



**Landscape-Based  
Forest Stewardship  
Bennington County,  
Vermont**



Landscape-Based Stewardship - Bennington County Vermont  
July 2012

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The Bennington County Sustainable Forest Consortium served as the steering committee for this Project. Members participating in the effort included:

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Kevin Beattie, Consulting Forester  
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Malcolm Cooper, Owner, JK Adams (Wood Products Manufacturer)  
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## I. Executive Summary

More than 70 percent of Vermont's 4.6 million acres of forest land is classified as "nonindustrial private forest land" that is divided among approximately 88,000 landowners who independently manage those properties according to their individual interests (Vermont Forest Resource Fact Sheet, Department of Forests, Parks, and Recreation). The fragmented nature of these forest lands means that resource planning occurs parcel by parcel, while more integrated planning would better address the State's objective of keeping forest land intact to maintain habitat connectivity, forest health and productivity, ecosystem quality, and strong forest products based economic activities. A landscape stewardship approach was identified as the most effective way to address these concerns and help communities and private landowners conserve forest resource values. Consistently applied regional forest stewardship planning will help ensure that Vermont's public and privately owned forests are managed in a responsible way.

This "Landscape-Based Forest Stewardship Planning" project was developed to increase the scale and pace of sustainable management of forest lands in Vermont. The Vermont Division of Forests and four regional planning commissions (Addison County Regional Planning Commission, Bennington County Regional Commission, Two Rivers-Ottawaquechee Regional Commission, Lamoille County Planning Commission) collaborated to apply a system that relied on geographical analyses and a stakeholder engagement process to help municipalities, regions, and private landowners inventory and assess forest resources, identify specific forest landscape types, and produce appropriate strategies to conserve identified values within each landscape type.

A statewide forest resource assessment recently completed by the Division of Forests was combined with research conducted in Vermont utilizing forest block and ecological landscape unit analysis and existing geographical information system ("GIS") data to provide a basis for some of the forest landscape-scale analysis. Large rural forest blocks, large and small lowland forest tracts, urban and community forests, and ecologically significant landscape types formed the basis for the analysis. A key project outcome was the production of forest plans that can serve as resource documents for municipalities and landowners.

Each region produced a maps characterizing forest landscape types and identifying forest resources that provided the basis for subsequent planning. Geographic data in the analysis included: land cover, elevation, soil productivity, water resources (e.g., streams, rivers, headwaters, lakes, ponds, wetlands, groundwater protection areas), wildlife habitats, rare and endangered species sites, unique natural areas, roads, recreation areas, sites, and trails, regional and town land use districts, conserved lands, and Use Value Appraisal parcels. In addition, data derived from recent landscape-scale forest research in Vermont was used to facilitate delineation of priority forest landscapes.

The project required collaboration among federal, state, and local governments, and with private entities. Steering committees were established in each region to guide those efforts; participants included county foresters, state lands specialists, private forest landowners, consulting foresters, local officials, representatives of forest product industries, environmental/conservation groups, and the Green Mountain National Forest. Each region convened a series of work sessions to review and discuss the forest landscape maps and data and to identify key issues. Staff from each regional planning commission met regularly to discuss progress and address issues and challenges as they arose.

The project resulted in regional forest stewardship plans that will be used by the Division of Forests, local decision makers, and forest landowners to increase the scale and pace of sustainable management of forest lands in Vermont. The following outcomes were accomplished:

- 1) Developed and tested a GIS-based methodology for landscape-scale forest planning.
- 2) Addressed region-specific issues by engaging local stakeholders in the process.

- 3) Identified strategies and developed tools for regions, municipalities, and forest landowners to maintain the viability of important forest resources.
- 4) Developed a process that can be replicated across different regions and landscape types.
- 5) Created a model collaborative process for regional and state organizations.

Many issues identified through the geographic analysis and stakeholder engagement process were common among the four regions: forests are valued for their ecological, economic, recreational, scenic, and cultural richness; forest resources are threatened by increasing fragmentation, unfavorable economic conditions, and environmental factors such as climate change, invasive species and disease. Also observed were regional contrasts associated with landscape types, economic and demographic conditions, and cultural/social values that resulted in priorities and strategies unique to each region. Each regional plan reflects those unique characteristics and sets the stage for implementation of forest stewardship projects.



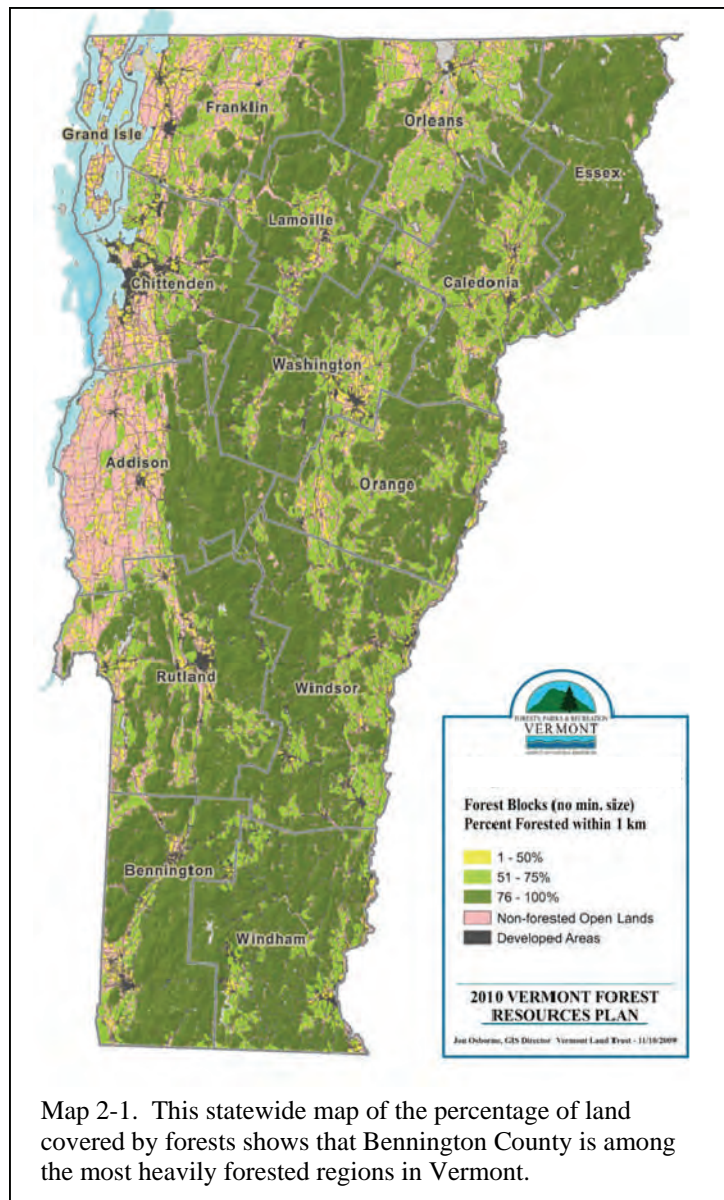
## II. Introduction

Approximately three-quarters of the Bennington Region’s landscape is covered by forests of one type or another. These forest lands have been important to the historical development of the area, continue to provide important resources today, and will be critical assets in the development of prosperous and sustainable communities in the future. Comprehensive plans developed by municipalities and by the BCRC have generally included a discussion of forests in one section of a chapter dealing with a variety of natural resources. Because of the extent of forests in our region, and because of their pervasive significance in all aspects of the daily lives and economic vitality of the region, a more thorough “landscape stewardship” approach to forest resource planning is warranted.

Landscape stewardship forest planning combines several key factors to create a comprehensive understanding of resources while developing strategies that will help to achieve the goal of “keeping forests as forests.” The first step in the process is to recognize that forests exist in a variety of different landscape settings. The vast unbroken forest tracts that stretch eastward from the escarpment that defines one side of the Valley of Vermont and the rugged and roadless landscapes of the High Taconics represent a common perception of the region’s forests. At the same time, the patchwork of forest blocks that are interspersed with farmland in rural valleys and the smaller woodlots and forested parcels in and around village and town centers represent significant forest resources that may provide different values and require different management and conservation strategies.

Another critical component to landscape stewardship planning for forests is to recognize that there are a variety of interest groups and viewpoints that have a stake in the region’s forests. An effective planning process must involve those stakeholders and incorporate the diversity of values represented. Once the forest landscape is understood and values clearly described, a set of strategies designed to protect and enhance the resources that serve those values must be developed.

An earlier forest resource planning project undertaken by the BCRC, the “Regional Forest Land Evaluation and Site Assessment for the Taconic Mountains of Bennington County” (1994) grew out of a desire on the part of local government



officials to have access to improved information when making decisions about forest use and ownership, due in large part to the 1991 extension of the Green Mountain National Forest proclamation boundary to include the western half of the region. That study included a comprehensive inventory of natural resources in the Taconic Range (all land west of the US Route 7 corridor in Bennington County) and assessed the value of land for extractive wood product uses, development, recreation, fish and wildlife habitat, and water supplies. The project also provided towns with maps showing where those uses might come into conflict. Geographic data available today allows for an improved region-wide resource assessment within the context of the area's unique landscapes. This current stewardship plan also gives local officials and private landowners information and strategies that will help improve the long-term viability of important forests and forest-based resources.

The forest stewardship project for the Bennington Region was guided by a steering committee consisting of the membership of the Bennington County Sustainable Forest Consortium, an organization that includes consulting foresters, local officials, forest landowners, wood products business owners, the county forester, and the director of the Bennington County Conservation District. The BCRC provided staff support, including geographic information system mapping and analysis, and coordination with three other regional planning commissions (Addison County Regional Planning Commission, Lamoille County Planning Commission, and Two Rivers Ottauquechee Regional Commission) working on forest landscape stewardship plans under the same program, and received further guidance from the Forestry Division of the Vermont Department of Forests, Parks and Recreation.



Forest landscapes in the Bennington Region are diverse, ranging from the vast unbroken tracts in the Green and Taconic Mountain Ranges to smaller woodlots in rural valleys and near town and village centers.

### III. Objectives

The overall objective of this planning effort is to provide information and tools needed by public and private sector decision-makers to “keep forests as forests.” This statement is perhaps overly broad, however, and needs to be further explored and clarified. It was noted earlier that a significant majority of the Bennington Region is covered with trees. Three hundred years ago, the entire landscape, with the exception of water bodies and a few small clearings made by Native American hunting parties, was forested. Following settlement of the area, beginning in the mid-1700s, clearing of forest lands began in earnest, and just 150 years ago, most of the valley lands and much of the mountainsides were devoid of trees. A slow, but steady, reforestation process began in the late 1800s and continues to this day, as previously open land is reclaimed through processes of natural ecological succession.

The reasons for this waxing and waning of forest cover is directly related to the changing needs

and desires of the human population that has inhabited the region over time. The first settlers in the area were almost entirely dependant upon local resources for their sustenance, using wood for home-building, heating, and the manufacture of everyday products, while raising crops and livestock on the cleared land. Later, economic incentives led to clearing forests further up the hillsides and mountains for additional grazing land, especially for sheep, and for production of charcoal that was used in blast furnaces and other manufacturing applications in nearby industrial cities. As more and more food, natural resources, and everyday



Remnant stone walls deep in the forest are reminders that much of our present-day forest land was once cleared for agriculture and rural settlements.

amenities were obtained from remote locations, thanks largely to the availability of cheap and abundant energy for transportation, the need to use the land so extensively for direct support of local communities declined and forest cover began to reclaim the landscape.

Present day forests in the Bennington Region provide numerous and diverse benefits (which will be described in detail in Section V), including wood for lumber, paper, and fuel, habitat for fish and wildlife, and an abundance of recreational opportunities. Those same forests also protect the quantity and quality of our fresh water, form the scenic backdrop to a distinctive rural landscape that is treasured by residents and visitors, and serve as an essential element supporting the strength and viability of the area’s complex ecosystem and economy.

No one can be sure of what the future holds, but all science-based environmental and economic models predict an inevitable reemphasis on the use of locally available resources to support community life and economic health. It is likely that this renewed demand for local resources will affect the region’s forests in a number of ways, including a greater demand for wood to heat homes and to provide raw materials for local production of goods. Forest habitats also may be looked to as a source for additional fish and game, and will certainly continue to serve an essential role in protecting environmental quality and water resources. At the same time, forces may dictate that some forest land be cleared to grow food crops, pasture livestock, and produce seed crops for biofuels. Forces that may encourage additional reforestation include a declining viability of non-agrarian residential uses currently located in areas remote from community centers.

**The principal goal of effective forest planning from a landscape stewardship perspective, therefore, must be to identify resources that are of greatest enduring value to local communities as well as any threats or constraints to the use of those resources, and to provide strategies and tools that can be employed to protect those critical forest lands.**

The specific objectives needed to ensure implementation of such a goal are covered in each subsequent section of this report. A necessary first step is to describe and understand the regional context of the forest resource in the Bennington Region. The types of landscapes within which the



forest resources are found will be discussed along with an overview of prevailing land use patterns, and demographic and economic characteristics, including the type and extent of existing forest-based land uses. The compilation and assessment of forest resource values was derived from existing local plans, meetings with municipal planning commissions and other interested parties, and consultation with the project steering committee. Those resource values were mapped at a regional scale using the BCRC's geographic information system, although local communities can use the same data to prepare maps of their towns.

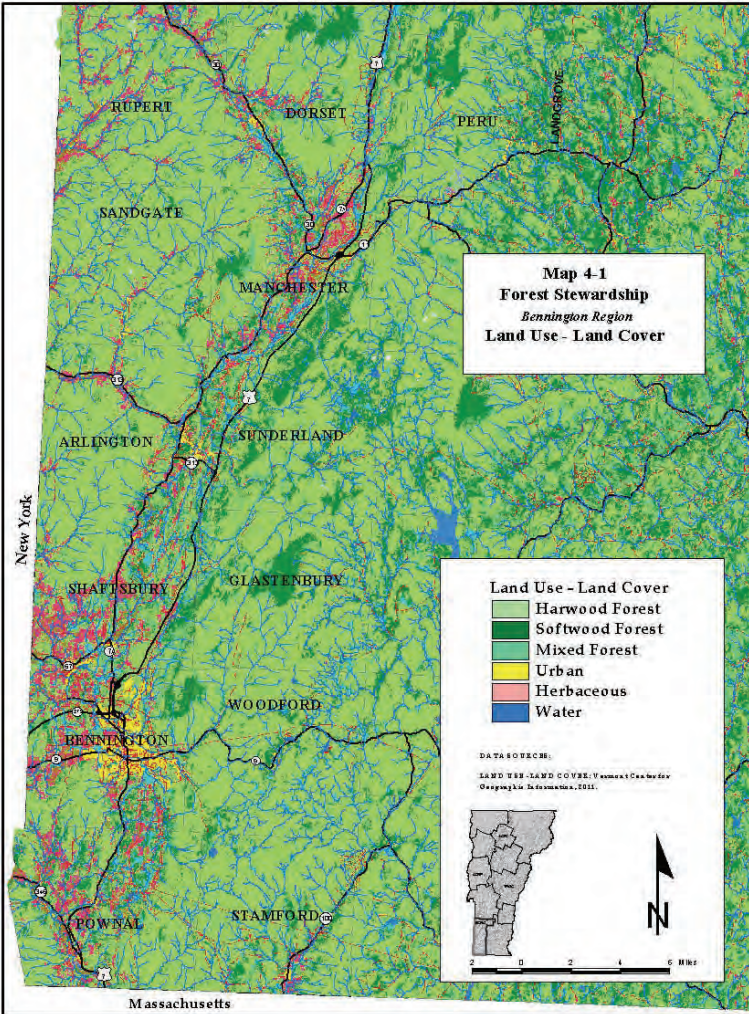
If there were no threats or limitations to forest sustainability, there would be little need to plan. However, environmental factors, human activities, and economic conditions all pose potential threats to forest resources. Once those challenges are understood, it is possible to assess the effectiveness of existing forest conservation measures, to explore changes to those strategies, and to develop new approaches to protect our forests.



Productive forest land covers much of the region, but environmental, human, and economic conditions can threaten the long-term viability of some of these resources.

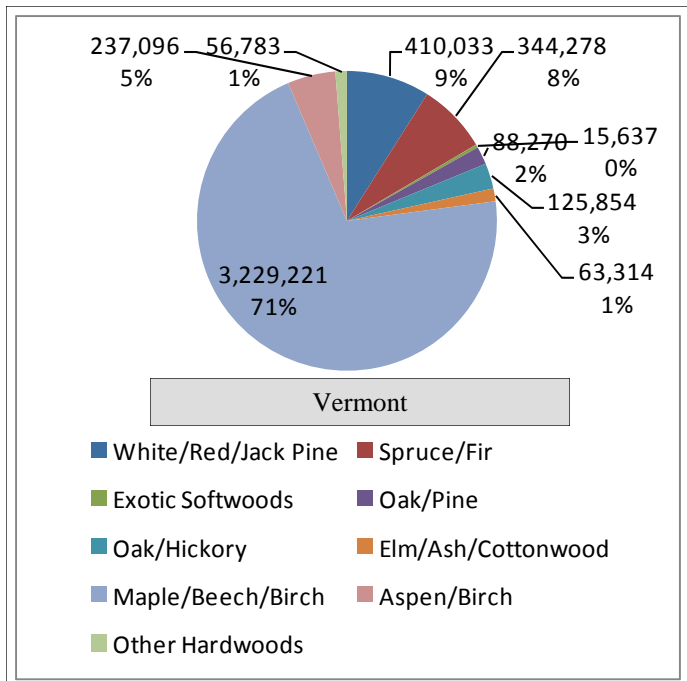
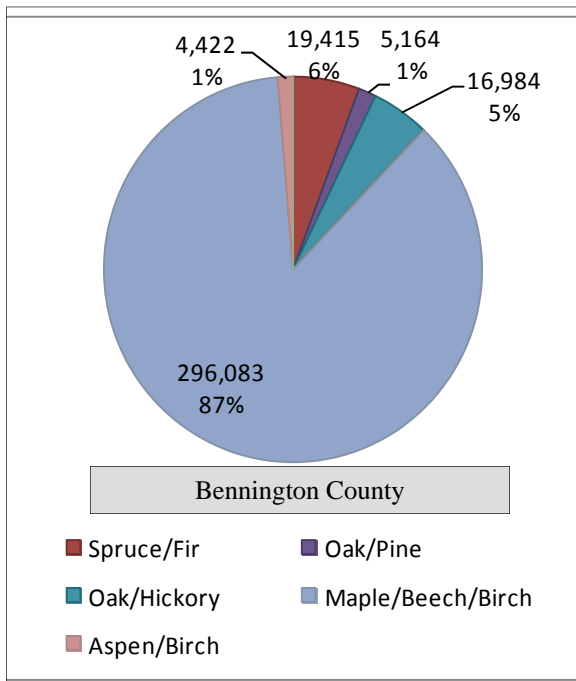
#### **IV. Regional Characteristics and Forest Landscapes**

The Bennington Region (Bennington County minus the towns of Winhall, Searsburg, and Readsboro, which are located in the Windham Region) covers 370,021 acres of land and water in southwestern Vermont. There are 13 towns, three incorporated villages, and one unorganized town in the region. Windham County lies to the east and Rutland County to the north, while the region's western border is formed by the New York State line and the southern boundary by the Massachusetts state line. The area is extremely mountainous, with the Green Mountains occupying much of the eastern part of the region and the Taconic Mountains on the west. The narrow Valley of Vermont lies between the two mountain ranges with several smaller valleys penetrating the mountains to the north, west, and south. Most of the land is forested, although lowland areas contain significant amounts of agricultural land as well as small villages and the more densely developed areas in and around Bennington and Manchester (Map and Figure 4-1).



Map 4-1 / Figure 4-1.

The great majority of land in the Bennington Region is forested, including nearly all of the land at higher elevations in the Taconic Range on the west side of the region and in the Green Mountains on the east side of the region. Throughout the state, and in the Bennington Region, the predominant forest type is maple/beech/birch. A significant and important portion of the forest in the region includes oak; most of this forest type is found in the Taconic Mountains.



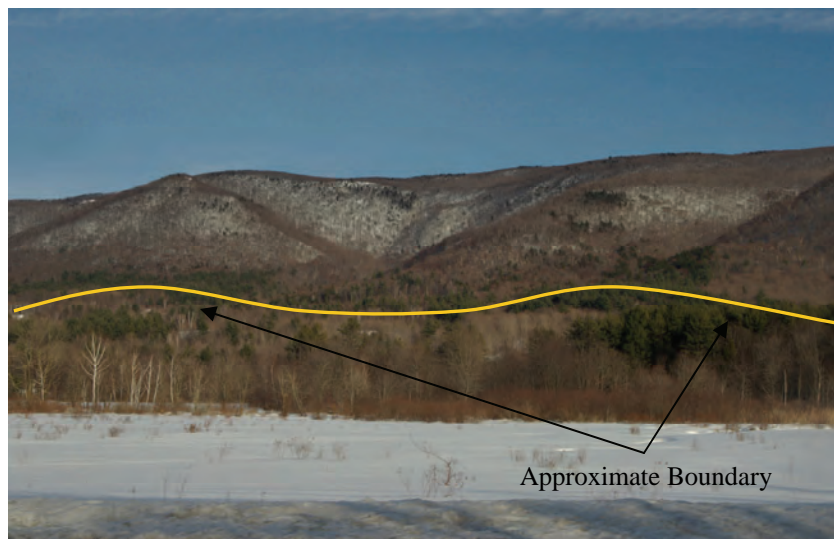
The entire Bennington Region lies within the proclamation boundary of the Green Mountain National Forest, and large amounts of land have been acquired by the Forest Service over the years. At the present time, approximately 32 percent of the region's total land area is owned by the federal government and managed through the Green Mountain National Forest offices in Manchester and Rutland. Including land owned by other public entities and nonprofit conservation organizations, roughly 40 percent of the region is conserved by virtue of ownership, and most of that land is forested.

Most of the region is distinctly rural in character, with a population of only 35,484 (2010 US Census), nearly half of whom live in Bennington (including the villages of Old Bennington and North Bennington). There is a fair amount of economic diversity in the region, with the retail services, health care, and manufacturing sectors being the largest employers, but government (primarily schools and colleges), accommodation/food services, and professional and financial services also well-represented among the roughly 17,000 jobs in the area. Less than one percent of the workforce is employed in forestry/logging occupations, although many more work in businesses that support those enterprises or which are directly tied to them (e.g., tree farms and nurseries, maple syrup producers, wood product manufacturers and retailers, and biomass fuel suppliers). As of June 2011, the unemployment rate in the region was 6.5% and the average annual wage was approximately \$37,000.

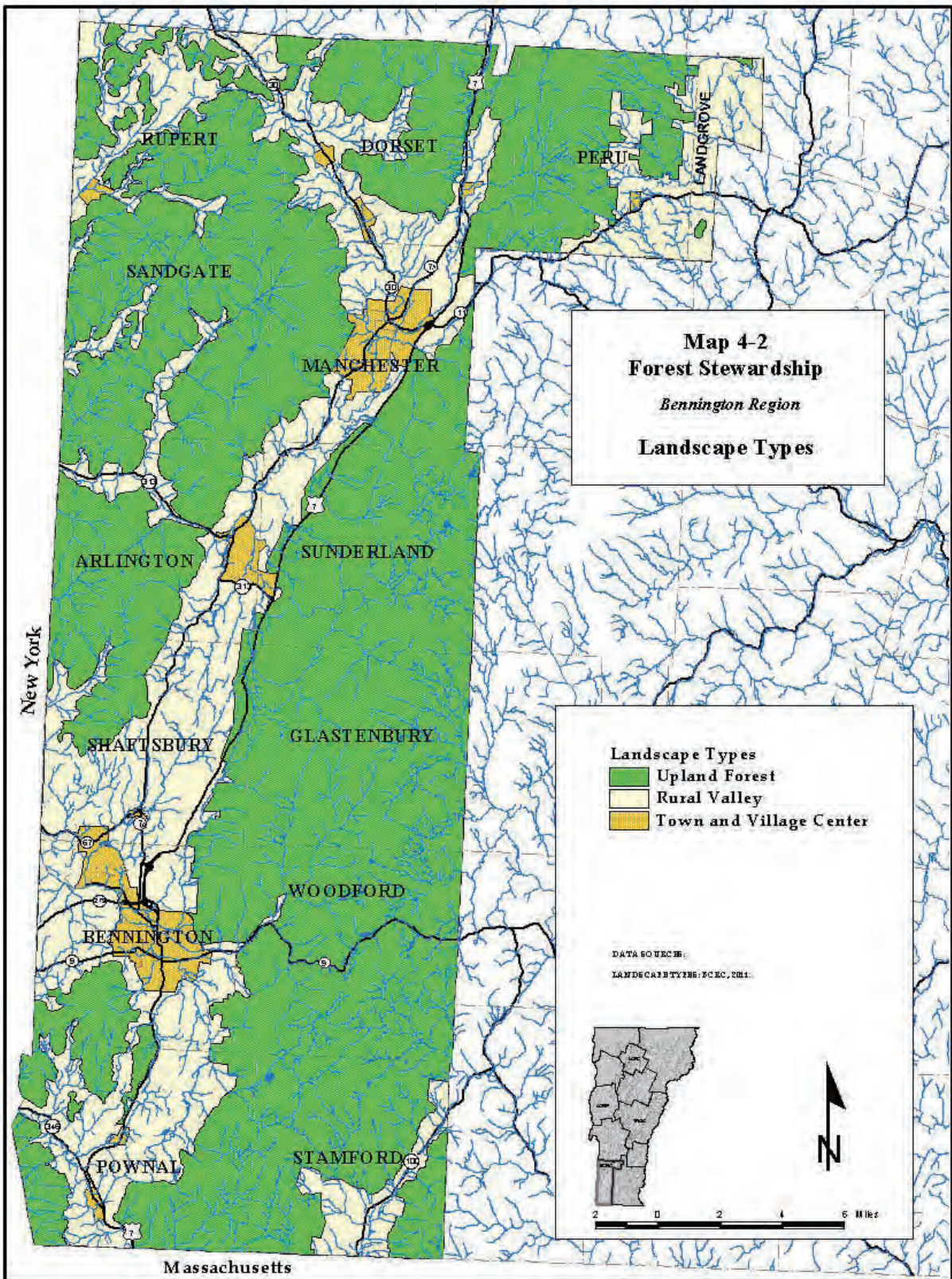
The region's forests occur in distinctive landscapes, and although it would be possible to describe any number of them, the project steering committee chose a classification system similar to that used in the 2010 Vermont State Forest Resource Plan. Recognizing that different values and management strategies are characteristic of each area, the region can be divided into Upland Forest, Rural Valley, and Town and Village landscape types (comparable to the Rural, Rural Residential, and Urban landscape types described in the State Forest Resource Plan). The BCRC's land use plan was used as a general guide for establishing boundaries for each of the landscape areas, with those "urban" and "village," "rural," and "forest" district lines refined by overlaying them on current orthophotos and municipal zoning maps (Map 4-2).

Upland forest landscape areas are remote, continuous blocks of forest cover, generally, but not always characterized by high elevation and/or steep slopes. Few improved roads and little permanent development are found in the upland forest areas. In addition to abundant tree cover, these areas contain important wildlife habitat, surface and groundwater resources, and extensive scenic and recreational assets. The largest landscape type in the region by area, much of the upland forest lies within the Green Mountain National Forest and among the rugged and remote portion of the Taconic Mountain Range north of the Walloomsac Valley in Shaftsbury to the peaks bordering the Mettawee Valley in Rupert and Dorset.

Rural valley areas contain a mix of open and forest land lying outside of the more densely developed village and town centers. The region's main transportation corridor runs north and south from



The boundary between the Rural Valley and Upland Forest landscape areas can be found where the gradient steepens and permanent development and most infrastructure ends.



Pownal to Dorset, with Routes 7 and 7A and a network of branching local roads providing access to agricultural and low density residential uses in the central “Valley of Vermont.” The broad Walloomsac Valley in Bennington and Shaftsbury opens to the west from this main north-south lowland area, with narrower valleys following the Hoosic River, Batten Kill, Mettawee River, White Creek, and smaller streams to the west. Smaller rural valley areas are found in mountain hollows, along the Route 100



Small forested areas like Bennington’s in-town Y-Woods are highly valued by residents of nearby neighborhoods.

corridor in Stamford, and in and around the Utlely Flats in Landgrove and Peru. Forests in these landscape areas provide readily accessible wood resources for rural residents, many of the region’s maple syrup producing stands and Christmas tree farms, wildlife habitat characterized by extensive edge habitats and riparian corridors, and are an important part of the rural scenery.

Town and Village landscapes are well-defined by existing and planned development areas. The smallest of the three regional landscape types by area, they also contain a majority of the region’s population. Although forest lands in these areas are not extensive, they add an important element of diversity and scenic character, harbor important populations of

birds, small mammals, and invertebrates, provide cover along streams and other waterbodies, and offer readily accessible recreational opportunities.

### Economic Characteristics

The Bennington Region supports a variety of forest resource based industries. Although several commercial sawmills have ceased operations in recent years, a large facility producing flooring and custom lumber continues to operate in Stamford and several commercial loggers employ portable sawmills for on-site processing of lumber (Figure 4-2). These operations are particularly important because Bennington County is consistently one of the top hardwood producing regions in Vermont.

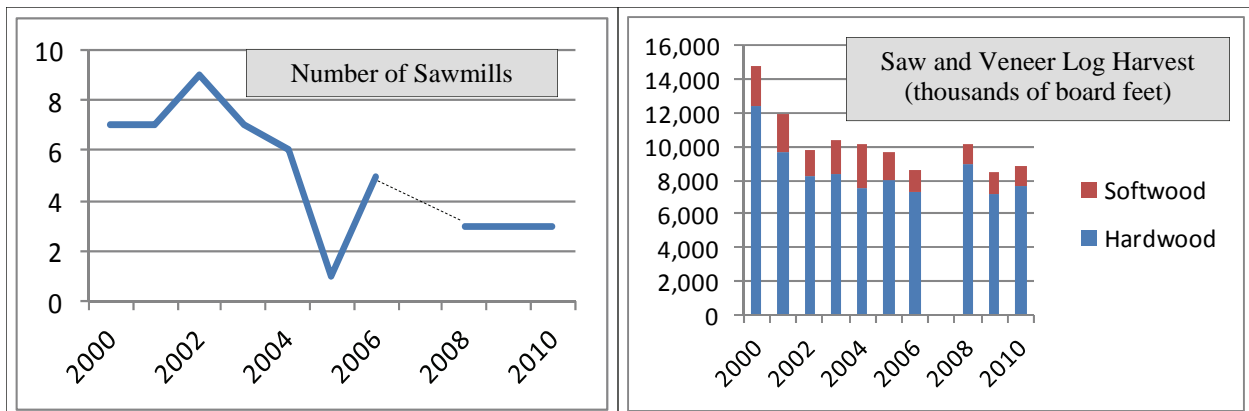


Figure 4-2. The number of sawmills in Bennington County has declined in recent years, consistent with statewide trends. Saw and veneer log harvests emphasize hardwoods to a much greater extent than in the rest of the state.

Three commercial Christmas tree farms are located in the region (as well as numerous smaller operations that raise and sell trees in the local market, figure 4-3). Some of these farms provide year-

round employment, and sales represent an important economic activity in the region. Fifteen commercial maple syrup producers in the Bennington Region, with three each in Manchester and Dorset, and four in Shaftsbury—produce much of the maple syrup and sugar sold in area stores (Figure 4-4). The six cabinet, furniture, and specialty wood products manufacturers in the region rely on quality wood as the principal raw material for their operations, much of which is sourced from forests in and around the region. All of these businesses produce direct economic benefits from production and sales and also are a principal draw for the region’s tourism economy.

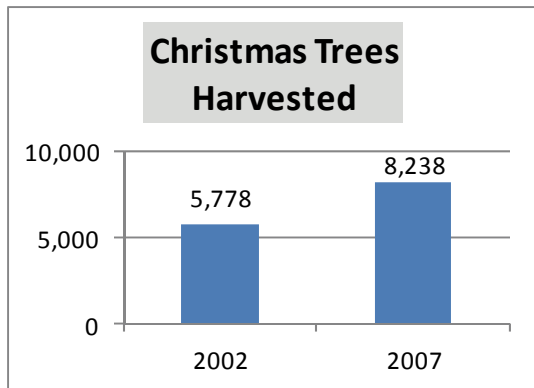


Figure 4-3. Although the acreage dedicated to Christmas tree production has declined in recent years, the total harvest has increased.

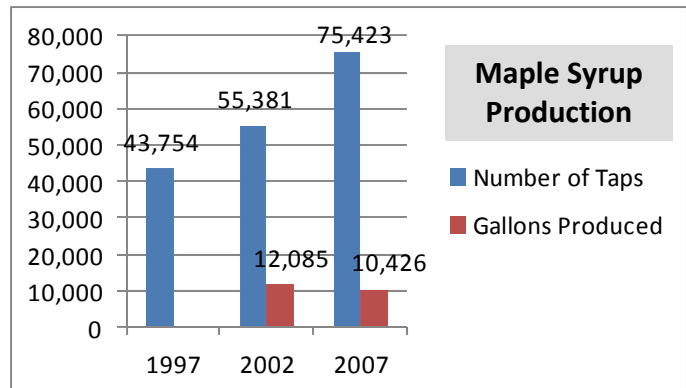


Figure 4-4. Maple syrup production in the region reached over 75,000 gallons in 2007. Variations in weather can significantly affect annual output (no gallon data for 1997).

A large number of loggers based throughout the region form the critical first link in the wood supply chain. Many provide cordwood for home heating and some of the larger operations are highly automated, cutting and splitting hundreds of cords annually. Indeed, as discussed further in Section VIII of this report, tremendous potential exists for expanding the use of the region’s forests for biomass fuel production. Approximately three-fourths of the region’s households currently use oil for space heating, as do most commercial and industrial buildings. Recent oil price increases have prompted many people to switch to wood heat, with an increasing number utilizing wood pellet fuel systems. At least one new wood pellet fuel production facility (that will utilize locally sourced biomass) is planned for construction in Pownal. Moreover, Bennington College and the Mount Anthony Union Middle and High Schools have recently installed woodchip –based heating systems (Figure 4-5). Additional large-scale biomass heating applications are under consideration for other schools and the regional hospital.

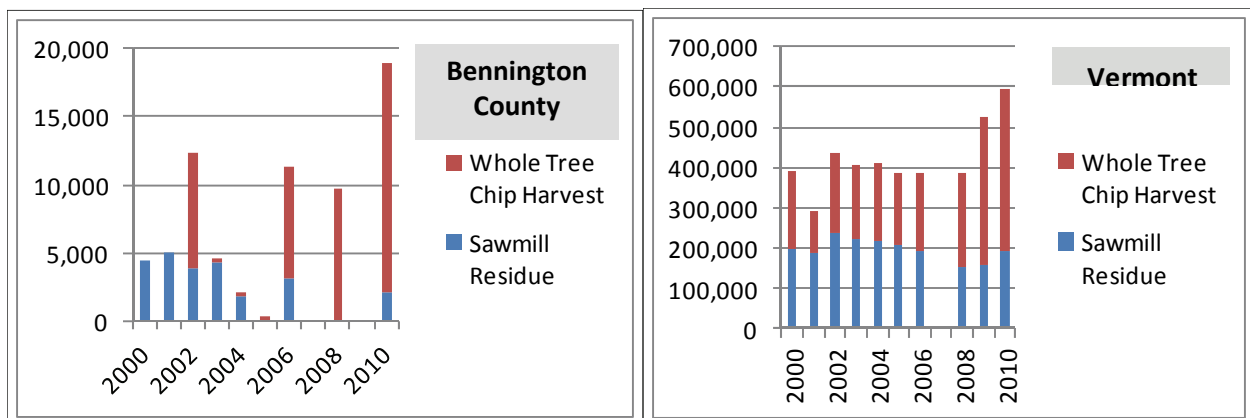


Figure 4-5. Wood chip production in Bennington County has varied widely in recent years, although a significant increase in whole tree chip harvest was observed in 2010. An increase in whole tree chip harvest has been observed statewide as well. All data in green tons; 2007 data not available.



This commercial Christmas tree farm lies at the base of Mount Anthony in Bennington's Pleasant Valley.

Professional forest managers and consultants are employed to oversee the extensive public and private forest lands in the region. Particularly notable is the presence of a district office of the Green Mountain National Forest in Manchester and the extensive forest land enrolled in the state's Use Value Appraisal (UVA) program. Properties enrolled in the UVA program are eligible for reduced property tax rates if they have a current ten-year forest management plan in place. All of these factors contribute to significant employment in forestry and wood products businesses in the region (Figure 4-6).

A diversity of recreational activities takes place in the region's forests. In addition to state parks in Woodford, Shaftsbury, and

Dorset, the US Forest Service operates a campground and recreation area at Hapgood Pond in Peru. Extensive public and public access trail systems exist along the Appalachian-Long Trail corridor and elsewhere in the Green Mountain National Forest, at the Merck Forest and Farmland Center in Rupert, at the Equinox Preservation Trust property in Manchester, along the Taconic Crest in Pownal, at Hildene in Manchester, and on lands maintained by the Fund for North Bennington in Bennington and Shaftsbury. Cross country skiing and snowmobiling (VAST system) trails exist on public lands and on private lands where access has been granted. Of course, hunting, fishing, and other outdoor pursuits are occur in forest lands throughout the region.

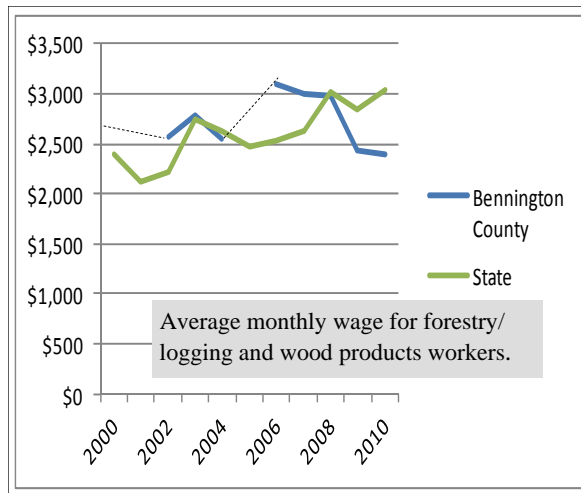
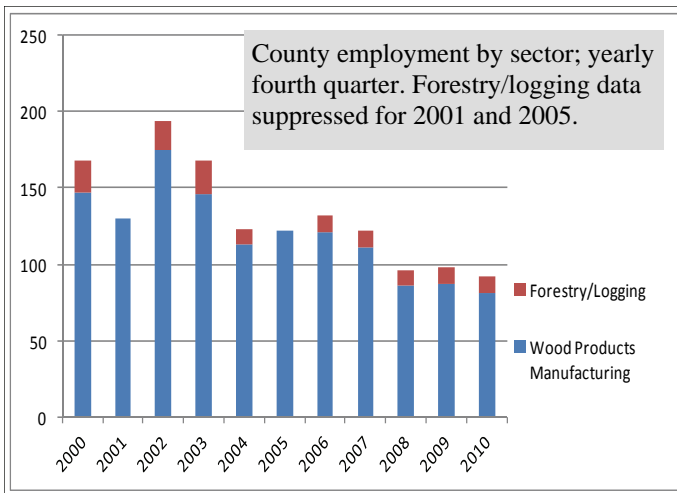
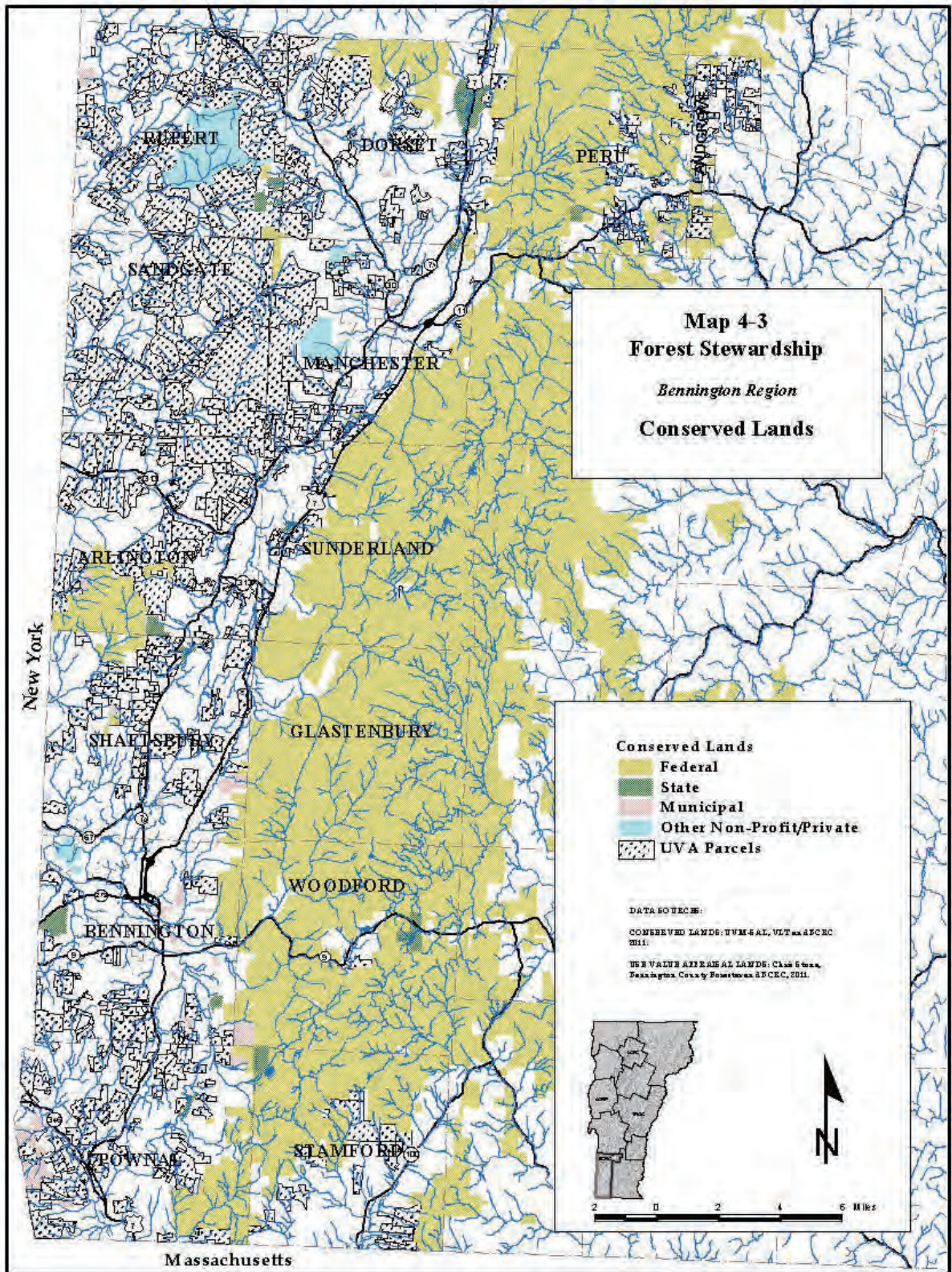


Figure 4-6. Total employment in forest-related businesses has fallen, although wood products manufacturing remains an important industry. Monthly wages have fallen below the state average for the sector.

## V. Forest Resource Values

Residents of local communities have identified a number of specific values that are supported by the presence of the region's forest land resources. Those values are outlined in municipal plans, and have been reinforced and expanded upon through discussions with the project steering





committee, municipal conservation commissions and other local officials, and at public meetings. This section of the report will describe those values and illustrate the location of key resources within the landscape context of the region on a series of maps.

### Wood/Biomass Productivity

Significant value is placed on the suitability of the land for sustainable harvests of wood to meet a variety of needs, including biomass energy, lumber, furniture and specialty wood product manufacturing, paper production, and other economic activities such as maple sugaring and Christmas tree farming. Two factors are of overriding importance in determining potential for supporting productive forests: soil quality and land use. The USDA Natural Resource Conservation Service has rated soils in Vermont based on their potential for supporting economically viable forestry activities. These ratings consider the potential for growing northern hardwoods (the soil's potential for growing white pine is considered on glacial outwash soils), along with costs and limitations of managing woodlands on those soils. Specific factors included in the ratings include: soil drainage class, effective rooting depth, erodibility, rock outcrops, seasonal high water table, slope, surface stones or boulders, and surface texture. Land use is an important consideration because conflicting development can preclude management for wood/biomass production even if soil conditions are favorable. Access is another important factor in assessing an area's suitability for effective forest management, but many of the most important access considerations (e.g., erodibility, rock outcrops, slope) are included in the soil ratings.

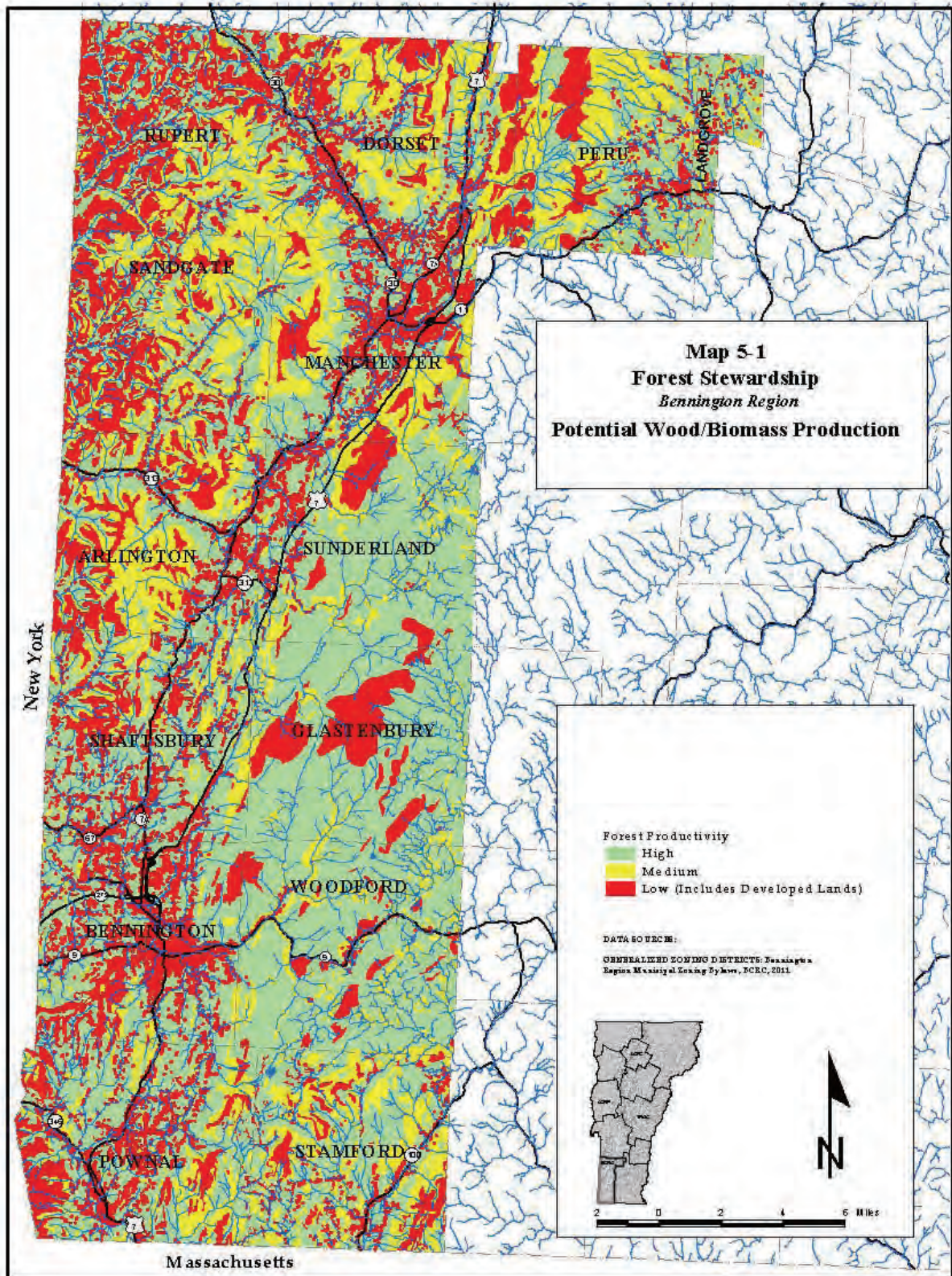
Following discussions with forest and conservation professionals, the forest soil value groups were categorized as having a high, medium, or low value for forest productivity. The resulting map was then modified by overlaying all of the developed land within the region—using all building locations buffered to cover an area of 100 meters around each—and classifying all such areas to the “low” value for forest-related uses. The final regional wood/biomass productivity map, therefore, includes areas of high, medium, and low value for wood and biomass production (Map 5-1). It should be noted that the map actually illustrates the *potential* for such use, as not all of those lands currently are used or managed for wood or biomass production.

Most of the large-scale harvesting operations occur in the upland forest areas of the region. It is not surprising, therefore, that the largest tracts of highly productive forest land are found there, most noticeably in the Green Mountains in Woodford, Glas-tenbury, and Sunderland. These areas are characterized by high quality soils and relative ease of access, although some extremely steep areas on the escarpment along the western edge of the Green Mountains are rated as having low value for this use. Wood and biomass production potential in the upland forests on the western side of the region (Taconic Mountains) tends to be lower than in the east, partially due to less productive soils near the New York State



The hardwood forests that cover much of the Taconic Mountains are an important economic asset for the region.

line, but also attributable to steep slopes and the presence of greater conflicting developed areas. Nonetheless, much of the region's valuable hardwood harvest is derived from the upland forest areas



of the Taconics, where extensive stands of northern red oak and sugar maple trees are found.

The region's rural valley landscape areas contain extensive areas of highly productive forest soils, with much of the landscape characterized by agricultural fields and woodlots. Because these are among the best soils in the region for a variety of uses, and because access from maintained roads is relatively easy, forested areas are interrupted by cropland, pasture, and rural residential development. Most of the region's maple syrup operations and Christmas tree farms are located in rural valley areas, and many residents of these areas utilize trees from easily accessible woodlots for firewood and other domestic uses.

Although town and village landscape zones contain highly productive soils, these areas—located within rural valleys—contain most of the region's population and permanent development. As a result, there is little land rated medium or high for wood and biomass productivity in these developed areas. Some economic use is, no doubt, derived from trees in certain town and village locales, but significant commercial operations do not occur in these areas.

### Important Habitats

The region's expansive and diverse forests provide habitat for a wide range of fish and wildlife species. Important habitats can be looked at by observing the location of specific resources and by considering the relative values of larger areas ("habitat blocks") by aggregating critical habitat factors to assess overall biological significance and contribution to physical landscape diversity.

One method used to categorize the value of forest landscapes for habitats is to use a "habitat block and connectivity analysis." This system uses land cover data, supplemented with information about the location of roads, buildings, and surface water features to define habitat blocks. Each block is then evaluated based on the presence and extent of key factors, including: the size of the habitat block, and especially the amount of "core" area that is distant from the block edge; the presence and extent of important "ecological landscape units" (defined by elevation, landforms, and bedrock

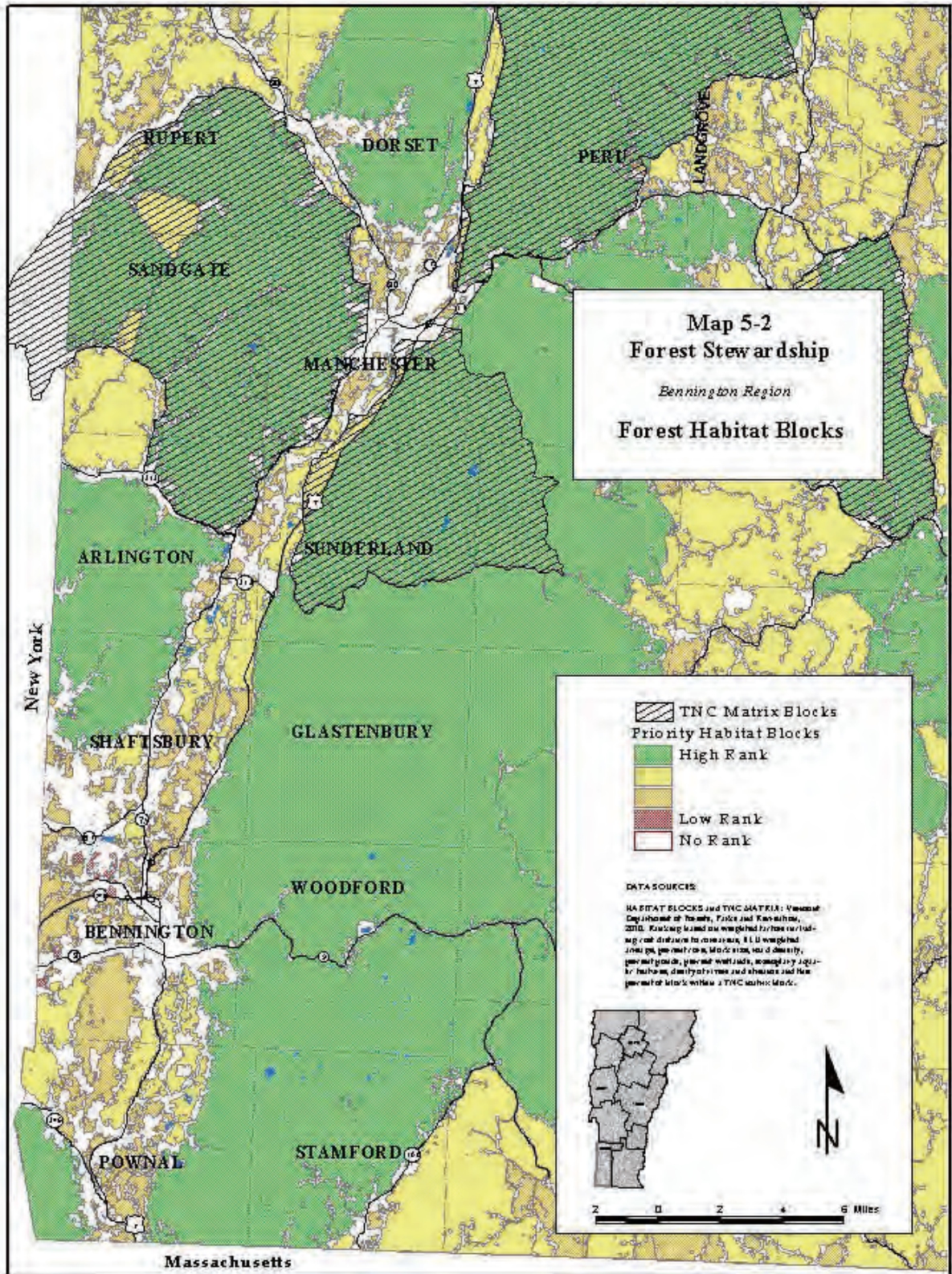


The region's upland forests provide habitat for a variety of wildlife.

geology); known rare species and/or significant natural communities—mapped by the Vermont Department of Fish and Wildlife; water resources, including the extent of lakes and ponds, wetlands, rivers and streams, and other important aquatic features; the relative lack of interior roads, and the presence of wildlife linkages and corridors. Each of these factors contributes to overall habitat quality and a weighted average provides a regional view of important habitat areas (Map 5-2).

The majority of the region's upland forest landscape areas are characterized as providing "high" quality habitat because of the large areas of remote land with few or no roads, the presence of critical landscape elements, and the extensive surface waters in those areas (notably streams throughout the region and high elevation ponds and wetlands in the Green Mountains).

Many rural valley forests at the upland forest landscape boundary are included as the "high" quality habitats because those blocks are contiguous with the remote forests that extend into the mountain ranges on either side of the valleys. The lowest ranked habitat blocks in the rural valley land-



scape zone are those closest to developed areas (especially in Bennington) and in areas where the forested blocks are relatively small (Shaftsbury and Rupert). Forested corridors along streams and between otherwise separate forest blocks in rural valleys provide vital cover and travel routes for numerous wildlife species.

Forest habitat blocks in town and village centers are relatively small and include fewer critical ecological landscape units and rare or significant species and natural communities. Nonetheless, forested areas in and around town and village centers do contain some important habitat areas which should be recognized and protected even though the habitat block analysis does not assign the areas an overall high rating.

The important habitat resources that may not be fully reflected in the habitat block analysis, including those in town and village areas and throughout the region, need to be identified and protected. A single wetland containing an important natural community or a deer yard in an area with relatively small habitat blocks, for example, may fall into a “lower” value block, but it is important to know that they exist as individual resource elements. A map of the distribution of these individual resources (Map 5-3), shows that many important wetland habitats and rare species and significant natural communities are found in rural valley landscape areas.

The map of regional wildlife resources also shows that the areas covered by significant bear habitat are closely correlated with high-rated habitat blocks because both rely on similar factors of remote and unbroken forest with supporting surface water resources. It also is important to note the presence of deer wintering yards in the region. The whitetail deer is an important species to the region’s ecosystem and also an important economic asset and wintering yards are especially important to the health of the herd.

The specific habitats and much of the value assigned to the habitat blocks place significant weight on the value of remote and largely uninterrupted expanses of forest land. These areas are necessary to support viable populations of many species, but other species thrive in areas which are either open, or which are characterized by “edge” habitat—transitional areas between forested and open lands. Many avian species rely on edge habitat areas, and deer migrate from forest cover to open fields to graze. Consequently, the interplay of smaller woodlots and open fields in rural valley and town and village center landscapes is an important component of the overall health and diversity of the region’s wildlife.

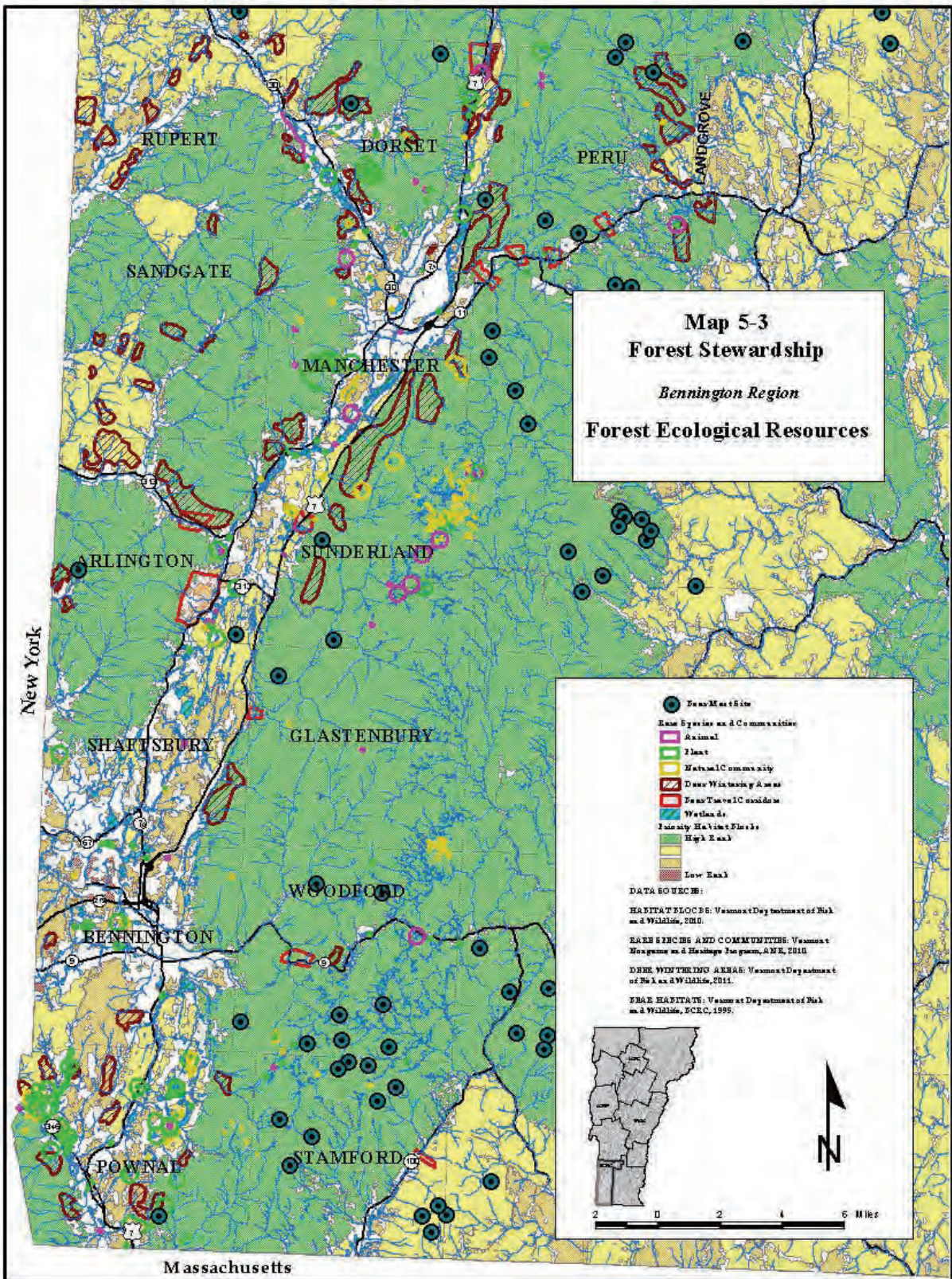
The region’s upland forests provide the environment required to ensure clean water for streams and ponds that support important fisheries. Forest cover along waterways in all landscape zones also moderates water temperature and contributes nutrients to the food chain to support a health aquatic ecosystem.

### Water Resources

The quality of surface and ground water is essential to the well-being of the area’s population



Forest cover along streams, and in other rural valley locations, provides important cover and travel routes for a variety of species.



and to the regional economy. Surface waters have inherent value to residents, and also support fish and wildlife, recreational, scenic, and economic development values. Clean ground waters feed into streams, ponds, and wetlands and also provide much of the potable water for domestic and commercial consumption. These resources are widely distributed throughout each of the region's landscape areas (Map 5-4), and rely on forest cover to maintain their quantity and quality.

Rivers and streams are abundant throughout the region. These waterways were of great importance to early inhabitants of the area, serving as travel routes, water supplies, and sources of power. They continue to have practical value to the region's communities for water supply, disposal of treated wastewater, and potential generation of hydroelectric energy. In addition, residents and visitors have placed great value on maintaining these resources for swimming, boating, and fishing, as well as for their aesthetic contribution to the landscape.

Upland forests contain all of the Class A headwaters in the region and many larger streams that include fisheries, waterfalls, swimming holes, and other recreational and scenic resources. Once in the rural valley landscape, these smaller streams combine and eventually form the four main river systems that drain the Bennington Region: the Mettawee River in the northwest part of the region, the Batten Kill in the north-central (which turns to flow westward through a gap in the Taconic Mountain Range), and the Hoosic and Walloomsac Rivers that drain most of the southern portion of the region. Most of

the relatively densely developed town and village centers lie along rivers and streams where those features are important scenic, cultural, and recreational assets. Many village centers developed around small waterfalls that provided power for early mills; those waterfalls are important scenic resources today and where existing dams and millponds are found, represent future hydroelectric resources.

Lakes, ponds, and wetlands are found predominantly in the rural valley landscape, but high elevation ponds and wetlands are common in the Green Mountains, primarily in Stamford, Woodford, and Sunderland. A number of small lakes and ponds, including Lake Paran, Equinox Pond, and Warm Brook Pond are found within town and village center landscapes. Lakes and ponds are among the most popular recreational sites in the region and are highly valued for their contribution to the scenic quality of the surrounding landscapes. Wetlands are highly productive ecological areas that help to maintain surface and ground water quality, support fish and wildlife populations, and in riparian areas, provide flood and storm water control.

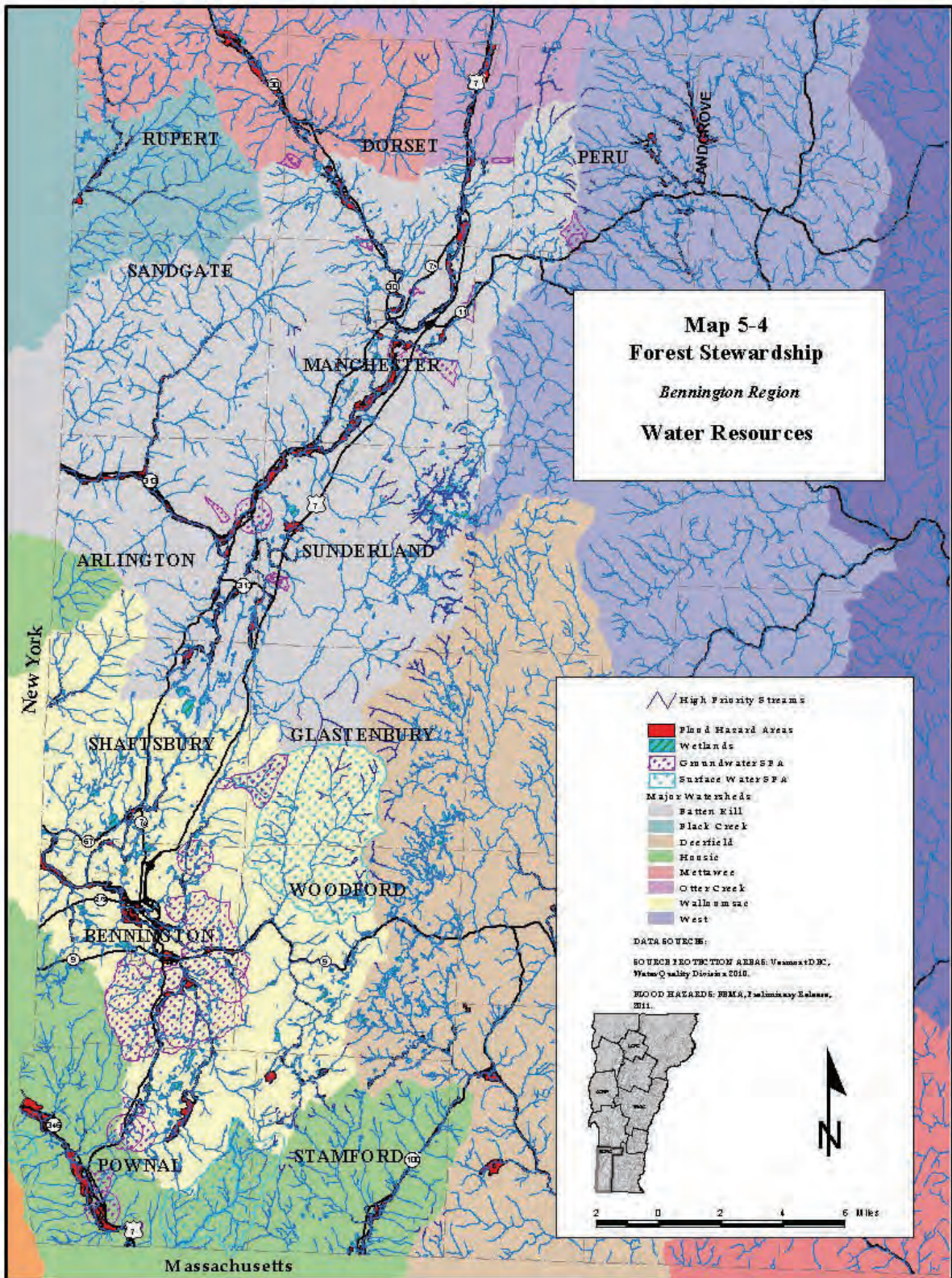
Groundwater resources are critically dependant upon healthy and extensive forest cover. Large areas within the upland forest landscape areas support critical public water supply



Urban woodlands line historic millponds and waterfalls in many of the region's town and village centers.



Mud Pond in Peru is an example of an ecologically significant high elevation water body.





protection areas, including part of the Bennington municipal water supply in Glastenbury and Woodford and the source for the Williamstown, Massachusetts water supply in Pownal and Stamford. Much of the rural valley and town and village landscape areas are underlain by sand and gravel, which hold large reservoirs of clean ground water. Those areas provide much of the water for the public systems in Manchester, Arlington, North Bennington, Bennington, and Pownal.

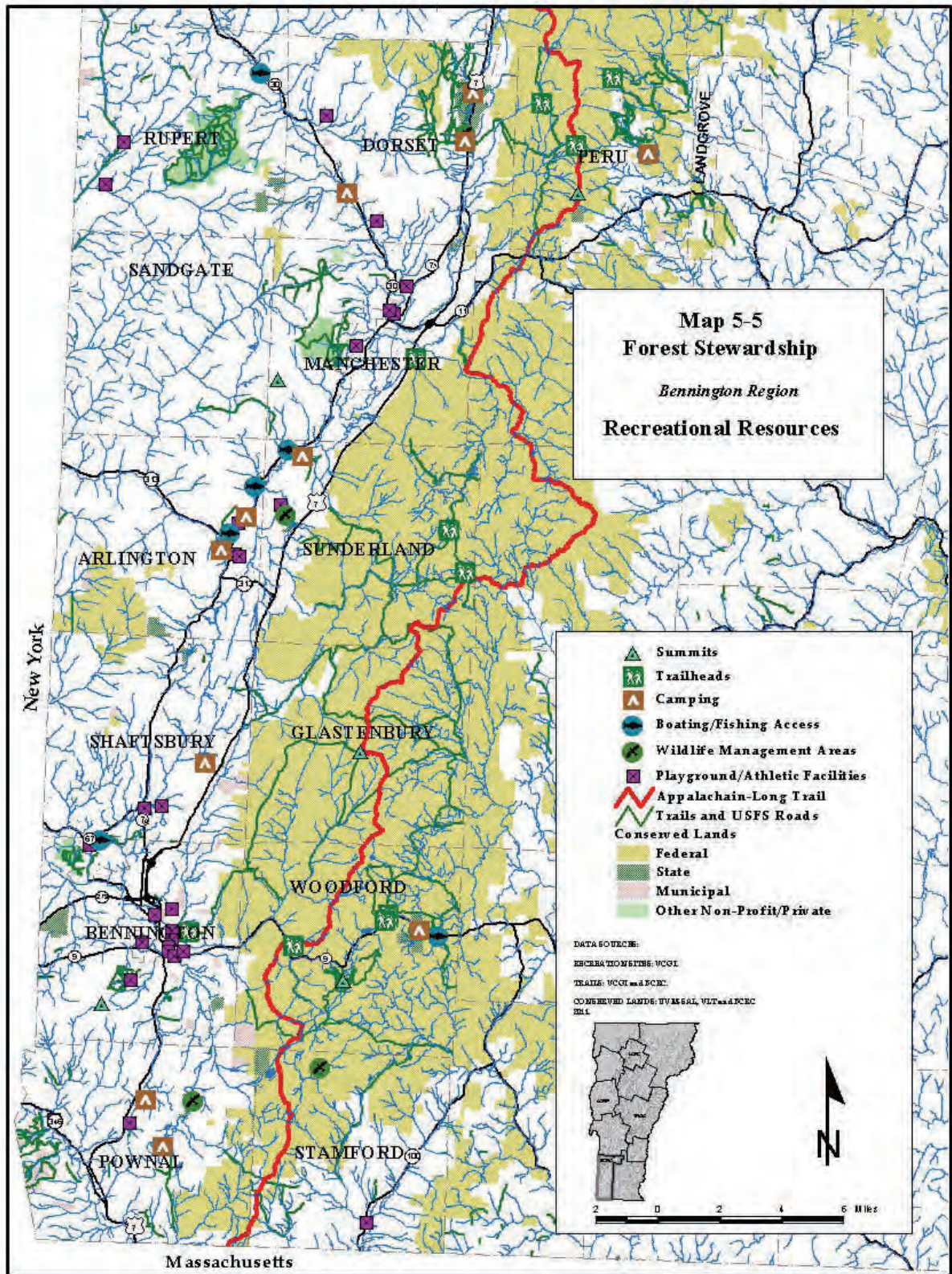
### Recreational Resources

Forests support a wide array of recreational activities in the Bennington Region (Map 5-5). Nearly half of the region is covered by public forest land (primarily Green Mountain National Forest) and privately held forest land that is managed, at least in part, for public recreational use. Public access trails are perhaps the most apparent of the specific recreational resources found in the forests. The Appalachian/Long Trail extends the length of the region, located primarily within the Green Mountain National Forest. The US Forest Service maintains a number of other trails on federally owned land and trails are available at each of the three state parks in the region. Additional trail networks are found in the forests of the Taconic Range in Rupert (D&H rail trail and Merck Forest and Farmland Center), Manchester (Equinox Preservation Trust), Bennington (Fund for North Bennington/Frost House land and Mount Anthony/Southern Vermont College), and in Pownal (Taconic Crest trail system). Other trail systems including the VAST snowmobile and Catamount Trail cross country ski route are available as well.



The Appalachian and Long Trail passes through deep forests as it traverses the length of Bennington County.

Particularly significant recreational features, in addition to the trail systems, include town and state parks and campgrounds, downhill and cross country ski centers, streams, rivers, and lakes with public access points, and unique landscape features such as waterfalls, caves, and scenic mountain summits and ledges. Most of the diffuse and long-distance trail-based recreational resources are found in the upland forest areas of both the Taconic Mountains and the Green Mountains. The shorter trail networks are located primarily in rural valley and town and village center areas, and are used frequently by residents of those communities.



## Scenic Values

Most of the municipal plans in the region include discussions of the importance of the scenic landscape; three communities have even completed inventories of scenic resources and plans for their protection. Many individual factors come together to create the region's unique and special visual landscapes, and forests certainly are one of the most important. As noted in the Peru, Vermont Inventory of Scenic Resources, "...the forests that cover much of the town are the context in which almost every view in Peru exists, and also contain endless fascinating views when traversed on roads or trails." The same could be said for all of the forests of the Bennington Region.

The publication, Vermont's Scenic Landscapes: A Guide for Growth and Protection identifies several specific attributes that make landscapes distinctive and visually appealing. Two of the most important are landscape contrast and spatial quality. Landscape contrast refers to the natural visual contrast between different elements in a view; an open field or pond set against a backdrop of a forested mountain, for example. Scenic views are enhanced by spatial quality that includes contrasting elements, such as mature trees or forested areas, that frame or define a view.

Although it is the forested mountainsides and colorful rural valley woodlots that are appreciated everyday by passersby on local roadways, people who venture deeper into the forests are exposed to a more intimate view of this wild landscape. A variety of forest types present themselves depending on one's elevation and aspect, some dominated by northern hardwood species such as sugar maple, black and yellow birch, and beech, and other areas by white pine, spruce, or eastern hemlock. As interesting as the trees are the diversity of flowers, mosses, ferns, and other herbaceous plants that live in their shadows, the animals that thrive among them, and the small natural clearings along streams, ponds, and wetlands.



Trees and forests are critical elements to nearly all of the Bennington Region's scenic views.

## VI Threats and Limitations to Forest Sustainability

The forests that cover much of the region are a vital part of our landscape and preservation of this resource is vital to our future quality of life and economic prosperity. There are limitations, however, to the amount of forestland that can be expected to be maintained in the future and there also exist very real threats to the quantity and quality of the resource. These limitations and threats can be generally classified into three categories:

- Environmental Threats—deriving primarily from chemical deposition (“acid rain” and similar pollution), climate change (affecting both forest health and species composition), and the introduction of pests and invasive species.
- Incompatible Development and Fragmentation—resulting from construction of buildings (largely residential) and supporting infrastructure in forested areas; also, subdivision of large tracts of forest land that poses challenges to long-term forest management and sustainability.
- Economic Conditions—which include the cost of maintaining forest land, the lack of economic opportunities for the use of forest resources, and related economic pressure to convert forests to alternative uses (such as residential uses as noted above or, in future scenarios, to agricultural uses).

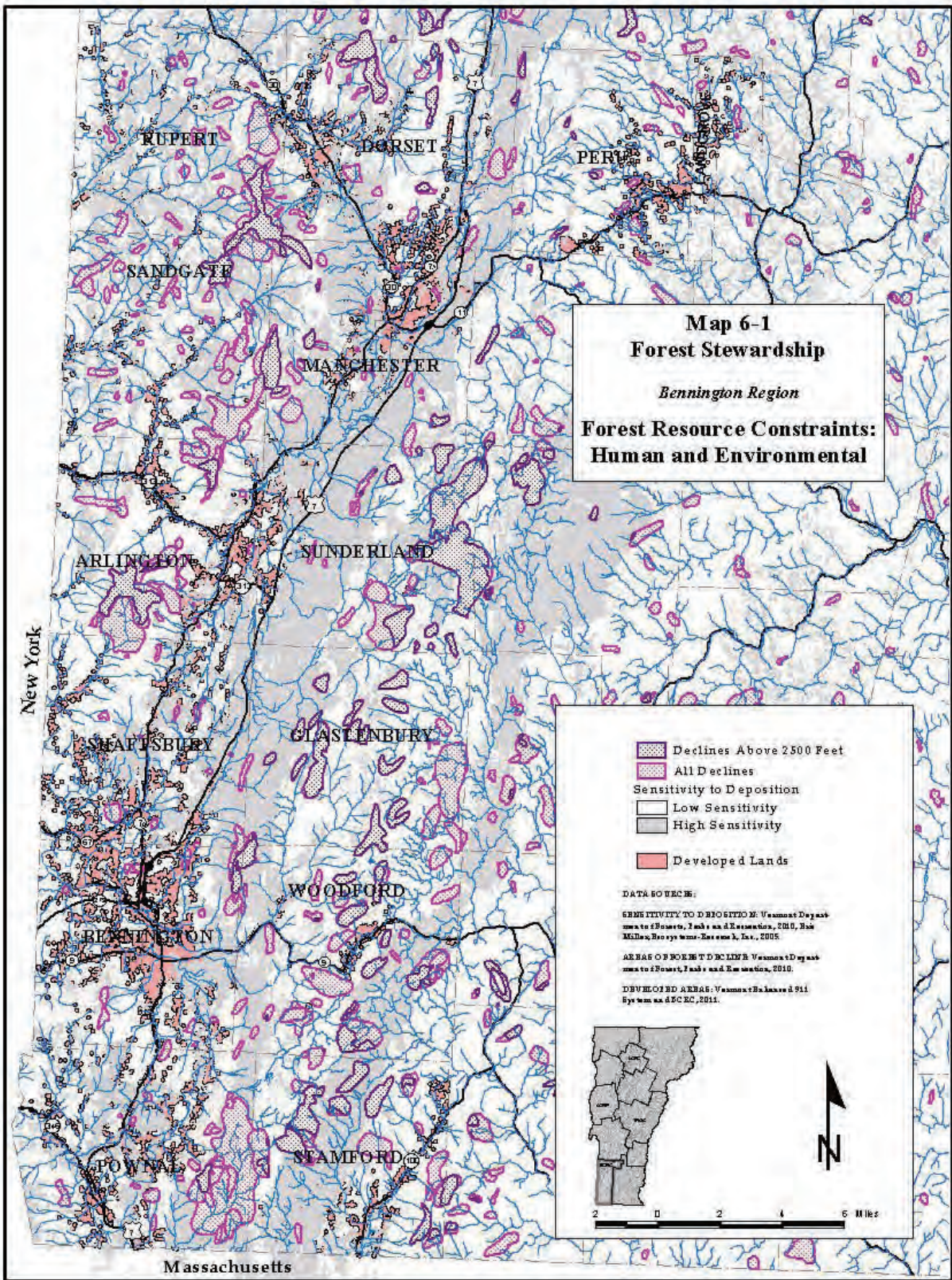
Some of the limitations may stem from the implementation of local and regional values and may prove to represent appropriate responses to difficult challenges. Others, however, are the result of external influences that are in conflict with local and regional needs and desires, and some may be attributable to ineffective planning. Once these factors are identified and understood, it is possible to determine how to best respond to minimize the loss of important resources opportunities.

### Environmental Threats

The affects of acidic deposition on forest, water, and fish and wildlife resources have been documented and understood for many years. Oxides of sulfur, nitrogen, and carbon emitted from fossil fuel combustion—coal or natural gas fired power plants, industrial processes, and motor vehicles—react with water vapor in the atmosphere to reduce the pH of rain, snow, and mist that is deposited in soil or taken up directly by plants from the atmosphere. Most of these pollutants are carried into the region from centers of population in New York, the Midwest, and southern Ontario by prevailing westerly wind flows. The Taconic and Green Mountain Ranges in the Bennington Region are among the first high elevation landforms impacted by these drifting air masses with the result being significant deposition affecting shallow soils, sensitive water features, and fragile upland vegetation.

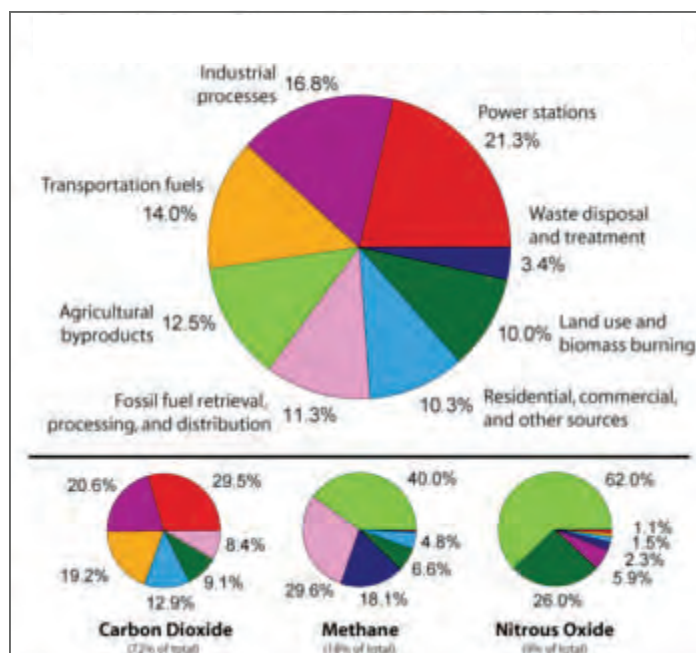
Acidic deposition harms forests in a number of ways. Soil nutrients are dissolved by the acidic waters and are washed away before they can be utilized by trees and other plants, while toxic materials such as aluminum are leached into the soil, causing direct damage to trees. In addition, acidic mist or fog can directly affect leaves and reduce their ability to carry on photosynthesis. These impacts are exacerbated in areas, frequently in upland forest landscapes, where soils are steep, thin, and poorly buffered against acidic deposition (Map 6-1). Of course, excess acidity affects other resources - streams, ponds, wetlands, as well as fish and wildlife—as damage to plants, macroinvertebrates, and other critical ecosystem elements leads to food and habitat losses.

Efforts have been made to reduce the impact of acidic deposition by requiring stricter emission controls at electricity generating and other industrial facilities, and by instituting enhanced emission



controls on cars and trucks. The problem likely will persist, however, as a continuing strong demand for electricity is expected to be fueled in large part by coal, and increasingly “dirty” (high sulfur) coal at that. Moreover, even though vehicle emission standards have improved, the number of vehicles on the road and the total vehicle miles traveled (VMT) has increased dramatically in recent years. Of course, depletion of oil and gas reserves will eventually lead to reduced vehicle use and emissions, but as that occurs, demand for electricity is likely to increase dramatically (driving increased use of coal).

Many of the same sources that add acidity to the atmosphere also add carbon, often in the form of carbon dioxide and other “greenhouse gases” that promote the retention of solar energy in the lower atmosphere, leading to an increase in mean temperatures. The consequences of a warming climate to the region’s forests can be severe. Although warming and cooling trends have occurred in the past, those changes took place much more gradually and natural progression in changes to species composition and ecosystem dynamics resulted. The process being observed presently, however, is driven by the release of several hundred million years worth of stored carbon (from the combustion of fossil fuels) at an increasing rate over just the past several decades. The resulting climatic changes are thus much more rapid, dramatic, and difficult for natural systems to respond to in a healthy manner.



US greenhouse gas emissions by sector and composition.

Specific impacts on forests of climate change are wide-ranging. Increases in carbon dioxide and temperature may have a positive effect by increasing the rate of tree growth, but increased temperatures are also likely to increase evapotranspiration, soil drying, and the frequency of short-term droughts. Spruce-fir forests, common at higher elevations in the region, are likely to significantly decline as conditions warm. Only slightly less vulnerable are northern hardwood forests whose dominant species are sugar maple, yellow birch and American beech. These forests are expected to be nearly eliminated in Vermont, replaced by species that prefer the warmer drier conditions.

For many pest species, rising summer and winter temperatures, and increased carbon dioxide will improve survival and growth, and in some cases increase reproduction. Trees stressed from low water availability tend to reduce their defense mechanisms and are more susceptible to insect or disease invasion. A number of examples exist to illustrate these concerns. Hemlock is susceptible to the

non-native hemlock woolly adelgid. Warmer temperatures may favor winter survival of this insect in Vermont, leading to increased declines and mortality of hemlock. Emerald ash borer has been eliminating ash trees across the US and when it reaches Vermont is likely to have a significant impact on white, green, and brown ash. The Asian long-horned beetle could pose similar threats to maple trees. (Vermont Agency of Natural Resources, May 2011).

Invasive plants, native (e.g., hayscented ferns) and non-native (e.g., buckthorn and barberry), are opportunistic and respond quickly to openings in the forest canopy, whether it be from natural disturbances (e.g. wind storms), forest harvesting, or declines from forest pests. Most of these non-native invasive plants have migrated from southern New England northward, and are well suited to predicted temperature increases.

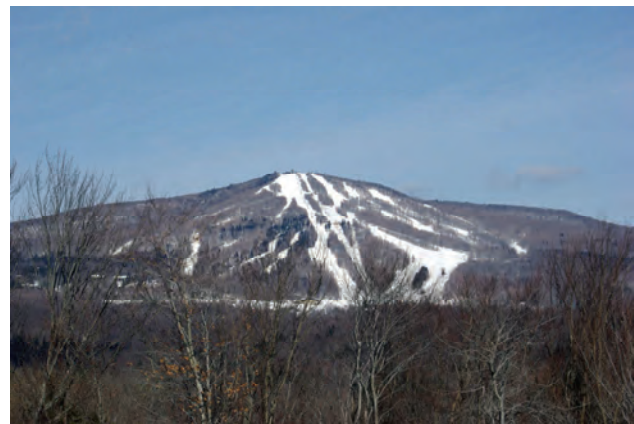
The increased energy in the atmosphere resulting from climate change also will lead to a greater number and frequency of severe storm events. In addition to direct damage to trees from high winds and saturated soils, these storms—as evidenced by tropical storm Irene that devastated the state in late summer of this year (2011) - may render forest service roads, logging trails, and other critical forest management infrastructure unusable.

The release of greenhouse gases eventually will decline, but the effect on climate and the ecosystem will persist for centuries. It is difficult to predict the precise long-term consequences of climate change; research on the effects of an increase in mean annual temperature and changing precipitation patterns is needed. Climate change is inevitable, and effective adaptation strategies will be possible only with a more thorough understanding of its complex environmental impacts.

#### Incompatible Development and Fragmentation

Management of forest resources is greatly facilitated when forest lands are uninterrupted by incompatible land uses and when forested properties are large in size (i.e., not subdivided into numerous smaller parcels with multiple owners). The practical realities, challenges, and strategies for promoting land use and ownership patterns that facilitate efficient forest management obviously vary considerably between landscape types.

The Bennington Region's upland forests are largely defined by vast tracts of unbroken forests. Non-forest land uses in these areas consist primarily of seasonal camps, utility lines, some telecommunication towers, and a few public and private roadways. Notable exceptions include the Bromley Mountain ski area facilities in Peru, the Carthusian Monastery and associated buildings in Sandgate, and the visitor center at the summit of Mount Equinox in Manchester. A limited amount of agricultural land can be found in upland forest landscape areas as well, the fields and pastures at the Merck Forest and Farmland Center being the most substantial.



Ski area development on Bromley Mountain in Peru.

As will be discussed in Section VII, regional land use policies and local zoning regulations severely restrict the type and intensity of new development in most upland forest areas. Two types of development that are allowed in these areas may have an effect on forest management. A relatively small impact may result if groups of seasonal camps proliferate in a given area; if the structures are dispersed throughout the forest rather than clustered along existing service roads effective management could be hindered. More substantial impacts may result from large-scale development of

renewable energy resources in upland forests. Developers have expressed an interest in commercial wind energy development involving numerous turbines on ridgelines, with supporting service roads and power lines, at locations in both the Taconic and Green Mountains. Developers also have explored the idea of siting commercial-scale solar photovoltaic arrays in upland forest areas. These uses are not incompatible with forest sustainability, and may actually help preserve large forested parcels in single ownership, but forest management concerns should be considered along with the ecological impacts and economic benefits of such projects.

Fragmentation of large tracts of upland forest into smaller parcels has occurred, but because development possibilities are limited in these areas, it has not been pervasive. Interestingly, a large number of separately owned parcels have been, over the years, consolidated under a single owner through purchases by the US Forest Service for expansion of the Green Mountain National Forest. All Forest Service lands are managed according to approved plans, although because of the length and complex planning and project development process, there is some concern that management of these vast forest tracts is less efficient than it might be under alternative ownership models.

Threats to forest sustainability driven by incompatible development and fragmentation are more at issue in the rural valley landscapes of the Bennington Region. Two types of rural residential development have affected forest management in these areas. Large residential subdivisions have been located in and around valley woodlots and forests, diverting a few dozen to a few hundred acres of rural land from natural resource based uses to incompatible residential uses. Although pressure for development of this type has fallen off in recent years, it still is possible given existing municipal land



Large single family residential lots scattered in rural valley forestland can adversely affect some forest uses and values.

use plans and regulations. The adverse impacts of such subdivisions can be greatly mitigated through the use of creative development techniques that concentrate development in less productive areas while preserving productive forest areas intact.

It is more difficult to mitigate the effects caused by the creation of individual large rural lots and homes scattered throughout the rural valleys. This type of development is permitted by right with limited local review and does not lend itself to any type of coordinated planning. While the effect of any given one or two lot subdivision and home construction tends to be minimal, the aggregate impacts over time in rural valley areas can be considerable. Sustainable forest management can be

challenged through creation of numerous unrelated parcels and because new property owners may not place high value on maintaining economic forest uses.

In town and village center landscapes, the principal concern is with sale of forest parcels for alternative uses. Because a range of uses, and relatively high density residential development, is allowed in these areas, there often is considerable pressure to convert these isolated, but valued, forested parcels for uses that may promise significant financial returns to the seller/owner.

### Economic Conditions

Maintaining productive forest land can impose significant costs on property owners. Unless those costs can be limited and reasonable revenues realized from sustainable forest management



activities, forest land owners will feel pressure to sell or convert their land to non-forest uses.

The property tax levied on each acre of forest land may not be large relative to taxes on other types of property, but the cumulative tax burden resulting from ownership of hundreds or thousands of acres presents a serious challenge for most owners. Programs are available to reduce the property taxes paid by owners of forest land (discussed in Section VII), but taxes remain a fixed cost of ownership regardless.

Forests have economic value, of course, and the motivation to obtain a reasonable return on these resources is in large part responsible for developing management plans for sustainable forests. Significant expenses are required to realize these returns, however, including the cost of developing and maintaining infrastructure (such as logging roads, culverts, and bridges) and ongoing operating expenses (for example, labor, equipment, and fuel expenses). Savings achievable through economies of scale are available when working large parcels or in closely coordinated work on adjacent parcels that may be under separate ownership.

The more readily accessible a market for forests and forest products, the more likely it is that the resource can be economically and sustainably developed. Significant markets do exist for forest-based recreation and tourism in the Bennington Region, and local outlets for a variety of specialty products (e.g., maple syrup, Christmas trees, and furniture and wood-craft products) have been developed. In addition, regional forests provide wood to heat the homes of many area residents. However, the region lacks industries that foster economic demand for large quantities of the type of wood that is so abundant locally. Additional institutional or community biomass heating systems, wood pellet manufacturers, sawmills, or similar local users of forest resources would increase demand for effectively managed forests while minimizing costs and simplifying the producer to consumer supply chain. Without such demand drivers it will prove to be challenging for many forest owners to operate sustainably and to maintain their forests.



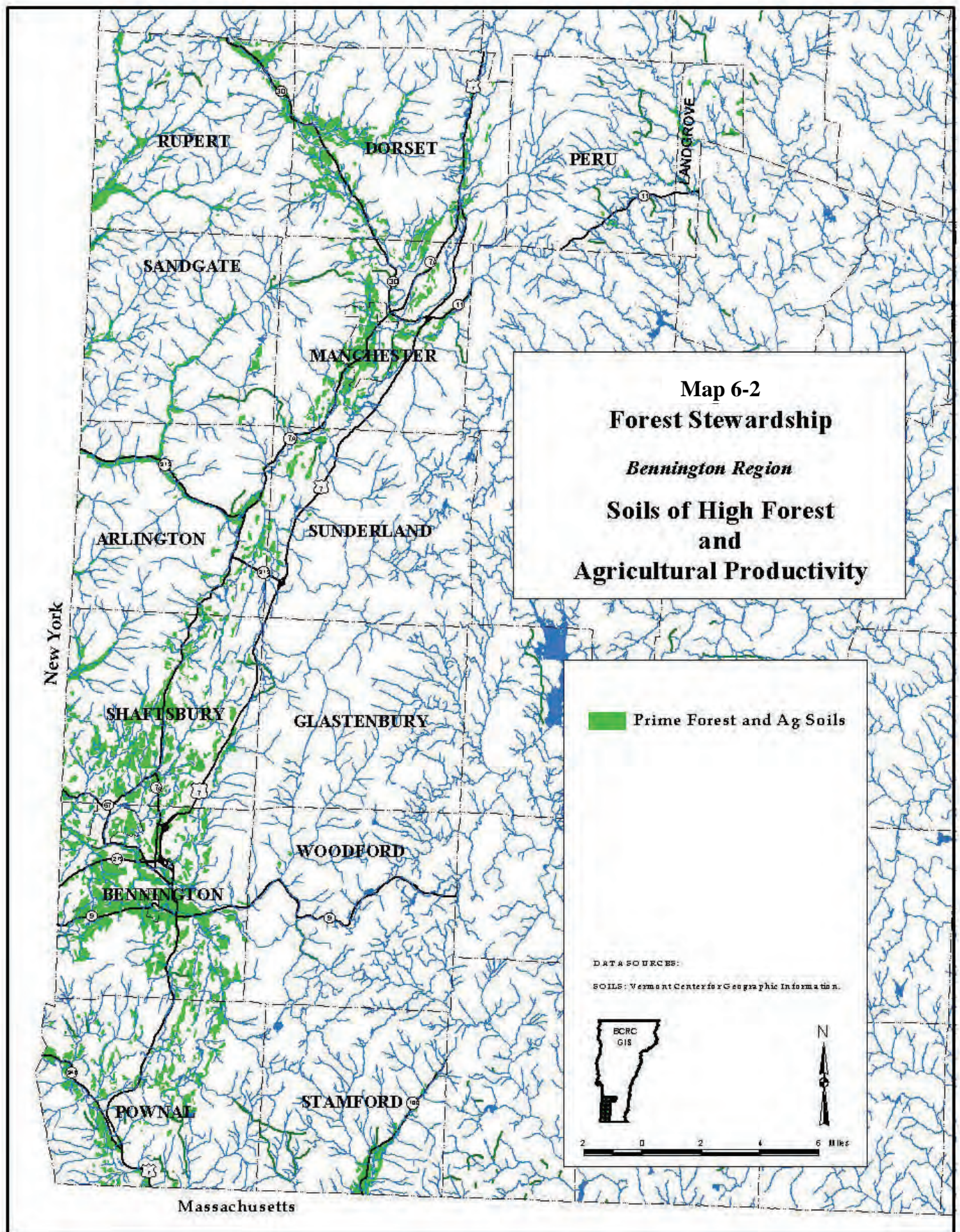
Construction and maintenance of roads to access logging sites is just one cost of active forest management.



Eagle Lumber in Stamford is one of the few primary industrial users of forest products located in the region.

One complex factor that also may be seen as a threat to some of the region's forests is that it is likely that future years will see a growing demand for locally produced food—as water shortages in the west and Midwest and increasing costs of petroleum-based fertilizers and transport fuels make increased local production more cost-effective and, ultimately, necessary. The demand for more crop and pasture land will exert pressure to convert productive forest land to food production because, as one member of the Bennington County Sustainable Forest Consortium put it, “The best land for growing trees is the best land for growing everything else” (Map 6-2). The most likely areas of

conflict between these uses will be in rural valley landscape areas because of the quality of the soils and the relative ease of access. It will be important, therefore, to identify soils and areas in rural valley



locations that are superior for forest products and to target such areas for forest land conservation. Maintaining forest cover in rural valleys and near concentrations of development will ensure ready access to forest products for local residents and maintain valuable wildlife habitat. Although there will be less demand for conversion of upland forest to agricultural uses, relatively unproductive forest soils on lower slopes of mountains would be logical sites for new pasture and forage areas for domestic livestock.

## **VII. Existing Forest Conservation Measures**

The importance of protecting the viability of forest resources has been recognized for many years and various complementary conservation strategies have been developed and employed. Existing conservation measures generally fall into three categories:

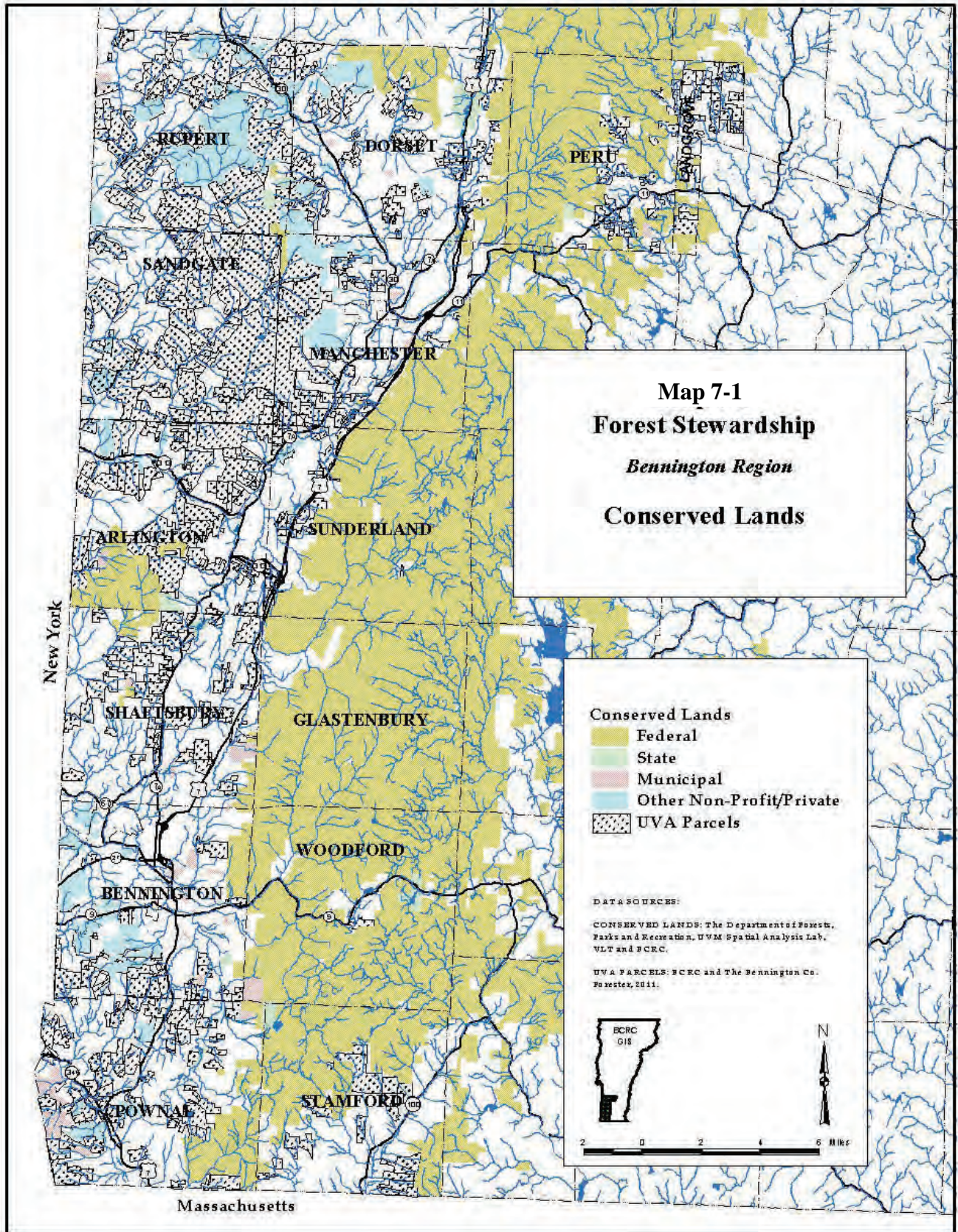
- Some form of investment, by a public entity or private conservation organization, that secures a specified level of interest in a property;
- Local or state land use and environmental regulations that limit alternative uses of all or a part of a property; and
- Economic development assistance that supports continued forest resource uses of a property.

### Public and Private Investment

The most straightforward, although often the most expensive, way to conserve valuable forest land is through outright purchase of the land by a public body (or, more affordably, donation of the land). Much of the conserved forest land in the Bennington Region has been protected in this way (Map 7-1). The United States government owns 205,817 acres of land in the Green Mountain National Forest within the region and manages the forest resource to support specified public objectives (recreation, timber production, and protecting wildlife and important natural areas). The State of Vermont and several towns own and manage smaller forest parcels. The region also includes three state parks and several small local recreational parks. Most of the federally owned land lies in the region's upland forest landscape areas, while town and state owned forest parcels are scattered throughout the region, but concentrated in rural valley locations. Municipally owned parks and recreational forest lands are found in and near town and village centers. Public ownership of these lands allows them to be managed and available for public use, but concerns are raised over reduced public revenues (property taxes) to support them.

Important forest lands also are owned by private non-profit organizations in the region. Large tracts of privately held forest land, conserved for public benefit, are found in Rupert (Merck Forest and Farmland Center), Manchester (Equinox Preservation Trust), and Bennington (Mount Anthony Preservation Society). In addition, The Nature Conservancy owns unique forest land such as the Canfield Pines in Arlington, the Equinox Highlands, the Mount Aeolus bat cave in Dorset, and Quarry Hill in Pownal. These privately conserved parcels are supported by foundations and memberships dedicated to their conservation. Nearly all of these properties are found in upland forest landscape areas.

Other investments conserve land through acquisition of a lesser interest in properties. The Vermont Land Trust, as well as some local land trusts, frequently purchase conservation, scenic, or recreational easements and development rights to protect specific resources (e.g., productive forest soils, popular trails, scenic views and open spaces) while the balance of the land rights are retained by the private owner of the property. Most of the land protected in this way is located in rural valley



landscape areas. Lands conserved by nonprofit organizations through ownership or easements amount to approximately 11,350 acres regionwide.

The Vermont “Use Value Appraisal” (UVA) program is another public investment that provides a measure of conservation for privately held forest land. When a forest land owner enrolls in this program, his/her property taxes are lowered to reflect the actual use of the land, and in return the owner must prepare and follow a forest management plan overseen by the County Forester. This program is particularly attractive since it provides a benefit (tax relief) to the owner while conserving natural resources based on a plan that supports economic and sustainable forest uses. A property owner may withdraw from the program at any time, however. Particularly common in the upland forests of the Taconic Range on the west side of the county, 79,775 acres of land currently are in the UVA program region-wide. Appendix B includes a list of conservation organizations active in the region.

### Land Use and Environmental Regulations

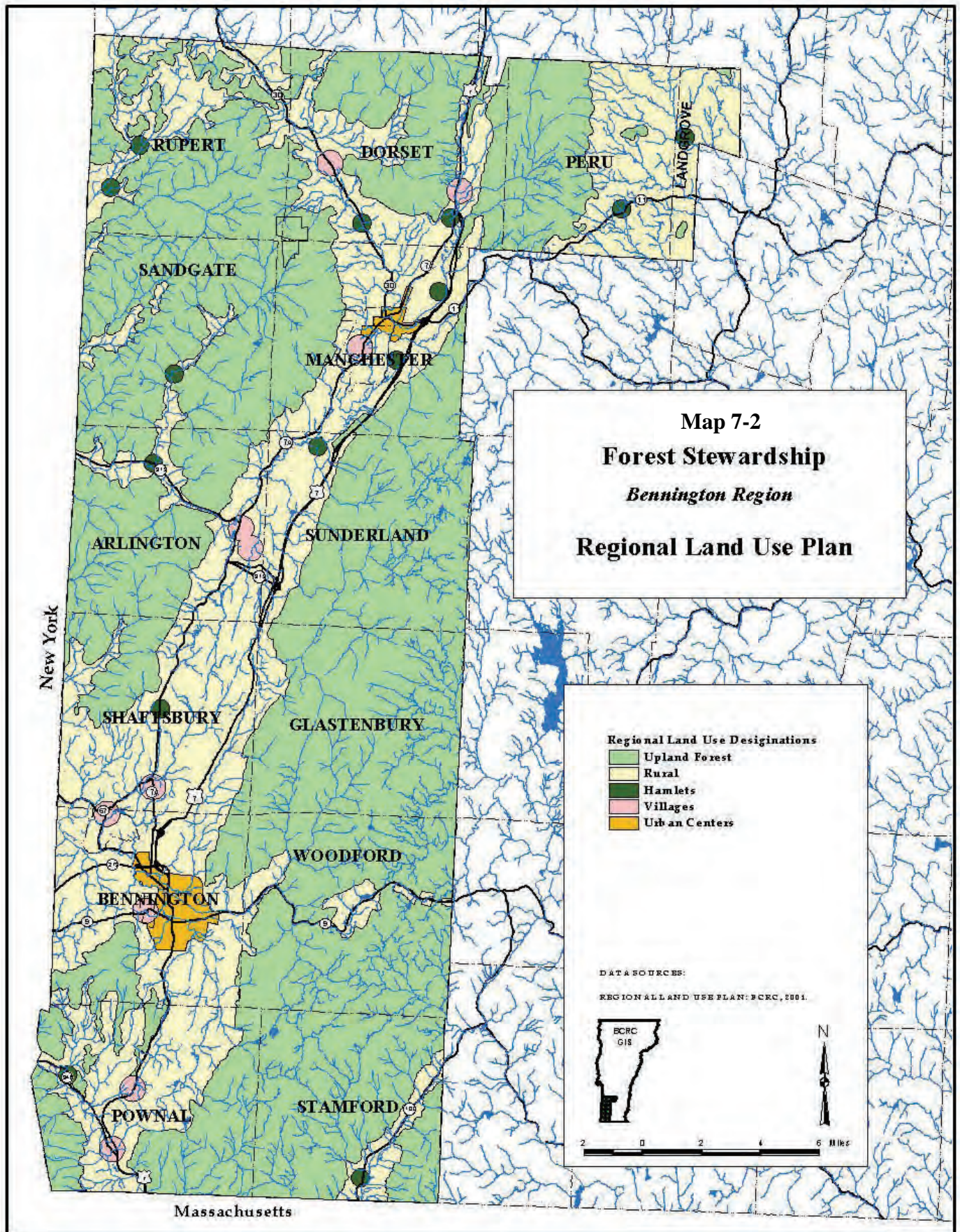
Every town and village in the Bennington Region has had land use regulations, in the form of zoning bylaws, in place for many years. Most municipalities also maintain comprehensive subdivision regulations. The zoning bylaws control the location, type, and intensity of land uses and the subdivision regulations ensure that land division is planned in a coordinated way and is supported by adequate infrastructure. These local land use regulations are based on approved comprehensive municipal plans, all of which are reviewed by the BCRC and approved if they meet statutory requirements for content and are, in turn, consistent with the adopted Bennington Regional Plan.

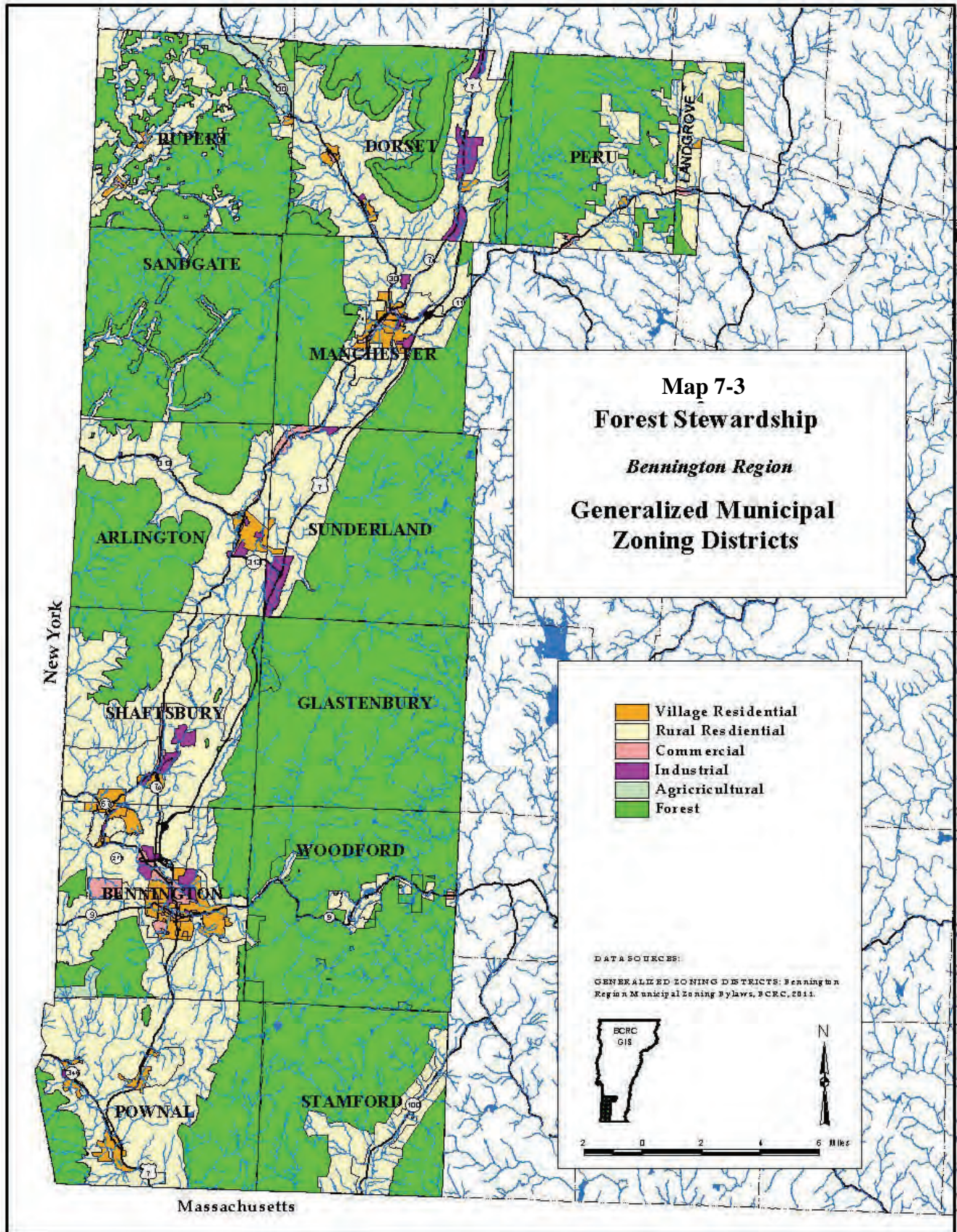
The Regional Plan’s land use policies and map (Map 7-2) provides the framework for the detailed local land use regulations. The “Upland Forest” regional planning district includes high elevation and remote forested areas, roughly mirroring the upland forest landscape zones. Uses in the Upland Forest districts are to be limited to natural resource based, low-intensity uses compatible with these environmentally sensitive and remote areas. All of the towns in the region have “Forest” or “Conservation” land use planning and zoning districts that closely follow the Regional Plan’s maps and guidelines; most restricting uses to forestry, recreation, seasonal camps, and similar low-impact uses (Map 7-3). Those towns that do allow permanent development in upland forest areas require large lots and extensive reviews before local boards to ensure that environmental impacts and burdens on public services are minimized. Refer to Appendix A for examples of regional plan and town plan/bylaw language addressing forest planning and conservation.

The Regional Plan’s “Rural” planning district covers much of the rural valley landscapes; policies encourage relatively low density residential development, agriculture, protection of important



The Rural planning district seeks to maintain the historic character of the countryside and protect important resources. The mix of open land, valley woodland, and forested mountainsides seen here in Stamford is typical of this district throughout the region.





resources, and activities consistent with the region’s historic character. Local governments apply a range of zoning standards to these areas, depending on local values and the presence or lack of supporting public infrastructure. In general, though, most local zoning bylaws allow residential densities of between one and five acres per unit, with lower densities in some critical resource areas (such as important agricultural land). Some towns also require, through zoning and/or subdivision regulations, that specific resources—including productive forest land—be conserved through careful siting of buildings, roads, and utilities.

The greatest density and mix of land uses are planned in regional “Urban” and “Village” districts and in corresponding municipal village center and downtown zoning districts. Consequently, little regulatory protection is afforded forest resources in town and village center landscape areas. Non-regulatory conservation measures, therefore, are more important in these densely developed areas.

Land use planning is limited at the state level, with most attention focused on “Act 250,” which does not control the location or type of development (aside from referencing local and regional land use plans), but does require that developments exceeding certain thresholds conform to ten criteria. Towns, the BCRC, and other parties to Act 250 hearings can request that such developments limit impacts on important forest soils and resources, but generally cannot prohibit development in an area where it is otherwise permitted.

### Promoting Appropriate Economic Development

A strong regional economy, with appropriate support for sustainable development, will promote forest conservation by providing ready markets for goods and services derived from the area’s forests. An important first step in this effort is to recognize that economic conditions in coming years will favor, and even demand, greater use of local resources and assets. Wise public policy and investments will encourage a strong and sustainable economy by directing development to areas supported by adequate infrastructure. Capital planning in the region’s larger villages and towns already support such a development pattern. This forward-thinking strategy has helped conserve important forest lands that now remain available for economic use.

State and local economic development plans and programs historically have been directed toward initiatives that support recruitment and retention of commercial and industrial businesses. Recent awareness of the potential for capitalizing on local natural resources to promote sustainable economic development—through initiatives such as the Vermont Sustainable Jobs Fund—have started to direct investment toward forest and other natural resource based businesses. Educational programs in area schools also are available to help develop the local workforce needed for forest-based economic enterprises.

Some forest landowners also have found that they are able to generate additional revenue through secondary economic activities. For example, several large tracts of land owned by forest product companies lease hunting rights to private clubs. Although this practice does generate extra income to help maintain the forest, it limits access by



The region’s Career Development Center offers a program of study in forestry.



the general public to those lands. On the other hand, some forest land owners lease land to recreation-based businesses, such as cross country skiing, that produce revenues by enabling greater public use of the land. Many extractive forest uses remove logs for timber, pulp, or cordwood; a portion of the residual branches and tops can be sold for use in biomass (wood chip direct burn or gasification) heating systems. It is important that sufficient biomass is left on the forest floor, however, to provide nutrients for the soil. Finally, telecommunication towers and renewable energy facilities owned and operated by private companies can provide rental income for forest owners with suitable sites.



Part of the wood chip based heating system in use at Bennington College.

### **VIII. Additional Strategies for Forest Conservation**

Ensuring the long-term health and viability of the region’s forest resources will require careful and effective implementation of the measures outlined in the previous section, as well as development of additional strategies that reinforce and expand upon existing policies and programs. The strategies discussed in this section fall into four general categories: regulatory tools, education, land management and marketing, and economic efforts. The specific measures are new, not widely practiced in the region, or show particular promise if developed further.

#### Regulatory Tools

The extensive local land use policies and regulations that have been put in place in the region protect forest lands and resources by limiting uses and establishing strict development standards in upland forest areas, and to a lesser extent, in rural valley landscapes. Some regulatory tools available to municipalities address the objective of forest land conservation by providing incentives or by assuring that uses which support forest-based businesses are allowed, and even encouraged, in the town.

The Vermont Planning and Development Act allows municipal zoning regulations to include

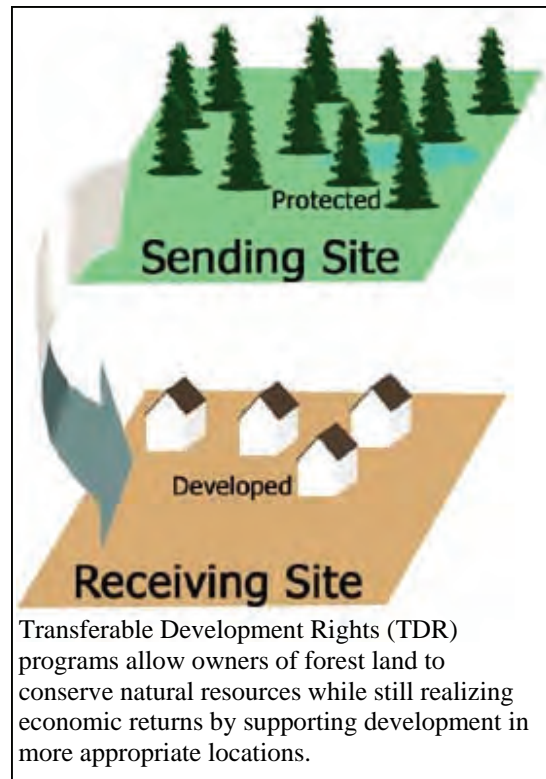
“planned unit development” (PUD) provisions that can be applied to specific districts or to developments that impact specified resources, including important forest land. When a parcel of land is developed as a PUD, the local review board (generally the planning commission or development review board) can modify specific standards (e.g., lot size, building setbacks) to achieve a design that results in a more efficient development pattern while protecting natural resources. The technique is sometimes referred to as “clustering” development, indicating that all of the development is concentrated in a relatively small portion of the original parcel.

Planned unit developments offer immediate incentives to developers because they can significantly reduce development costs. If a 100 acre parcel in a zoning district that requires a minimum lot size of ten acres is to be developed, the network of roads and utilities required to serve the resulting ten scattered lots would be much more costly than a network that served ten two-acre lots located on just 20 of the 100 acres – the remaining 80 acres reserved as undeveloped open (forest) land. The PUD regulations can be quite specific as to the resources that are to be protected (e.g., productive forest soils, important wildlife habitat, scenic views) and the local review board can work with the developer to ensure that the desired result is achieved.

Most PUD regulations are discretionary, but some towns mandate this development design in certain districts (Bennington requires PUD plans in its Rural Conservation District, for example) or if certain resources are present. More often, municipal bylaws authorize density bonuses for developments that meet PUD standards and objectives. In the example described above, for example, a municipal bylaw could allow additional house lots if the PUD design meets the objective of protecting prime forest soils and a mapped deer wintering area. If a 20 percent density bonus were offered, twelve lots could be created on the developed portion of the lot instead of the ten that would otherwise be allowed.

Another incentive-based regulatory tool authorized by statute is a zoning tool called “Transfer of Development Rights” (TDR). If a town has identified conservation of critical forest areas in a certain part of town as a priority, the zoning bylaw can designate that area as a “sending” zone. The allowable density for a parcel in that zone can be “sent” to a different parcel located in a “receiving” zone, where the town desires more dense development. Again using the hypothetical 100 acres of forest land in a ten-acre zone, the rights to develop ten units of housing on that parcel could be transferred to a parcel in a different area, perhaps in a village center where the availability of infrastructure allows for greater density. A ten acre receiving parcel in a district allowing two units per acre (20 units total) could be developed with 30 units if the development rights were transferred.

The principal challenge with implementation of TDR programs is that most municipalities have very limited potential receiving zones – largely because of a lack of either public water or sewer systems that would accommodate the higher density development. For towns with a well-defined growth area that includes the infrastructure necessary for high density development, TDRs can be a useful conservation tool, and can allow forest land owners to realize an economic benefit from the development value of their land while



preserving the forest resource.

Some towns, recognizing the limited application of a traditional TDR scheme, have combined the TDR and PUD concepts. In this hybrid scheme, the development rights from one rural valley parcel containing valuable forest resources can be transferred to another parcel, also in a low-density rural location. The result is one parcel with a “cluster” of development at a higher density than generally allowed under standard zoning regulations and another, non-contiguous, parcel that remains undeveloped, basically containing the open space portion of the two-parcel PUD. An obvious concern with this, and indeed any, TDR program is that the municipal government has to have a fairly sophisticated administrative capacity to ensure that all of the transferred development rights are documented – on both the sending and receiving parcels.

It is more likely that forest land will be managed for long-term productivity if local markets exist for the wood produced on the land. From a regulatory perspective, therefore, towns and villages should be sure that their zoning regulations permit, in appropriate locations, sawmills and other forest product processing facilities such as wood chippers, wood pellet manufacturing, and similar facilities. In addition, towns should include on-site processing of forest products (e.g., use of portable sawmills) as part of forestry activities that are exempt from most regulatory review. Although not subject to local zoning review, biomass-based energy projects do undergo Section 248 review before the Public Service Board, and that process includes an evaluation of the project’s conformance with the local plan; therefore, plans should include unambiguous language concerning the appropriate location and development standards for biomass energy projects.

Education

A greater awareness and understanding of forest practices and programs will result in more effective resource conservation and forest-based economic development. Vermont’s Use Value Appraisal (UVA) program, discussed earlier, combines conservation with active management of forests, thus promoting long-term forest health and supporting economic opportunity. The UVA program directly benefits forest landowners by providing tax relief and promoting management practices that increase the value of the resource. Additional education about the UVA program could encourage greater participation and appreciation of its benefits. Towns should include a detailed description of the program in their comprehensive plans and should support outreach efforts so that landowners are encouraged to participate and so that the general public understands the benefits of the program – and so that it is widely understood that the program is property tax neutral to local government since the state provides full reimbursement of all deferred tax revenue.

Similar educational efforts focusing on the wide variety of federal programs available to help forest landowners should be pursued as well. The US Department of Agriculture maintains information

2011 WHIP – CONSERVATION PRACTICES AVAILABLE BY FUNDING POOL			
Practice Code	Practice Name	FUND POOL NAME	
		UPLAND HABITAT	FORESTRY INITIATIVE
300	ACCESS ROAD		✓
314	BUSH MANAGEMENT	✓	✓
317	CONSERVATION COVER	✓	✓
320	CRITICAL AREA PLANTING	✓	✓
327	EARLY SUCCESSIONAL HABITAT MANAGEMENT	✓	✓
330	FENCE	✓	✓
332	FIELD BORDER	✓	✓
333	FILTER STRIP	✓	✓
336	TRAIL PASSAGE	✓	✓
346	FOREST STAND IMPROVEMENT	✓	✓
357	FOREST TRAILS AND LANDINGS	✓	✓
422	HEDGEROW PLANTING	✓	✓
51E	HERBACEOUS WEED CONTROL	✓	✓
516	PODLINE	✓	✓
528	PREScribed BURNING	✓	✓
533	PUMPING PLANT	✓	✓
640	RESTORATION AND MANAGEMENT OF DECLINING HABITATS	✓	✓
301	NEARBY FOREST BUFFER	✓	✓
574	SPRING DEVELOPMENT	✓	✓
578	STREAM CROSSING	✓	✓
582	STREAM HABITAT IMPROVEMENT AND MANAGEMENT	✓	✓
583	STREAMBANK AND SHOULDER PROTECTION	✓	✓
587	STRUCTURE FOR WATER CONTROL	✓	✓
612	TREE AND SHRUB ESTABLISHMENT	✓	✓
660	TREE AND SHRUB PRUNING	✓	✓
480	TREE AND SHRUB SITE PREPARATION	✓	✓
64E	UPLAND WILDLIFE HABITAT MANAGEMENT	✓	✓
614	WATERING FACILITY	✓	✓
657	WETLAND RESTORATION	✓	✓
644	WETLAND WILDLIFE HABITAT MANAGEMENT	✓	✓

The Wildlife Habitat Incentives Program is one of several federal programs intended to provide technical and financial assistance to forest land owners.

on a variety of such programs, which are administered through the Forest Service, Natural Resource Conservation Service, and the Vermont Department of Forests, Parks, and Recreation. A partial listing of available programs includes: Forest Stewardship, Conservation Reserve, Environmental Quality Incentives, Forest Land Enhancement, Forest Legacy, and Wildlife Habitat Incentives.

As the potential demand for forest products increases over time, it will be critically important to have a workforce trained to fill jobs and manage forest resource-based businesses. An important part of this workforce development effort is in place at the Southwest Vermont Career Development Center in Bennington, where a two-year program in forestry and heavy equipment is offered. The program introduces students to forestry science and safe operation of chainsaws and heavy equipment. Forestry students also learn about identification of trees and forest pests, tree and lumber scaling, surveying, forest management, and soil, water, and wildlife conservation. The skills and knowledge acquired in class are used in community and class projects that focus on the development of students' planning, supervision and teamwork skills. Second year students are introduced to forest management and planning, arboriculture, basic welding, Commercial Drivers License (CDL), training, and timber harvesting.



Education about forest resources should continue from elementary through post-secondary schools.

Of course, for these programs to be effective, students must recognize the value of the education and the potential career opportunities that will be available to graduates. Education about the importance of forest resources and qualified practitioners, therefore, should be taught beginning in elementary schools, and forest-based industries should be represented at all of the area's job and career fairs.

Efforts also should be made to educate the general public in the region about the importance and economic value of the forests that surround them. A focus on forestry too often appears only when a controversial logging or biomass energy project is proposed. If a greater understanding of the economic—and ecological—values of greater forest resource management were fostered, it is likely that the kind of widespread support evident in the area of local agriculture would begin to be felt in the area of local forestry as well. The Bennington County Regional Commission, Bennington County Industrial Corporation, Bennington County Sustainable Forest Consortium, and other organizations should cooperatively sponsor regular forums and workshops that highlight the positive aspects of forest management and related economic development.

### Cooperative Management and Marketing

The expense of actively managing a sizeable woodlot can be considerable for a private landowner. Logging companies also can find it challenging to maintain a positive cash flow and generate a profit because of large up-front investments in equipment and high operating costs. There may be ways for landowners and forest products businesses to more closely cooperate to reduce costs and gain efficiencies.

Landowner cooperatives can be designed both reduce each individual's land management costs and to facilitate joint marketing of forest products. Landowners who coordinate activities through a cooperative or association can share in road and other infrastructure costs, develop

comprehensive management plans, and jointly apply for state or federal assistance. Coordinating activities over multiple properties can also make the land more attractive to organizations seeking to purchase conservation easements to protect the working landscape and overall forest ecosystem health. Cooperative management also can help landowners obtain better per acre pricing from loggers, identify markets for their products, and obtain favorable long-term contracts.

By banding together, a group of forest landowners in an area can more effectively “brand” their product – obtaining market visibility and potentially a premium price. A cooperative, for example, could jointly seek third party certification – through an independent audit – to certify that its lands are being managed in a sustainable fashion. There is a very real potential for accessing markets and obtaining a premium if a cooperatives lands and products are certified by a group such as the Forest Stewardship Council, Vermont Family Forests, or the Sustainable Forestry Initiative. Green Mountain College, for example, has instituted a policy to secure all of the wood used in its biomass-fueled heating system from sustainable local growers and harvesters.



A chipping facility, jointly operated through a cooperative, can open up new markets for loggers.

Loggers and other forest product users may find it advantageous to jointly purchase and/or operate certain equipment to reduce costs and access new market areas. For example, several businesses could acquire a large-scale chipper and a site for processing and storing wood chips; low-grade wood can be brought to the facility by each of the companies with the resulting production sufficient to meet the needs of one or more institutional user of chips—such as facilities with large-scale biomass heating systems or commercial composting operations. By cooperating in this way, an adequate supply of material is sourced from local forests and combined to allow for effective and targeted marketing. The wood chip processing and distribution could be operated by one of the logging companies, with a revenue sharing agreement among all of the participating companies based on the amount of raw material supplied, or a third party operator could be hired by the cooperative.

### Economic Initiatives

Forest-based economic activity has historically been an important part of the region’s Economy; with the great majority of our land covered by forests, and with a strong demand for resources that can be provided from our local forests, the potential for harnessing economic forces to maintain a healthy forest landscape is considerable. As noted earlier in this report, local sawmills and manufacturers can use these resources to meet the needs of builders and specialized retail markets. The potential energy market, discussed below, offers additional economic opportunities. A significant need in the supply chain is for the modern and efficient equipment that is essential for a forest product business to be competitive in today’s marketplace. The high cost of such equipment, especially for the small and start-up businesses, however, discourages investment and slows the growth of this economic sector within the region. State and federal support for these investments—through programs such as the proposed Vermont Working Landscape initiative and federal Rural Business Enterprise grants would be particularly effective and should be supported.

The level of opportunity presented by the biomass energy sector of the economy, however, is so compelling that it warrants additional attention here. Wood, together with direct solar energy, is the most obvious and ubiquitous source of locally available energy. The Bennington Regional Energy Plan estimates that forests, just within Bennington County, could provide over 150,000 cords of wood per year for fuel (in addition to timber harvested for sawlogs, veneer wood, and pulpwood). That quantity of wood could easily satisfy all of the residential space heating needs for the region, with a significant volume of biomass remaining for use in commercial/industrial applications and for electricity generation. Forest resources in nearby areas of New York and Massachusetts provide additional resources that could be available for local energy utilization (from studies by the Biomass Energy Resource Center). Of course, prior to the rapid exploitation of fossil fuels that began in the late 1800s, space heating needs in the region were met almost exclusively by locally harvested wood. The use of wood as a heating fuel steadily declined as it was replaced by various fossil fuels. The local use of wood jumped noticeably after the increase in oil prices during the 1970s, but declined again in line with the falling cost of oil.

A recent study of the costs and benefits of using biomass (woodchips) as a primary or secondary fuel source at the Southwestern Vermont Medical Center documented compelling evidence that



A large portion of the region's energy needs can be satisfied by looking to a local and reliable source—the forests that cover most of our landscape.

increases in oil prices will make wood-derived fuel become increasingly competitive over time. More alarming than the inevitable increase in the price of oil is the report's finding (backed up by extensive collaborating research) that all data "clearly show a problem at some point in the next 50 years that there will likely be little oil left. It should also be noted that there are political issues that surround a large portion of the world's oil supplies...that could have a significant impact on the price and availability of oil."

Price and supply considerations, therefore, clearly argue for greater utilization of locally derived biomass fuel for space heating and, potentially, electricity generation as discussed below. A significant increase in utilization

of local wood products for energy poses some serious challenges as well, however. Much of the forested land in Bennington County is not currently available for harvesting because it is located in federally designated wilderness or other protected areas. Furthermore, long-term "sustainable" harvesting of large acreages of forest land that involve complete removal of woody biomass to maximize energy yield could deplete soil nutrients and reduce future productivity and degrade certain wildlife habitats. Net energy considerations must be considered as well, because cutting, transporting, and processing trees for ultimate use as firewood, woodchips, or pellets requires a great deal of energy, mostly derived from petroleum fuels.

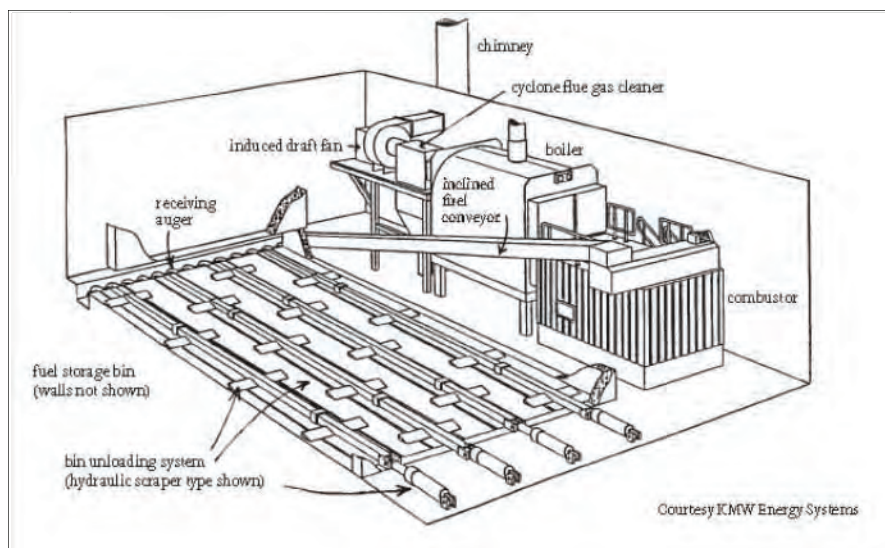
Despite the hurdles that must be overcome to make wood a significant, and perhaps primary, local energy source, its abundance, reliability, and the fact that reliance on this fuel provides jobs and recycles money in the regional economy suggest that planning for greater utilization of the resource should be pursued. Data gathered for the Bennington Municipal Energy Plan shows that residential and commercial/industrial purchases of oil and propane account for over \$25 million in spending—just within Bennington—most of which ultimately is exported from the local economy. Shifting some of

that spending to biomass fuels sourced from local forests not only results in a direct investment in the local economy, the reduced overall spending on energy allows for greater spending by residents in the local market and greater productivity-driven investments by local business and industry.

The reduced net carbon and sulfur dioxide emissions realized through utilization of biomass rather than coal, oil, or gas provide additional reasons to pursue exploitation of this renewable resource. Research on sustainable harvesting and processing, and identification of preferred locations and extent of annual biomass removal should be conducted.

Obtaining energy from wood is a relatively simple process using time-tested and proven technologies. Many homes can be heated with a single wood or pellet burning stove or furnace. Cord wood used in stoves or furnaces is readily available from many local suppliers and requires little preparation beyond splitting and drying. Pellets require more energy to produce, but also burn more efficiently and are easier to store and feed into a stove or furnace. There are no local pellet manufacturing facilities so, at this time, pellets must be shipped in from a considerable distance (reducing net energy yield of this fuel). Additional demand for pellets locally, through purchases of new residential pellet stoves and furnaces as well as pellet-fired boilers used by businesses and institutions, may provide an incentive for a manufacturer to locate in the region.

Biomass fuels are proving to be a cost-effective heating solution for many large institutions such as schools and colleges (MAU Middle School and Bennington College being local examples) as well



Schematic of a typical wood biomass heating system in use at many schools, hospitals, and other institutions around the northeast.

as industrial parks, hospitals, and other large scale users of energy. The SVMC Biomass Feasibility Study notes that the hospital campus currently burns over 700,000 gallons of oil annually – an amount equal to that burned by 1,000 average homes. Direct burn woodchip or wood-gasification boilers at such facilities can, therefore, have a dramatic impact in lessening the region’s reliance on imported oil while reducing operating costs and providing demand for local goods and services. Using waste heat from biomass heating systems also can be used to generate electricity in “combined heat and power” (CHP) systems. This electricity can provide important future generating capacity and alleviate pressure on strained electricity distribution systems, such as the “Southern Loop” that serves Bennington County.

With the likely increased reliance on electricity as a way to provide energy for everything from

manufacturing to transportation and communication, the feasibility of using wood from the region's forests to generate electricity should be considered as well. Most utilities are now planning for a future electricity generating/distribution system that relies to a much greater extent on a "distributed system" of smaller local generating plants. The Bennington Region requires approximately 50MW of generating capacity; a combination of local hydroelectric, solar, hydroelectric, and biomass generators could meet a majority of that demand. A properly sited and scaled facility could prove to be an important economic asset to the region.

Consideration must be given to the size of the site (for storage and processing of fuels), ease of access for fuel deliveries, availability of sufficient water, and the ability to generate a high net energy yield (i.e., the energy expended in all aspects of electricity production must be significantly lower than the eventual energy yielded by the facility).

## IX. Conclusion

The forests that cover much of the region's landscape represent an important part of the area's history, contribute to the unique character of our communities, and represent a significant economic development asset. Extensive unbroken forests cover much of the high elevation and remote areas in the Green and Taconic Mountain ranges, while woodlots, wooded riparian corridors, and other forested landscapes are found throughout the region's valleys and lower elevation hills. Many people interact most directly with the smaller isolated wooded areas that exist in an adjacent to town and village centers. All of these forest landscapes are important, and the conservation and wise use of the resources they contain present challenges that differ according to physical and political geographies. The overriding objective of planning for forest landscape stewardship in the region, however, is to identify key resources, understand and address threats and constraints to the use of those resources, and to provide effective strategies to ensure that those areas provide maximum benefits to our communities.

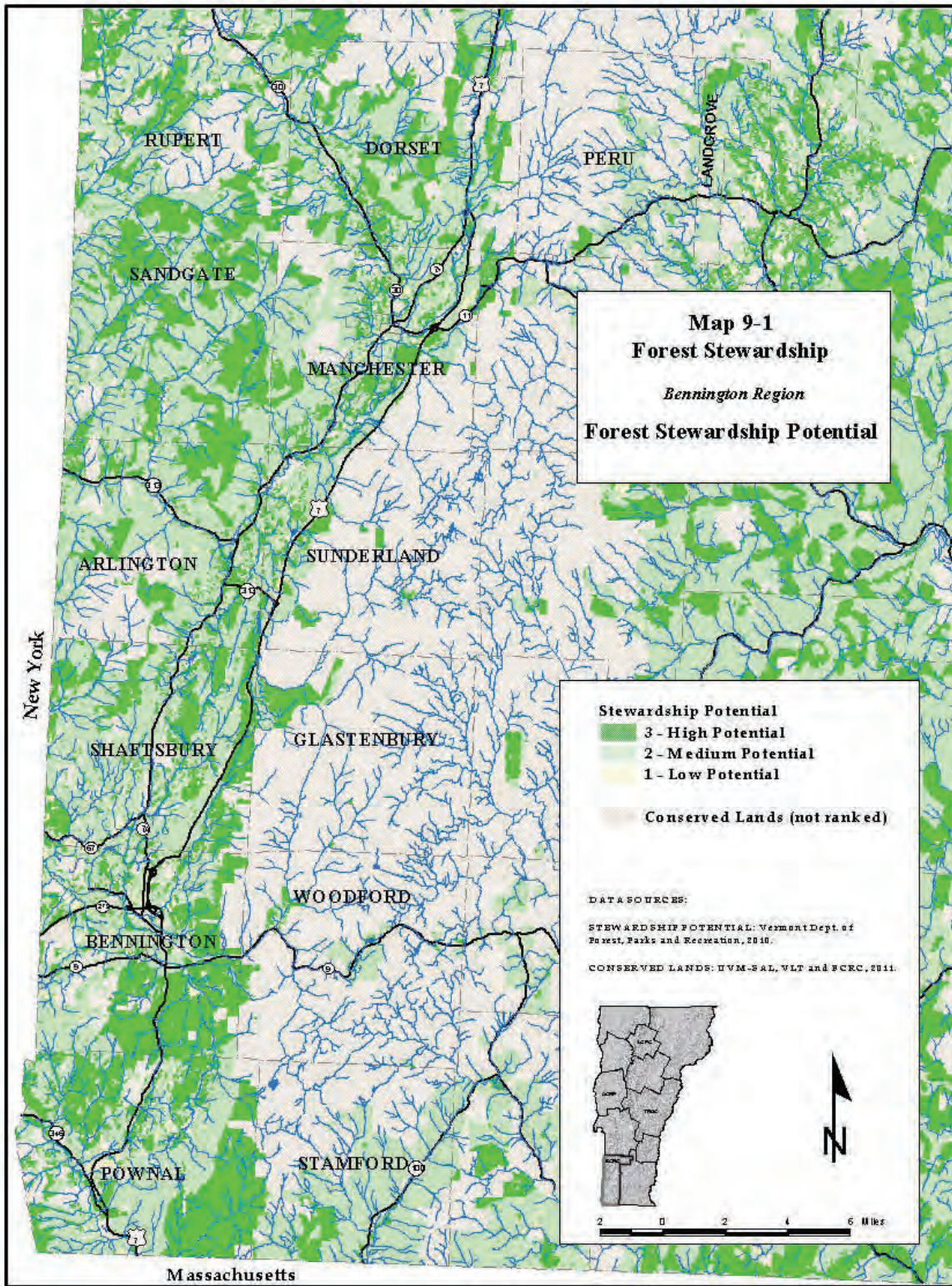
The values ascribed to the region's forests include; wood and biomass production, fish and wildlife habitat, surface and ground water resources, recreational opportunities, and scenic values. While this plan provided maps and information giving an overview of each of the resource values, the Vermont Department of Forests, Parks, and Recreation has produced a map of overall "forest stewardship potential" that aggregates many of those values for forests located on private lands (Map 9-1). It is interesting to observe that while the "high potential" stewardship lands are found in all landscape types, many are found in rural valleys and near population centers where competing uses may pose challenges for conservation and forest management. Additional threats derive from variety of sources including airborne pollutants, climate change, invasive species and pests, fragmentation of blocks of forest land, and economic conditions that make productive management of forests difficult.

A number of strategies have been employed to help "keep forests as forests" and to retain and



Site plan for a biomass-based electricity generating facility previously considered for a site in Pownal; waste heat from the process would be used in an on-site pellet manufacturing process. A similar project proposed for Fair Haven, Vermont, would also use excess heat to support a 10-acre greenhouse to supply year-round local food.





enhance their values. Ownership of land by a public or non-profit entity is an effective strategy that has been widely used in the Bennington Region - a large percentage of the region's forests have been conserved through acquisition. Other public investments, ranging from conservation easements to taxation programs such as the Use Value Appraisal program, also have benefited large areas of forest land in the region. The region also has benefited from comprehensive local land use regulations that have been coordinated through effective regional planning; as a result the potential for scattered development, particularly in upland forest areas has been limited. Historical markets for forest products and emerging markets for use of forest lands have provided economic benefits that help landowners maintain their forests.

A variety of new strategies also can support forest stewardship objectives. Regulatory tools such as transferable development rights, planned unit developments, and clearly defining forest resource based land uses as permitted uses in local plans and bylaws all can be very effective. Education at various levels also has a key role to play. Forest landowners should be educated about existing programs designed to assist with forest management, students need to be exposed to forest science and forestry in their curriculum and appropriate training programs set up and supported, and the general public needs to be better informed about the benefits for forest land conservation and resource management. Landowner cooperatives can reduce costs and open up new opportunities for marketing products. Finally, there is tremendous potential for gaining economic benefit from the region's forests, particularly in the area of developing a strong market for sustainably produced biomass from local forests.

The Vermont Natural Resources Council (VNRC) has compiled a toolbox of strategies, including all of the items described above, that municipalities, landowners, businesses, and other interest groups can use to advance forest stewardship objectives. That guide provides descriptions, examples, and links to useful resources and information.

[http://wcs.conservationregistry.org/assets/0000/0971/Planning\\_Tools\\_Matrix.pdf](http://wcs.conservationregistry.org/assets/0000/0971/Planning_Tools_Matrix.pdf)

## Appendix A

### Bennington Regional Plan and Municipal Plan and Bylaw Provisions Related to Forest Resources

It is expected that the next update of the Bennington Regional Plan, as well as updates to municipal plans and bylaw amendments, will incorporate concepts and language from this forest stewardship plan. The following excerpts are examples taken from existing documents that illustrate current planning and regulatory approaches to forest planning and conservation in the Bennington Region.

#### **BENNINGTON REGIONAL PLAN**

##### Development in Rural Areas (emphasis added to highlight forest issues in this section)

While concentrations of new development should be directed to established growth centers, some development has occurred, and will continue to occur, in rural areas outside of villages and urban centers. Such growth must be planned to avoid impacts on the region's rural character, environmental quality, and excessive costs to municipalities. Historically, rural homesteads were established in conjunction with farms, sawmills, or other land-based family businesses. In addition, small settlements sprang up at many rural crossroads and other locally convenient sites. These hamlets consisted of a small cluster of homes and perhaps a school, church, store, or some other public building. Many rural hamlets are still evident today. These areas are important as focal points for local communities and contribute to the diversity of the rural landscape. For the most part, hamlets have no public water supply or sewage disposal systems, and most of the buildings are located along one or two roads. Examples of hamlets in the Bennington region include: Rupert, West Rupert, South Dorset, Peru, Landgrove, Sandgate, Richville and Barnumville (in Manchester), West Arlington, Center Shaftsbury, North Pownal, and Stamford.

In recent decades, residential subdivisions have created new concentrations of settlement in rural areas. These developments are generally entirely residential, with self-contained road networks and on-site wells and septic systems (some subdivisions, particularly those with multi-family or clustered units, may have community water supplies and wastewater disposal systems). Subdivisions in the region range in size from a few to several dozen lots, and may consist of single-family homes on lots of one to ten or more acres, clustered single-family homes on smaller lots, or multi-family condominiums. A few examples of the many rural subdivisions in the region include: Dorset Orchard (Dorset), Bromley Brook Woods and Eagle Rise (Manchester), Wilcox Road (Arlington), the several Sunderland Hill and Bacon Hollow developments (Sunderland), and Hidden Valley (Shaftsbury). Subdivisions must be carefully planned to provide a desirable living environment for residents, and to ensure that the rural character and natural resources of the area are protected. In areas that have extensive or concentrated natural resources, including important agricultural and forest land, proposals for residential developments must retain the integrity of those resources.

Municipal bylaws should ensure that development in rural areas reflects historical settlement patterns. Scattered development in remote areas with poor access to town centers must be avoided. New subdivisions must incorporate the positive characteristics of earlier rural settlements: a community identity, public open spaces, preservation of economically important resources (such as agricultural soils), and so on. Many of these objectives can be realized by clustering lots to create a hamlet-type character around the 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 roads and other infrastructure need not be as extensive or costly to construct and maintain.

Agriculture, forestry, recreation, and other land uses that rely on the region's natural resources are appropriate uses in rural areas. Certain small-scale industries, especially those related to the region's agricultural and forest resources (e.g., dairy products, saw mills), may be compatible with, and most appropriate in, outlying rural areas. Properly planned residential development may be accommodated at overall densities of one to two acres per dwelling unit in valley areas where there are few physical or economic impediments to growth. Residential densities of three to twenty-five acres per dwelling unit are appropriate in rural areas that are more remote, are at high elevations or have other physical limitations, or which lie in agricultural zones (where clustered development to preserve open land also may be appropriate). Rural developments also must comply with local and state regulations pertaining to water supply and wastewater disposal to ensure protection of public health and the environment. In any event, rural development must not be widely scattered throughout the countryside, but should occur as relatively compact and cohesive units that serve to reinforce, rather than to replace, the region's rural character.

### Upland Forests

The 'Upland Forests' comprise the most extensive planning area in the Bennington region. This area includes the remote and rugged lands of the Green and Taconic Mountains, as well as isolated valleys such as Black Hole Hollow in Arlington; essentially all of the land outside of villages, urban centers, and rural valleys. In total extent, upland forests cover approximately 266,500 acres, or 72 percent of the region's land area. Most towns in the region have zoned these areas as "Forest" or "Forest and Recreation" districts where most permanent development is either prohibited or allowed only in certain areas on very large lots with strict environmental controls. Such stringent regulations are attributable to the conditions characteristic of upland forests. Steep slopes often in excess of 20 percent predominate, year-round roads and permanent structures designed for sustained use are largely absent, and population centers and public services are quite distant. Lands 2500 feet or more above sea level (all of which are included in the upland forest planning area) demand special attention. In addition to the limiting characteristics noted above, lands at such high elevations are very fragile because of a relatively cold and moist climate, shallow, poorly drained, and easily erodable soils, and the presence of delicate ecological communities. Although presenting many limitations to development, upland forests provide us with many tangible benefits that must be protected.

Natural resource conservation and management are preferable to the development of permanent improvements and structures in upland forests. Conservation of the upland forests serves to support the following regional and local objectives:

- \* Protection of important ground water recharge areas and sources of clean surface waters.
- \* Protection against soil erosion and downstream flooding.
- \* Maintenance of the forest resource for silviculture and recreational use.
- \* Preservation of natural beauty and rural character.

- \* Preservation of long-abandoned historic and archaeological remains and sites (cellar holes, mill seats, charcoal and lime kilns, etc.) that still remain in our forested areas.
- \* Prevention of costly and poorly planned scattered growth.

Of course, many activities are appropriate in upland forests. Economically important forestry practices such as logging and maple sugaring are natural ways to derive benefits from these areas. Because of the potential for environmental damage when working in upland forests, it is particularly important for loggers to abide by the acceptable management practices (AMPs) prepared by the Vermont Department of Forests, Parks, and Recreation. Numerous outdoor recreational activities benefit from the region's extensive upland forest areas. Hiking, camping, hunting, camps for hunting or other occasional use, cross-country skiing, snowmobiling, and horseback riding are representative of the recreational activities that are appropriate in upland forests. Limited commercial natural resource based recreation facilities (e.g., campgrounds, cross-country ski centers) may be appropriate in areas with adequate existing access roads. The economic importance of the upland forests is further evidenced by the many vacationers who are attracted to the region by the abundant opportunities for such recreation. Caution must be exercised, however, in those areas located above 2500 feet in elevation; large group camping areas, all-terrain vehicle (ATV) use, and similar activities that would easily damage this fragile environment must be avoided. Certain important public facilities – wind energy generating stations, for example – may be sited in upland forests in appropriate locations and with proper environmental controls. Such facilities will, by their nature, be visible over a wide area, so planning studies should be undertaken to ascertain locations that are both economically viable and which are acceptable to residents of the region. The growth in cellular/wireless communication towers or facilities is discussed in greater depth in a subsequent chapter. A modern and state-of-the-art telecommunication system is an essential economic resource for the region. However, its development should be in accordance with an overall plan to avoid an excessive number of towers as industries compete for a growing market.

No discussion of the region's upland forests would be complete without mentioning the Green Mountain National Forest. A large percentage of land in the Green Mountains is owned and managed by the United States Forest Service. These lands are maintained and managed for the public's use and enjoyment. Forest management plans for the Green Mountain National Forest stress multiple uses of upland forest areas: timber production, wildlife habitat, wilderness preservation, and recreational uses are all important elements in these plans. The Forest Service recently completed an update to the Land and Resource Management Plan, which will guide management for the next 10-15 years. The regional office of the Forest Service wishes to work cooperatively with town officials and the BCRC in developing management plans and identifying parcels suitable for acquisition.

### Policies and Actions

- New development should be concentrated in and around established growth centers; scattered development that is remote and has little relationship to existing settlement patterns should be avoided. Distinctive edges between urban and village centers and rural countryside become obscured with the advent of sprawl. Municipal plans and zoning should strive to retain a clear boundary between the urban/village areas and countryside.
- In rural areas, emphasis should be placed on the conservation and use of natural resources and the avoidance of costly scattered development that is disruptive of the region's rural character. Low-

density residential, commercial (small general/convenience stores, home occupations) and compatible recreational uses are also appropriate in rural areas. Planned commercial or mixed uses within existing roadside commercial zoning districts must be carefully planned to avoid the appearance of sprawl, traffic congestion, or safety concerns. Roadside commercial areas should not be expanded and should be retracted when feasible and appropriate. Development should reflect historic settlement patterns and preserve important resources, such as productive agricultural soils. Creative land use techniques should be used to retain the integrity of special natural resources.

- The development of permanent improvements and structures for year-round use is inappropriate in upland forest areas (although certain important public service facilities may be permitted with proper controls). The conservation and wise use of natural resources in upland forests should be emphasized; forestry and outdoor recreation are appropriate activities in these areas. Special care must be exercised in areas where the elevation exceeds 2500 feet, because of the fragility of the environment. Acquisition of important upland forest parcels by the United States Forest Service is encouraged.
- The BCRC should continue to offer assistance to municipalities in the area of land use planning. Specific activities should include:
  - Conduct workshops, prepare model bylaws, and undertake other educational projects dealing with creative planning techniques such as: cluster (open space) subdivision, agricultural and forest land conservation, historic district ordinances, and performance standards for commercial and industrial developments.
  - Continue to work with the United States Forest Service and towns to develop forest management plans and establish criteria for identifying upland forest parcels that are appropriate for public acquisition and other areas that may utilize federal funds.

### Agricultural and Forest Lands

#### Forests:

Extensive forests cover much of the Bennington region, particularly in the Green and Taconic Mountains. Numerous smaller woodlots are found throughout the valley areas. All of these woodlands help to prevent soil erosion and flooding, contribute to air and water quality, and provide valuable timber, wildlife, recreational, and aesthetic resources. The economic importance of the timber industry has historically been of great significance in the region, and continues to contribute to the area's economic diversity. The array of recreational uses supported by the region's forest lands is particularly impressive: hunting, camping, hiking, cross-country skiing, snowmobiling, and mountain biking are a few of the more popular activities. Many people in the region make use of their sugar bush to produce maple syrup or maple sugar, and several of the larger producers derive significant economic benefits from the activity. To protect these many values, it will be necessary to ensure the continued existence of the forest resource.

Fortunately, much of the region's forestland is located in rugged mountainous areas and has thus not been developed. In fact, with the decline in both agricultural land use and the demand for wood prod-

ucts during the twentieth century, the amount of forested land has actually increased. Recently, however, there has been a strong market for good quality saw timber. While a strong market makes improvement harvests in many woodlots commercially viable, it can also persuade some landowners to liquidate the timber resource completely. Research suggests, however, that the private owners of the majority of the region's forests are not motivated by economic incentives alone. In fact, most forest owners highly value the non-economic resource attributes of the land. Nonetheless, the threat of permanent conversion to non-forest uses looms large when ownership passes to younger generations or other new ownership. There is a need to ensure the continued protection and management of this resource so that it will continue to serve the public.

Many of the preservation strategies for agricultural lands are equally applicable to forest lands. Most of the towns in the region have zoned upland forest areas to permit only forestry, recreation, and other uses that will protect the value of the resource; such zoning designations are proper and should be maintained. The Vermont Department of Forests, Parks, and Recreation has provided information to encourage and assist communities in the development of a forest land evaluation and site assessment (FLESA) program to identify important forest lands. The Town of Dorset has developed a useful FLESA model. Use value taxation, creative development techniques, and acquisition of land or development rights can also be used to protect forested parcels that have been found to be valuable to a community.

The education of woodland owners has been greatly enhanced by the Vermont Current Use Program that requires the landowner to create and implement long-term forest management plans. Other programs sponsored by the Woodlands Owner's Association and the Department of Forests, Parks and Recreation have increased woodland owner's awareness of management options that combine timber improvement and utilization with enhancement of wildlife habitat. Professional programs for loggers and other forest workers such as the Logger Education to Advance Professionalism and the Game of Logging programs have increased safety levels while improving forest management practices.

Public access to forests is made possible through the largesse of landowners and the extensive public holdings in the Green Mountain National Forest. As more and more private lands are closed to the public, the importance of the National Forest lands grows. Eight Bennington region towns (all those that would be affected) voted to support extension of the National Forest proclamation boundary westward to include the Taconic Range. The extension was approved by the Vermont Legislature in 1989, and by the United States Congress, and was signed into Law by the President in 1991. Lands within the proclamation boundary may, with the approval of the Town and landowner, be added to the National Forest, thus ensuring continued public access to these areas. National Forest acquisitions in the Taconic Range include lands in Arlington, Dorset, Manchester, Rupert and Shaftsbury.

In February 2006 the Forest Service adopted The Green Mountain National Forest Land and Resource Management Plan. The BCRC participated throughout the planning process by hosting 13 local planning group meetings as well as submitting written testimony supporting Management Alternative E. The BCRC will continue to support the planning programs of The Green Mountain National Forest.

### Policies and Actions

1. The surface waters of the Bennington region are extraordinarily valuable natural resources that must be protected from incompatible development and land uses. The natural characteristics and

values of these resources should be preserved. An undisturbed buffer of at least 50 feet in width should be maintained, wherever possible, between any developed area and a river, stream, lake, pond, or wetland to ensure that water quality and natural ecosystems are protected. Greater buffer distances often will be required depending on the nature of the land and affected waterway. The density and type of new development in shore land areas may need to be limited to a greater extent than in other areas in order to prevent environmental damage and protect the values associated with these resources.

2. Recreational uses such as fishing, canoeing, and swimming are appropriate in natural settings in and along rivers, streams, lakes, ponds, and wetlands. Development planning should include provisions for public access to these resources. The intensity of use and access points should be limited in particularly fragile ecological areas, especially when motorized vehicles are concerned.
3. Development in floodplains must be carefully controlled in accordance with flood hazard area regulations. Development is strongly discouraged in flood hazard areas.
4. Aquifers and ground water recharge areas (including all designated source protection areas) must be protected from activities or development that would adversely affect the quantity or quality of available ground water. Municipal subdivision and health ordinances and the regulations of the Vermont Agency of Natural Resources must be strictly enforced to protect individual water supplies.
5. Developments or activities that would significantly degrade air quality in the region, or that would impede economic development in the region, should not be permitted. Efforts to limit air quality degradation from sources beyond the region should also be supported.
6. Public sector planning and investments should promote growth in designated growth centers and discourage scattered development in outlying areas that would result in the loss or fragmentation of important agricultural or forest lands.
7. Developments on agricultural lands shall be planned so as to preserve the viability, or potential viability, of the site for agricultural use. Developments should also include the objective of maintaining the values afforded by woodlands on or near the site.
8. Silvicultural practices that minimize soil erosion and impacts on roads, streams, wildlife habitat, and the natural appearance of mountain and ridge tops should be employed.
9. Developments should be planned and permitted so as not to preclude the future utilization of important earth resources.
10. The extraction and processing of earth resources and the disposal of wastes must not have an unduly harmful impact on the environment or surrounding land uses and development. Upon completion of the extraction or processing, the site should be restored and left in a condition suited for an approved alternative use.
11. An activity or development in the vicinity of an important natural area or wildlife habitat must be carefully planned so that adverse impacts are avoided.



12. New construction on visually prominent shorelines, hillsides, or ridges should include provisions for siting and screening buildings to protect important scenic values. Towns in the Bennington Region are strongly encouraged to adopt appropriate ordinances to ensure that scenic values, including the natural appearance of view sheds and ridgelines, are protected adequately.
13. Acquisition of land, easements, or development rights by a public entity or nonprofit conservation organization is an appropriate method to protect important resources or to provide public access for recreation.
14. Owners of valuable agricultural and forest lands should be informed of the Vermont Current Use Program and encouraged to participate in that program.
15. The BCRC should continue to participate in cooperative planning for regional water resources. Such projects may consider issues related to environmental quality, public health, recreational use and public access, fish and wildlife habitat, and aesthetic values, and should involve representatives of town governments (in the region and in neighboring regions and states, as appropriate), special interest groups, and other interested persons.
16. The BCRC should compile a resource manual for municipalities that contains model bylaws that will aid in the protection of important surface waters and aquifers and ground water recharge areas.
17. Efforts to acquire important shoreline and public access areas in rural areas should be supported, as should improvement projects (such as riverfront parks and building renovation and reuse) along waterways in urban and village areas.
18. The BCRC should participate in environmental reviews of developments that could have regional air quality impacts.
19. The BCRC should work with towns, perhaps through conservation commissions, in developing LESA and FLESA programs for their individual communities, and should assist towns in the identification of suitable preservation strategies. The results of local LESA and FLESA projects should be reviewed to aid in the identification of regionally significant agricultural and forestlands.
20. If a town is interested in using a creative technique such as a transferable development rights zoning system to direct growth in a certain way, the BCRC should help that town with a pilot project that could serve as a model for other towns.
21. BCRC will continue to support acquisition of important forestlands by the U.S. Forest Service. Acquisition of development rights provides an alternative to fee ownership.
22. The BCRC should prepare background information and model regulations to be used by municipalities to support the protection of agricultural lands, scenic uplands, and other important open space areas. The BCRC has worked with the Town of Bennington to develop such provisions which have been adopted as permanent amendments to the Town's Land Use and Development Regulations.
23. The BCRC should compile an index of characteristics of key wildlife habitats to help local planning

commissions and conservation commissions.

24. Construction of ponds is strongly discouraged, unless fed by ground water and/or overland drainage, or is essential for fire protection. In-stream ponds are discouraged on all streams that support fish life. In cases where feasible alternatives do not exist, in-stream ponds on seasonal streams, or off-stream ponds that discharge directly into a stream may be acceptable provided that the pond waters do not violate Vermont Water Quality Standards.
25. Development should be designed and sited in a manner to preserve contiguous areas of active or potential wildlife habitat. Fragmentation of significant and necessary wildlife habitat is discouraged.
26. Large contiguous tracts of forests should be managed so as to maintain the diversity of age and species of tree cover necessary for shelter and food supply for deer, bear and other large mammals and birds. Uneven age management of forest areas is encouraged in order to enhance or maintain the quality of the resource.
27. It is in the region's interest to conserve large tracts of bear habitat whenever possible and to adopt cluster land use concepts in zoning bylaws as a mechanism for maintaining contiguous forest cover. Undeveloped buffer zones should be maintained around identified critical bear habitats.
28. Encourage Federal, State, and local acquisition of land and facilities well suited for outdoor recreation, provided that the adequate financial and management arrangements are made with involved governments.
29. The Regional Commission encourages towns that have not already established Conservation Commissions to do so.

## **SHAFTSBURY TOWN PLAN**

### Forests

Extensive forests cover much of Shaftsbury, particularly on West Mountain and the ridges and hills in the eastern part of the town. Numerous small woodlots dot the landscape in and around village and agricultural areas. All of these woodlands help prevent soil erosion and flooding, and provide valuable timber, wildlife, recreational, and aesthetic resources. Consequently, municipal planning and private developments should include the objective of maintaining natural vegetative cover to the greatest extent possible. With the expansion of the Green Mountain National Forest proclamation boundary to include the Taconic Range, some forest land in the northwest part of Town has become federally owned and managed. Public access to this land should be maintained and a solution to the degradation of trails by motorized vehicles and poor logging practices should be found. Motorized vehicle overuse represents a serious threat to road stability in all forests.

### Wildlife Habitat

The diverse natural environments in Shaftsbury provide habitat for a wide range of wildlife species .

Mature softwood and hardwood forests, young second growth woods, open farmland, rocky ledges, lakes, streams, and wetlands all combine to support populations of large and small mammals, birds, fish, reptiles, and amphibians. The most important factor in maintaining viable populations of these animals is protection of their habitats and travel corridors. For example, the Vermont Department of Fish and Wildlife has identified important winter deer ranges in the Town; these areas are crucial to the survival of deer herds in the region as they provide shelter and browse for deer during the winter months. Other key habitat areas should be mapped to help protect such areas from incompatible development.

### Hillsides, Ridgelines, and Mountains

The natural appearance of Shaftsbury's numerous hillsides, ridgelines, and mountains are fundamental to the Town's rural character and appeal. A single development sprawling across or along a prominent hillside or ridgeline would seriously degrade these aesthetic values. These uplands also tend to be environmentally fragile due to prevalent steep slopes, poor soils, and inadequate infrastructure. Such lands should be regulated to minimize the potential for substantial changes in topographic features, destruction of vegetation, or other visual/aesthetic degradation, and to minimize erosion, pollution of ground or surface waters, and flooding in lowland areas. However, special consideration should be given to wind energy projects.

Wind energy is a renewable resource that can be effectively utilized only by erecting turbines on ridgelines that are exposed to reliable winds. The town recognizes the value of wind energy and supports development of carefully sited and designed wind energy systems.

### Policies and Recommendations

- Development planning should recognize the use potential of soils. Where possible, the development or subdivision of lands with high potential for agriculture, forestry, public water supply, wildlife habitat, or mineral and earth resource extraction should provide for the continued or potential use of the land for these land uses.
- Future growth should occur on land with relatively few topographic limitations to development, thus reflecting historic development patterns. Permanent development should not be permitted in the high elevation and rugged backcountry areas identified as "Forest and Recreation" on the Town Plan and Zoning maps.
- Developments should be planned so as not to significantly diminish the values afforded by woodlands on or near the site.
- Silvicultural practices which minimize erosion and impacts on roads, streams, wildlife habitat, and natural areas, should be employed.
- Large blocks of productive forestland should be identified and fragmentation of parcels within these blocks discouraged.
- Public sector planning and investments should promote growth in centers near existing villages, and discourage excessive scattered development in outlying areas that would result in the loss or

fragmentation of important agricultural lands.

- Developments on agricultural and forest lands should be planned so as to preserve the viability, or potential viability, of the site for agricultural use.
- Development planning should identify important wildlife habitat and should incorporate appropriate protection measures. Examples of such measures are: the maintenance or provision of natural buffers between developed areas and wildlife habitat, the maintenance of vegetated corridors along streams, shorelines, and between otherwise separate habitat areas, and utilization of construction practices that minimize environmental disturbances.
- New development on hillsides, mountains, or ridgelines - with the possible exception of wind energy generation projects - should be situated or screened by vegetation, so as not to be prominently visible from off-site locations.
- Development on hillsides, mountains, or ridgelines should be carefully planned to protect the environment.

## **BENNINGTON TOWN PLAN**

### **Land Use Plan**

The town seeks to direct growth and development in a way that reinforces the existing settlement pattern of a concentration of mixed uses within the Urban Growth Area surrounded by open rural countryside. A sufficient amount of land must be available to support new growth and economic development opportunities. At the same time, policies and regulations must be implemented to ensure that new development enhances the town's unique character and furthers this Plan's Vision Statement and Goals.

### Rural Conservation District (RC)

Rural Conservation Districts are located in valley areas outside the Urban Growth Area which have retained their rural and open space character. Considerable acreages of agricultural land exist in these areas, along with extensive woodlands and low density residential development. The purpose of the Rural Conservation Districts is to preserve this distinctive rural character while accommodating low density residential development in a manner that avoids the need for public water supply and public sewer systems.

Agriculture, forestry, very low density single-family residential development, and certain limited uses that are suitable in rural areas are permitted in the district. Additional standards apply to college buildings, cultural institutions, and the adaptive reuse of historic structures as bed and breakfasts. Subdivisions must protect important agricultural land, natural, and scenic resources; major subdivisions must meet the standards for residential Planned Unit Development.

Connections of any building to the municipal wastewater treatment system may only be approved if the Development Review Board finds a compelling public health threat, and such connection cannot be used to expand the use.

Specific design standards shall apply to new development in the Rural Conservation Districts in recognition of the existence of a concentration of agricultural and forest lands and to pro-

protect the extraordinary scenic resources such lands and uses provide. Any use in the Rural Conservation District, including single-family dwellings, shall require approval under those regulatory guidelines. Development in this area cannot be sited in prominently visible locations on hillsides or ridgelines, shall utilize earth tone colors and non-reflective materials on exterior surfaces of all structures, and must minimize clearing of natural vegetation.

#### Forest District (F)

The Forest Districts encompass Mount Anthony, Whipstock Hill, and the forested western flanks of the Green Mountains in the northeastern and southeastern parts of town. The land in these areas is characterized by steep slopes and the absence of development or improved roads. These forested mountains also provide an important scenic backdrop that is an integral part of the town's rural character. The purpose of the district is to provide for commercial forestry uses and the protection of timber and wildlife resources.

Permitted uses are restricted to forestry, small seasonal camps, appropriate open space based public recreational uses, and telecommunication facilities. Any building development must meet additional standards that are designed to limit their size, environmental, and aesthetic impacts.

Any development of telecommunications facilities must conform to standards which are designed to accommodate the communication needs of residents and businesses while protecting the public health, safety, general welfare, and scenic character of the town.

#### Public Open Space Districts (POS)

The Public Open Space Districts include several existing public open spaces: Willow Park, Memorial Park, Beech Street Park, Stark Street Park, the "Y Woods," the Leonard J. Black property, and the Bradford-Putnam Wetlands. The purpose of the district is to recognize the existence of the major community open spaces and to provide for their continuation.

Permitted uses are restricted to public park, recreation, conservation facilities, and associated public utilities.

The town must maintain these properties and ensure their continued availability to the public, and should consider acquisition of additional lands for public open space as appropriate.

### **Natural Resources**

#### Forest Land

Much of Bennington is covered in forests, particularly on the slopes of the Green Mountains and Mount Anthony. Numerous smaller woodlots are found throughout the valley areas. All of these woodlands help to prevent soil erosion and flooding, contribute to air and water quality, and support valuable timber, wildlife habitat, recreational, and aesthetic resources. Protection of forest resources is an important objective of this Plan.

The extensive forests covering the mountain slopes have not been developed because of their remoteness and limited access. With the withdrawal of agricultural uses from marginal hillsides and reduced demand for local timber in the 20th century, the amount of forest land in Bennington actually increased. However, experiences such as the unsuccessful effort to create residential lots over much of Mount Anthony serve as a reminder that active efforts to conserve these resources are necessary.

Most of Bennington's high elevation forest land is zoned to permit only forestry, recreation,

and other uses that will protect the value of the resource. Property tax reduction programs, appropriate land use planning, and acquisition of land or development rights by a land trust or other conservation organization are appropriate techniques for preserving forest land.

The Green Mountain National Forest covers a large amount of land on the town's eastern side and in the nearby mountain towns. Lands acquired by the Forest Service remain accessible to the public; all of these properties should be actively managed for multiple uses including recreation, timber production, and wildlife. The town should participate in National Forest planning activities and should coordinate forest planning with other nearby towns, especially with Woodford. Particular attention should be given to planning for the wise and environmentally sound use of forest trails and roads. Unrestricted access by all-terrain vehicles, trucks, and other motorized vehicles can result in severe damage to these travelways and cause erosion and water quality degradation; consequently, use of these vehicles should be allowed only on public lands and trails when proper environmental safeguards are in place.

## **ARLINGTON ZONING BYLAW**

### **FOREST AND RECREATION DISTRICT**

The area within the Forest and Recreation District shall be determined by the following boundary description:

Beginning at the southwest corner of the Town of Arlington and northwest corner of the Town of Shaftsbury, thence northerly along the Vermont/New York state line to a point 4,000 feet southerly of the center line of Vermont Route 313. Thence 4,000 feet distant from and parallel to Route 313 to an intersection with the 1200' elevation contour, thence following the 1200' contour in a generally northerly then southerly direction around the north face of Buck Hill to the intersection of a line 4,000 feet distant from and parallel to the center line of Vermont Route 313, thence easterly along this line to an intersection with the 1200' elevation contour, thence following the 1200' contour as it continues in a generally easterly then southerly direction to the Shaftsbury Town Line; thence westerly along the Arlington/Shaftsbury Town Line to the point of beginning. In addition, all areas of Arlington north of Vermont Route 313 which are above 1200' elevation.

1. Purpose:

To guide the growth of the Town in an orderly manner by concentrating development where it can be served most efficiently by public facilities, services, utilities, and roads. To preserve the Town's forest resources and protect the Town's watershed.

2. Permitted Uses:

- a. Commercial forestry and related uses.
- b. Forestry carried on for research, demonstration, educational, and other purposes.
- c. Agricultural uses, including: maple sugaring, pasturage of livestock, crop raising, and buildings (except dwellings) accessory to and necessary for such agricultural uses.
- d. Private recreational, hunting, or fishing camps, consisting of a building or tent not suitable for use as a dwelling but used occasionally or seasonally for temporary shelter in connection with a recreational activity. Such camps may not be operated as a

business, must each be located on a separate lot of no less than fifteen (15) acres and, for the purpose of wastewater disposal, may only include chemical, incinerator, or privy toilet facilities.

- e. Accessory uses customarily incidental to a permitted use.

3. Conditional Uses:

- a. Recreation areas operated by a government unit or a non-profit organization, including hiking trails, bridle paths, and overnight shelters.
- b. Hunting and fishing establishments, dealing with trap, skeet, sporting clays fields, firearms safety instruction, and fishing techniques, located on a lot of not less than 25 acres, provided that sales of merchandise be limited to items incidental to the principal use of the property, and that such sales be made only to users of the on-site facilities. As a condition of approval, the Zoning Board of Adjustment may set specific limits on hours and days of operation and noise levels.
- c. Sawmill operations and customary accessory uses.

## **BENNINGTON SUBDIVISION REGULATIONS**

### Rural Conservation District

It is important that special consideration be given to the pattern and configuration of new subdivisions to maintain the district's rural character, in accordance with Section 8.4. Any major subdivision within the RC District, as defined in Article 2, shall meet the standards for a Planned Residential Development set forth in Article 9.

### **Section 8.4 Preservation of Rural Character**

(A) **Subdivisions outside the Urban Growth Center.** Outside of the Urban Growth Center, as designated in the *Bennington Town Plan*, subdivisions shall be designed and laid out to achieve the purpose and desired settlement pattern of the district in which they are located. To that end, subdivisions outside of the urban core shall meet the following standards to protect identified "rural conservation resources," in addition to the other provisions of these regulations.

(B) **Prominent Hillside & Ridgelines.** Subdivision boundaries, lots and development envelopes shall be located and configured to avoid the placement of structures in locations with high visibility from surrounding areas, especially public roads and important community vantage points (e.g., public parks and recreation areas, historic sites). Methods for avoiding such adverse impacts include but may not be limited to the following:

Development Envelopes shall be located and configured so that the height of any structure placed on the site after subdivision will not visually exceed the height of the adjacent tree canopy serving as the visual backdrop to the structure, and shall be located down-slope of ridgelines and prominent hills.

On wooded sites, forest cover shall be maintained or established adjacent to proposed structures to interrupt the facade of buildings, provide a forested backdrop to structures, and/or soften the visual impact of new development as viewed from public roads and properties. The Board shall consider the

location of proposed structures relative to existing vegetation, and may require additional planting and/or limit the amount of clearing adjacent to proposed development to provide screening and maintain a forested backdrop. A tree cutting, landscaping and/or forest management plan may be required to ensure that ridges and hill tops remain wooded, and trees remain standing immediately adjacent to buildings to visually interrupt facades and reduce reflective glare, as viewed from off site. Such a plan shall address specific measures to be taken to ensure the survival and, if necessary, replacement of designated trees during or after site development and the installation and maintenance of all site improvements.

On ridgelines and prominent hillsides that have been cleared prior to subdivision, the Board shall consider the location of development envelopes and associated development relative to potential visibility and the availability of less visible locations on the site. The location of development shall be restricted to minimize visibility as viewed from town roads and properties; and additional landscaping may be required to screen development and reduce visibility.

Access roads and utility corridors, shall use or share existing accesses and rights-of-way where feasible; follow existing contours as closely as possible to achieve angled ascents, and avoid areas of steep slope.

(C) **Wildlife Habitat.** Subdivision boundaries, lots and Development Envelopes shall be located and configured to minimize adverse impacts on critical wildlife habitat, including travel corridors, identified in the Bennington Town Plan, by the Vermont Department of Fish & Wildlife, or through site investigation. Methods for avoiding such adverse impacts include but may not be limited to the following:

Development envelopes shall be located to exclude identified wildlife habitat, including deer wintering areas and other critical habitats. A buffer area of adequate size shall be established to ensure the protection of critical habitat. In determining the appropriate buffer area, the Development Review Board may consult with the Vermont Fish and Wildlife Department.

To avoid the fragmentation of wildlife habitat, including core habitat and connecting travel corridors, the Board may require the submission of a wildlife habitat assessment, prepared by a wildlife biologist or comparable professional, to identify the function and relative value of impacted habitat and provide recommended management strategies to maintain or enhance those values and function. The Board may also consult with Vermont Fish and Wildlife Department staff prior to issuing a decision.

Roads, driveways and utilities shall be designed to avoid the fragmentation of identified natural areas and wildlife habitat.

(D) **Forest Resources.** Subdivisions of land located within the Forest Reserve District shall, to the extent practical, be configured to allow for ongoing forest management of the parcel after subdivision. Lot boundaries and development envelopes should be laid out to avoid unnecessary fragmentation of distinct timber stands, and provision for forest management access should be a consideration of the final plan.

(E) **Farmland/Open Land.** Subdivision boundaries, lots and development envelopes shall be located and configured to avoid adverse impacts to prime and statewide agricultural soils, other productive



farmland and open land. Methods for avoiding such adverse impacts include but may not be limited to the following:

Development envelopes shall be located at field and orchard edges or, in the event that no other land is practical for development, on the least fertile soils in order to minimize the use of productive agricultural land, impacts on existing farm operations, and disruption to the scenic qualities of the site.

Buildings and associated building lots should be clustered to avoid the fragmentation of productive farmland/open land.

Vegetated buffer areas may be required to buffer agricultural operations from other uses to minimize land use conflicts.

Access roads, driveways and utility corridors shall be shared to the extent feasible; and, where sites include linear features such as existing roads, tree lines, stone walls, and/or fence lines, shall follow these to minimize the fragmentation of agricultural land and visual impacts.

**F) Other Scenic Resources.** Subdivision boundaries, lots and development envelopes shall be located and configured to avoid adverse impacts to scenic resources, including those identified in the Bennington Town Plan. Methods for avoiding such adverse impacts include but may not be limited to the following:

Subdivisions within view of scenic roads, as identified in the Bennington Town Plan, shall be designed to avoid adverse impact to the scenic resources.

Development envelopes located within view of scenic roads, including all state highways, or within scenic viewsheds shall be located to avoid prominent placement within the foreground or background of the viewshed; rather, development should be placed within the middleground of the view to the extent practical.

When evaluating the impact of proposed subdivisions on scenic resources, the Development Review Board may consider the Vermont Agency of Natural Resources publication *Vermont's Scenic Landscapes: A Guide for Growth and Protection* (1991).

**(G) Open Space.** Subdivisions outside of the urban core should provide for open space in accordance with the standards set forth in Section 8.11.

## Appendix B

### Conservation Organizations Active in the Region Or Available as Statewide Resources

**Green Mountain National Forest:** The largest landowner in the region, owning over 200,000 acres of forest land and recreational resources. These lands are managed according to the Forest Service's multi-use ethic that emphasizes ecological and science based forestry stewardship, clean water, diverse vegetation, high quality forest products, and trail-based backcountry recreation. The Green Mountain National Forest Administrative Offices are located in Rutland; the Manchester Ranger District is directly responsible for the forest in Bennington County.

**Vermont Department of Forests, Parks, and Recreation:** This state department oversees the several state parks and state-owned forests located in Bennington County. The Mission of the Department of Forests, Parks and Recreation is: To practice and encourage high quality stewardship of Vermont's environment by: monitoring and maintaining the health, integrity and diversity of important species, natural communities, and ecological processes; managing forests for sustainable use; providing and promoting opportunities for compatible outdoor recreation; and furnishing related information, education, and service. A county forester is assigned by the Department to provide forest planning and management services to the region.

**Bennington County Conservation District (BCCD):** the BCCD was established in 1946 to serve all of Bennington County and its four principal watersheds. Headquartered in Bennington, it includes among its many roles " protection of the forests that cloak our Green Mountains and Taconics - the natural areas and wildlife habitats they represent, the clean air and dark skies they protect, the timber and other resources they offer."

**Bennington County Sustainable Forest Consortium (BCSFC):** The members of this organization served as the steering committee for this forest stewardship project. The BCSFC is a collaboration between landowners, foresters, loggers and other natural resource professionals. The Consortium facilitates the exchange of ideas and experiences to encourage people to care about our forests. The mission of the BCSFC is to promote responsible use and exemplary stewardship of the woodlands of Bennington County, and in so doing, to sustain the healthy ecosystems and rural livelihoods those forests support.

**Merck Forest and Farmland Center:** Merck Forest & Farmland Center is a non-profit environmental education organization located on 3,160 acres of forest and farmland in the Taconic Mountains of southwestern Vermont. It offers programs and demonstrations for visitors, school groups, landowners, professional foresters and farmers, as well as high school and college internships. Forest activities include sustainable agriculture, four-season recreation, habitat preservation, maple sugaring, timber harvests, forest roads, water control and wildlife habitat management.

**Equinox Preservation Trust:** The Equinox Preserve consists of over 914 acres on the slopes of Mt Equinox in Manchester, VT. The mission of the Trust is to encourage the responsible use of the land and protection of our natural and cultural history by providing the opportunity to interact with the environment through education, research and environmentally sensitive recreation.

**Mount Anthony Preservation Society (MAPS):** Originally established to acquire extensive forest lands

on Bennington's iconic Mount Anthony, the Society now works to preserve that land and maintain it for public recreational use. It also supports land conservation and related educational initiatives in the Bennington area.

**The Fund for North Bennington:** The Fund currently owns over 400 acres of land in North Bennington, Bennington, and Shaftsbury. It is principally engaged in preserving undeveloped land to conserve natural resources, maintain agricultural uses, and to provide opportunities for public recreation.

**Vermont Chapter of the Nature Conservancy:** the Nature Conservancy owns several parcels of forest land in the Bennington Region that together account for approximately 3,000 acres of valuable forest land and wildlife habitat. It seeks to conserve land based on an ecological inventory prepared by the **Vermont Nongame and Natural Heritage Program**.

**Vermont Land Trust (VLT):** The Southwest Vermont office of the VLT is located in Bennington. It has conserved dozens of properties in the area through acquisition, easements, and other methods. It seeks to conserve well-managed forestland for its timber production capabilities, biological attributes (such as habitat protection), and the recreational benefits this land provides.

**Manchester Community Land Trust:** This land trust is devoted to educating the public about the benefits of land conservation and facilitating the preservation of lands that are important to the local community.

**Municipal Conservation Commissions:** Several towns in the Bennington Region have established local conservation commissions. The mission of each varies somewhat, but those organizations have been active in preparing inventories of important natural resources, reviewing development proposals that may impact natural areas, and promoting conservation of key properties.

**Logger Education to Advance Professionalism (LEAP):** The purpose of the Vermont LEAP program is to promote a professional approach to logging by providing the knowledge necessary for loggers to work safely, efficiently, and in an environmentally conscientious manner while harvesting timber in Vermont. LEAP certification is a formal training program for loggers which includes practice courses in managing and using forest ecosystems, professionalism in forestry, and equipment handling and safety.

**Vermont Family Forests (VFF):** VFF is a non-profit family forest conservation organization that promotes conscientious forest stewardship to maintain natural ecosystem health. The organization developed the "Forest Health Conservation Checklist" which outlines 43 practices that ensure ecologically sustainable management. This checklist leads to certification -- a forest can be a "VFF Verified Forest" and can utilize different branding tools, including "NeighborWood" for firewood and "Family Forest" for flooring and other products. VFF brand NeighborWood was used in the new Green Mountain Club Headquarters in Waterbury.

**Vermont Woodlands Association (VWA):** Vermont Woodlands Association is a private non-profit whose mission is to advocate for the management, sustainability, perpetuation, and enjoyment of forests through the practice of excellent forestry that employs highly integrated management practices which protect and enhance both the tangible and intangible values of forests. VWA objectives are to communicate the benefits of working forests, to recognize exemplary actions of woodland owners and

managers, to provide educational opportunities, and to represent its membership before governmental bodies. Vermont Woodlands Association provides a variety of educational programs, including workshops, woodland tours, and a "Forestry School." Vermont Woodland Association also provides technical briefs and printed materials. Vermont Woodlands Association oversees the Vermont Tree Farm Program.

**Vermont Tree Farm Program:** Sponsored by the American Forest Foundation, the National Tree Farm Program promotes native working forests, while receiving advice from leading foresters and environmental specialists. In Vermont, the Tree Farm Program is overseen by the Vermont Woodlands Association.

**Vermont Wood Products Marketing Council:** The Vermont Wood Products Marketing Council works to promote the quality and craftsmanship of Vermont wood products so that residents and nonresidents may increase their awareness of the outstanding design of the products, the environmental sensitivity of the manufacturers, and their commitment to customer satisfaction. The Wood Products Marketing Council has developed the "**Vermont Quality Wood Products**" brand and logo. The Council has also created the **Essential Buyers Guide for Vermont Wood Products**, which allows readers to view furniture, wooden ware, toys and games, building supplies, carvings, and architectural wood products from over 100 Vermont wood artisans. **The Cornerstone Resource Manual** connects architects, designers, and purchasers with Vermont producers and crafts people. The Vermont Wood Products Marketing Council is also the organizer of the **Vermont Forest Heritage Trail**.

**Vermont WoodNet:** Vermont WoodNet, Inc., is a non-profit organization established to address the needs of small-scale Vermont wood product businesses that produce "Vermont Made" products by creating opportunities for education, joint manufacturing, joint marketing, and increased access to materials and services. Vermont WoodNet provides an online directory which connects wood product businesses with other Vermont businesses that provide services they may need (for example kiln drying and tool and equipment suppliers). Vermont WoodNet also provides a list of Vermont companies that produce and sell Forest Stewardship Council Certified products.

**Vermont Coverts:** Vermont Coverts works to enhance wildlife habitat and promote healthy forest stewardship practices among private landowners in Vermont. The group educates forest owners on how to draft and implement a sound management plan. Part of this work involves hosting workshops on forest management and working with landowners through personal contacts. Vermont Coverts also represents its constituency among State agencies and other forest and wildlife related groups.

**Vermont Natural Resources Council (VNRC):** The VNRC is a non-profit environmental advocacy organization and the Vermont-based wing of the National Wildlife Foundation. While the group works to address several environmental issues (including energy, water, air, etc.), VNRC's Healthy Forests Program is especially strong. "Recovery of threatened and endangered species, wilderness, ecological reserves, and sustainable forestry are key conservation components in VNRC's forest program." Most notably, VNRC coordinates the Vermont Forest Roundtable with stakeholders from across the state to discuss threats to forests and brainstorm recommendations to ensure a sustainable future.

**Vermont Council on Rural Development (VCRD):** The Vermont Council on Rural Development (VCRD) is a non-profit organization dedicated to the support of the locally-defined progress of Vermont's rural communities. Currently, the Vermont Working Landscapes Partnership is a major initiative of the VCRD. The Working Landscapes Partnership is a non-partisan and broad-based effort to support local agriculture and forestry, grow and attract farm and forest entrepreneurs, and conserve Vermont's

Working Landscape far into the future.

**Center for Northern Woodlands:** The mission of the Center for Northern Woodlands education is to advance a culture of forest stewardship in the Northeast and to increase understanding of, and appreciation for, the natural wonders, economic productivity, and ecological integrity of the region's forests. Programs of the Center for Northern Woodlands include **Northern Woodlands Magazine** – a quarterly magazine for landowners, forestry professionals, conservationists, and outdoor enthusiasts; **Northern Woodlands Goes to School** - a program that provides place-based environmental education resources to educators in our region who want to connect their students to the outdoors; **The Outside Story** - a weekly column on forestry subjects, natural history, and ecology syndicated in dozens of newspapers and now a book of the same name; and **The Place You Call Home** - a magazine format owner's manual geared to particular regions or states. The Center for Northern Woodlands is currently working on a publication for woodlot owners titled: **More Than a Woodlot: Getting the Most from Your Family Forest.**