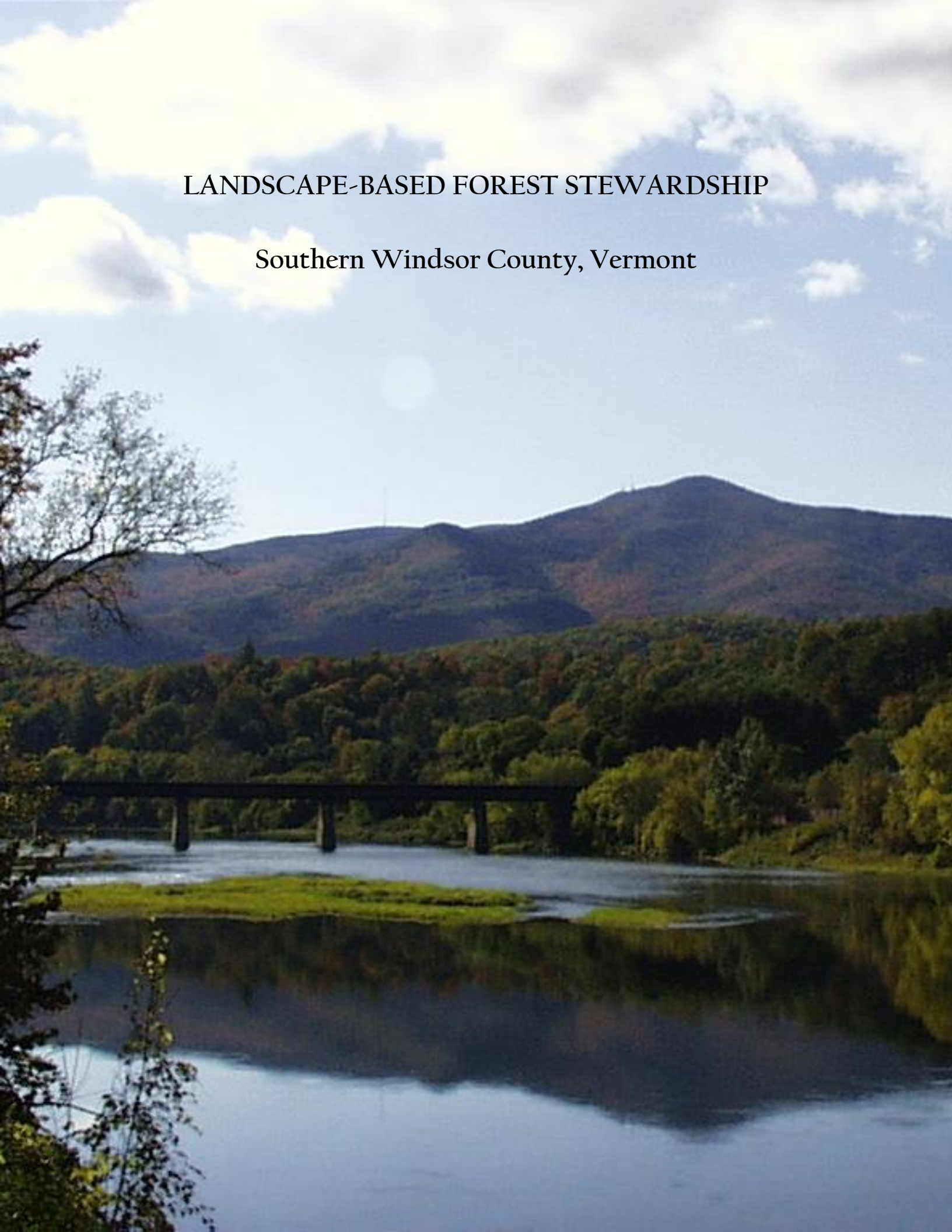
LANDSCAPE-BASED FOREST STEWARDSHIP

Southern Windsor County, Vermont



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Executive Summary

Introduction

Forests are an integral part of the landscape in the Southern Windsor County region. They have been an important driver in the historical development of the area, provide crucial resources today, and will continue to be a critical asset in the development of a prosperous and sustainable future. In spite of the prominent role that forests play in our communities, they are often overlooked or afforded minimal discussion in Town Plans and are usually lumped into an all-encompassing 'Natural Resources' section. With this project, the Southern Windsor County Regional Planning Commission (SWCRPC) seeks to give our forest resources the attention they deserve by employing a "landscape-scale stewardship" approach to planning for their continued vitality.

The purpose of landscape-scale stewardship planning is to foster a comprehensive understanding of existing forest resources and then develop strategies that will support the overarching goal of "keeping forests as forests." The first step in this process is to recognize that forests exist in a variety of different landscape settings. For instance, this region is home to several large blocks of conserved forested areas like the Arthur Davis Wildlife Management Area, the Mt. Ascutney State Park, and the Okemo State Forest. At the same time, the wooded banks of the Black and Williams Rivers, smaller woodlots interspersed with farmland in rural valleys, and forested parcels in and around villages and downtown centers represent significant forest resources that are equally important, yet are valuable for different reasons.

A critical component to landscape-scale stewardship planning is recognizing the variety of interest groups and viewpoints that have a stake in this region's forests. An effective planning process must involve those stakeholders and incorporate the diversity of values and opinions represented. To this end, the Forest Stewardship Steering Committee was created.

The Southern Windsor County Forest Stewardship Steering Committee
The Forest Stewardship Steering Committee was comprised of individuals from across the region, all of whom are currently involved in forest-related work. The committee met several times between 2013 and 2014 to discuss what barriers our region faces in maintaining forested lands and what kinds of strategies we will need to enhance and sustain their health. The committee was comprised of:

Name, Organization
Sam Schneski, Windsor County Forester
Cynthia Rankin, Private Landowner
Robbo Holleran, Consulting Forester
Roy Burton, Ottauquechee Natural Resources Conservation District Board Member
Gil Whittemore, Private Landowner & Weathersfield Planning Commission Member
Daniel Ingold, North Springfield Sustainable Energy Project
Sue Greenall, Landowner, West Windsor Conservation Commission, District Manager – Ottauquechee Natural Resources Conservation District

In addition to establishing the Southern Windsor County Forest Stewardship Steering Committee, the SWCRPC also reviewed the municipal bylaws of four towns within the region. A summary of the review is included below in this document.

SWCRPC dedicated two key staff members time to the project: Katharine Otto (Geographic Information Systems Contact) and Dan Potter (Planner). Katharine primarily focused on developing the landscape-scale forest maps while Dan drafted and finalized this report. Both worked with the Forest Stewardship Steering Committee.

The SWCRPC provides land use planning services to its ten member municipalities. SWCRPC's primary goal is to advocate for the needs of its member towns, and to articulate a vision for building a thriving regional economy while enhancing the region's quality of life.

Project Goals and Objectives

The overarching goal of this project is "keeping forestland as forestland." Forests are an integral part of the landscape in the Southern Windsor County region. They have been an important driver in the historical development of the area, provide crucial resources today, and will continue to be a critical asset in the development of a prosperous and sustainable future. In spite of the prominent role that forests play in our communities, they are often overlooked or afforded minimal discussion in Town Plans and are usually lumped into an all-encompassing 'Natural Resources' section. With this project, the Southern Windsor County Regional Planning Commission (SWCRPC) seeks to give our forest resources the attention they deserve by employing a "landscape-scale stewardship" approach to planning for their continued vitality.

The following objectives were completed during the project period to advance the goal of keeping forests as forests: inventory and assessment of forest resources, identification of forest landscape types, development of strategies to assist towns and forest landowners in keeping forests as forests, development of tools that towns and regions can use to address priority forest landscapes, and providing landowners and towns access to and understanding of data that can be applied to forest management decisions.

The mapping of these resource values on a regional scale represents a departure from past efforts related to forest stewardship: in general, forest resources have either been mapped at the state level (which is usually too coarse to highlight important regional issues) or at the parcel level (which fails to capture the political and geographic cross-boundary context in which these resources exist). This project was based on the belief that mapping and analysis at the regional level is optimal for landscape-scale forest stewardship planning.

Regional Characteristics

Land Use

The area served by the Southern Windsor County Regional Planning Commission is comprised of ten towns: Andover, Baltimore, Cavendish, Chester, Ludlow, Springfield, Reading, Weathersfield, West Windsor, and Windsor. The region is bordered on the east by the Connecticut River and the western towns approach the foothills of the Green Mountains. Historically, the Southern Windsor County (SWC) region has featured a rural landscape with scattered farms, clusters of towns, and small villages along the rivers. During the middle of the 19th century when the region was mostly cleared farmland, the region's two urban centers (Springfield and Windsor) swelled people coming to work in the new mills and machine shops of the industrial era. Since then, the surrounding landscape has regained its forests, and today the region is 81% forested.[1] However, the region is by no means a simple arrangement of three-quarters forest monocultures and one-quarter commercial, industrial and residential land. But rather, it is a network of villages, rural residential areas, commercial and industrial areas, working landscapes, forest types and successional stages.

The peak of deforestation in Vermont occurred in the mid-to-late 1800s as a result of the merino wool boom and increase in dairy farms. Since that time, there has been a severe decline in both sheep and dairy farms, e.g. the Town of Weathersfield lost 35 of 36 dairy farms. However, as land that was once used for sheep and dairy farms is being reforested, the state has also seen an increase in people moving to the state and building single family homes. More recently; however, there has been a slight reversal of the reforestation trend, which has led to an overall loss and fragmentation of forest cover for the first time in a century.[2] While the most recent, general trend is towards fragmentation and deforestation, there are certain areas within the southern Windsor county region that are experiencing conversion at a much faster rate. A few examples include the clearing of land in the town of Reading for horse pastures, the planting of land to maintain or gain EVA eligibility, and clearing of land for additional or increased capacity electrical transmission lines.

Today the region is dominated by single family residences and is predominantly rural. The historic settlement pattern of compact village centers surrounded by countryside has, for the most part, continued today. The exceptions to this trend are some commercial strip development and suburban sprawl. Additionally, the increase in single family homes is leading to the parcelization and fragmentation of our forest resources.

Demographics

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[1] SWCRPC, *Map 1 – Biophysical Regions with Landcover* (2014).

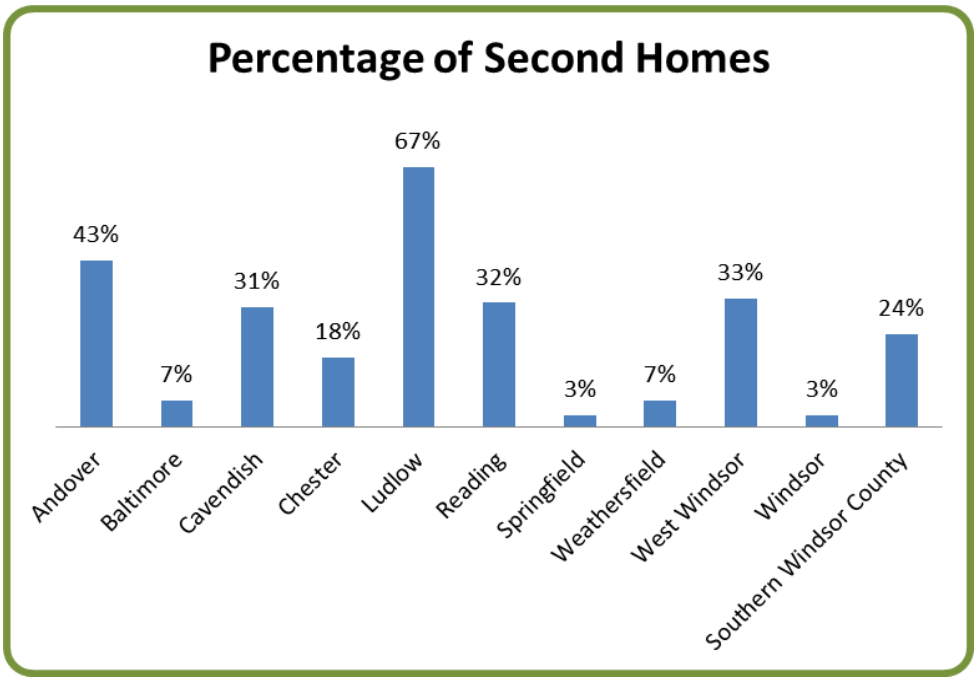
[2] Foster, D.R. *et. Al. Wildlands and Woodlands: A Vision for the New England Landscape*. (Harvard Forest, Harvard University, Petersham, Massachusetts, 2010).

The towns in the SWC region had a combined population of 24,711 according to the 2010 census. Individual town populations range from Baltimore with 244 people to Springfield with 9,373 people.[3] Six of the ten towns are somewhere between 1,000 and 3,500 people. The region's population is 49.3% male and 50.7% female, with 21% under the age of 20, and 18.9% over the age of 65.[4] By just examining these statistics it appears that there is a relatively even distribution of people amongst age groups; however, the region's population is actually aging with 63% of residents over the age of 34.

During the last census period (2000-2010), the southern Windsor county region saw a population decline of 1.6%. A few towns (Chester, Springfield, Weathersfield, and West Windsor) experienced mild growth during that period, at 3.6%, 3.2%, 1.3%, and 3.0%, respectively. The remaining towns within the region all experienced population declines with Ludlow topping the list with a 19.8% decrease. It is interesting to note that despite the decline in population, forest fragmentation is still continuing.

Another important, unique characteristic of the region is that a large portion of the houses in the region are owned by out of state residents and serve as second homes. As you can see by the graph below, the 24% of the region's housing are second homes. This is higher than the statewide percentage which is only 16%.

Figure 7: Percentage of Homes for Towns in the SWCRPC Region



[3] 2010 Decennial U.S. Census
[4] 2010 Decennial U.S. Census

Economic Conditions

The southern Windsor County region has a rich history of manufacturing. The Springfield area was deemed "Precision Valley" in the early-to-mid 1900's. Both Windsor and Springfield hosted very large manufacturing companies. However, with the downturn in the manufacturing industry in the 1970s that followed World War II, these companies closed shop and left the region. The result was a loss of many higher paying jobs, e.g. the engineers and plant managers, and many jobs in general, e.g. the machine operators. Many of the large plant buildings are still abandoned today and are not only eyesores for the communities they reside in, but are also "brownfield" sites and thus have potential pollution issues.

Currently many residents can find work in the larger towns in the region, i.e. Ludlow, Springfield, and Windsor. The five largest employers in the region are the Okemo Mountain Resort, Local Governments, Springfield Medical Care Systems, Mount Ascutney Hospital, and State Government. However, many residents also commute to the Upper Valley where many larger, regional employers exist, e.g. Dartmouth Hitchcock Medical Center. Forest related professions are one of the employment opportunities for residents who wish to work within the region.

Overall, the "annual contribution of forest-based manufacturing and forest-related recreation and tourism to the Vermont economy is over $1.5 billion."[5] Indeed, it's estimated that 6,379 Vermonters are employed in forest-based manufacturing, while approximately 13,000 people are thought to be working in some type of forest related profession (manufacturing, tourism, and recreation).[6] While tourism may not seem to fit into this section, a lot of people come to visit the state of Vermont at least in part due to its wealth of natural resources and scenic beauty and the Southern Windsor County Region is no exception. Intact forest lands provide opportunities for the following activities, many of which are also enjoyed by locals as well:
wildlife viewing, skiing (both downhill and nordic), hiking, biking, hunting, fishing, and the list goes on.

According to the American Community Survey, the largest employment sectors in the SWC region are 'educational services and health care and social assistance' (14.7%), manufacturing (6%), and 'arts, entertainment, and recreation, and accommodation and food service' (6%). According to that survey, only 1% of the region's employed population worked in the 'agriculture, forestry, fishing and hunting, and mining' industries.[7] Compared to the number above (13,000 in the State), the southern Windsor County region employs a smaller percentage (1%) of people in forest related professions than the state as a whole (2%).

Although only 1% of people work in forestry, many others work part time in the forestry sector, running small time sugaring operations, backyard saw mills, and growing and selling Christmas trees. There are several local forestry related businesses that employ locals and stimulate the local economy. Sawmills, furniture makers, consulting foresters, loggers, truckers, firewood

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[5] Northeast State Foresters Association, *The Economic Importance & Wood Flows from Vermont's Forests,* (2007).
[6] Northeast State Foresters Association, *The Economic Importance & Wood Flows from Vermont's Forests,* (2007).
[7] U.S. Census Bureau, 2005-2009 American Community Survey 5 Year Estimates. (2009).

producers, and maple producers are the bulk of the forest-based professions in the region. Some examples of forest related businesses include:

- Sheehans Lumber Mill, Perkinsville
- Plumb Lumber, Andover
- Vermont Hardwoods, Chester
- Vermont Timberworks, North Springfield
- Wellwood Orchards, Weathersfield
- Willis and Tina Wood, Wood's Cider Mill and Sugarhouse, Springfield
- Richard and Nancy Lockerby, Lockerby's Sugarhouse, Chester
- Sharon and Peter Mollica, Vermont Christmas Trees, Springfield

The list above is not comprehensive, but includes a few of the larger employers in the forest sector in the region as well as examples of some of the other smaller types of employers or self-employed folks.

Regional Forest Characteristics

i. Biophysical Context

Vermont is one of the most heavily forested states, with about 4.6 million acres or 75% of its land covered with forest.[8] At approximately 81%, the southern Windsor County region is slightly more forested than the state as a whole. Applying that percentage to acres, approximately 80,112 acres in the region are forested. The SWC region is part of the larger Northeast forest corridor, which includes the Adirondacks of eastern New York, the Green Mountains of Vermont, and the White Mountains of New Hampshire. The SWC region has a large range of landforms, from the foothills and northern hardwood forests of the Green Mountains in the western part of the region, to the fertile, sandy soils and white pines of the Connecticut River valley. In between those two major regions lie the Black and Williams river valleys where forested hillsides host farms, sugarbushes, orchards, and small woodlots.

The region is home to several large portions of conserved land including the Okemo State Forest, the Arthur Davis Wildlife Management Area, Mt. Ascutney State Park, and several town forests. These lands connect with other large tracts of forested land and together they provide habitat for small and large animals alike. This influences the distribution of several areas of rare, threatened, and endangered animals, plants, and natural communities. There appears to be groupings of rare natural communities along both the western and eastern edges of the region, near the Mt. Ascutney State Forest and the Okemo State Forest. Additionally, there are several areas of rare animals and plants along the banks of the Connecticut River.

Other important biophysical features of the area to note are watersheds, deer wintering areas, and several regional habitat connectors. The southern Windsor County region is home to three larger watersheds (within the context of the larger Connecticut River watershed): the Mill Brook, the Black River, and the Williams River. While deer wintering areas are distributed throughout the region, there are two larger, notable groupings. The first is along the northern edge of Route 131 through Weathersfield, Cavendish, and Ludlow and the second is surrounding

[8] Vermont Department of Forest Parks and Recreation, *Vermont Forest Resources Fact Sheet.* http://www.na.fs.fed.us/ra/factsheets/vt.brief.pdf. (Accessed March 2014).

the junction of Routes 103 and 11 in Chester. Additionally, there are several important wildlife crossings scattered throughout the region. The more important connectors are listed below.

East/West Connectors

- Along Route 106 in Reading, north of town
- Along Route 10 between Route 11 and Route 131
- Along Route 5 and I-91 in Springfield

North/South Connectors

- Along Route 131 in Cavendish, east of the town center
- Along Route 103 in Ludlow, west of the junction with Route 100

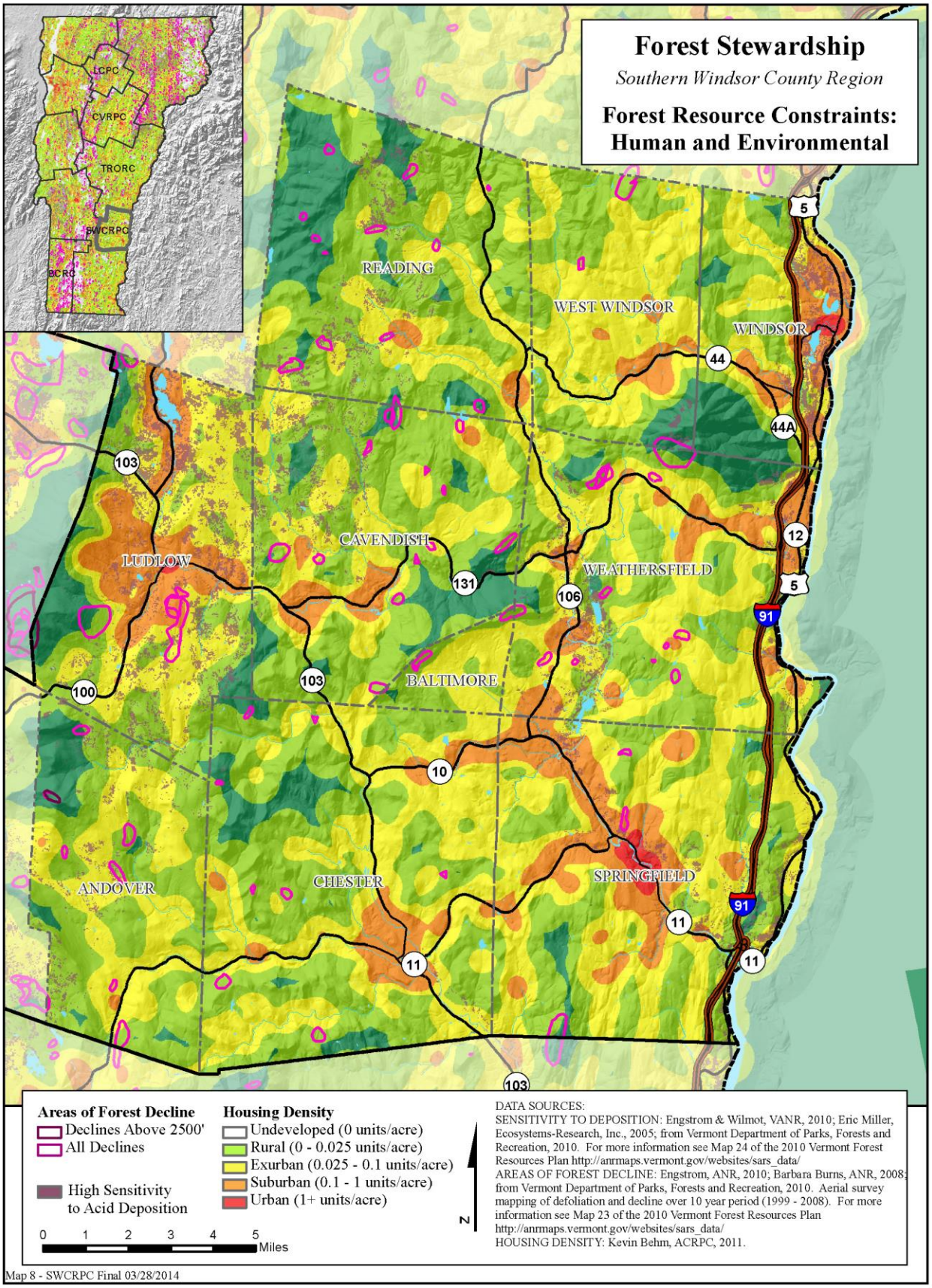
ii. Land Cover

The forests of the SWC region reflect the statewide characteristics of predominantly Maple/Beech/Birch forests. This type of forest covers approximately 71% of Vermont, and about 77% of Windsor County.[9] The amount of White/Red Pine in Windsor County is also typical of the statewide trend, with only about 11% of the forests being of this type (statewide 9%).[10] Windsor County also has small amounts of Spruce/Fir and Aspen/Birch forests.

A majority of the development within the region exists along the eastern edge where the Connecticut River drove historical development. Development throughout the remainder of the region primarily occurs along the major roads, Routes 100, 10, 11, 106, 131, and 103.

The two maps below show land cover and forest resource constraints (i.e. development), respectively, and help to illustrate the points made above.

[9] USDA Forest Service, *Forest Inventory and Analysis* (2010).
[10] USDA Forest Service, *Forest Inventory and Analysis* (2010).



Map 8 - SWCRPC Final 03/28/2014

iii. Natural Environmental Characteristics

The SWC region has a variety of forest based land uses. Forest lands are harvested for primary manufacturing (processing logs for lumber, veneer, pulp, or paper) and secondary manufacturing (creating value added products such as furniture). Other major uses are the use of stands of maple trees for maple syrup production, and the growth of Christmas tree plantations. Forests also provide a place to forage for wild edibles such as fiddleheads, berries, wild apples, and mushrooms. Recreation is one of the forest based land uses that Vermont is famous for and brings a lot of tourism to the state and region. Vermonters and tourists alike love camping, hiking, snow-shoeing, and skiing in the Green Mountains and surrounding hills. The SWC region contains Okemo Mt. Resort which brings thousands of people to the area each winter. In addition to downhill skiing, trails for snow-shoeing and cross-country skiing are numerous. Others prefer to utilize the miles of VAST (Vermont Assoc. of Snow Travelers) to snowmobile through the forests. The wildlife that live in the woods are an attraction as well, and thousands of people each year hunt for turkey, grouse, white tail deer and moose in the Vermont woods, while others come for scenic wildlife walks and birding tours. Many residents and tourists seek out Vermont's forests as places of beauty for spiritual or personal growth and fulfillment. The fall foliage season brings thousands of tourists to see the beauty of Vermont forests.

These existing forest-based land uses will continue into the future, but the progression of climate change could alter Vermont's forested landscape. As climate change continues it may affect some Vermont pastimes such as skiing and maple sugaring. In 2012, a warm winter and early spring led to a shortened season for many ski areas. Additionally, sugar makers reported a decline in production during the 2012 sugaring season due to an early and shortened sugaring season; however, many producers experienced a banner year in 2013. As the effects of climate change are extremely difficult to predict it will be important to monitor the changes and continue to adapt strategies designed to mitigate the negative effects.

Although those uses may appear to be threatened by climate change, new uses for forests will continue to emerge. Recently, the use of biomass (plant material) for energy production has increased demands on forests, and as the trend for renewable, local energy continues, this use could increase. Forest's ability to store carbon could also receive more interest through carbon dioxide mitigation projects.

Forest Resource Values

Over the course of several meetings, the Southern Windsor County Forest Stewardship Steering Committee discussed what forest resource values are provided by forestland in the Southern Windsor County Region. What follows below is a discussion of the more important values provided by forestland; however, it is important to note that they are not listed or ranked in any particular order. Also, please note that the data presented below is for Windsor County as a whole. SWCRPC represents a subset of the total towns in Windsor County and often data is gathered by federal and state governments at the county level only. Therefore, an analysis of Windsor County was deemed the best option for presenting a close approximation (rather than an exact accounting) of forest resources in the region.

Forest lands are valued for many different reasons. From primary manufacturing (processing logs for lumber, veneer, pulp, or paper) and secondary manufacturing (creating value added products such as furniture) to tourism and recreational opportunities. Other major uses include: maple syrup production; Christmas tree production; a place to forage for wild edibles such as fiddleheads, berries, wild apples, and mushrooms; and recreation such as camping, hiking, snow-shoeing, and skiing; and tourism. The wildlife that live in the woods are an attraction as well, and thousands of people each year hunt for turkey, grouse, white tail deer and moose in the Vermont woods, while others come for scenic wildlife walks and birding tours.

Economic Values

i. Jobs

Forestlands are important because they provide residents with the opportunity for locally based employment that has the potential to be sustainable, as long as good forest management practices are utilized. Residents of this region work in primary and secondary forest related jobs. For instance, there are employment opportunities to be found working in forestry or logging or in trades such as construction or furniture making.

The Quarterly Workforce Indicators (QWI) from the U.S. Census presents employment and salary statistics for Vermont's forest industry. The QWI counts jobs, rather than employed workers and does not include self-employed workers and independent contractor employment. This is particularly important to note as many of the folks working in the forestry and logging industries are either self-employed or individual contractors. In the graphs below, one can see that employment in Windsor County has remained relatively steady for forestry and logging, generally staying just above 20 jobs, with slight variations from year to year. A very similar trend is noticeable in the statewide employment graph, but with a slight, general increase between 2003 and 2012.

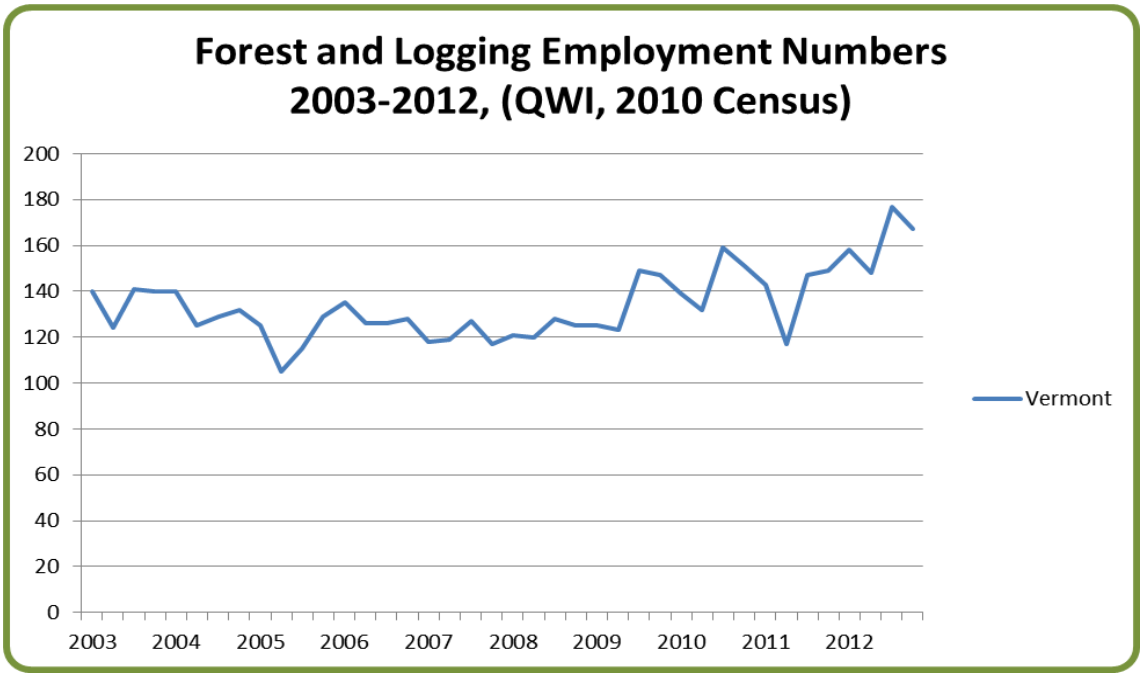


Figure 8: Forest and Logging Employment Numbers, Vermont

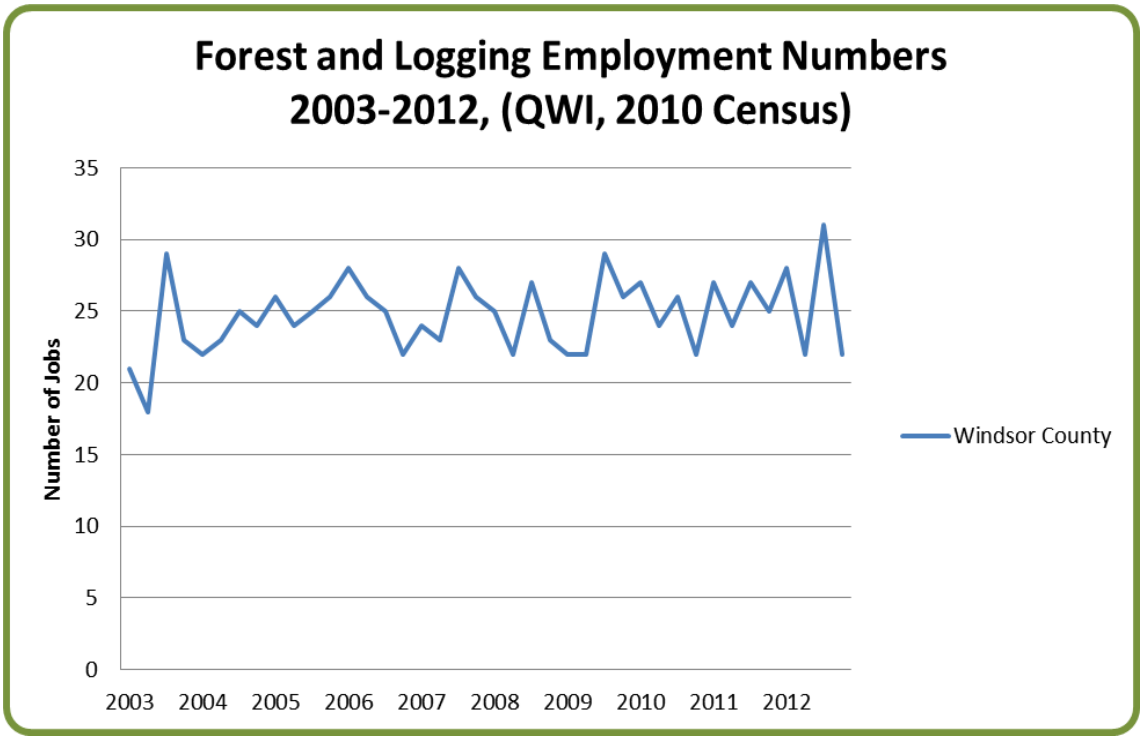


Figure 9: Forest and Logging Employment Numbers, Windsor County

In regard to forestry and logging wages, the average for Vermont was higher than that for Windsor County throughout most of the past ten years (2003-2012). This is shown by the graph below, which also demonstrates that wage increases and decreases for the State and Windsor County mirrored each other.

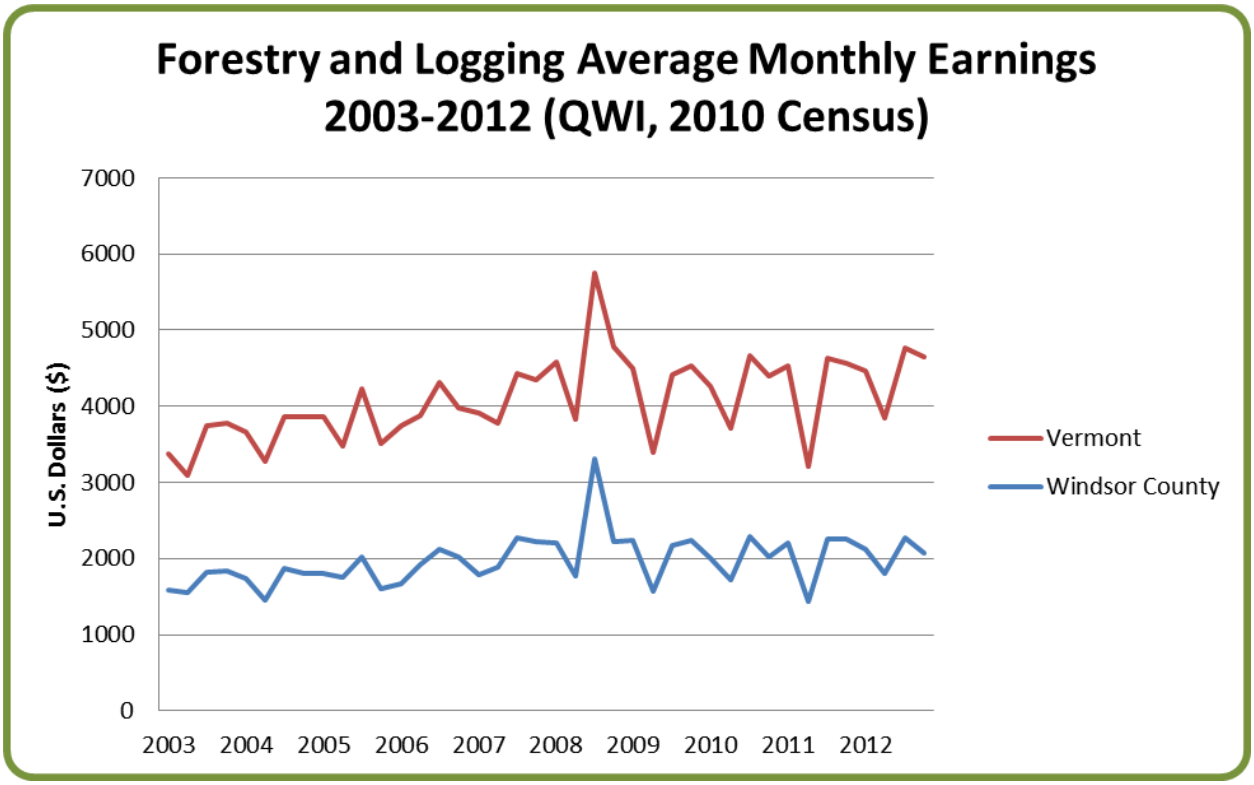
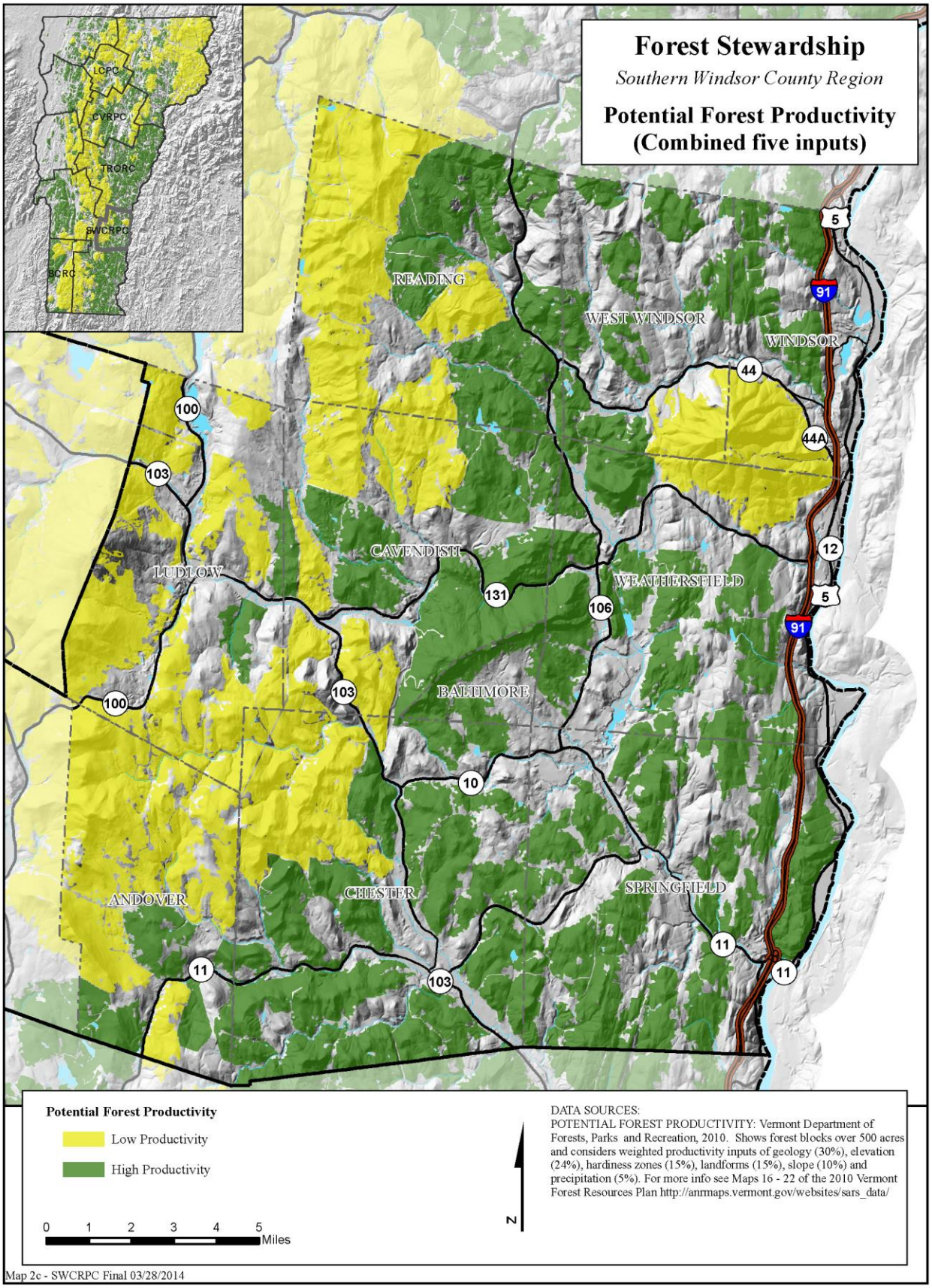


Figure 10: Forestry and Logging Average Monthly Earnings

The map included below, *Forest Productivity*, illustrates areas of high and low forest productivity and timber resources. One can see the correlation between lower productivity and higher elevations (generally, the soil depths and quality are lower).
Higher productivity forest lands are concentrated along the eastern side of the southern Windsor County region. Forest blocks have had difficulty surviving in these areas because of the rich soils (which are ideal for agriculture) and proximity to large population centers (which are subject to development pressure). However, the Southern Windsor County Forest Stewardship Steering Committee's local knowledge did not comport with the productivity areas on the map.

Over the last decade, Windsor County has consistently housed more sawmills than Orange County; however, there is a decline in the number of sawmills in both counties, with fewer existing in 2010 than in 2000. The lack of sawmills in this region is of concern as it forces timber harvests to be shipped elsewhere in the state (or, more often, out of state) to be processed. This results in lost revenue for our residents, can minimize the opportunity to create value added wood products, and increases the 'carbon footprint' of an operation (due to the fuel burned during transportation).



Map 2c - SWCRPC Final 03/28/2014

ii. Stumpage Income

Landowners who engage in active forest management receive income from the sale of standing trees, referred to as "stumpage". This is the value that a logging or lumber company will pay for the trees, and can be thought of as the delivered value of the products to sawmills, pulpmills, chip facilities, or firewood, minus the costs of logging, trucking, access and other logging-related expenses and profit.

This can be considered a dividend on the investment in forestland, and is the primary economic benefit of land stewardship in Vermont. It is this income from periodic sales of forest products that pays the expenses of ownership, and hopefully provides some economic return beyond expenses for the investment involved in land ownership. This income is a driver in private landowner decisions to maintain or dispose of forestland. The expenses include property taxes, boundary maintenance, management planning and timber sale administration (required for participants in Use Value Appraisal), application of Acceptable Management Practices, and compliance with a host of regulations.

Stumpage prices for quality sawlogs rises at rates just above inflation, with up- and down-turns based on consumer preferences and housing starts, but provides some incentive for growing quality wood products. These are mature trees with market characteristics, and can bring $100 to $5000 per truckload. Stumpage prices for pulpwood and firewood do not keep up with inflation due to increased supply, reduced demand, and increased harvesting costs. These are the trees that need to be removed to improve stand quality and growth, but delivered values just barely cover logging and trucking costs with a small price per truckload ($0-$200) paid as stumpage.

Using harvesting data and prices from Windsor County for 2010, 21 million board feet, 18,000 cords plus 94,000 tons of forest residue chips were harvested and sold for total estimated stumpage of about $3.5 million dollars. This is the monetary benefit paid to thousands of landowners annually for participating in active management, after the loggers, truckers and other contractors are paid. (see http://www.vtfpr.org/util/documents/rpt10.pdf) This is taxed at either income or capital gains tax rates.

iii. Primary Manufacturing

Another valuable forest resource is that derived from the harvest of timber for lumber, veneer, pulp, pellets, or paper products. This is often referred to as primary manufacturing. The table below summarizes the harvest rates of Hardwoods and Softwoods for both Windsor County and the State from 2000-2010. It is interesting to note that harvest rates have not changed very much; however, there are some small fluctuations. For instance, there appears to have been a spike in hardwood harvest rates in 2005; whereas, harvest rates for softwoods have remained relatively steady. Currently, there is a proposed pellet plant in West Windsor. If the plant is approved and receives all the necessary permits, it will provide add significantly to primary manufacturing in the region.

	Windsor Co.		State	
	Hardwood	Softwood	Hardwood	Softwood
2010	10,159	10,849	86,864	93,320
2005	20,461	12,840	118,589	92,840
2000	13,008	11,365	118,153	128,666

Table 3: Millions of Board Feet Harvested (2000-2010)
Vermont Department of Forest, Parks, and Recreation

iv. Secondary Manufacturing

Forests also provide for secondary manufacturing resources. These are often referred to as value-added products as the item produced is worth more that the un-refined resource. A prime example of secondary manufacturing is the creation of furniture from timber resources. A rocking chair is going to fetch a higher value on the market than the wood would have as board length. There are many examples of such products that are produced within the Southern Windsor County Region. Some of them include: furniture, cutting boards, bowls, and toys.

Recreational Values

The Region's forest lands also offer a multitude of recreational opportunities. Tourists and locals alike enjoy hiking, biking, camping, downhill skiing, x-country skiing, snowmobiling, hunting, fishing, horseback riding, ATV riding, fishing and many other activities. Outdoor recreation is commonly associated with the Vermont 'way of life' and is a reason that many residents choose to live here and tourists decide to visit. By providing recreational opportunities, forests contribute to residents' physical health and happiness.

As you can see on the map below, the region is home to many areas devoted to outdoor recreation. Ludlow is home to the Okemo State Forest and the Okemo Ski Resort, West Windsor is home to Ascutney Trails (a mountain bike trail system) and Ascutney Mountain which one of the Northeast's premier hangliding spots, Windsor is home to the Mt. Ascutney State park, which offers several hiking trails, Reading is home to a large portion of the Green Mountain Horse Association's trail network (although there are many other horse trails throughout the rest of the region as well). Furthermore, VAST (Vermont Association of Snow Travelers) maintains a vast network of snowmobile trails in the region.

The region is also host to the Vermont 100 and Vermont 50. These long distance races are very popular (the 2014 Vermont 100 online registration filled in just 12 minutes!), utilize the forests, and are a large boon to the local economy. Additionally, the Vermont 100 is the last ultra-marathon to host both humans and horses on the same track.

As forests, wetlands, and riparian zones cannot be separated and are often used together for recreational purposes (and others), the Water Resources map is also included below. A few of the recreational opportunities that exist in the southern Windsor County Region include: boating, swimming, canoeing, kayaking, and fishing.

i. Tourism

The Southern Windsor County Forest Stewardship Steering Committee values forests for the important role they play in the tourism industry. In the summer months, forested areas

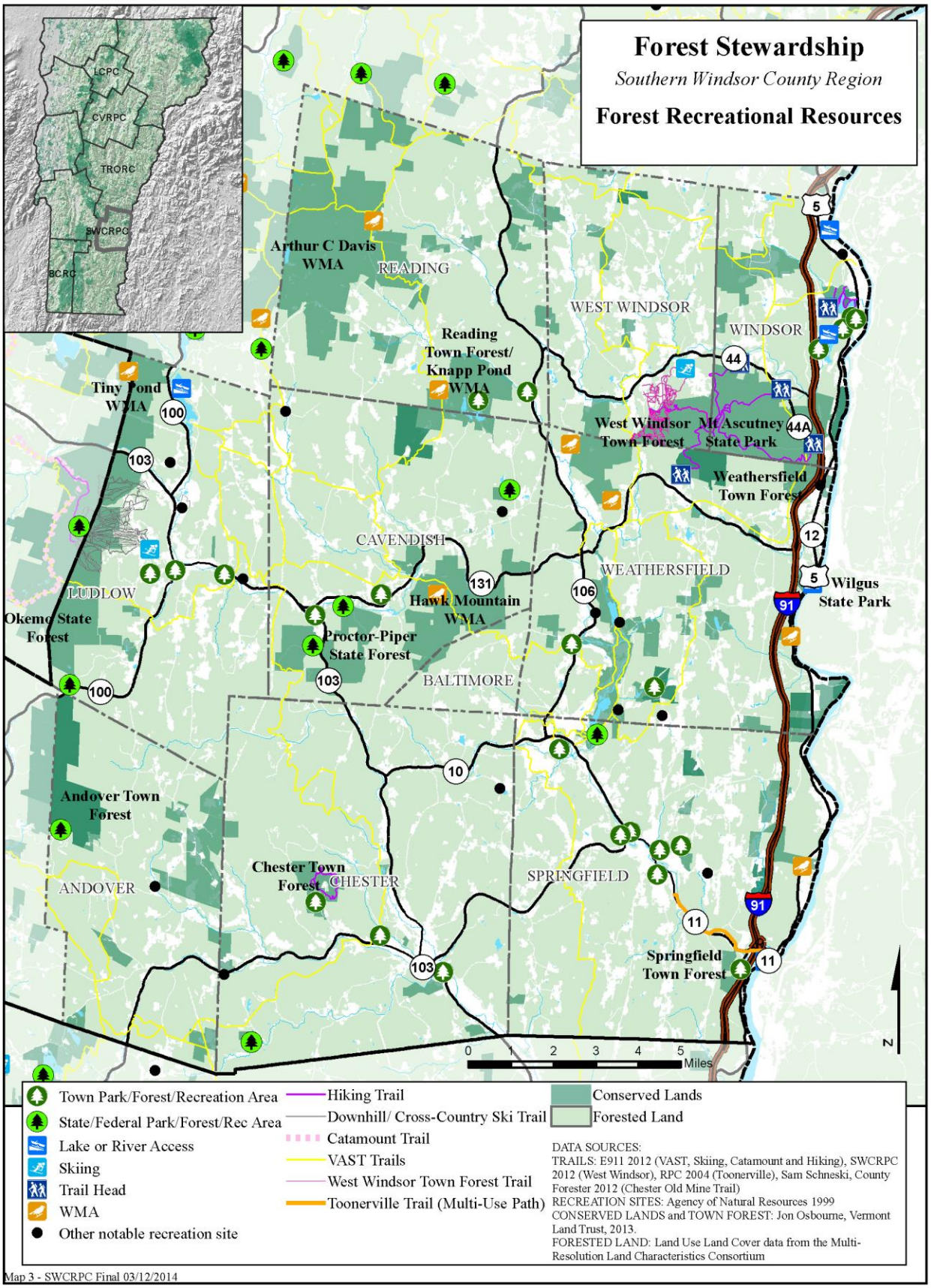
contribute to the 'green' mountain appeal of Vermont, while in the fall, maple trees color the landscape. The landscape is visually appealing to tourists, drawing visitors during all seasons, but especially in the autumn. Forests in the southern Windsor County region are also critical to maple syrup and candy production and recreational opportunities. As a result, forests indirectly support establishments that are dependent on visitors, like hotels, bed and breakfasts, restaurants and gift shops.

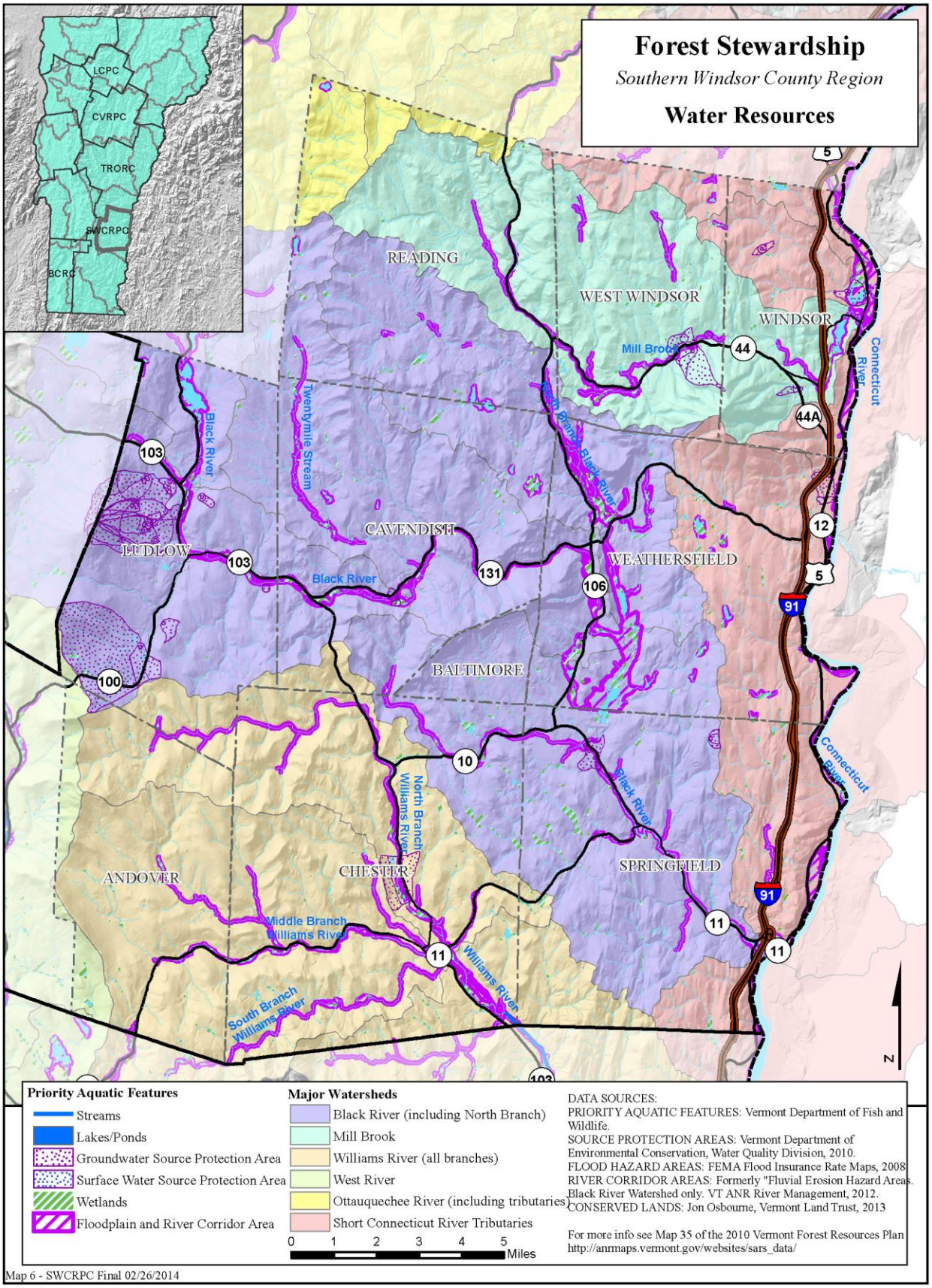
ii. Hunting & Fishing

The Region's forested lands also provide for ample hunting and fishing opportunities. Not only do Vermont's hunting and fishing seasons attract many tourists (as discussed above), they also provide for local jobs and increased tax revenues. Additionally, money that is spent on these activities has a multiplier effect and is felt many times over in the community.

According to a report published by the International Association of Fish and Wildlife Agencies, the economic impact of hunting in Vermont included the following: $60 million in retail sales, $96 million in multiplier effects, $21 million in salaries and wages, 1,037 jobs, and $5.5 million in sales, fuel, state, and federal taxes.[11] If you divide these numbers by 14 (there are 14 counties in Vermont), the impact to the region is enormous and, given that the southern Windsor County region is more rural than others included, e.g. Chittenden County, the impact is most likely even larger than the strict 1/14 division.

[11] International Association of Fish and Wildlife Agencies, *Economic Importance of Hunting in America,* 2001.


Forest Stewardship
Southern Windsor County Region
Forest Recreational Resources
LCPC
CVRPC
TRORC
SWCRPC
BCRC
Arthur C Davis WMA
READING
Reading Town Forest/ Knapp Pond WMA
WEST WINDSOR
WINDSOR
Tiny Pond WMA
West Windsor Town Forest
Mt Ascutney State Park
Weathersfield Town Forest
CAVENDISH
WEATHERSFIELD
Wilgus State Park
LUDLOW
Okemo State Forest
Hawk Mountain WMA
Proctor-Piper State Forest
BALTIMORE
Andover Town Forest
ANDOVER
Chester Town Forest
CHESTER
SPRINGFIELD
Springfield Town Forest
0 1 2 3 4 5 Miles
N
Town Park/Forest/Recreation Area
State/Federal Park/Forest/Rec Area
Lake or River Access
Skiing
Trail Head
WMA
Other notable recreation site
Hiking Trail
Downhill/ Cross-Country Ski Trail
Catamount Trail
VAST Trails
West Windsor Town Forest Trail
Toonerville Trail (Multi-Use Path)
Conserved Lands
Forested Land
DATA SOURCES:
TRAILS: E911 2012 (VAST, Skiing, Catamount and Hiking), SWCRPC 2012 (West Windsor), RPC 2004 (Toonerville), Sam Schneski, County Forester 2012 (Chester Old Mine Trail)
RECREATION SITES: Agency of Natural Resources 1999
CONSERVED LANDS and TOWN FOREST: Jon Osbourne, Vermont Land Trust, 2013.
FORESTED LAND: Land Use Land Cover data from the Multi-Resolution Land Characteristics Consortium
Map 3 - SWCRPC Final 03/12/2014


Forest Stewardship
Southern Windsor County Region
Water Resources
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WEST WINDSOR
WINDSOR
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LUDLOW
WEATHERSFIELD
BALTIMORE
ANDOVER
CHESTER
SPRINGFIELD
Mill Brook
Black River
Twentymile Stream
North Branch Black River
Connecticut River
North Branch Williams River
Middle Branch Williams River
South Branch Williams River
Williams River
Priority Aquatic Features
Streams
Lakes/Ponds
Groundwater Source Protection Area
Surface Water Source Protection Area
Wetlands
Floodplain and River Corridor Area
Major Watersheds
Black River (including North Branch)
Mill Brook
Williams River (all branches)
West River
Ottauquechee River (including tributaries)
Short Connecticut River Tributaries
0 1 2 3 4 5 Miles
DATA SOURCES:
PRIORITY AQUATIC FEATURES: Vermont Department of Fish and Wildlife.
SOURCE PROTECTION AREAS: Vermont Department of Environmental Conservation, Water Quality Division, 2010.
FLOOD HAZARD AREAS: FEMA Flood Insurance Rate Maps, 2008
RIVER CORRIDOR AREAS: Formerly "Fluvial Erosion Hazard Areas. Black River Watershed only. VT ANR River Management, 2012.
CONSERVED LANDS: Jon Osbourne, Vermont Land Trust, 2013
For more info see Map 35 of the 2010 Vermont Forest Resources Plan
http://anrmaps.vermont.gov/websites/sars_data/
Map 6 - SWCRPC Final 02/26/2014

Ecosystem Services

The forests of the southern Windsor County region provide many valuable ecosystems services that include: groundwater recharge, water filtration, carbon storage, wildlife habitat, and flood prevention. The Southern Windsor County Forest Stewardship Steering Committee recognizes that these services are extremely valuable and that they should be taken into account when considering actions that affect forests.

Energy

i. Home Heating

The forests of the southern Windsor County Region provide heat for many of the area's residents in the form of cordwood. Approximately 18% of the homes in the region heat with cord wood.[12] It is also important to note that there has been a recent trend towards the adoption of pellet stoves and wood pellets as fuel. While the region does not have a pellet plant, there is a proposed pellet plant in West Windsor, some of the wood harvested in the region does go to pellet plants for processing into pellet fuel.

ii. Biomass

In addition to utilizing cordwood and pellets for home heating, wood from the region is also used to produce electricity and heat larger buildings such as businesses, schools, or municipal facilities. Lower value trees, tree tops, and forest residues are often chipped and used as fuel at these types of institutions. At plants designed to produce electricity the wood chips are burned to heat water which turns a turbine to create electricity. Currently, there are no biomass plants in the region.

Education

Forests are valued because they provide the setting for place-based learning as kids explore the sciences in school, at camp, and with their families and friends. Many local farms and town forests are utilized for educational opportunities, e.g. Spring Brook Farm in Reading and Paradise Park in Windsor.

Well Being/Spiritual Benefits

Americans have a tradition of seeking solace in the woods as demonstrated by great writers like Henry David Thoreau (author of *Walden*) or John Muir (author of *My First Summer in the Sierra)*. Southern Windsor County residents are no different—they enjoy forests for various reasons, whether the trees bring them joy, happiness, or peace of mind.

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[12] U.S. Census, 2012 American Community Survey: 3 Year Estimates, available at: http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_12_3YR_B25040&prodType=table, (last accessed 04/28/14).

Threats, Barriers, and Limitations

The Southern Windsor County Forest Stewardship Steering Committee would like to recognize the following threats, barriers, and limitations to maintaining forests as forests within the region.

1) Forest Fragmentation and Parcelization

Forest fragmentation, which is an interruption in otherwise intact forestlands due to infrastructure, e.g. roads, is a potential issue throughout the southern Windsor County region. Parcelization, the subdivision of a large parcel into several smaller ones, is also an issue throughout the southern Windsor County region. These issues are intertwined, often confused, and can be addressed with similar solutions. Thus, the Steering Committee chose to address them as one threat. A recent statewide report estimates that the amount of forest land on parcels of 50+ acres decreased by about 34,000 acres between 2003 and 2009 (See VNRC's *Community Strategies for Forest's and Wildlife: A Guide for Local Action*).

a. Environmental Implications

Forest fragmentation and parcelization have many environmental implications. The list of potential threats included below is not exhaustive, but does address what the Steering Committee felt are a few of the more important environmental implications.

i. Water Quality

Forest fragmentation can have negative effects on water quality as it reduces the forests ability to absorb water and reduces the amount of forestland and soil available to filter water. Increased development, which is usually accompanied by fragmentation and/or parcelization, can result in a loss of forest cover, which can in turn increase runoff of pollutants to rivers and streams. Furthermore, less forest cover contributes to riverbank destabilization, sedimentation, and increases in water temperature. All of these symptoms contribute to poor water quality.

ii. Wildlife

Forest fragmentation and parcelization threatens some types of wildlife habitat and interrupts travel corridors for larger species. Additionally, as fragmentation and parcelization increase the number and diversity of species that our land can support decreases.

iii. Flood Resilience

Similar to water quality, forest fragmentation and parcelization also threaten to reduce our environment's natural flood resilience capabilities. As fragmentation and parcelization occur they are typically accompanied by a loss of forest cover, which in turn reduces the lands ability to absorb water. As less water is absorbed by the land, it flows faster into our streams and rivers. This contributes to erosion and riverbank destabilization.

b. Economic Implications

Smaller parcels make it more difficult to manage for forest industries or wildlife. This reduces the range of economic activities that a landowner and a community have available to them. Furthermore, healthy, intact forests are a large part of Vermont's landscape. They provide many recreational opportunities, e.g. hunting, hiking, birding, and without the large, intact portions of forestland the tourism economy would suffer.

2) Invasive Species

Invasive species such as the Asian Longhorn Beetle, Emerald Ash Borer, Hemlock Wooly Adelgid, Honeysuckle, Barberry, Buckthorn, Multiflora Rosa, and Japanese Knotweed present, or soon may, present a threat to Vermont's forests.

a. Environmental Implications

Invasive species can challenge and overwhelm native species, causing a ripple of consequences throughout an ecosystem. For example, Vermont's Department of Forests, Parks, and Recreation is worried about the Emerald Ash Borer (EAB), a wood boring insect from Asia that kills ash trees; it has already spread to the Hudson Valley in New York, areas of Canada directly north, New Hampshire to the east, and Massachusetts to the south of the Vermont state border. EAB can kill trees in four to six years. The Hemlock Wooly Adelgid is another species of concern. It has already been sighted in Windham and Bennington counties, both of which neighbor the southern Windsor County Region.

b. Economic Implications

When an invasive species causes damage to a native species that is of economic importance, our economy suffers. Two examples are the ash and maple trees. Ash trees are important to the forest industry as the timber is white, dense, and grows quickly; maple trees are important as they provide some of the highest value lumber and the tree's sap is used to produce maple syrup. The Emerald Ash Borer, if it spreads to Vermont could negatively affect the ash timber industry in our state. The Asian Longhorn Beetle, while it prefers other trees, will eat maple trees.

3) Decrease in Local Wood Processing Sites

a. Environmental Implications

The lack of local wood processing sites results in additional, unnecessary carbon pollution. Without a local wood processing site, wood that is harvested within the region must be trucked to elsewhere in the state, outside of the state, or even to Canada. This results in additional fuel consumption which in turn results in higher carbon pollution.

b. Economic Implications

The loss of local wood processing sites and the lack of new investment in wood manufacturing also have serious economic impacts. Lack of competition for these wood products lowers their actual value. Some products are simply not economical to harvest with long trucking distances. Loggers are forced to truck wood harvested within the region to outside the region, out the state, or even outside the country. This results in additional trucking cost to the logger and lower stumpage income to the landowner. Then, value is added outside the region so employment and tax revenues are moved elsewhere. Thus, the economic impact is compounded since, if these opportunities were kept local, they would add a multiplier effect to the economy.

4) Diminishing Cultural Connection to Forests

The lack of personal and cultural connection to forests and forest services/products is concerning to the southern Windsor County Forest Stewardship Steering Committee as it has the potential to cause significant environmental and economic impacts.

a. Environmental Implications

The lack of connection to forestland is indicative of, and reinforces, the knowledge gap between consumers and producers of forest products. Without informed and proactive consumers, it is less likely that industry will be held accountable for their impact on forests. Simply, if southern Windsor County residents do not value the environmental benefits of our forests and act as stewards of this resource, degradation is inevitable. A lack of connection to the land can also further fragmentation and parcelization. As lands are transferred from one generation to the next, the new landowner may choose to subdivide and sell the land rather than keeping it as it was.

b. Economic Implications

A lack of personal or cultural connection to forests will drive consumers towards the lowest priced wood products, which will undercut local businesses in favor of foreign competition.

5) Economic Incentive to Develop Land

Forestland parcels equal to or larger than 50 acres have increased in value from an average of $930 per acre in 2003 to $1,615 per acre in 2009.[13] This increase in value makes it more difficult to own forestland for non-development purposes.[14] It is important to note that the pressure to develop land fluctuates with the economy. When "times are good" the pressure increases.

a. Environmental Implications

[13] Vermont Natural Resources Council, *Community Strategies for Forest's and Wildlife: A Guide for Local Action* (2013).
[14] Id.

The economic pressure to develop land often leads to parcelization and fragmentation. There are many benefits of Vermont's forestlands that are negatively affected by parcelization and fragmentation, please see above.

b. Economic Implications

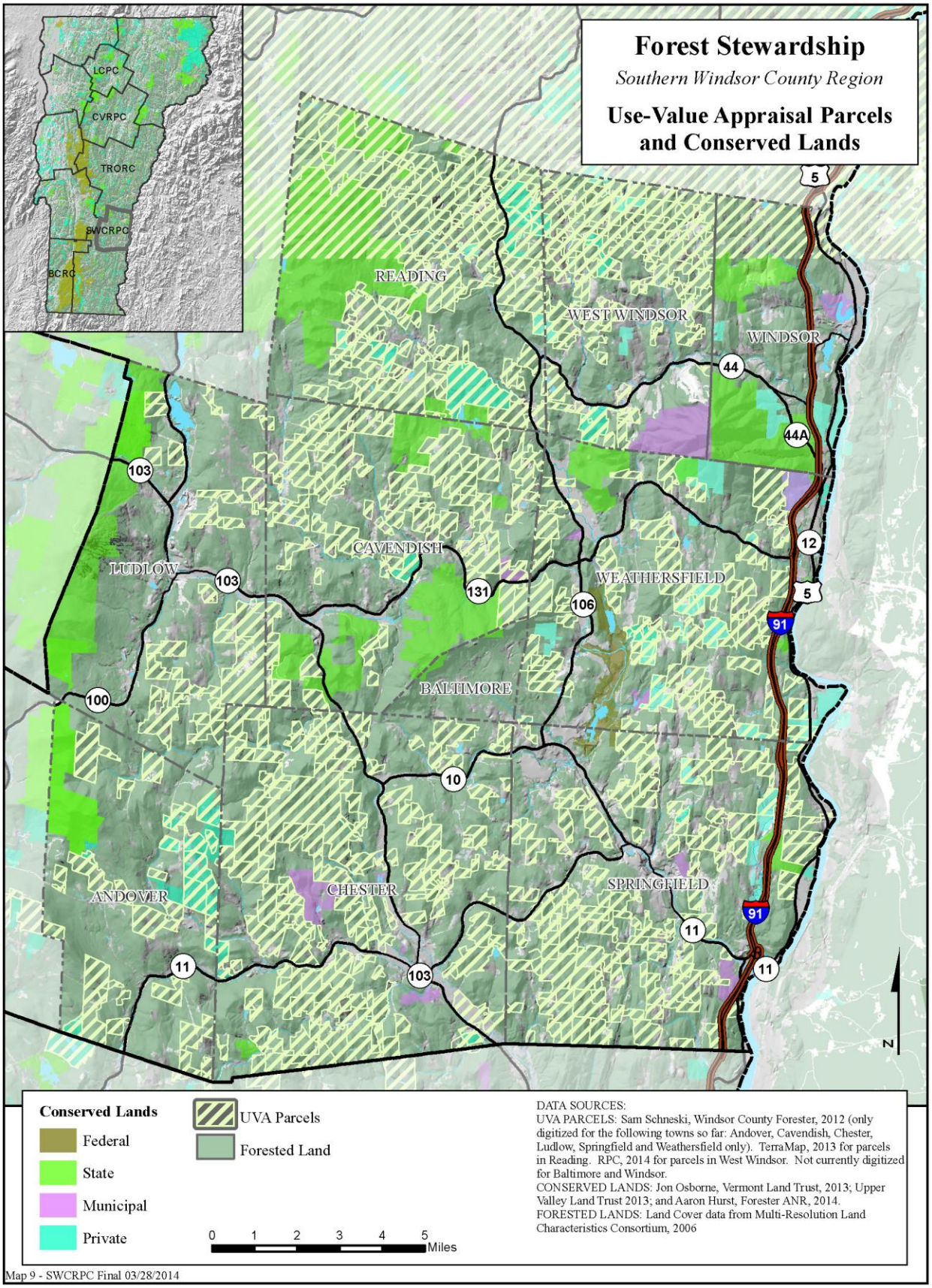
Recreation, tourism and forest based manufacturing employ many Vermonters and bring approximately $1.5 billion dollars to the state every year.[15] As more land is developed (as a result of the economic incentive), its utility for these purposes diminishes. However, increasing land values can also provide an incentive to invest in long-term ownership of forestland. Often, this investment fosters good stewardship. Moderate rates of development increase the tax base, provide markets for wood products, and maintain the perception that forestland is valuable and worthy of long-term investment.

Forest Stewardship Strategies

Conserved Lands

There are a variety of conserved lands in the southern Windsor County region as can be seen in the map below. The State owned lands and those in the Use Value Appraisal Program are required to maintain management plans.

[15] Id.


Forest Stewardship
Southern Windsor County Region
Use-Value Appraisal Parcels and Conserved Lands
LCPC
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WINDSOR
CAVENDISH
LUDLOW
WEATHERSFIELD
BALTIMORE
ANDOVER
CHESTER
SPRINGFIELD
5
44
44A
12
103
131
106
91
100
10
11
N
Conserved Lands
Federal
State
Municipal
Private
UVA Parcels
Forested Land
0 1 2 3 4 5 Miles
DATA SOURCES:
UVA PARCELS: Sam Schneski, Windsor County Forester, 2012 (only digitized for the following towns so far: Andover, Cavendish, Chester, Ludlow, Springfield and Weathersfield only). TerraMap, 2013 for parcels in Reading. RPC, 2014 for parcels in West Windsor. Not currently digitized for Baltimore and Windsor.
CONSERVED LANDS: Jon Osborne, Vermont Land Trust, 2013; Upper Valley Land Trust 2013; and Aaron Hurst, Forester ANR, 2014.
FORESTED LANDS: Land Cover data from Multi-Resolution Land Characteristics Consortium, 2006
Map 9 - SWCRPC Final 03/28/2014

State Lands

The southern Windsor County Region is home to several state parks and forests. Additionally, the region is home to several Wildlife Management Areas, the largest of which is the Arthur Davis WMA. The Arthur Davis WMA is a 7,788 acre parcel that stretches between the towns of Reading and Plymouth, and abuts Coolidge State Forest and Camp Plymouth State Park. Given that Coolidge State Forest is connected to the Plymsbury WMA, the combination has resulted in one of the largest state-owned forested areas in southern Vermont. The forest lands in the Arthur Davis WMA are comprised of sugar and red maple, yellow birch, and beech trees, with red spruce and white pine present to a lesser degree. It is home to rivers, vernal pools, and Reading Pond, as well as wildlife like moose, black bears, snowshoe hare, barred owls, and white tailed deer, amongst others. While the property is owned by the State of Vermont, it is actively logged by private parties who hold the timber rights.[16]

State Parks (SP)	Wildlife Management Areas	State Forests (SF)
Wilgus SP	Weathersfield WMA	Albert C. Lord SF
Mt. Ascutney SP	Knapp Brook WMA	Williams River SF
	Little Ascutney WMA	Okemo SF
	Knapp Pond WMA	Proctor Piper SF
	Hawks Mountain WMA	
	Skitchewaug WMA	
	Arthur Davis WMA	
	Tiny Pond WMA	

Table 4: State Parks, Wildlife Management Areas, and State Forests in the SWCRPC Region

Federal Lands

The U.S. Army Corp of Engineers owns and operates two dams along the Black River in Springfield. The associated land, which is federally owned and consists of approximately 1,361 acres, is primarily forested. This area is a popular recreation destination and there are several trails that run throughout the area. For more information on this area, please visit the area's website at http://www.nae.usave.army.mil/Missions/Recreation/NorthSpringfieldLake.aspx.

Town Forests

Owned by the local municipality, a 'town forest' conserves land while providing recreational opportunities for the community, wildlife habitat for plants and animals, and sometimes revenue for the town government (through timber sale or sap production). Of the towns in the southern Windsor County region, Reading, Chester, Springfield, West Windsor, Weathersfield, Andover, Ludlow, Cavendish, and Windsor have town forests.

[16] Vermont Fish & Wildlife Department, "Arthur Davis Wildlife Management Area." Website: http://www.vtfishandwildlife.com/library/maps/Wildlife%20Management%20Areas/Springfield%20District/Arthur%20Davis%20WMA.pdf (accessed June 11, 2012).

Conservation Easements

A conservation easement (CE) is a legally binding agreement between a landowner and the government or a local land protection organization (land trust) that ensures a parcel will be protected from certain types of development indefinitely. CEs are typically created to conserve farm and forestlands, or other ecologically sensitive areas, such as wildlife habitat or wetlands; however, a landowner can choose to conserve any of his or her parcels, regardless of ecological integrity. Indeed, many landowners conserve areas that are of particular importance to an individual, family, or community. The parcel can be small or large, and it is usually donated, although sometimes organizations will fundraise to purchase a parcel. In the southern Windsor County region, many conservation easements are written, held, and enforced by either the State of Vermont or one of the local land trusts, such as the Vermont Land Trust (VLT) or the Upper Valley Land Trust (UVLT). Conserved parcels can be viewed on the Use Value Appraisal Parcels and Conserved Lands Map which is included above and in the appendices.

Private Lands & the Use Value Appraisal (UVA) Program

Ensuring the continued existence of private forestlands is a high priority of the State of Vermont, as evidenced by the Use Value Appraisal program, and the attention paid to the land's stewardship potential.

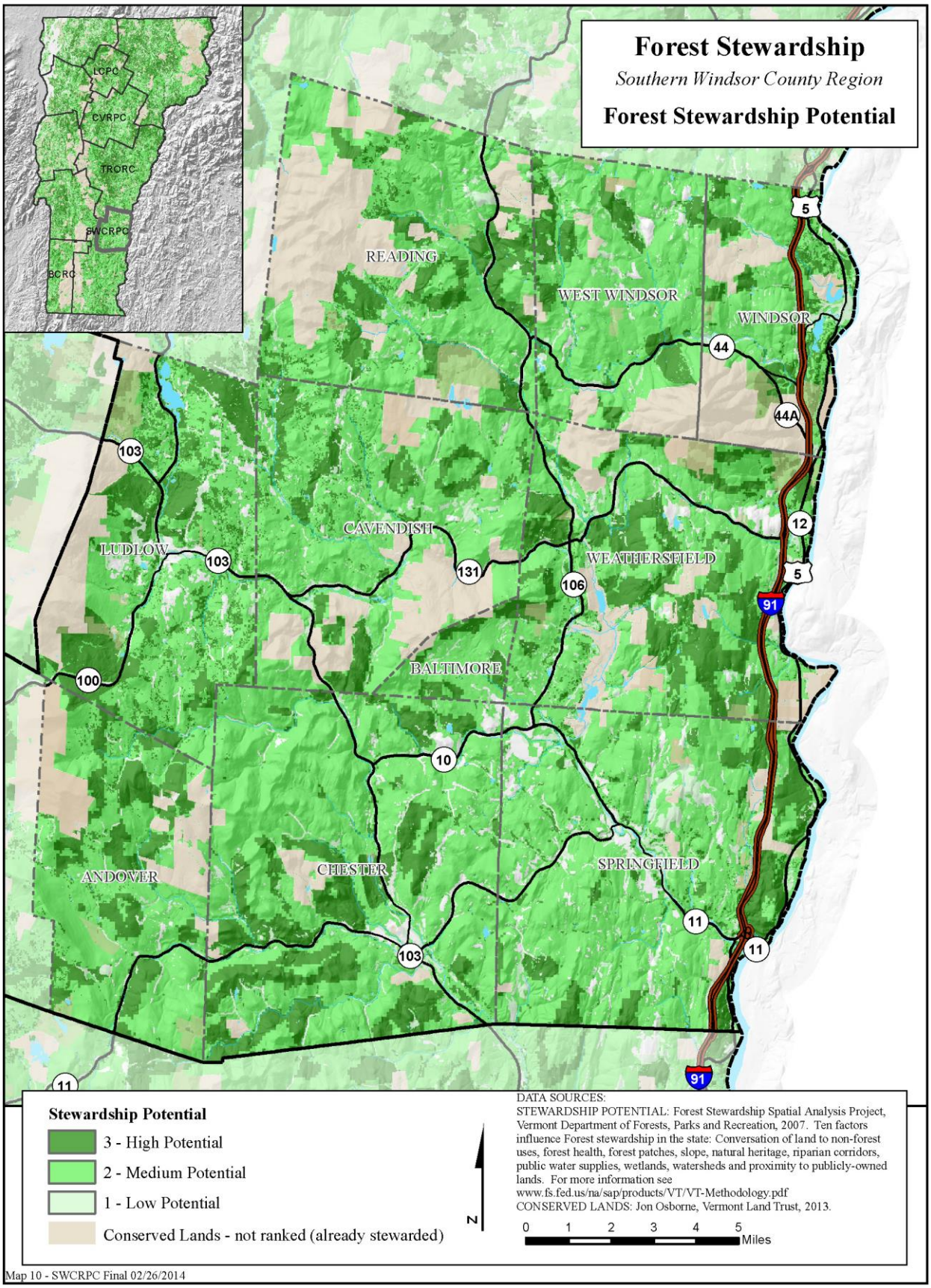
Vermont's Use Value Appraisal (UVA) Program, also called "Current Use" or "Land Use", enables landowners who practice long-term forest management to have their enrolled land appraised for property taxes based on its value for forestry, rather than its fair market (development) value. When land is enrolled in the UVA program, the State attaches a permanent lien to the deed. Productive forest land appraised under this program receives this assessment as long as it is actively managed, unless the landowner decides to withdraw the land from the program, the legislature ends the program, or the parcel is discontinued by the Division of Property Valuation & Review. UVA is the critical tool for private lands conservation in the region; maintaining UVA with simple and low cost requirements will "keep forests as forest", a primary goal of this document. Approximately half of eligible lands in the region are enrolled, (see Use Value Appraisal and Conserved Lands map on page 27) which requires a landowner to follow an approved forest management plan, and manage their land to higher standards than otherwise required by state law. Most enrolled landowners have a relationship with a private forester and are receiving professional advice on a wide range of stewardship issues. In addition, state foresters inspect each parcel every ten years or so for compliance. UVA also creates the cultural connection between landowners and the working landscape and fosters a high level of stewardship.

The Vermont Department of Forests, Parks, and Recreation (FPR) developed the Vermont Forest Stewardship Spatial Analysis Project (SAP) to determine the potential for stewardship of private forest lands in Vermont. Spatial data were used to indicate non-industrial private forest lands where stewardship could be encouraged or enhanced. Lands with high stewardship potential are considered priority areas for the Forest Stewardship Program of the U.S. Department of Agriculture (USDA) as well as for more concentrated conservation, management, and associated planning efforts. This project identified 10 important factors that influence

suitability for forest stewardship. Factors that threaten forest resources include development (conversion to non-forest uses) and forest health (risk and adaptability to change). Factors that support the potential of forest resources include forest patches, slope, wildlife and biodiversity, riparian corridors, wetlands, priority watersheds, and proximity to publicly-owned lands. Using a GIS analysis, 30 x 30 meter grid cells were assigned values based on each of the 10 parameters to determine their individual forest stewardship potential or threat. Then the importance of each of these factors was ranked as high, medium or low and the results were combined in a GIS overlay analysis. The final product is a single data layer which represents the suitability of the land for further stewardship efforts, scored from 3 (high potential for forest stewardship) to 1 (low potential).[17]

The results of SAP for the southern Windsor County region are shown in the following 'Forest Stewardship Potential' map. The Forest Stewardship Potential Map is designed to be used for very broad regional planning purposes. Parcel or multiple parcel level planning requires more specific criteria and on-site assessment.

[17] Vermont Department of Forests, Parks & Recreation, 2010.



Map 10 - SWCRPC Final 02/26/2014

Regional Plan

The SWCRPC's 2009 Regional Plan (http://swcrpc.org/publications/) contains a chapter that is dedicated to Natural Resources, including a section on Forestry and Agriculture. In this section, SWCRPC stresses the importance of maintaining forest industry while simultaneously preserving the region's ecological integrity. The plan further recognizes some of the threats to forests, e.g. fragmentation and parcelization, and emphasizes the preservation of large tracts of contiguous forestland.

In general, the Regional Plan seeks to curb fragmentation and parcelization by promoting Vermont's historic settlement pattern of compact village centers separated by rural countryside. For instance, a few of the plan's overarching goals are quoted below:

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

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

Agriculture & Forestry Section

SWCRPC's Regional Plan sets out the following goals, policies, and recommendations under the Agriculture and Forestry section. Please note that the list below is not comprehensive, but rather a selected few that support the ideas discussed above.

Goals

- Sustain agriculture and forestry in those areas of the region where they are predominant land uses, and where soils, and other conditions enable them to remain economically viable.

- Reduce fragmentation of forest and agricultural lands.

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

- Encourage the conservation, wise use and management of the Region's agricultural and forestry resources, to maintain its environmental integrity, and to protect its unique and fragile natural features.

- Expand the agricultural and forestry economies by coordinating planning, zoning, and economic development activities with member communities and organizations.

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

Policies

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

- Agricultural land and forested land form the separations between town centers, villages, and hamlets in the traditional regional settlement pattern. Tangible efforts shall be made to preserve this patch-worked balance of open and forested space, to promote compact settlements through creative regional planning, municipal planning, private initiatives, purchases, leases and transfers of development rights and efficient site designs. Contiguous forest and significant agricultural areas shall remain largely in non-intensive uses unless no reasonable alternative exists to provide essential residential, commercial and industrial activities for the region's inhabitants.

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

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

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

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

- Where important natural features, soil conditions, or special resources including, but not limited to, agricultural and forested land are identified, clustered or peripheral development is required to protect such resources and prevent fragmentation and sprawling settlement patterns.

- Encourage appropriately sited and designed businesses promoting the local processing, sale and distribution of native raw materials and products. Planning and regulatory review at the state and local level should not unduly restrict the development of "home cottage" industries which complement farm and forestry.

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

- It is the policy of the RPC to minimize or mitigate the loss of these resources to development. As an alternative to conventional methods, the RPC endorses use of off-site mitigation techniques to offset the loss of these resources. However, endorsement of off-site mitigation should be conditioned on finding that the project proposal is:

    - Consistent with this Plan and the plans of affected municipalities; and

    - Provides an equal or greater public benefit than conservation of the development site itself.

Recommendations

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

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

- The RPC will evaluate proposed developments involving Primary Agricultural Soils and forest lands, and their related industries. Where appropriate, it will provide information to federal and state agencies, town boards and commissions, and other parties regarding the probable impacts these resources have on the welfare of the region.

Revising the Forestry Chapter of SWCRPC's Regional Plan

As an outgrowth of this forest stewardship project, several changes to the current Agriculture and Forest Resources section of the Natural Resources chapter in the Regional Plan have been proposed. These include:

AGRICULTURE & FOREST RESOURCE GOALS

1. Create and maintain healthy and productive forest and agricultural economies while preserving the environmental integrity of the region.

AGRICULTURE & FOREST RESOURCE POLICIES

1. The patch-worked balance of open and forested space and compact settlements shall be preserved through creative regional planning, municipal planning, private initiatives, purchases, leases and transfers of development rights, and efficient site designs. Contiguous forest (as identified by the Forest Resources Map) and significant agricultural areas (areas if prime agricultural soils as identified on Map #5, *Important Farmland Soils*) shall remain in non-intensive uses unless no alternative exists to provide essential residential, commercial, and industrial activities for the region's inhabitants.

2. The construction of utilities, roads or other land development shall skirt tracts of agricultural and forest land to avoid fragmentation and be sited to cause minimal negative impact to forest contiguity and aesthetics.

3. Where an alternative exists, development is prohibited in large tracts of Primary Agricultural Soils located outside of downtowns, villages, and other locally designated growth areas.

4. Development within downtowns, villages, and other locally designated growth areas should be allowed on areas of Primary and/or Secondary Agricultural Soils, if supported in the town plan, but shall use innovative site designs such as clustered of development on the periphery (for examples see *Conservation Design for Subdivisions: A Practical Guide to Creating Open Space Networks* (1996) by Randall Arendt) to minimize negative impacts and prevent fragmentation. Additionally, such developments shall be required to maintain a small tract for future small-scale agricultural use or community garden.

5. Encourage appropriately sited and designed businesses promoting the local processing, sale and distribution of native raw materials and products. Planning and regulatory review at the state and local level should not unduly restrict the development of "home cottage" industries which complement farm and forestry.

6. Agricultural and forestry activities shall minimize point and non-point source pollution.

AGRICULTURE & FOREST RESOURCE RECOMMENDATIONS

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

2. Encourage local farm and forest product ventures such as community gardens and community Supported agriculture throughout the Region where such enterprises would benefit the community and the Region.

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

4. Work with the Department of Health and other partner agencies to promote the agricultural production and retail sales of healthy local foods.

As of the Spring of 2014, these revisions were being considered by the SWCRPC Board. The Southern Windsor County Forest Stewardship Steering Committee has reviewed the proposed changes above and generally approves of them. However, there are some specific areas where the Committee feels changes should be made. For example, the Committee feels that mandatory language is not in the best interest of keeping forests as forests; more passive language should be considered for the regional plan. Additionally, the Committee felt that the plan should discuss the benefits of small and large scale forest based businesses as well as to further promote such businesses.

Local Plans and Land Use Regulations

West Windsor

The Town of West Windsor is one of the more active towns in the region with respect to forest stewardship; however, the town also ranked very high on the prioritization matrix as completed by SWCRPC staff under the Forest Stewardship project. The West Windsor selectboard has established a Town Forest Committee which is responsible for oversight of the Town Forest. "The Committee's primary function is to oversee the care, custody and management of the West Windsor Town Forest. The goal is to conserve the health of the forest community while enabling the public to enjoy high quality outdoor experiences (scenic/backcountry views, wildlife, etc.) away from development, noise, and pollution.[18]" West Windsor's Town Plan, Zoning Regulations, and Subdivision Regulations contain many policies, recommendations, and rules aimed at promoting forest stewardship within the town. Please see below for a summary:

West Windsor Town Plan

- Forests are designated as "Special Consideration Resources" in the Town Plan
- Policies:
    - Support for Use Value Appraisal Program.
    - Protection of forest lands.
    - Safe and sustainable use of forest land for a variety of uses including, but not limited to, recreation, fuel wood, and wildlife habitat.
    - Support for value added forest products.
- Recommendations:
    - Map/Inventory Forestlands

[18] Town Forest Committee Mission Statement, available at: http://www.westwindsorvt.govoffice2.com/index.asp?Type=B_BASIC&SEC={A527025C-4B77-481E-A948-8A96E61CA58A}. Last accessed: 06/30/14.

Zoning Regulations

- Silviculture Accepted Management Practices are exempt from zoning permits.
- Allows for PUDs which, by relaxing dimensional requirements, could lead to innovative site design, e.g. clustering, that could be used to further forest stewardship.
- DRB may require forest management plans for PUDs
- Forestry Use Defined as: The use of land for management, including logging, of a forest or woodland, including the maintenance, construction or alteration of woods-roads, skid-ways, landings, fences and forest drainage systems.
- Conservation District has minimum lot size of 30 acres

Subdivision Regulations

- Sketch plans (and final plans) must include:
    - Critical Wildlife Habitat
    - Threatened or Endangered Species
    - Ag Soils – Cluster Development
    - Forest Land and Trees
        - Avoid fragmentation
        - Minimize adverse impacts to productive or potentially productive forestlands
        - Significant mature trees that provide shade, beauty, habitat and/or agricultural products shall be retained wherever possible.
- Cluster development encouraged, and potentially required in certain instances.
- Utilities should be placed underground, in the road right-of-way, where feasible.
- Encourages road, sewer and utility easements to be laid out as efficiently as possible to minimize the acreage reserved for such purposes.

<u>Recommendations for Goals/Strategies</u>

- Map the high quality forest areas in town
-

<u>Reading</u>

The Town of Reading is another town in the southern Windsor County region with high forest stewardship potential. Much of the town (approximately 89% according to the town plan) is considered forestland. While some of that land is owned and managed by the State (the town is home to two Wildlife Management Areas and one State Forest), the majority of the forestland is privately owned. Current goals, policies, and rules contained within the Town Plan, Zoning Regulations, and Subdivision Regulations are included below.

Town Plan

- Forest Category under Future Land Use
- Goals
    - Maintain compact village centers surrounded by forestland

    - Protect unique forests
- Policies
    - Encourages the use of Accepted Management Practices in all silviculture projects within town.
    - Where development threatens critical wildlife habitat or other biologically sensitive areas, development is encouraged along the periphery of the property.
    - Discourage clear-cutting projects. A plan is required for any clear-cutting project above 1,900 feet in elevation.
    - Encourages land-based resource activities, e.g. forestry.
    - Work with the VT Department of Forest, Parks, and Recreation and VT Department of Fish and Wildlife to update management plans for state owned land in the town.

Zoning Regulations

- Silviculture Accepted Management Practices are exempt from zoning permits.
- RR-10 District requires site plan approval for forestry processing sites (10 Acre).
- RR-5 District requires site plan approval for forestry processing sites (5 Acre).
- Industrial Mining District site plan approval for forestry processing sites.
- Forest Cover maintenance provision under the Ridgeline Protection Overlay District which, in certain cases, could require a forest management plan.
- Site Plans in rural districts shall minimize adverse impacts on forestry (among other activities) by clustering development or siting in such a manner to achieve the same effect.
- Purpose of PUD Regulations is to, in part, provide for the conservation of forestland.
- Requirement under PUD provisions to preserve "Open Space." Open space as defined under Reading's Zoning Regulations includes productive forestland.
- Agriculture and forestry product processing is defined as: the processing of agricultural or forestry products which are grown primarily on the site, for sale to or consumption by others.

- Forestry use is defined as: any management, including logging, of a forest or woodland, including the maintenance, construction or alteration of woods roads, skidways, landings, fences and forest drainage systems.

Reading also utilized funding from a Municipal Planning Grant in 2007 to look at Forest Fragmentation around town. They hired VNRC to assist with the project. A Report was finalized and published in 2008. The town is currently in the process of updating their Town Plan and Zoning Regulations. The Planning Commission has been working to incorporate recommendations from the Forest Fragmentation Project into the Town Plan and Zoning Regulation updates, where feasible.

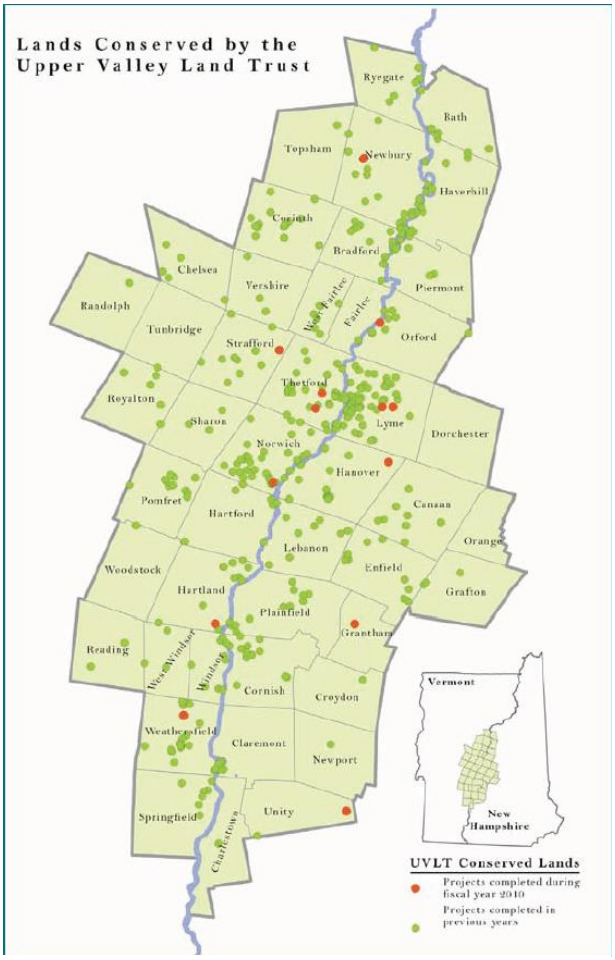


Figure 11: Map of Land Conserved by UVLT

Local Conservation Commissions & Other Conservation Organizations

Land Trusts

Upper Valley Land Trust (UVLT):

The UVLT assists landowners with the conservation of their lands, whether those lands are in the form of working farms or forests, wildlife habitat, or even trails and scenic views. Efforts are focused on the upper Connecticut River Valley, which includes half of the SWCRPC's member towns, as well as several cities in New Hampshire. Specific activities include developing, monitoring, and enforcing permanent conservation easements, as well as engaging communities through education and outreach. UVLT works with conservation commissions, neighborhood organizations, and landowners to accomplish their work.[19]

Vermont Land Trust (VLT): The VLT facilitates the implementation of permanent conservation easements on lands in Vermont in the hopes of preserving farms, forests, wetlands, and open space. Having worked on these issues since 1977, VLT estimates that they have conserved more than 360,000 acres of productive forestlands across Vermont as of January 2012. The following

[19] Upper Valley Land Trust, "About Us: Conserving Special Places," 2010. Available at: http://www.uvlt.org/aboutus (last accessed June 9, 2014).

figure shows VLT conserved properties in the Upper Valley region, include the southern Windsor County region.[20]

Private Landowner Associations

Vermont Woodlands Association (VWA): VWA is a non-profit organization that advocates on behalf of its members (private landowners, forest managers, and other professionals) to promote "the management, sustainability, perpetuation, and enjoyment of forests through the practice of excellent forestry."[21] The VWA collects examples of best practices, provides educational and training opportunities for its members, and represents them with a unified voice. In November 2011, the VWA had 1,064 members across Vermont. The organization's primary concern is to convey the benefits of working forests (these include habitat, environmental quality, and jobs) to the public.

Local Conservation Commissions

Conservation Commissions play an important role in maintaining and enhancing natural resources in the southern Windsor County region. Currently, there are 4 such groups that organize hikes and nature walks, energy audits of local buildings, and educational opportunities for the community. Some Conservation Commissions are also involved in local planning efforts, particularly in the review of the 'natural resources' section of a Town Plan, and comment on local permit applications that might have an adverse environmental impact if approved.

Other Conservation Organizations

Sierra Club: The Vermont chapter of the Sierra Club (a national environmental group) has been promoting their campaign 'Our Forests Our Future' across the state. Staff explain: "Our goal from the start was (and continues to be) the building of popular support for the establishment [sic] wildlife migration corridors connecting the northern Connecticut River with the Nulhegan Basin, the Basin to the northern Green Mountains, and the southern Green Mountains with our western border."[22] This mission has led them to advocate for town owned and conserved forests across the state.

Vermont Coverts: 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, and Coverts also represents its constituency when interacting with state agencies and other forest and wildlife related groups.[23] Part of this work involves hosting workshops on forest management and working with

[20] Upper Valley Land Trust, "About Us: Conserving Special Places," 2010. Available at: http://www.uvlt.org/aboutus (last accessed June 9, 2014).
[21] Vermont Woodlands Association. Available at: http://www.vermontwoodlands.org/ (last accessed June 9, 2014).
[22] Sierra Club, Vermont Chapter, "Our Forests Our Future: Forest Conservation in Northern Vermont," 2012. Available at: http://vermont.sierraclub.org/issues/change_to_short_issue_name.html (last accessed June 9, 2014).
[23] Vermont Coverts: Woodlands for Wildlife, 2009. Available at: http://www.vtcoverts.org/ (last accessed June 9, 2014).

landowners through personal contacts.

Vermont Family Forests (VFF): VFF is a non-profit family forest conservation organization that promotes conscientious 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.[24]

Vermont Natural Resources Council (VNRC): 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."[25] 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.

Forest Guild: The Forest Guild practices and promotes responsible forestry as a means of sustaining the integrity of forest ecosystems and the human communities dependent upon them. The Guild engages in education, training, policy analysis, research, and advocacy to foster excellence in stewardship, support practicing foresters and allied professionals, and engage a broader community in the challenges of forest conservation and management.

Society of American Foresters: The Society of American Foresters (SAF) is the national scientific and educational organization representing the forestry profession in the United States. Founded in 1900 by Gifford Pinchot, it is the largest professional society for foresters in the world. The mission of the Society of American Foresters is to advance the science, education, technology, and practice of forestry; to enhance the competency of its members; to establish professional excellence; and, to use the knowledge, skills, and conservation ethic of the profession to ensure the continued health and use of forest ecosystems and the present and future availability of forest resources to benefit society. SAF is a nonprofit organization meeting the requirements of 501 (c) (3). SAF members include natural resource professionals in public and private settings, researchers, CEOs, administrators, educators, and students. Furthermore, there is a Green Mountain Chapter of the SAF.

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

[24] Vermont Family Forests, 2011. Available at: http://www.familyforests.org/ecoforestry/index.shtml (last accessed June 9, 2014).

[25] Vermont Natural Resources Council, "About VNRC." Available at: http://www.vnrc.org/about-vnrc/ (last accessed June 9, 2014).

Vermont Woodlands Association's Board of Directors. This program provides third party certification through the international Programme for the Endorsement of Forest Certification (PEFC); the certification requires farms to meet sustainable management standards. As of early 2014, there are 475 Certified Tree Farms in Vermont, managing approximately 200,000 acres.[26]

Ottauquechee Natural Resource Conservation District (ONRCD): The Ottauquechee NRCD promotes soil and water conservation at the local level through education, partnerships, and natural resources projects. The organization primarily serves Windsor County.

Forest Products Associations

Vermont Wood Manufacturer's Association (VWMA): The VWMA is an organization with more than 120 primary and secondary wood processors as its members. "VWMA's mission is to support the industry in Vermont and promote its long-term viability by expanding members [sic] presence in the marketplace, ensuring a sustainable supply of raw materials, increasing workforce skill and acting as responsible employers and community members."[27] Accordingly, the VWMA maintains a website on which its members can post profiles of their company and wood products. They also helped publish "The Essential Buyer's Guide" to wood products manufactured in Vermont. Additionally, the VWMA offers educational workshops and discounts on events throughout the state.

Vermont Wood Products Marketing Council (VWPMC): The non-profit VWPMC was created by the Vermont Department of Economic Development in 2002 to support the local wood products industry. The Council is composed of members of the industry, as well as trade associations. They have worked to promote the Vermont brand (a logo used for marketing purposes), and implement other awareness raising activities and events to support the industry. For instance, the VWPMC helped create the Vermont Forest Heritage Trails tour program.[28]

Vermont Forest Products Association (VFPA): The VFPA represents all aspects of the forestry community and the member businesses and individual that are located throughout the State of Vermont. The VFPA meets its mission through:

1) Information and continuing education to its members
2) Public outreach and education
3) Working with other organizations through partnering and building coalitions

[26] Vermont Tree Farm Program, "About Tree Farm." Available at: http://www.vermonttreefarm.org/about.asp (last accessed June 9, 2014).
[27] Vermont Wood Manufacturers Association, 2012. Available at: http://www.vermontwood.com/home (last accessed June 9, 2014).
[28] Vermont Wood Products Marketing Council, 2011. Available at: http://www.vermontwood.org/ (last accessed June 9, 2014).

4) Networking with others in the forest products industry

5) Lobbying state and federal government officials and lawmakers.[29]

Vermont Forestry Foundation (VFF): VFF is the educational arm of the VFPA. The Mission of VFF is to educate the people within the forest products industry to improve efficiency, safety, professionalism, to increase profitability and build a positive image for the industry. In addition, VFF is engaged in outreach efforts to educate the general public about the importance of a vibrant working forest and forest products industry in Vermont. [30]

Advocacy Organizations and Associations

Vermont Maple Sugar Makers Association
The Vermont Maple Sugar Makers' Association was founded in 1893, making it one of the oldest agricultural organizations in the United States. While the Vermont maple industry has changed a bit since then, our commitment to the craft of maple sugaring has not. VMSMA is made up of Vermont maple sugarmakers and maple packers who are dedicated to producing the highest quality maple syrup found anywhere in the world.

The VMSMA helps to promote and protect the branding of pure Vermont maple products and to serve as the official voice for Vermont sugar makers. Our members take great pride in maintaining a prosperous maple industry and a working landscape that future generations will enjoy.

Northeast State Foresters Association (NEFA)
NEFA is an organization comprised of the state foresters of Maine, New Hampshire, Vermont, and New York. They coordinate their efforts with the USDA Forest Service and Private Foresters. NEFA was established in the 1980s and has focused its efforts on areas where the missions of the individual state forestry agencies and State and Private Forestry meeting and where joint action could yield greater benefits.[31] The organization is driven by the following goals which were taken directly from their Strategic Plan:

1) Support Land conservation efforts for the purpose of conserving sufficient forestland to: provide fiber for wood - Using manufacturing mills and wood energy plants, biodiversity conservation, ecosystem services and public values. NEFA accomplishes this goal by working with organizations to develop regional targets for land conservation.

2) Support sound stewardship of the forests of the NEFA region.

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[29] Vermont Forest Products Assocation, 2014. Available at: www.vtfpa.org (last accessed July 18, 2014).
[30] Vermont Forestry Foundation, 2014. Available at: http://www.vtfpa.org/vtforesty.html (last accessed July 18, 2014).
[31] Northeast State Foresters Association, *NEFA Strategic Plan* (2008) available at http://www.nefainfo.org/images/NEFA%20Strategic%20Plan%202008-2013%20Version%20FINAL.pdf (last accessed 04/29/14).

3) Provide timely, credible regional information of consistently high quality, and support applied research that will enhance the health, productivity, and sustainability of forests across the NEFA region in order to reach public officials, forest industry, environmental groups, private forest landowners, and other interested members of the public.

4) Provide a forum for the NEFA states for presentation and discussion of current resource issues and trends to reduce duplication, share experiences, attract and focus resource, and benefit from the strength of multi-state initiatives and partnerships where appropriate.

Estate Planning

In addition to the fact that almost 25% of forestland nationally is owned by people 65 and up[32], Vermont has an aging population. In 2013, the State of Vermont issued population projections for each county. The southern Windsor County region is poised to see a large increase in the number of elders over the next two decades. Under Scenario A, which assumed a slightly higher rate of net migration, Windsor County is projected to see a 105.8% increase in the 65+ population.[33] Furthermore, the majority of age cohorts below 65 are expected to see decreases in population.[34]

An aging population can increase the fragmentation and parcelization of forestland.[35] Estate planning can be used as a tool to avoid fragmentation and parcelization; however, in many instances the will of a deceased landowner breaks up a larger tract of land.[36] According to VNRC, "Municipalities can encourage landowners to engage in estate planning so that forestland can be maintained over multiple generations, thus reducing the future threat of subdivision due to a death in the family, an unforeseen illness, or other events. Conservation commissions can conduct workshops for landowners with estate planning professionals."[37] Some factors that influence these decisions include favorable tax treatment (e.g. Use Value Appraisal), costs of ownership and maintenance, and return on investment through sources of revenue such as stumpage.

Municipal Conservation Fund

Municipalities may opt to establish a fund specifically for conservation purposes. Typically, these funds are a type of reserve fund established by a vote and placed under control of the

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[32] Vermont Natural Resources Council, *Community Strategies for Vermont's Forests and Wildlife: A Guide for Local Action* (2013).
[33] Jones and Schwarz, State of Vermont. *Vermont Population Projections – 2010 - 2030.* (2013).
[34] Jones and Schwarz, State of Vermont. *Vermont Population Projections – 2010 - 2030.* (2013).
[35] Vermont Natural Resources Council, *Community Strategies for Vermont's Forests and Wildlife: A Guide for Local Action* (2013).
[36] Vermont Natural Resources Council, *Community Strategies for Vermont's Forests and Wildlife: A Guide for Local Action* (2013).
[37] Vermont Natural Resources Council, *Community Strategies for Vermont's Forests and Wildlife: A Guide for Local Action* (2013).

legislative body of the town. Conservation Commissions may; however, establish a fund under their statutorily granted ability to "receive money, grants or private gifts from any source" (24 V.S.A. §4505). Sources of funding for conservation funds include grants, gifts, lump sum annual appropriations, dedicated portion of property taxes, donations, and/or fundraising efforts.[38]

Conservation funds are typically used for the purchase of land or easements for conservation purposes, but may also be used to purchase options, rights of first refusal, leases, to support local grant and loan programs, and to leverage or match other sources of funding.[39]

The only town within the southern Windsor County Region that has established a conservation fund is West Windsor.

Education and Outreach

The southern Windsor County Forest Stewardship Committee identified education and outreach as necessary if the region is to remain forested. Target audiences include: private forest landowners, consulting foresters, municipal officials, and the community. Some of the general educational opportunities in the region, i.e. those targeted to several of the target audiences discussed below, include programs hosted by the United States Forest Service; the Vermont Department of Forests, Parks, and Recreation; and the Vermont Department of Fish and Wildlife. Additionally, the Center for Northern Woodlands Education is a regional organization whose mission 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.[40]

Education and Outreach – Private Forest Landowners

While some private landowners, such as those enrolled in the Use Value Appraisal program, may have an understanding of forest stewardship, many do not. The southern Windsor County Forest Stewardship Committee believes that education and outreach to private landowners is a vital component of promoting landscape scale forest stewardship in the region. For those who have enrolled their land in the UVA program, this could be accomplished by either the requirement or incentives to take a walk with their consulting forester through the land enrolled in the UVA program every year, or contact their county forester for a walk-through of their woods. For landowners not enrolled in the UVA program, a strategy might be to contact their county forester who can talk with them about their goals and objectives for their property and lead them to additional resources they may find useful given their specific interest in the land.

Education and Outreach – Consulting Foresters

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[38] Vermont Planning Information Center, *Vermont Land Use Planning Implementation Manual (2007).*

[39] Vermont Planning Information Center, *Vermont Land Use Planning Implementation Manual (2007).*

[40] The Center for Northern Woodlands Education, 2014. Available at: http://northernwoodlands.org/about (last accessed July 18, 2014).

Consulting foresters help private landowners develop their Forest Management Plan when enrolling in the UVA program. As the 'experts,' these foresters have a unique opportunity to help landowners understand the connection between their parcels and the larger region. As a result, consulting foresters are uniquely positioned to promote forest stewardship amongst private landowners as is discussed above. Currently, the Vermont Woodlands Association accredits Consulting Foresters. As part of that accreditation Consulting Foresters must complete 40 continuing education credits in a two year period. To be accredited through the Society of American Foresters, a forester must complete 60 hours of continuing education credits per year. Additionally, the Forest Guild holds workshops aimed towards foresters and other land managers.

Education and Outreach – Municipal Officials

The State of Vermont allows municipal governments to create a Town Plan and develop zoning ordinances as long as they conform to the state's planning goals. For those municipalities which have embraced this type of planning, the ability to influence current and future land use is profound. Educational opportunities regarding landscape scale forest stewardship should be offered to these individuals through avenues such as the annual Town Officer Education Conference or the Vermont Planning Information Center.

Education and Outreach – Community

The community at large could benefit from learning about forest stewardship. This could be accomplished by distribution of materials such as VNRC's *Community Strategies for Vermont's Forests and Wildlife.* Local Conservation Commissions could be valuable resources in this area. They could promote and sponsor local educational events such as presentations, lecture, movies, forest walks, etc.

Project Learning Tree is a childhood education program with multiple curriculum developed for different aged kids. It's all nature/outdoor based learning that teachers can fold into different required disciplines like math, art, writing, etc. Additionally, the Vermont Fish and Wildlife's Green Mountain Conservation Camps as well as vocational programs at some of the larger public schools (e.g. Hartford Area Career and Technology Center and River Valley Technical Center in Springfield) offer educational opportunities for older children.

Analysis, Recommendations, and Conclusions

The following threats, barriers, and limitations to maintaining forests as forests were recognized by the southern Windsor County Forest Stewardship Steering Committee: forest fragmentation and parcelization, invasive species, decrease in local wood processing sites, an economic Incentive to develop land, and a diminishing cultural connection to forests. Forest fragmentation

and parcelization can have many different negative effects on forests. Some of the environmental implications include a decrease in water quality, decrease in the number and diversity of species that can be supported by a landscape, and a decrease in a landscape's ability to handle floods. A decrease in the size and connections amongst parcels can also have negative economic implications; once a parcel is below a certain size it becomes more difficult to manage for economic output such as timber or tourism. Invasive species also cause many negative environmental and economic effects. For example, the Emerald Ash Borer kills ash trees and invasive plants such as Japanese Knotweed choke out local flora and fauna. A decrease in local wood processing sites results in additional carbon emission by requiring trucking of goods to locations that are farther away as well as bringing the money associated with the processing and resale of those goods outside of the region. A diminishing cultural connection to forests makes it more likely that local residents will not appropriately value the regions forests thus making them more likely to be degraded. Furthermore, consumers will often choose the lowest priced wood product, resulting in a loss to the local economy. The final threat is the economic incentive to develop land. While this threat may have been lessened in recent years due to the downturn in the economy, ti is still relevant. Economic implications include a loss of tourism revenue and environmental implications include those associated with fragmentation and parcelization.

There are a variety of means by which the promotion of landscape based forest stewardship and mitigation of the above threats could be addressed. They include both non-regulatory and regulatory strategies. Some of the non-regulatory strategies include: education and outreach, regional planning, local planning, conservation funds, conservation commissions, advocacy organizations, and state programs. Some of the regulatory tools include: the Use Value Appraisal program, conservation easements, zoning bylaws, subdivision regulations, planned unit developments (???), and town ordinances. ENSURE THESE ARE DISCUSSED ABOVE

As a result of this process, the Southern Windsor County Regional Planning Commission has already drafted and is considering updates to the goals, policies, and recommendations pertaining for forests. However, as the Regional Plan is an important, semi-regulatory tool that can have an effect in Act 250 hearings as well as inform local planning processes, these goals, policies, and recommendations should continue to be analyzed as forest, economic, or social changes occur. Up-to-date goals, policies, and recommendations are vital to effective management of our forests and keeping forests as forests.

Local, municipal plans are also a very important tool for promoting landscape based forest stewardship in the southern Windsor County Region. These plans are the visionary (as well as semi-regulatory) document for a town. Thus, if a town is interested in promoting forest stewardship, one of the first places they can start is in their town plan. Furthermore, as zoning and subdivision regulations are meant to implement town plans, a town plan should contain

references to forest stewardship meant to guide how it will be incorporated into the zoning and subdivision regulations.

Education and outreach also have enormous potential to help promote forest stewardship in the southern Windsor County Region. Private landowners, community members, municipal officials, and even consulting foresters could all benefit from additional education and outreach. Private landowners may have no knowledge of forests stewardship and once learning, may be happy to engage.