived from VT Agency of Natural Resources, Department of Fish and Wildlife, Nongame and Natural Heritage Program’s Rare, Threatened and Endangered Species and Significant Natural Communities database. The GIS data are current to 2013. The locations of occurrences are displayed as points on this map, whereas in the data they are represented as polygons; the actual area represented by the species or community may be a few square feet or many hundreds of acres. For further information, contact the Nongame and Natural Heritage Program.

29. Deer wintering areas are taken from the VGIS data layer DEERWN. They were delineated by VT ANR, Department of Fish and Wildlife, and have been updated to a limited extent through 2010.

30. Bear habitat and corridor data are from GIS data provided the University of Vermont’s Spatial Analysis Laboratory. This data layer was developed from Vermont Agency of Natural Resources, Department of Fish and Wildlife habitat boundary maps, which are based on photocopies of 1:63,360-scale General Highway Maps. The corridor locations are approximate.
31. The two regionally significant bear travel corridors were identified by Vermont Agency of Natural Resources personnel on topographic maps and then digitized by Windham Regional Commission in December of 1992 and updated in October 2000. Black bear travel corridors, according to Forrest Hammond, biologist with the Vermont Department of Fish and Wildlife, are forested habitats that are regionally important and are used by large numbers of bears to access critical seasonal foods or to link bear ranges and sub-populations. Travel corridors are comprised of bear travel routes and may include one or more road crossing areas.

32. Data on villages with pedestrian facilities was developed by Windham Regional Commission.

33. Data on public transit stations were developed by Windham Regional Commission from digitized 1:1250-scale Vermont Base Maps using information from the public transit providers.

34. Data on local and intercity bus routes were developed by Windham Regional Commission using information provided by the bus route operators.

35. Data on proposed transportation system improvements were developed by Windham Regional Commission.

36. Slope categories and shaded relief data were developed by Windham Regional Commission using 1:24000-scale USGS Digital Elevation Models. Data processing was performed using ESRI’s Spatial Analyst software.

37. Watershed boundaries are based on data in the VGIS data layer WATSHED, derived from 1:24,000-scale USGS maps of Natural Resources Conservation Service hydrologic unit boundaries. The data were edited by Windham Regional Commission and attributed to match the watershed delineations and coding schemes of Vermont Agency of Natural Resource’s river basins and surface waterbodies.

38. Data on proposed land use districts were developed by Windham Regional Commission in 2014.

39. Locations of governmental services are tied to the building in which these services originate. Data were developed by Windham Regional Commission for the Windham Regional Plan and for state-wide Critical Facilities/Vermont Infrastructure Database mapping. Locations are taken from the VGIS data layer ESITE. These data originate with the Vermont Enhanced 911 Board. Locations were captured using GPS from information provided to the Board by individual town E911 coordinators.

40. The child care centers shown on this map are those listed with Windham Child Care Association and the Vermont Department for Children and Families, Child Development Division.

41. The facilities for the care of the aged and disabled shown on this map are those nursing or residential care facilities listed with the Vermont Department of Disabilities, Aging and Independent Living.
42. Health care facilities include general hospitals, mental health hospitals, and certified rural health clinics listed with the Vermont Department of Health.

43. Information on adult day centers, teen centers, and senior centers was gathered by Windham Regional Commission from a variety of sources including community outreach.

44. The historic districts shown on this map are those listed on the state or national register of historic places. The general location of these districts was determined by the Windham Regional Commission using 1:5000 VGIS base data.

45. Surface waters (rivers, streams, lakes, and ponds) data were derived from the cartographic version of the Vermont Hydrography Dataset, 1:5,000-scale data managed by the Vermont Center for Geographic Information. Major surface waters were identified by Windham Regional Commission.

46. The designation of villages, hamlets, regional centers, and resort centers were done as part of the Windham Regional Plan by Windham Regional Commission in 2014 (“villages” for this map are a WRC designation, and not that the village is an incorporated village).
APPENDIX B: REFERENCES

INTRODUCTION


WINDHAM REGION PROFILE


ENERGY


Appendix


REGIONAL ECONOMY


**NATURAL RESOURCES**


Vermont Sustainable Jobs Fund. *Farm to Plate Strategic Plan*. 2009. [http://www.vsjf.org/assets/files/Agriculture/Strat_Plan/3.2_Farm%20Inputs_Soil_2_V2.pdf](http://www.vsjf.org/assets/files/Agriculture/Strat_Plan/3.2_Farm%20Inputs_Soil_2_V2.pdf)

**HOUSING**


Appendix


**EDUCATIONAL, CULTURAL AND RECREATIONAL RESOURCES**


**UTILITIES, FACILITIES, AND TECHNOLOGY**


Appendix

APPENDIX C: GLOSSARY

Acceptable Agricultural Practices: Farmland management practices set forth by the Vermont Agency of Agriculture, Food and Markets that all farm operators must follow as part of their normal operations to reduce pollutants associated with agricultural operations such as sediments, nutrients and agricultural chemicals.

Act 250: Commonly used reference to Title 10 Chapter 151 of the Vermont Statutes, “State Land Use and Development Plans”. The environmental review process conducted by the Vermont District Environmental Commissions to determine whether certain types of proposed developments will cause undue adverse impact on a site and its vicinity on the basis of 10 criteria.

Affordable Housing: (A) Housing that is owned by its inhabitants whose gross annual household income does not exceed 80 percent of the county median income, or 80 percent of the standard metropolitan statistical area income if the municipality is located in such an area, as defined by the United States Department of Housing and Urban Development, and the total annual cost of the housing, including principal, interest, taxes, insurance, and condominium association fees is not more than 30 percent of the household's gross annual income. OR (B) Housing that is rented by its inhabitants whose gross annual household income does not exceed 80 percent of the county median income, or 80 percent of the standard metropolitan statistical area income if the municipality is located in such an area, as defined by the United States Department of Housing and Urban Development, and the total annual cost of the housing, including rent, utilities, and condominium association fees, is not more than 30 percent of the household's gross annual income. (24 V.S.A. § 4303)

Approved Town Plan: A town plan which in the judgment of the regional planning commission is 1) consistent with goals established in 24 V.S.A. § 4302; 2) compatible with the regional plan; 3) compatible with approved plans of other municipalities in the region; and 4) contains all the elements included in 24 V.S.A. § 4382.

Aquifer: A water bearing stratum of permeable rock, sand, gravel, or other alluvial soils. (10 V.S.A. § 1391)

Best Management Practices: Site specific on-farm remedies implemented either voluntarily or as required in order to address water quality problems and in order to achieve compliance with Vermont water quality standards.

Brownfield: Real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant.

Capital Budget: A list and description of capital projects (any physical betterment or improvement including furnishings, machinery, apparatus or equipment for such physical betterment or improvement, any preliminary studies and surveys relating to any physical betterment or improvement, land or rights
in land, or any combination of these) to be undertaken during the coming fiscal year, the estimated cost of those projects, and the proposed method of financing.

**Capital Program:** A plan of capital projects (any physical betterment or improvement including furnishings, machinery, apparatus or equipment for such physical betterment or improvement, any preliminary studies and surveys relating to any physical betterment or improvement, land or rights in land, or any combination of these) proposed to be undertaken during each of the following five years, the estimated cost of those projects, and the proposed method of financing.

**Cluster Development:** Site planning that provides for locating residential or commercial units on the most appropriate portions of a site in return for permanent protection of open space and resource lands on the balance of the site.

**Co-Generation:** The use of a power station to simultaneously generate both heat and electricity, allowing a more total use of energy than conventional generation. This means that less fuel needs to be consumed to produce the same amount of energy. Also called combined heat and power (CHP).

**Combined Heat and Power:** See Co-generation.

**Compatibility between Plans:** A judgment made whereby the plan in question, whether a town plan, regional plan, or state agency plan, as implemented, will not significantly reduce the desired effect of the implementation of the plan to which it is compared.

**Conservation Easement:** A recorded land use agreement in which the property owner conveys to a governmental unit or charitable organization certain rights to be enforced by the holder for public benefit.

**Conservation Subdivision/Development:** An approach to laying out subdivisions/developments to maintain valuable natural resource land in permanent protection while allowing for denser development in the most appropriate areas of the land tract. This is accomplished through allowing the total number of units to be built on the site, as per town ordinances and zoning regulations, but permitting smaller lot sizes and setbacks so as to “cluster” the developments to protect environmentally sensitive areas from encroachment. This allows for protection of the area's natural environmental features in perpetuity, including preserving open space landscape and vista, protecting farmland or natural habitats for wildlife, and maintaining the character of rural communities. When accomplished successfully, this type of development also creates interconnected networks of conservation lands that can span across parcels and land ownership.

**Consistent with Goals:** The substantial progress on the part of a town, region or state agency toward attainment of the goals established in 24 V.S.A. § 4302. The statutory requirement of “substantial progress” is noted in § 4302(f).
**Appendix**

**Cumulative Impacts:** Effects that may occur as the combined result of developments that, although proposed through separate applications, are associated by ownership, geography, timing, or issue.

**Current Use:** see Use Value Appraisal Program

**Density:** The amount of development permitted on a given parcel of land. It is typically measured in dwelling units per acre.

**Development:** The division of a parcel into two or more parcels; the construction, reconstruction, conversion, structural alteration, relocation, or enlargement of any building or other structure; any mining, excavation, or landfill; and any change in the use of any building or other structure, or land, or extension of use of land.

**District Environmental Commission:** One of nine commissions in Vermont that review applications for Act 250 permits. (see 10 V.S.A. § 6001)

**Energy Conservation:** Reducing energy use. This applies to measures, including changes in personal habits (e.g., turning off lights, driving less) that reduce the amount of energy consumed.

**Energy Efficiency:** Using less energy to perform the same functions and tasks. This applies to measures, such as the use of new technologies (e.g., LED lights, more energy efficient appliances) that use energy more efficiently and reduce waste.

**Fluvial Erosion Hazard (FEH):** Major streambed and stream bank erosion associated with the often catastrophic physical adjustment of stream channel dimensions (width and depth) and location that can occur during flooding. Fluvial erosion becomes a hazard when the stream channel that is undergoing adjustment, due to its instability, threatens public infrastructure, houses, businesses, and other private investments.

**Fragmentation:** The division of habitats that formerly occupied large, continuous areas into smaller areas by roads, fields, housing developments, and other human activities.

**Geographic Information System (GIS):** A computer system capable of capturing, storing, analyzing, and displaying geographically referenced information.

**Growth Center:** Title 24 V.S.A. § 2701(12) (A): An area of land that contains substantially the characteristics specified by a subdivision and that is located in: (i) a designated downtown, village center, or new town center and/or (ii) an area of land that is in or adjacent to a designated downtown, village center, or new town center, with clearly defined boundaries that have been approved by one or more municipalities in their municipal plans to accommodate a majority of growth anticipated by the municipality or municipalities over a 20-year period.
Growth Management: Practices used to minimize the negative effects of rapid development by controlling the timing, location, amount, and density of new commercial buildings, residences, and roads.

Household: For US Census purposes, includes all the people who occupy a housing unit as their usual place of residence.

Housing Affordability: Refers to the ability of all residents within a community to find housing that matches their level of income. Traditionally, housing is considered affordable when a household spends no more than 30 percent of its gross income on housing.

Impact Fee: A fee levied as a condition of issuance of a zoning or subdivision permit which will be used to cover any portion of the costs of an existing or planned capital project that will benefit or is attributable to the users of the development or to compensate the municipality for any expenses it incurs as a result of construction. The fee may be levied for recoupment of costs for previously expended capital outlay for a capital project that will benefit the users of the development. (24 V.S.A. § 5201)

Income: For U.S. Census purposes, the sum of the amounts reported separately for wages, salary, commissions, bonuses, or tips; self-employment income from own nonfarm or farm businesses, including proprietorships and partnerships; interest, dividends, net rental income, royalty income, or income from estates and trusts; Social Security or Railroad Retirement income; Supplemental Security Income (SSI); any public assistance or welfare payments from the state or local welfare office; retirement, survivor, or disability pensions; and any other sources of income received regularly such as Veterans' (VA) payments, unemployment compensation, child support, or alimony.

Intermodal: The connections between modes of transportation (such as automobile, transit, bicycling, and walking).

Land Trust: A private non-profit organization that acquires and holds land and easements for conservation and/or affordable housing purposes. A land trust may also transfer land rights to public agencies or sell land that has restrictions placed on it.

Level of Service: A qualitative measure describing operational conditions within a traffic stream, generally described in terms of factors such as speed and travel time, delay, freedom to maneuver, traffic interruptions, comfort and convenience, and safety.

Mobile Home: A structure or type of manufactured home that is built on a permanent chassis and is designed to be used as a dwelling with or without a permanent foundation, includes plumbing, heating, cooling, and electrical systems, and is: (A) transportable in one or more sections; and (B) at least eight feet wide or 40 feet long or when erected has at least 320 square feet or if the structure was constructed prior to June 15, 1976, at least eight feet wide or 32 feet long; or (C) any structure that
meets all the requirements of this subdivision except for size and for which the manufacturer voluntarily files a certification required by the US Department of Housing and Urban Development and complies with the standards established under Title 42 of the US Code. (10 V.S.A. § 6201)

**Modular (or Prefabricated) Housing:** A dwelling unit constructed on-site and composed of components substantially assembled in a manufacturing plant and transported to the building site for final assembly on a permanent foundation.

**Multimodal:** The availability of transportation options (such as automobile, transit, bicycling, and walking) at a location or within a system or corridor.

**Net Metering:** Measuring the difference between the electricity supplied to a customer and the electricity fed back by a net metering system during the customer's billing period.

**Net-Metered System:** An onsite generating system for local use that is connected to the power grid. The state defines this more specifically as a facility for the generation of electricity that is of no more than 500 kW capacity; operates parallel with facilities of the electric distribution system; is intended primarily to offset the customer's own electricity requirements; is located on the customer's premises or, for group net-metered systems, on the premises of a member of the group; employs a renewable energy source or is a qualified micro-combined heat and power system of 20 kW or less, that meets state definitions and may use any fuel source that meets air quality standards (30 V.S.A. § 219a). Net metered systems include most smaller, renewable energy systems, and represent a form of decentralized or "distributed" energy generation.

**New Town Center:** An emerging community center that is planned for, or developing as, the 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. (24 V.S.A. § 2791(11))

**Open Space:** Any public or private land that is undeveloped or predominantly undeveloped including but not limited to fields, forests, undeveloped shorelands and water bodies.

**Paratransit:** Passenger transportation, generally door-to-door service from any origin to any destination in a service area, for those who are unable to use bus service due to disability.

**Per Capita Income:** The mean income generated for every person in a census designated place, derived by dividing the total income generated in that place by its total population.

**Personal Communications Services (PCS):** Digital wireless telephone technology using higher frequency spectrum than cellular.
Photovoltaic: The generation of direct current voltage by a material that is exposed to light in the visible and invisible ranges, usually sunlight.

Primary Agricultural Soils: Soil map units with the best combination of physical and chemical characteristics that have a potential for growing food, feed, and forage crops, have sufficient moisture and drainage, have plant nutrients or responsiveness to fertilizers, have few limitations for cultivation or limitations which may be easily overcome, and have an average slope that does not exceed 15 percent. Present uses may be cropland, pasture, regenerating forests, forestland, or other agricultural or silvicultural uses. However, the soils must be of a size and location, relative to adjoining land uses, so that those soils will be capable, following removal of any identified limitations, of supporting or contributing to an economic or commercial agricultural operation. Unless contradicted by the qualifications stated in this subdivision, primary agricultural soils shall include important farmland soils map units with a rating of prime, statewide, or local importance as defined by the Natural Resources Conservation Service (NRCS) of the United States Department of Agriculture (USDA). (10 V.S.A. § 6001)

Projects of Regional Importance: Those projects that require the use of regional resources, services or facilities and/or because of their size, location, or type will:
- benefit the region as a whole;
- be necessary to the well being of the region;
- be responsible for negative impacts to regional resources, service or facilities;
- affect more than one town; and/or
- have cumulative regional impacts as the result of multiple projects or ongoing development.

Projects of Regional Plan Conformity: Developments of regional importance, both public and private including:
- those that are located outside the region but affect it in some manner; and/or
- those that continue to cause ongoing concern to the region or its communities.

Regional Road or Route: Roadways that function as arterial routes (routes that provide thru-travel between towns or through the region) and major collectors (roads that provide essential or immediate access to arterials). Arterial roadways are Interstate 91, most numbered US and VT highways, and Class I town highways, which form an extension of a state highway and which carry a state highway number. Major collectors include some numbered state and US highways and all Class 2 town highways, which are designated by the towns as the most important highways and which usually form major transportation links from town to town or to other special places.

Renewable Energy: (1) Energy available for collection or conversion from direct sunlight, wind, running water, organically derived fuels, including wood and agricultural resources, waste heat, and geothermal sources (24 V.S.A. § 4302). (2) Under the state's renewable energy programs, "renewable energy" means energy produced using a technology that relies on a resource that is being consumed at a harvest rate at or below its natural regeneration rate (30 V.S.A. § 8002).
Riparian: Of, pertaining to, or situated on, the edge of the bank of a stream, river or other body of water.

Riparian Vegetation: A strip of land with plant ground cover bordering surface water, whether still or flowing, that acts as a protective strip between the body of water and any adjacent land that has undergone human transformation and that, at optimum, contributes to the well-being of the biota both in and adjacent to the body of water.

River Corridor Planning Tools: A set of strategic actions or combinations of actions to support river corridor conservation that are compatible with restoring equilibrium conditions at the reach and watershed scales; along with programs and incentives necessary to engage and work with affected landowners and communities. Strategies may include perpetual easements of the river corridor, riparian vegetation management, and active or passive streambank management projects.

Scenic Corridor: The area adjacent to a road that traverses landscapes of high quality or provides access to significant scenic views.

Seasonal Housing: Any housing units including cottages, apartments, single family homes, multi-family homes, and mobile homes that are not principal residences.

Section 248: The Vermont law (30 V.S.A. § 248) that governs how the Public Service Board regulates certain utility facilities and activities.

Silviculture: Manipulation of the forest ecosystem to achieve specific goals and objectives.

Stream Geomorphic Assessments (SGA): Stream geomorphic assessments are the collection of scientifically sound watershed-wide data from maps, aerial photographs, existing studies, and field data on the geographic, geologic, and hydrologic factors of the stream channel and floodplain characteristics, that reveals equilibrium departures, ongoing channel adjustments, and detailed characterization of riparian and in-stream habitat, stream-related erosion, and flood hazards for use in watershed planning.

Strip Development: A linear pattern of commercial, residential, or mixed-use development along a roadway.

Source Protection Area: The surface or subsurface area from or through which contaminants are reasonably likely to reach a public water source, including both surface and ground water supplies.

Telecommunications Facility: All equipment (including repeaters) and locations of equipment with which a telecommunications provider transmits and receives the waves which carry their services. This facility may be sited on one or more towers or structure(s) owned and permitted by the provider or another owner or entity.
Traffic Calming: Any of a variety of measures that are intended to reduce the negative effects of motor vehicle use—primarily speed—alter driver behavior and improve conditions for non-motorized street users. Traffic calming measures can include roadway alterations and streetscape design.

Use Value Appraisal (UVA) Program: A Vermont program which taxes qualifying farm and forest property according to its use value. This program enables landowners who practice long-term agricultural and/or forest management to have their enrolled land appraised for property taxes based on its value for forestry, rather than its fair market (development) value. When land is enrolled in the UVA program, the State attaches a permanent lien to the deed. Productive forestland appraised under this program receives this assessment as long as it is actively managed, unless the landowner decides to withdraw the land from the program, the legislature ends the program, or the parcel is discontinued by the Division of Property Valuation & Review. Also called “Current Use” or “Land Use”.

Vernal Pool: Small, shallow ponds resulting from the persistence of standing water for a portion of the year that are characterized by a lack of vegetation (though they may support some herbaceous wetland species), typically well shaded, and that act as important breeding habitat for amphibians and invertebrate animals.

Village Center Designation: A Vermont program that recognizes and encourages local efforts to revitalize Vermont’s traditional village centers. There are 15 Village Center Designations in the Windham Region.

Watershed: An area of land that drains water, sediment, and dissolved material to a common outlet at some point along a stream channel.

Wetland: Areas that are inundated by surface or ground water with a frequency sufficient to support plants and animals that depend on saturated or seasonally saturated soil conditions for growth and reproduction. These include areas commonly known as ponds, bogs, fens, marshes, wet meadows, shrub swamps, and wooded swamps.
## APPENDIX D: ACRONYMS

The following are frequently used acronyms in the Windham Regional Plan:

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACS</td>
<td>American Community Survey</td>
</tr>
<tr>
<td>ANR</td>
<td>Vermont Agency of Natural Resources</td>
</tr>
<tr>
<td>BDCC</td>
<td>Brattleboro Development Credit Corporation</td>
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<tr>
<td>CBES</td>
<td>Commercial Building Energy Standards</td>
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<tr>
<td>CEDS</td>
<td>Comprehensive Economic Development Strategy</td>
</tr>
<tr>
<td>CEP</td>
<td>Comprehensive Energy Plan</td>
</tr>
<tr>
<td>DEC</td>
<td>Vermont Department of Environmental Conservation</td>
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<tr>
<td>EIA</td>
<td>U.S. Energy Information Administration</td>
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<tr>
<td>EPA</td>
<td>U.S. Environmental Protection Agency</td>
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<tr>
<td>FEMA</td>
<td>Federal Emergency Management Agency</td>
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<tr>
<td>FCC</td>
<td>Federal Communications Commission</td>
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<tr>
<td>GHG</td>
<td>Greenhouse Gas</td>
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<tr>
<td>GIS</td>
<td>Geographic Information Systems</td>
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<tr>
<td>HLRW</td>
<td>High Level Radioactive Waste</td>
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<tr>
<td>HUD</td>
<td>U.S. Department of Housing and Urban Development</td>
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<tr>
<td>ISO</td>
<td>Independent System Operator</td>
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<tr>
<td>LEPC</td>
<td>Local Emergency Planning Committee</td>
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<tr>
<td>LLRW</td>
<td>Low Level Radioactive Waste</td>
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<tr>
<td>NRC</td>
<td>U.S. Nuclear Regulatory Commission</td>
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<tr>
<td>PSB</td>
<td>Vermont Public Service Board</td>
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<tr>
<td>SERC</td>
<td>State Emergency Response Commission</td>
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<tr>
<td>RBES</td>
<td>Residential Building Energy Standards</td>
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<tr>
<td>SeVEDS</td>
<td>Southeastern Vermont Economic Development Strategies</td>
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<tr>
<td>SNR</td>
<td>Spent Nuclear Fuel</td>
</tr>
<tr>
<td>UVA</td>
<td>Use Value Appraisal</td>
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<tr>
<td>USDA</td>
<td>U.S. Department of Agriculture</td>
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<tr>
<td>USFS</td>
<td>U.S. Forest Service</td>
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<tr>
<td>VGIS</td>
<td>Vermont Geographic Information System</td>
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<tr>
<td>VTrans</td>
<td>Vermont Agency of Transportation</td>
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<tr>
<td>VY</td>
<td>Vermont Yankee Nuclear Power Plant</td>
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<tr>
<td>WRBRI</td>
<td>Windham Region Brownfields Reuse Initiative</td>
</tr>
<tr>
<td>WRC</td>
<td>Windham Regional Commission</td>
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