Photo Credit, clockwise from top left: Karen Gowan Photography, Lauren Sopher, C.A. Armstrong, Lauren Sopher

TOWN PLAN

GREENSBORO, VERMONT

Greensboro Planning Commission

DRAFT

Revised April 7, 2019

PROLOGUE

The Greensboro Planning Commission prepared this Town Plan over a 36-month planning process. The Town Plan should be an important document for the community.

"The local plan is not simply a rhetorical expression of a community's desires. It is instead a document that describes public policies a local government actually intends to carry out. If it were otherwise, why bother to complete and adopt one?"

Growing Smart Legislative Guidebook
American Planning Association

This planning process can be defined as:

- A process that helps a community prepare for changes, rather than reacting to change
- An opportunity to retain the values that make Greensboro a truly special place
- An approach to manage growth in a way that preserves Greensboro's natural resources and rural character while supporting a vibrant economy that provides many benefits to the community

The purpose of this Plan is to ensure that change is consistent with the Town's vision and goals for the future, as they were articulated in the 2016 Community Survey results, and to provide a framework for defining the future of Greensboro through the next eight-year planning period.

The Town Plan should be used in a variety of ways. For example:

- A document that the Planning Commission uses to update and revise, as appropriate, the Town's Bylaws and zoning regulations
- The Conservation Commission uses the Planning Commission's prioritization of natural resource protection to inform their actions
- A guiding document for use by the Selectboard for deciding and implementing policy
- Input to the Selectboard's capital budgeting process
- A document the Development Review Board uses to understand the reasoning behind the Bylaws and the Town's priorities for preserving its rural character and natural resources
- A reference to be used by the Town to determine eligibility for state grants
- A source of and justification for recommended actions for studies or other activities that address community issues

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Photo Credit: C.F. Armstrong

Photo Credit: Dorothy Miller Armstrong

CHAPTER 1

GREENSBORO'S COMMUNITY

COMMUNITY PROFILE

The Town of Greensboro is 39.4 square miles in size. It is first and foremost a rural community, characterized by farms, forest, open land, healthy natural resources, modest-sized homes, a diversity of small-scale employers, dirt roads, and a community of people with a range of incomes, family sizes, and ages who place great value on neighborliness while respecting each others' privacy in a rural community. Increasingly, Greensboro has become a preferred destination for retirees who have had a history with the community and who seek a balanced, connected, and active lifestyle.

Greensboro has been a recreation destination for many years. Summer campers used to arrive by train at the Greensboro Bend station and were escorted by horse and buggy to the camp for their summer retreat. Today, Caspian Lake is still a destination for many vacationers, although the increase in property taxes has strained the resources of many long-time camp owners. The preservation of a healthy, natural lake as an important economic resource is a key objective of this Plan.

Greensboro's historic settlement pattern is that of two compact villages (Greensboro and Greensboro Bend) with a mix of housing and commercial services, surrounded by farms and forested land. The major objective of this Plan is to retain these rural characteristics. The intention of the overarching consideration in the Town Plan is to retain the influence that the healthy, natural environment heritage has had on Greensboro's community character.

As Greensboro transitions from a resources-based economy to a tourist-based economy, it is imperative to create a Town Plan that honors and respects Greensboro's relationship with the natural environment. A healthy natural environment is critical to meeting many goals of the Plan, and a major objective is the protection and preservation of all Greensboro's waters, including lakes, ponds, streams, rivers, groundwater, wetlands, floodwater absorption areas, sources of water supply, habitats, and recreation areas.

Finally, maintaining a community of people with a mix of household incomes, ages, and family sizes requires that Greensboro make efforts to maintain an adequate supply of housing and to retain or attract non-polluting, small-scale employers and cottage industries that contribute to community vitality.

Looking forward, the Town will be increasingly challenged to make decisions that honor the stewardship of the rich history of the healthy, natural world that has shaped this community. In light of development pressures, it may be a difficult balance to preserve what is precious about Greensboro. Stewardship of the health of the lake and maintenance of the rural character of the community are integral to Greensboro's sense of identity.

HISTORY

The history of Greensboro began with the building of the Bayley-Hazen military road ordered by George Washington in 1776 for an anticipated invasion of Canada. By 1779, the road had reached Greensboro and continued through to Montgomery before the project was abandoned. Blockhouses, including one at Greensboro, were erected at intervals for protection. Because of Indian raids on Peacham in 1781, four scouts, all young boys, were sent to man the blockhouse near the southwest corner of Caspian Lake. The four were surprised by Indians, who killed two and took the other two to Quebec, where they were later traded for some Indian prisoners in Vermont.

On August 20, 1781 the town received its charter from the Vermont colony. It was granted to Harris Colt and 66 associates and was called Coltkiln. However, later the name was changed to Greensboro in honor of Timothy Green, another of the petitioners. [Green never settled in Greensboro and he forfeited his 300 acres for non-payment of a $24.00 road tax.]

In the spring of 1789, Ashbel Shepard and his brother Aaron arrived in Greensboro with their wives. Ashbel and his wife moved into the blockhouse, and Aaron and his wife built a cabin near what is now Randolph Road at the south end of the lake. The following year, Timothy and Joseph Stanley arrived, starting a sawmill and blacksmith shop in what is now Greensboro village. Timothy Stanley built a house near where the McIntyre house now stands in the village.

Photo Credit: Dorothy Miller Armstrong

In 1791, Vermont became the 14th state to become a member of the United States; by 1793, there were enough inhabitants in Greensboro to organize a town, and the first town meeting was held in Ashbel Shepard's new home. Many more settlers arrived in the newly-formed, independent state, and by 1795 there were twenty-three families with a total of 108 persons in town. School was being taught in Aaron Shepard's barn, while a suitable building was being erected near the golf course road. Settlement of North Greensboro and East Greensboro had begun. Greensboro Bend remained largely a cedar swamp with only two farms until the coming of the railroad in 1872. The years following the railroad's arrival were prosperous, as the Bend began building. A

large sawmill and box factory employed many residents, and numerous stores, including a foundry/tin shop and a granite shed, were also in operation.

The perimeter of Caspian Lake was originally settled as a farming community by settlers from lower New England. They were followed in the early 19th century by Scottish immigrants and then, in the late 19th century, by French Canadians. Other immigrants, notably from Portugal, followed to work in the sawmills.

Accompanying the flow of permanent residents who moved to Greensboro in the late 19th century were a number of summer campers whose families spent summers on the lake. Many of them purchased lots from the farmers in order to build summer homes. Thus began the intertwined relationship of summer people and permanent residents--a defining quality of the character of the community that abides today.

In the first half of the 20th century, those summer visitors who enjoyed months of summer vacation were largely college professors and clergymen. They brought with them a summer culture of thoughtful reserve and mutual respect with the year-round residents. Subsequent multigenerational devotion to the community grew deep roots and that loyalty has benefited the town. Had it not been so, exploitation into a resort town could have overwhelmed the community's unique character.

Act 60, a 1997 Vermont tax law, has altered the ease with which families could keep their camps by imposing increasingly heavy tax burdens on summer camp owners. Many summer residents struggle to save their summer homes by commercializing them into rentals. Others have sold their family summer camps, opening the doors to new summer community members. The low key, lazy, long summer days at the lake are challenged not only by the tax burden, but by the changes to America's family life in general---summer long holidays are the exception.

An example of the community culture, focus and priorities is the work of the Greensboro Land Trust--a partnership of both summer residents and year-round community members. Together they strive to protect and preserve irreplaceable productive agricultural land, healthy forests and shoreline so as not to be squandered to development forever.

Greensboro's population is now a mix of many groups which historically peopled the town – the English of the 1790's, Scots of the 1830's, Irish of the 1870's, Portuguese and French Canadians of the early 1900's. Other descendents from the original summer community members have contributed to the year-round population as well. In the 1970's, the national discord generated a counterculture, with some participants electing to settle in Vermont,

bringing their independent thought with them. Greensboro was no exception to this immigration--some people settled in town to add to the year-round population of free-thinking individuals. Many of the more recent arrivals are retired individuals who value the quality of life Greensboro offers them.

For years, the summer people sustained the economic life of the town as the number of dairy farms declined and economic opportunities narrowed regionally. But Greensboro has been fortunate. Local residents, members of the eighth generation of the Hill farm family, and two summer residents, quietly started two small manufacturing businesses, replacing the original dairy farms. They have since flourished. Hill Farmstead Brewery, an internationally celebrated craft brewery, opened in 2010. Its mission statement reads: "To hand craft succinct, elegant beers of distinction and to revive and diversify the farmscape of the Hill Farmstead in Greensboro." The Cellars at Jasper Hill, a renowned cheese manufacturer, opened in 2003. Other larger local businesses include an international youth circus school, Circus Smirkus, which opened in 1987; and a regional theater, Highland Center for the Arts, which opened in 2017. Willey's Store, the bedrock of the community, endures.

Photo Credit: Jasper Hill Farm

COMMUNITY SURVEY

In August of 2016, the Planning Commission conducted a Community Survey in Greensboro. This survey formed the foundation for the Town Plan. The entire survey is available online, at http://www.greensborovt.org/wp-content/uploads/2018/11/Community-Survey-8-2016.pdf. An overview is presented here, and references to the survey are made in other chapters as appropriate.

The survey asked, "What are the top priorities for the Planning Commission?" The key answers were as follows:

- Protect the rural character of the community
- Preserve the character of Greensboro Village
- Protect natural resources
- Maintain the Lakeview School
- Attract new families with children
- Develop a recreational trail network
- Attract new small businesses

Then the survey asked, "What I never want to change in Greensboro". The top four responses were:

- Lake Water Quality
- Willey's and Other Establishments
- Rural Character
- Open Space

Finally, the survey asked "what I would change in Greensboro". The top four responses were:

- Taxes
- Bicycle and Walking Amenities
- Unite the Community
- Restaurants

A VISION FOR GREENSBORO

Greensboro residents aspire to see a future for the community where:

- The Town's rural character is viewed as a significant benefit that should be preserved
- As a community, there is a strong sense that conservation of our natural resources, including Caspian Lake, should be a high priority
- Greensboro continues to attract and enjoy vibrant and unique small businesses that sustain tourism, support our economy, and are gathering places for local residents
- Greensboro is attractive for both retired families as well as new families raising young children. This balance is what will make ours a special community
- Greensboro, a small New England town, is the home of many cultural opportunities typical of larger towns
- The community offers a multitude of recreational activities for young and old
- The community strongly supports maintaining the Lakeview School, with the important benefits it provides to the community

Photo Credit: Karin Newhouse Photography

Photo Credit: Dorothy Miller Armstrong

Photo Credit: C.A. Armstrong

CHAPTER 2

GREENSBORO'S ENVIRONMENT

POPULATION IN GREENSBORO

A. Trends

From the time of its settlement in the late 1700's Greensboro's population grew steadily, reaching a high of 1065 residents in 1860. Since that time the population decreased to its most recent low of 593 in 1970. The 2010 Census puts the total population count at 762, which represents a very minor decrease from the previous decade. (See Figure 1).

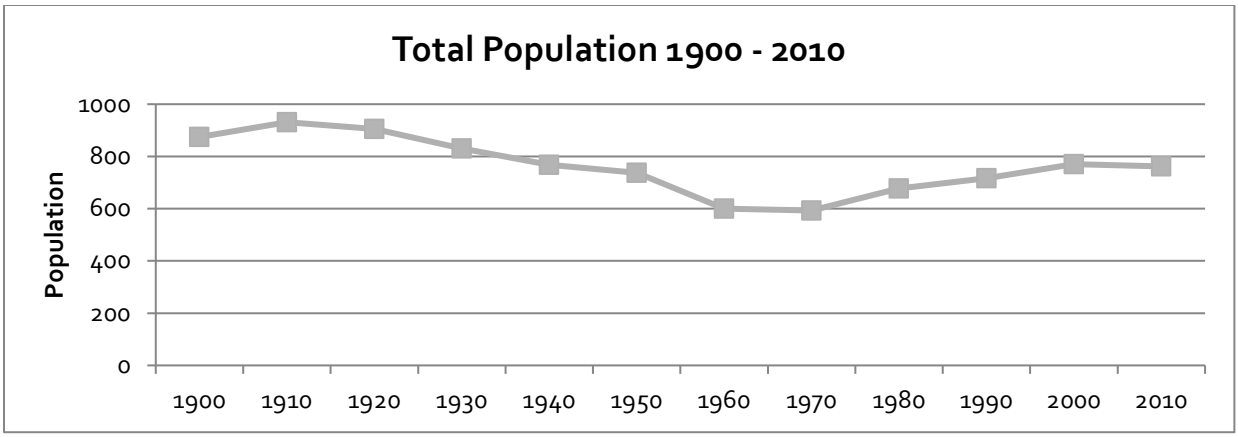


Figure 1: Total population from 1900 - 2010 in Greensboro.

Despite a 3.5% population growth rate decline in Orleans County, and a similar 2.8% decline in Vermont as a whole, percent of growth declined only 1% in the last decade (see Figure 2).

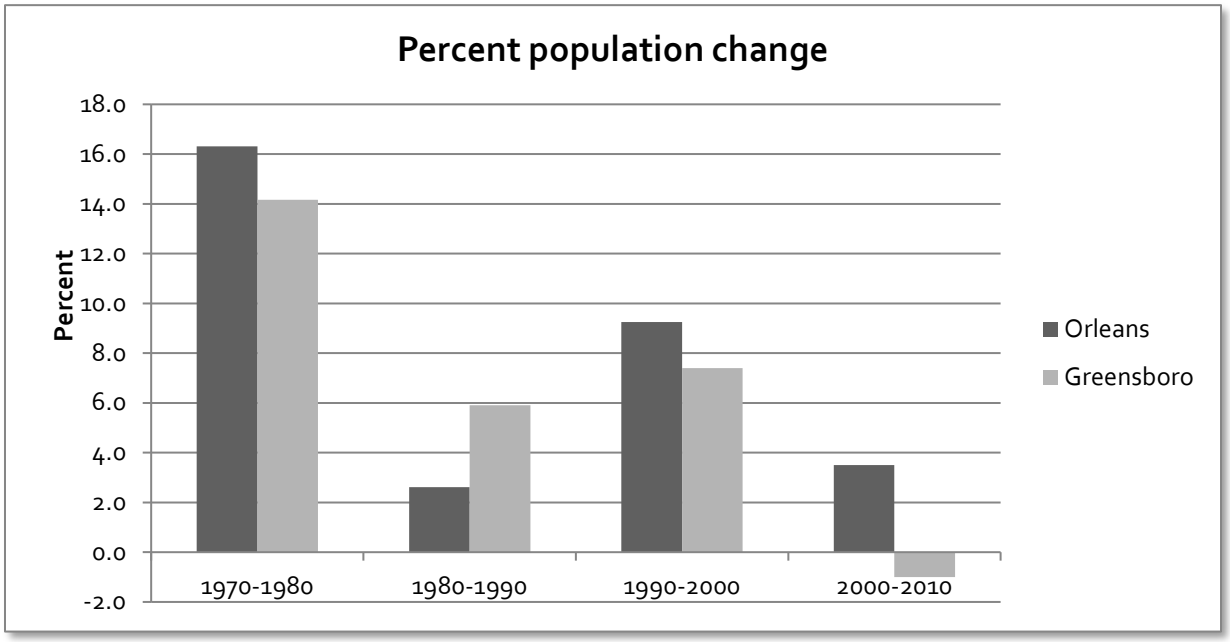


Figure 2: Percent population change from 1970 to 2010 in Greensboro and Orleans County.

Seasonal population trends play an important role in the population dynamics in Greensboro. Due to a high number of vacation homes (approximately 307 homes for seasonal, recreational, or occasional use), it is estimated that the population of 762 (projected from 2010 decennial census) nearly triples during the summer months.

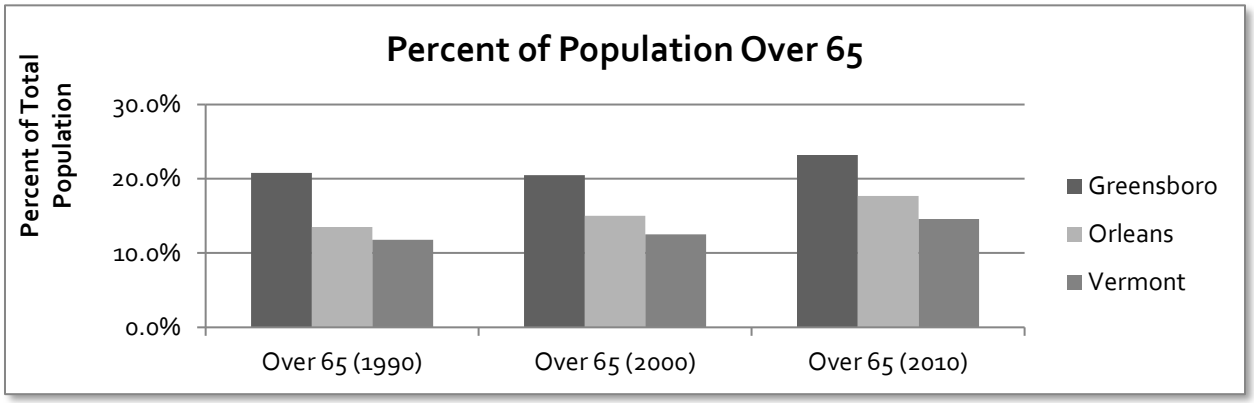


Figure 3: Percent of population over 65 in Greensboro, Orleans County, and Vermont.

B. 2010 Characteristics

The population of Greensboro is 762 year-round residents. Of this, 52.4% are female, 47.6% male. The median age is 51.3 years, which is considerably higher than the median age for Orleans County (43.7 years) and Vermont (41.5 years). This is closely linked to the high proportion of Greensboro residents above the age of 65 (23.2%) versus the Orleans County and Vermont percentages (17.7% and 14.6% respectively) (Figure 3), and the below average proportion of residents under the age of 18 (19.4%) when compared to Orleans County (21.3%) and Vermont (20.7%) as illustrated in Figure 4.

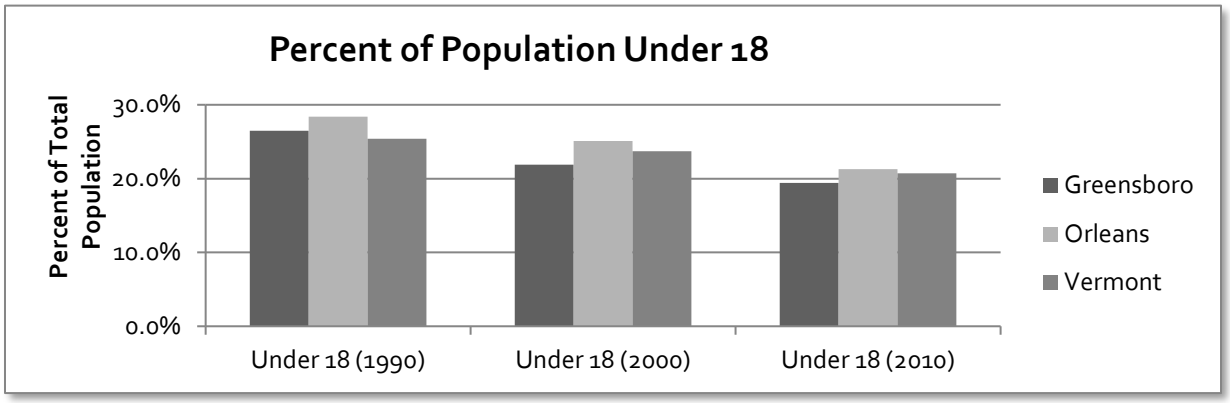


Figure 4: Percent of population under 18 in Greensboro, Orleans County, and Vermont.

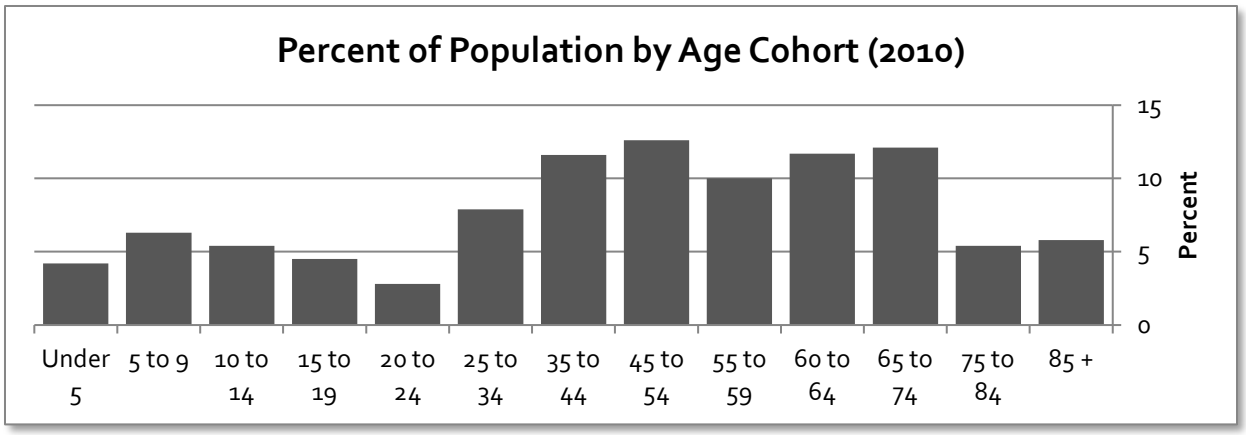


Figure 5: Percent of population by age cohort (2010) in Greensboro.

Based on current trends, it appears the population will become increasingly skewed over the next two decades. Currently 12.6% of the population falls within the 45 to 54 year old age group as illustrated in Figure 5. As this large portion of the population ages, it will further increase the already large portion of the town population above retirement age.

Racial/Ethnic Background of Population (2010)	
Black or African American	0.8%
Latino/Hispanic	1.3%
American Indian and Alaska Native	0.1%
Asian	0.3%
Other	0.1%
Multi-racial	2.0%
White	96.7

Table 1: Racial/ethnic background of the Greensboro population in 2010.

As with most rural communities in Vermont, the Greensboro population is primarily white (Table 1). According to 2006-2010 American Community Survey Five-Year Estimates, only 5.4% of the population speaks a language other than English at home. 6.9% of the town population is foreign born.

The population density of Greensboro (39.4 square miles in size) has been increasing steadily with the rising population over the past three decades (Figure 6). However it is still well below the state and country averages. However, this information is calculated for full-year residents only and would increase significantly during peak tourist season.

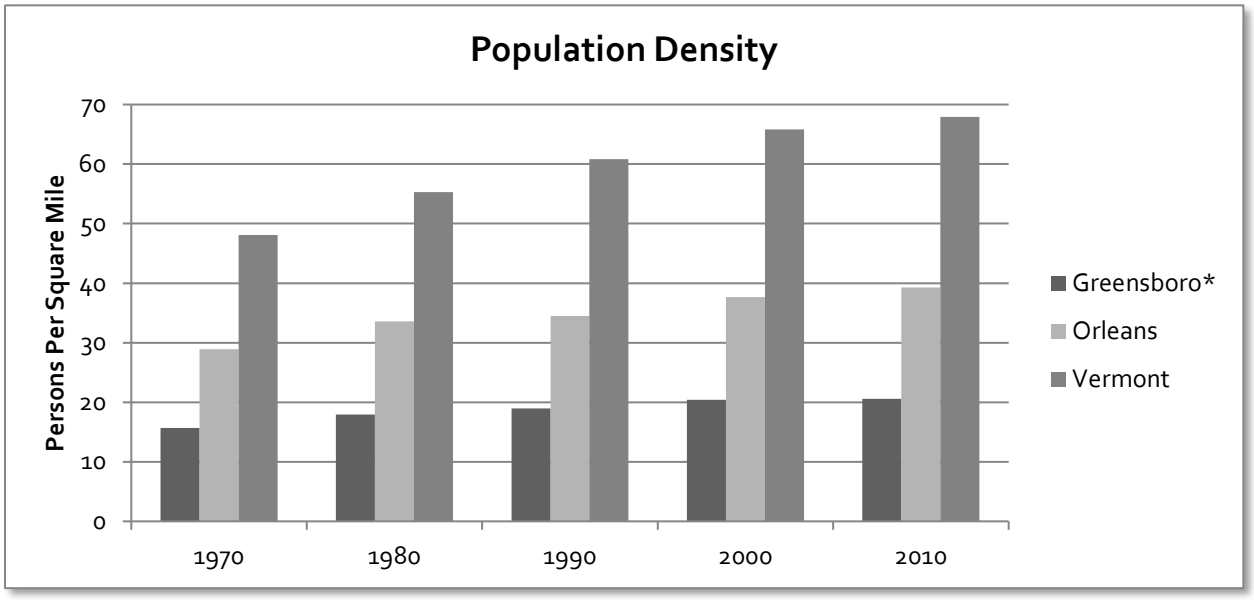


Figure 6: Population density of Greensboro, Orleans County, and Vermont, from 1970 – 2010.
*Greensboro estimate

C. Greensboro Population Projections

The American Community Survey (part of the Census Bureau) and the Vermont Agency for Commerce and Community Development make population projections. However, because Greensboro is such a small town, these projections are not credible. The growth of Greensboro is likely quite slow, or even stagnant, given that the population did not change from 2000 to 2010.

LAND USE

Introduction

There are 925 parcels of taxable land in Greensboro and 22 exempt (from taxes) parcels. The total area of Greensboro is 25,600 acres.

Future development in Greensboro is limited by both natural resources and zoning regulations. Development is limited by mountainous terrain, steep slopes, wetlands, floodplains, and conserved land. Zoning regulations, through the various land use districts, also put limits on development, as shown below:

Greensboro Village District	Minimum lot size: ½ acre
Greensboro Bend Village District	Minimum lot size: ½ acre
Lakeshore District	Minimum lot size: 1 acre
Rural Lands District:	Minimum lot size: 10 acres
Resource District	Minimum lot size: 25 acres

In addition, Greensboro allows a Planned Unit Development (PUD) in the two Village Districts and in the Rural Lands District. A PUD clusters dwellings so that open space, forests and farms are preserved to the extent practicable. A PUD can be source of workplace, senior or affordable housing. PUDs cluster several dwellings and set aside about 50% of the land as open space or otherwise productive land.

These land use districts establish restrictions on the general type, location, scale, distribution, pattern and character of future land uses in Greensboro. The Town's land use regulations and zoning map are used to determine the specific land uses permitted and the densities and dimensional requirements established for a given property.

The land use districts and conserved lands are shown in Figure 1. Conserved lands include those of the Vermont Land Trust, the Nature Conservancy, and the Greensboro Land Trust.

Additional maps showing Greensboro and the Greensboro land use districts are included in the appendix.

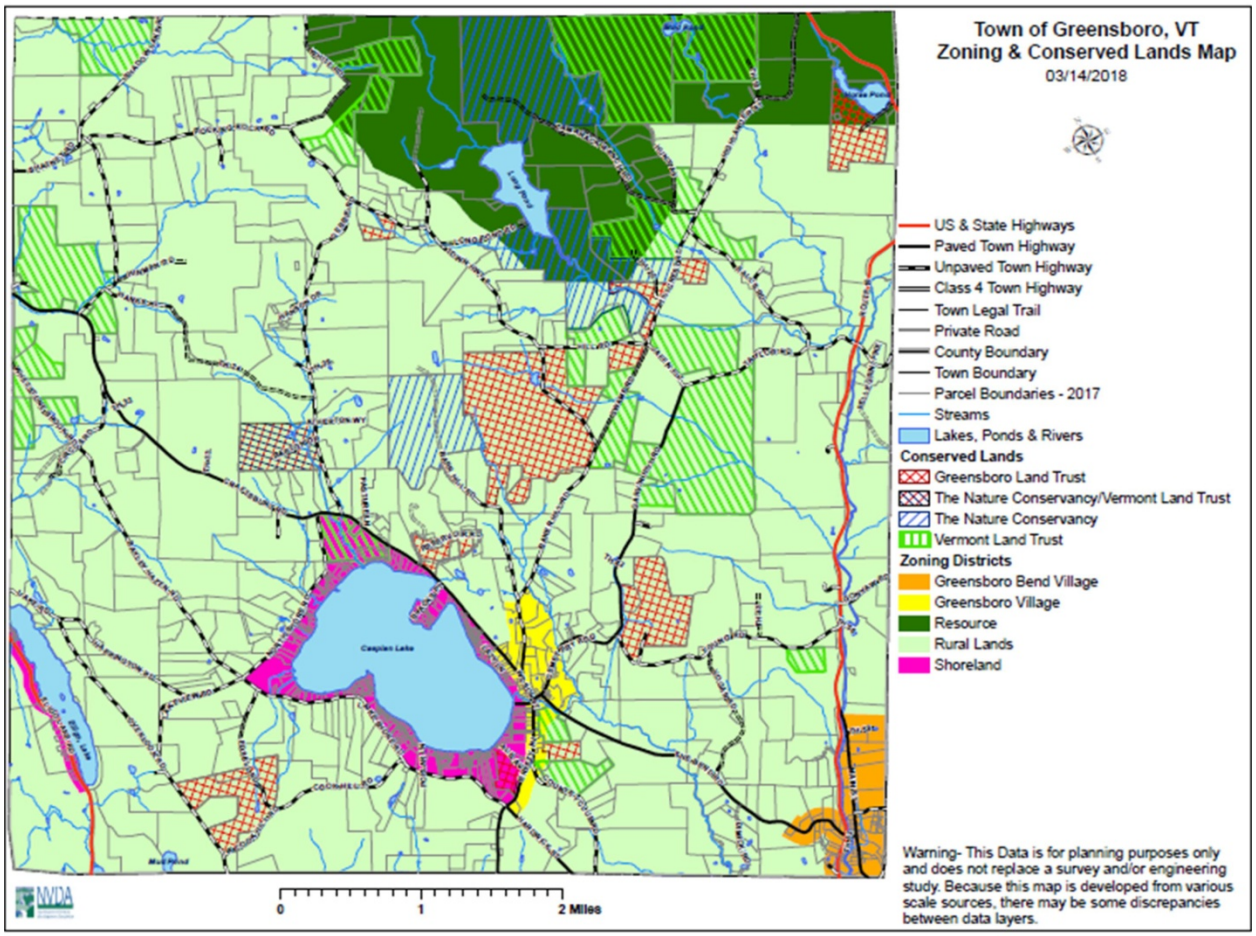


Figure 1: Greensboro Zoning Districts and Conserved Lands

Geography

Greensboro lies in the southern part of Orleans County, and borders Caledonia County on the east and south. Greensboro is adjacent to Glover to the north, Stannard to the east, Hardwick to the south, and Wolcott to the west. The area of Greensboro is 39.4 square miles, of which 37.8 square miles is land and 1.6 square miles is water (Caspian Lake and Eligo Lake). With regard to elevation, the lowest part of Greensboro is the shoreline of Eligo Lake (1100 ft) and the highest part is in the northeast (2200 ft)

Geology

Northeastern Vermont geology is characterized by the term "Vermont Piedmont", where the word piedmont means "at the foot of the mountains" or "foothills". This region is made up of rolling hills and valleys, and glaciated lakes "at the foot" of the Green Mountains. The most common rock types in this region are sedimentary and metamorphic. Igneous rocks, including granite, are also found in the Piedmont region and make up the most common mineral deposits.

Surficial geological mapping indicates that most of Greensboro is classified as unsorted till. Till is also called glacial till, which is unsorted sediment derived from erosion and entrainment of material by the moving ice of a glacier. Its content includes clay, sand, gravel, and boulders.

Soils

Soils in Greensboro are varied. Areas with gentle slopes that are under cultivation or are used as pastureland typically have soils that are well-drained sandy loam characterized by some fine sands along with clay and stony sands. The soil types include Cabot silt loam, Vershire-Lombard complex, and Peru fine sandy loam. Areas with steeper slopes that are forested typically have soils that are poorly drained and rocky or stony in character. Examples include Buckland loam and Tunbridge-Lyman complex.

Topography

The topography of Greensboro is varied, with the elevation ranging between 1000 ft on Lake Eligo to hills in the northern part of the town at 2200 ft. The terrain is marked by many hills, with streams flowing through some of the lowest areas between the hills.

The variability of the terrain is best seen on a map of slope, shown in Figure 2.

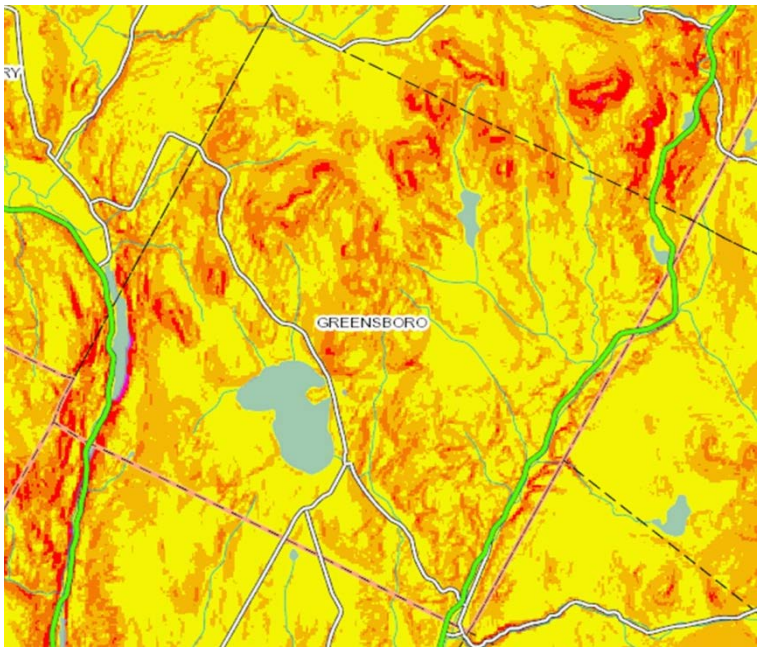


Figure 2: Greensboro Slope Map

About 16,000 of Greensboro's 25,600 acres is less than 10% slope. The lightest, or yellow lands in the figure are less than 10% slope. The next darker color (orange) land has a slope of 10-20%, and the darkest (red) areas have a slope of greater than 20%.

Land Use

Land use in Greensboro is varied. The major land uses (approximate) are listed below. Transitional is a mix of homes, pasture and forest, typically found on the edges of developed areas.

Transitional	20%
Evergreen Forest	14%
Deciduous Forest	18%
Mixed Forest	20%
Pasture	10%
Open Water	5%
Wetlands	4%
Commercial/industrial/residential	4%
Other	5%

Source: Vermont Fish & Wildlife, 2008

Figure 3 shows the National Land Cover map for Greensboro. The figure shows pasture land and cultivated land as yellow and brown, respectively, and green areas (light and dark) are forested. As can be seen, most of Greensboro is forested.

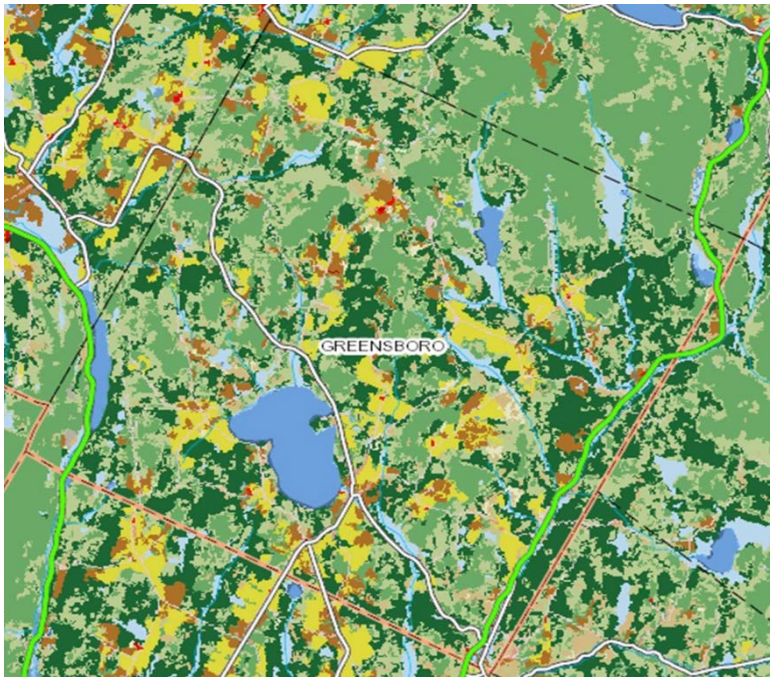


Figure 3: Greensboro Land Cover

TRANSPORTATION

The transportation infrastructure that allows people to travel from point to point plays a very important role in Greensboro's economy and recreation opportunities. Greensboro's transportation network is a combination of different modes, from the two village centers, where vehicle speed is a concern, to dirt roads, where maintenance is an issue, to Route 16, which transports people at higher speeds. Transportation also encompasses other means of mobility, such as snowmobile and Nordic trails, cycling, and walking paths.

Rural development patterns are directly impacted by available transportation alternatives. For example, new development in or adjacent to village centers encourages more pedestrian use. Improved telecommunications (e.g. cell phone coverage and Internet connectivity) enables more workers to telecommute and work at home, thus reducing annual vehicle miles traveled.

Roads

Greensboro employs a staff of three, plus one part-time summer person, to maintain its fifty-seven miles of dirt roads, eleven miles of pavement, 14 bridges, and 582 culverts. The town road crew works out of the Town Shed located on Cemetery Ridge. The town owns a gravel pit in Glover.

Two state roads pass through Greensboro: State Route 16 runs through Greensboro Bend as it connects Hardwick to points in northern Orleans County, and a short portion of State Route 14 runs aside Lake Eligo. In the 2016-2017 fiscal year, the town spent approximately $628,000 keeping the roads maintained. Road maintenance equipment owned by the town includes a pick-up, two ten-wheeler 14-yard dump trucks, one 7-yard six-wheel dump truck, an excavator, a grader, and a bucket loader. Driveway plowing and roadside mowing services are contracted to private contractors on an annual basis.

Public Transit

Rural Community Transportation, Inc (RCT) is the only public transit provider in the Northeast Kingdom. It provides transport for a fee on its fixed routes. It not only provides regular routes, but will schedule an individual volunteer driver to drive a person from their home to an appointment. Unfortunately, their regular routes do not cover the Greensboro/Hardwick area.

Airports

The state-owned airports in the Northeast Kingdom are Northeast Kingdom (Newport), Morrisville-Stowe, and Caledonia (St. Johnsbury). These airports serve private aircraft and limited charters and cargo services. Also, there is the John H. Boylan Airport in Brighton. For national and international destinations, the closest airports are Burlington and Montreal.

Rail Service

The closest rail services to Greensboro is Amtrak out of Essex Junction and Montpelier. Amtrak runs the Vermonter service to Springfield, MA, New York City, Philadelphia, Baltimore, and Washington, D.C. In addition, there is freight rail service in the Northeast Kingdom that includes Washington County R.R., Central Maine and Quebec R.R., and the St Lawrence and Atlantic R.R.

Cycling

The roads in Greensboro offer a variety of on-road and back-road cycling opportunities. Some roads have fog lanes that enable safer bike riding, such as Route 16 in Greensboro.

The NVDA published a document called "Cycling in the Kingdom" that describes a number of cycling routes and loops in the Northeast Kingdom. One of the loops is called "Around the Block", which begins in Hardwick and follows Route 14 north to Irasburg, then takes Route 58 and Route 5 south to Barton, then Route 16 south to the Hardwick area. This route passes through Greensboro Bend.

The Lamoille Valley Rail Trail is currently under construction on the railbed of the former Lamoille Valley railroad, which ceased operation in 1994. The rail line extended from Swanton to St. Johnsbury. Sections from St. Johnsbury to Danville, and Morrisville to Jeffersonville are complete. A future section will connect Danville with Morrisville, which will pass through Greensboro Bend, providing easy access to what will be the longest trail in New England. This trail will provide many recreational advantages to Greensboro during all four seasons.

Snowmobile Trails

Vermont Association of Snow Travelers (VAST) sponsors the maintenance of snowmobile trails through the volunteer efforts of local club members. The only VAST trail in Greensboro follows Richardson Road (Town Road 23) from Craftsbury to Campbell's Corner and to Edsell Road south to Cook Hill Road.

In addition, there are many private snowmobile trails in Greensboro.

Cross-country Ski Trails

The Craftsbury Outdoor Center operates a system of Nordic trails that cover much of Craftsbury and Greensboro. Trails also extend from Highland Lodge to Craftsbury.

Sidewalks, Walking Paths and Traffic Calming

One of our initiatives is to work towards creating safer village centers in Greensboro, while at the same time improving opportunities for walking and biking. This also is a goal of Act 174, Energy Planning, as discussed in the Energy Chapter, to reduce energy consumption.

In early 2017, discussions were begun with Local Motion, a state-wide advocate for safer cities and walkable and bikeable communities. Local Motion performed a study of the Greensboro Village, from Tolman Corner to the town center, and north to Cheney Road. The purpose of the study was to suggest a number of actions that would calm traffic and provide for safer walking.

Local Motion discussed many possible ways to reduce vehicle speeds in the town and provide for better and safer walking conditions. The following are examples of the types of actions that could be implemented:

- Install speed feedback signs on major entrances to the village
- Repair, improve and extend sidewalks and bike paths where needed
- Implement safety improvements at Tolman Corner
- Add a walking path between Town Center and Cheney Road (Stage 1) and then to Highland Lodge (Stage 2)

These types of traffic calming and walking improvements also would apply to Greensboro Bend. The Local Motion Study can be found here: http://www.greensborovt.org/wp-content/uploads/2018/09/Kingdom-Roads-Safer-Walking-an-in-Craftsbury-Greensboro-Hardwick-and-Barton-Vermont-draft-Nov-2017.pdf

Photo Credit: C.F. Armstrong

RECREATION AND CULTURE

Recreation is integral to the life and community of Greensboro. The full time residents along with a significantly larger summer population appreciate and enjoy the recreation opportunities available in the town. The natural areas that are valued include our lakes, the rural landscape, and preserved natural areas. Other recreational and cultural attractions and organizations include the Mountain View Country Club, The Highland Center for the Arts, Highland Lodge, the Greensboro Arts and Alliance Residency, the Greensboro Ladies Walking Society, concerts, lectures, plays, Circus Smirkus camps and art galleries. Caspian Lake provides for swimming opportunities at the public beach along with boating access and fishing.

These facilities allow for a myriad of summer activities including hiking and walking, bicycling, swimming, boating of various sorts, golf, tennis, concerts, performing arts, lectures and exhibits. Winter activities include cross country skiing, snowshoeing and ice fishing along with performing arts events at the Highland Center. There is a system of cross country skiing and snowshoeing trails maintained by and connected to the much larger trail system of the Craftsbury Outdoor Center. Snowmobilers utilize the VAST snowmobile trail that winds through Greensboro.

Photo Credit: C.F. Armstrong

Other recreation activities include yoga classes, softball and soccer games at the Tolman's Corner field, and swimming lessons at the public beach. There is a public playground with a basketball court in Greensboro Bend.

Although Greensboro has these opportunities available to its residents and visitors, it is challenging for individuals to find these resources, as there is no compilation of information describing these same activities. Natural and cultural advantages provide what might be the best opportunity to grow Greensboro's economy. To take advantage of this opportunity will require coordination and a proactive effort on the part of the town. To this end it is recommended that the town hire at least a part time recreational and cultural affairs director to create recreational and cultural guides, coordinate recreational and cultural activities, and develop new events and publicize these events to support the growth of recreational and cultural tourism in Greensboro.

NATURAL RESOURCES

Greensboro is home to a community of people who care about the natural landscape and whose vision for the future is a profound and strengthened human commitment to the natural world, while striving to protect and conserve Greensboro's natural heritage. Nearly 40 sq miles in size, Greensboro is rich with outstanding natural features. The local community recognizes the value in stewardship of wildlife, plants, ecological systems, fish, and the immeasurable benefits therein.

Given the community commitment to conservation (The 2016 Greensboro Community Survey results showed overwhelmingly that protection of our natural resources and protection of the rural character of Greensboro were the top priorities of our residents), it is natural to take the steps to actualize that commitment. If we foster the stewardship of undeveloped lands in large landscapes, we will protect the quality of wildlife and native plants. Furthermore, we will nurture the natural environment so prized by our community members who actively participate in restorative outdoor activities of skiing, hiking, fishing, boating and wildlife watching. Many believe it is less the activity and more the natural environment that is restorative.

Forests

A continuous forest habitat, uncontaminated and unfragmented, offers lands that represent what makes life in Greensboro sought after and appreciated; serves up what connects wildlife to wildlife, and connects current residents to dreams of what the future holds for future generations of the community. The forest habitat must be recognized as a significant contribution to Greensboro's natural and cultural heritage and must be respected and supported as such.

Contiguous forest habitat is defined as an area of forested land with either no roads or low densities of Class III or Class IV roads and virtually no human development. While this habitat may be actual forests of differing ages, it could also be wetlands, streams, ponds or old meadows--private environments for the wildlife that make their homes there and the plants and natural communities that thrive there without human contamination. Key to the sustainability of wildlife is the concept that animals can migrate widely to share genes and to access varying feeding habitats. Thus, the habitat in undeveloped lands and waters must connect with other undeveloped lands and waters so animals and fish can roam, procreate and thrive, again, absent the human contamination. Contiguous forest habitat--undeveloped land habitat--buffers species against consequences of land fragmentation. Greensboro must consider and prioritize this fact, the concept of contiguous forest habitat, when viewing any proposed development and/or conservation efforts.

Act 171 requires that municipalities (and regional planning organizations) address the risks of forest fragmentation and impacts on habitat connectivity corridors. In concert with Act 171 requirements, our Town Plan must consider the protection of locally significant forest blocks and habitat connectors, which impact forest and ecological health and viability. Policies should be included in the Town Plan that encourages active management of these areas regarding development, logging, timber production, recreation, and wildlife habitats.

Greensboro has 38,255 acres of blocks of contiguous forest habitat, 76% of the 49,940 acres of the town. Future planning must consider and prioritize the maintenance of contiguous forest habitat when viewing any proposed development and/or conservation efforts. The largest forest blocks in Greensboro ring the outer boundary of town. A 9,636 acre block in the northeast extends into Glover. To the east, a small portion of a 19,584 acre block [that is mostly in Wheelock] occurs east of Route 16. To the west/southwest, a small bit of a 9,294 acre block in Wolcott occurs west of Route 14. The inner ring of forest blocks surrounding Lake Caspian are all less than 2,000 acres.

Photo Credit: Lauren Sopher

Of this area, 3,315 acres are conserved, (6% of Greensboro). These are primarily conservation easements on privately owned land. In addition, there are 15,960 acres (32%) in the Use Value Appraisal program. *[*Vermont's Use Value Appraisal (UVA) Program (also known as "Current Use") enables eligible private lands where owners practice long-term forestry or agriculture to be appraised for property taxes based on the property's value of production of wood or food rather than its fair market residential or commercial development value. When land is enrolled in the UVA program, the State attaches a lien to the deed.]* In Greensboro, permanently conserved land is mostly north of Lake Caspian, with a concentration in the northeast of town.

Figure 1 shows contiguous forest habitat and conserved land. Greensboro has about 7,300 acres of high priority acres of contiguous forest habitat, of which 6,300 acres are classified as highest priority forest blocks.

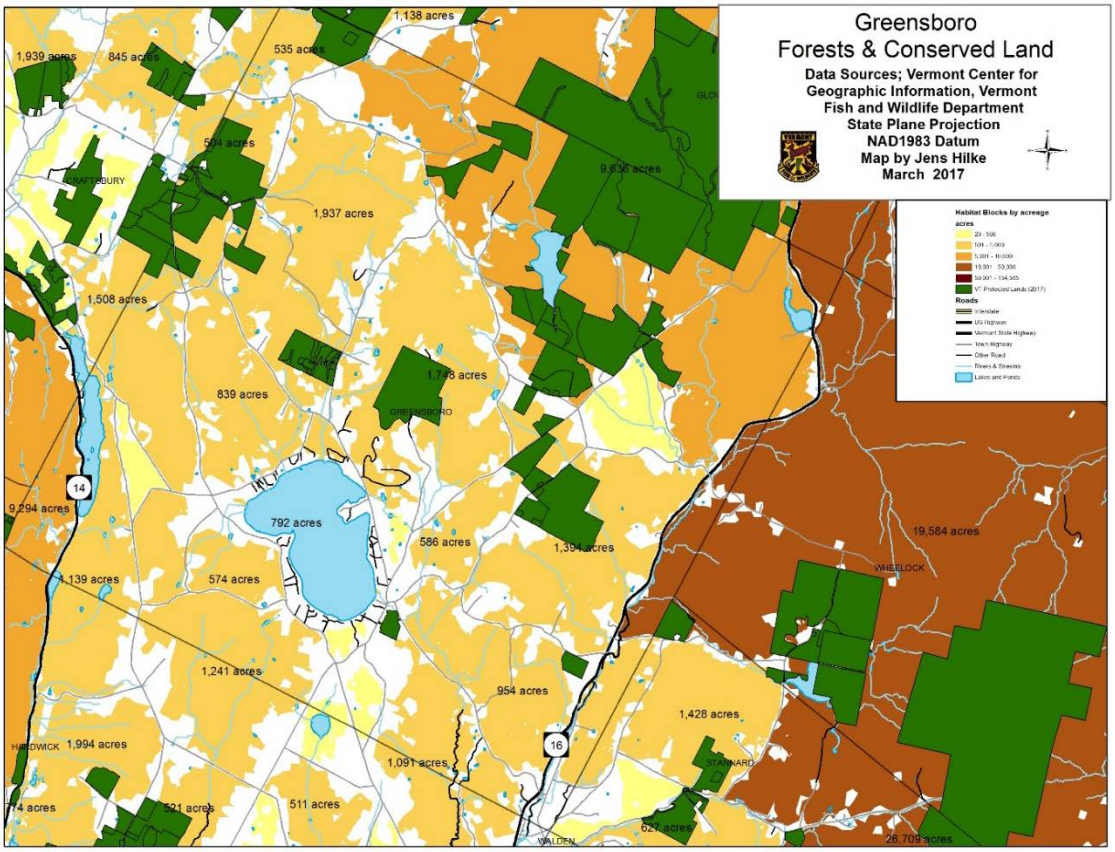


Figure 1: Forest Blocks and Conserved Lands in Greensboro

Enduring Features

The biophysical region of Greensboro, as defined by its climate, bedrock geology, surficial geology, topography, hydrology and land use history, is in the Northern Vermont Piedmont region. Calcium rich soils in this cool climate create mixed forests, Northern White cedar swamps, interesting fens and natural areas. The agricultural soils are good, and coupled with the cool climate, offer a short growing season.

Evidence of glacial movement and of the associated moving water which shaped the land are abundant in Greensboro and in the land surrounding Greensboro. These features are part of the landscape that resists change despite changes in land cover and wildlife. They will remain the same with climate change. They speak to time, to a much longer and a much larger view.

Polished bedrock is found on the top of Barr Hill. Evidence of north/south glacial action is also seen in the valley of Eligo Gulf, (The most prominent cliffs in town are located on the eastern side of Lake Eligo), the elongated hills of Patmos Peak and Baker Hill. Terraces were formed in the Lamoille River valley when the glacier retreated.

Limestone and phyllite deposits (metamorphic rock) underlie much of Greensboro but are not currently of commercial value. There are three sections of plutonic rock (granite): in a crescent curving over the north end of Caspian Lake, around the northern section of Long Pond, including Paddock Hill, and in an area northwest of Gebbie Corners.

The town offers other interesting glacial features. Across town, small erratic boulders can be seen, including Rocking Rock and the large Pulpit Rock in North Greensboro, as well as one on the Swamp Road, and several on the north shore of Caspian Lake. [An erratic is material moved by geologic forces from one location to another, usually by the movement of the ice in a glacier].

Paddock Hill, located approximately one mile northeast of Long Pond is a *roches moutonnées.* [A roches moutonnées is a rock formation created by the passing of a glacier over underlying bedrock. All the sides and edges of the rock have been smoothed in the direction of the glacier that once passed over it. The other side is much more rough and craggy.] The large vein of granite on Paddock Hill was used in the late 1800's and early 1900's for local building purposes and to supply the granite polishing shed in Greensboro Bend. There are also granite outcroppings in Caspian Lake, such as Huckleberry Rocks, Gunther's Rocks, Bathtub/Elephant Rocks, and Blueberry Rocks in Long Pond.

Various small ponds and swamps scattered throughout the area are largely the result of glaciation. Glaciation left behind several kettle ponds: Long Pond, Horse Pond and the two Mud Ponds. [A kettle pond is created when a section of glacial ice dropped off of the retreating glacier and was buried in sediment. When the ice melted, a shallow hole was left which ultimately filled with water, sediment or vegetation.]

Lakes and Streams

Caspian Lake: Caspian Lake is regarded as the town's natural resource jewel and, together with Long Pond and Horse Pond, is considered to be in the overall top 20% of Vermont's Best Lakes. (Vermont Lakes and Ponds Program, 2012). The lake is 789 acres and has a maximum depth of 142 feet, (mean depth is 57 feet), a maximum length of 1.66 miles and a maximum width of 1.3 miles. It is classified as oligotrophic (a deep clear water lake with a very low nutrient level). It is in the Upper Lamoille Basin whose waters ultimately flow into Lake Champlain.

In 2016 the status of the lake was downgraded to Stressed due to the flow alteration with resultant water level fluctuation, causing pollution and jeopardizing fish habitat. Caspian had one of the finest lake trout fisheries in northern Vermont, but current water level fluctuation has the potential to impair fishery. Ice damage due to the lack of drawdowns invites evaluation of the best water level to be maintained in order to have the least amount of impact.

Sedimentation and road and developed land runoff are negatively affecting water quality. Action by the town to address the sedimentation and the feeder stream contribution to the problem is imperative. Furthermore, the groundwater table is unusually high, and old, outdated and expired, overburdened septic systems increase the danger of septic overflow, especially in wet years.

The only lakeshore property owned by the town of Greensboro is the Willey Beach, which is preserved in its natural wooded state, adjacent to the Public Beach. The Public Beach is owned by the Town of Hardwick. The beach is maintained through a Beach Committee made up of Hardwick and Greensboro representatives.

The Greensboro Association is very active in keeping the lake free from Eurasian Milfoil and Zebra Mussels. The Association also sponsors swimming lessons, and monitors water quality on a weekly basis. These activities are testament to the concern and care the residents, both full and part time, have for Caspian Lake.

The Vermont Department of Environmental Conservation (DEC) has conducted a lake water quality monitoring program for over twenty years. These data have been reported as the Lake Scorecard. Overall, the DEC rates Caspian Lake as follows:

Nutrient Trend: Fair Condition

Shoreland Habitat: Fair Condition

Invasive Species: Good Condition

The DEC monitors Caspian Lake for total phosphate (a limiting nutrient in most lakes), chlorophyll-a (a green pigment responsible for the plant's ability to convert sunlight into chemical energy), and Secchi depth (an indicator of lake water clarity or transparency). These parameters provide an indication of nutrient loading or algal biomass activity.

Table 1 presents a comparison of the water quality parameters across several Vermont lakes.

Constituent Lake:	Caspian	Seymour	Willoughby	Carmi	Elmore
Mean Summer TP,ug/l	9	9	11	31	15
Mean Chlorophyll-a, ug/l	2	2.4	1.2	17	4.1

Summer Secchi, m	7.6	8	8	2.5	3
Mean Lake Depth, m	57	51	140	10	6

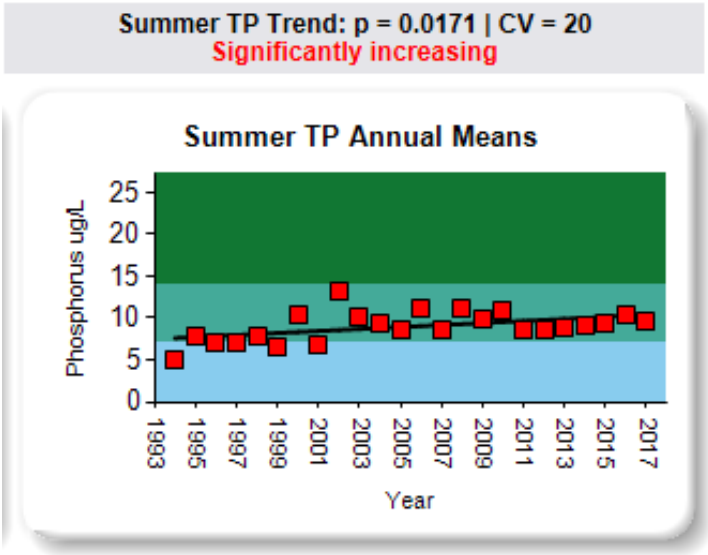
Table 1: Water Quality Comparison

The mean chlorophyll-a concentrations in the DEC data have been stable over ten years.

The summer Secchi disk depth data have been stable over time.

However, the mean total phosphate (TP) concentrations in the DEC data show the Caspian Lake trend is "significantly increasing," as shown in Figure 2. The summer TP concentrations have increased from the 5-7 ug/l to about 11 ug/l since the late 1990's. These levels are in the "mesotrophic" category, which indicates a moderate level of nutrients (oligotrophic being low in nutrients). At 15 ug/l or higher, Caspian would be classified as a eutrophic lake, indicative of higher nutrient levels and a higher probability of algal blooms in summer, which in turn, can impair recreational uses, aesthetic enjoyment, water supplies, the biological community and produce toxins that harm animals and people.

Figure 2
Summer Total Phosphorus in Caspian Lake



Phosphorus in lakes comes primarily from nonpoint sources. Nonpoint sources of phosphorus are carried by precipitation running over the land and sometimes through the soil into our waterways. Nonpoint sources of phosphorus include agriculture runoff, stream bank erosion, developed land (from roads, parking lots, lawns, athletic fields, and buildings), wastewater

treatment facilities and failing septic systems, forest harvesting, and historically deposited phosphorus that has collected in bottom sediments in portions of the lake. Point source discharges of phosphorus include regulated storm water discharges and sewage treatment plants.

Figure 3 shows sources of phosphorus in the Lamoille watershed (Source: Lamoille Watershed Basin Study, VDEC). This data, while not directly from Caspian Lake, will be indicative. Clearly, agricultural sources represent the largest phosphorus input, followed by developed lands (e.g. homes located in the Greensboro Shoreland District). Unpaved roads can be another significant source of phosphorus.

Figure 3
Phosphorus Sources in the Lamoille Watershed

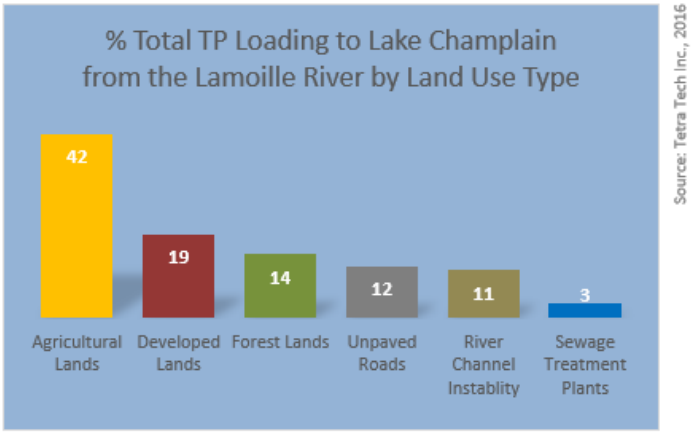


Figure 4 shows similar data for phosphorus loading in Lake Memphremagog (Source: Lake Memphremagog Basin Study, VDEC). Once again, while this data is not from Caspian Lake, it will be representative.

Figure 4
Phosphorus Loading in Lake Memphremagog

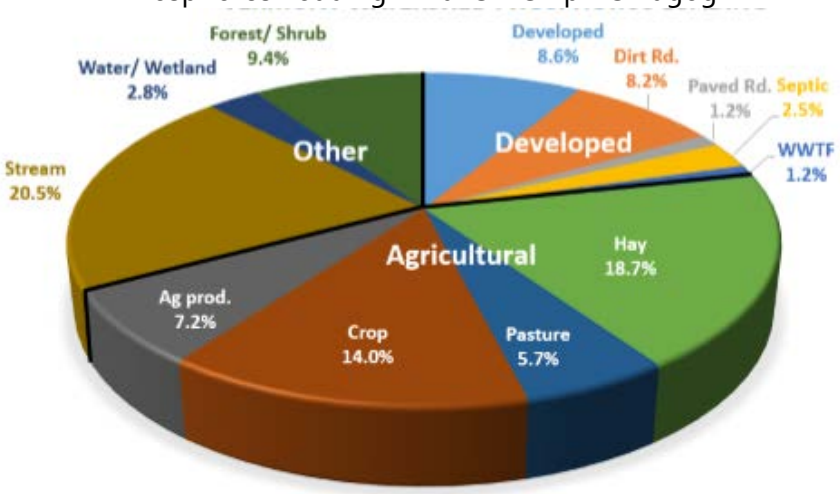


Figure 4 shows again that agricultural phosphorus sources are the largest contributors to lakes in Vermont, such as Caspian. Note that streams are a significant source as well. This figure also indicates that developed areas contribute to phosphorus loading. Septic, though, was only 2.5% of the TP.

The sources of total phosphorus must be investigated and mitigated to the fullest extent possible to maintain and improve Caspian's water quality.

Because excess nutrient loading results from activities both in the watershed and along the lakeshore, protective action is required at both the lake and along the waterways in the watershed.

References:
1 https://anrweb.vt.gov/DEC/IWIS/ReportViewer.aspx?Report=LayMonLakeReport&ViewParms=False&LayMonID=CASPI
2 https://anrweb.vt.gov/DEC/IWIS/ReportViewer.aspx?Report=WQSummarySecchi&LocationID=503784
3 https://anrweb.vt.gov/DEC/IWIS/ReportViewer.aspx?Report=MonitoringSiteSummary&ViewParms=False&LocationID=503784
4 https://anrweb.vt.gov/DEC/IWIS/Factsheets/Chem.pdf

Photo Credit: Karin Newhouse Photography

Eligo Lake: This lake of 174 acres, with a maximum depth of 100 feet (mean depth is 29 feet), is shared with Craftsbury. That Town maintains a public beach at the north end. The area surrounding this glacial pond is so level that it drains both south (into the Lamoille) and north (into the Black River). The steep slopes on the eastern side are environmentally sensitive as are the northern and southern outlet areas. Like Caspian, Eligo is oligotrophic, meaning a deep clear water lake with very low nutrient level. Eligo is currently fighting to combat its milfoil problem.

Long Pond: One of the four kettle ponds in town, this body of water consists of 100 acres and is essentially undeveloped. Its maximum depth is 33 feet (mean depth of 15 feet) and it is classified as mesotrophic (moderate in nutrients). It was evaluated by the State for water quality, biological diversity and unusual or scenic natural features. It is ranked as exemplary in all three categories. Other than the fishing access owned by the State of Vermont and a few lots owned by private landowners, most of the surrounding property is owned and protected by The Nature Conservancy. One of the largest northern white cedar swamps of approximately 115 acres is located at the southern end of Long Pond. It is second growth trees of white cedar, a few emerging white spruce growing out of a mossy groundcover growing over a meter of woody muck. Historically, a state-threatened orchid (Calypso bulbosa), the fairy slipper, has been seen there, along with a rare moss (Calliergon richardsonni); and an adult black-backed woodpecker (Picoides articus). It is labeled by the state as a warm water fish habitat.

Horse Pond: This pond of 32 acres with a maximum depth of four feet is adjacent to Route 16. Classified as mesotrophic, recreational fishing is poor due to excessive plant growth. It is labeled by the state as a warm water fish habitat.

Mud Pond(s): These ponds are located in North and South Greensboro. These two ponds are small, (9 and 5 acres), shallow, are rapidly eutrophying and becoming swamps. There is no road access to either pond.

Rivers and Streams

High-quality surface water that is clean and cool is important to the spawning and nursery habitat for Caspian and the Lamoille River Watershed. River corridor protections around issues of channel erosion, encroachment, flood resiliency, and nutrients are important considerations for the Town Planning and Zoning regulations.

Major streams that drain to Caspian are Cemetery Brook, Porter Brook and Tate Brook. Both Porter and Tate support very high-quality mixed resident trout, allopatric brook trout, and spawning/nursery stream populations. They are important to the spawning and nursery habitat for Caspian Lake and for the Lamoille River Watershed and are ranked as a very high-quality

water which support recreational fishing. Whetstone Brook drains to Lake Memphremagog, and Wright Brook drains to Caspian Lake.

The Lamoille, Barton and Black Rivers flow through Greensboro. The Lamoille River which runs through the valley adjacent to Greensboro Bend has ecological integrity consistent with very good or excellent conditions to support biological health of macroinvertebrates and fish communities. In addition, there are several smaller brooks and streams in good condition all of which drain into the Lamoille River, including: Esdon Brook, Paine Brook, Withers Brook and Stanley Brook. Mud Pond Brook, the outlet of Mud Pond, and Sawmill Brook, the outlet of Long Pond, both drain to the Lamoille and are in very good or excellent condition to support biological health. Skunk Hollow Brook is an inlet of Long Pond.

Greensboro Brook, the outlet of Caspian also drains to the Lamoille. However, according to the Lamoille Watershed Tactical Plan, this brook is stressed by land erosion, toxics and nutrients. Projects to mitigate stormwater runoff from Lauredon Avenue will be important.

Photo Credit: Karen Gowan Photography

Wetlands, Swamps, and Riparian Areas

Figure 2 shows the wetlands, lakes, ponds, and streams in Greensboro. All wetlands in Greensboro are Class II or Class III wetlands. Note that the streams and associated wetlands create habitat connections that allow animals to move from one location to another.

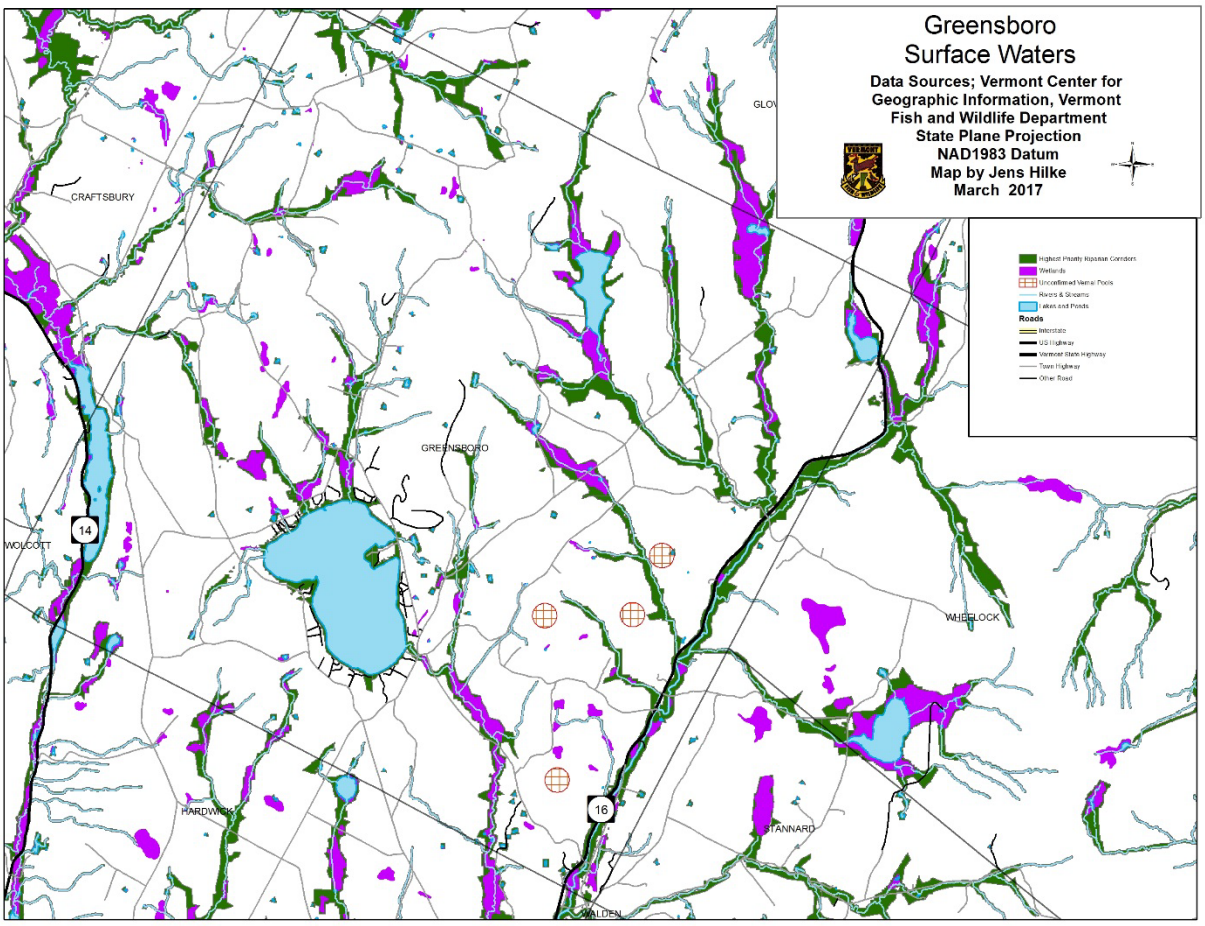


Figure 2: Greensboro Surface Water

Biological and Wildlife

Figure 3 shows the sensitive natural communities that have been identified in Greensboro. These include deer wintering areas, rare plants and animals, significant natural communities, mast stands, wildlife crossings, and habitat blocks (with levels of importance indicated by color, with green being the highest priority).

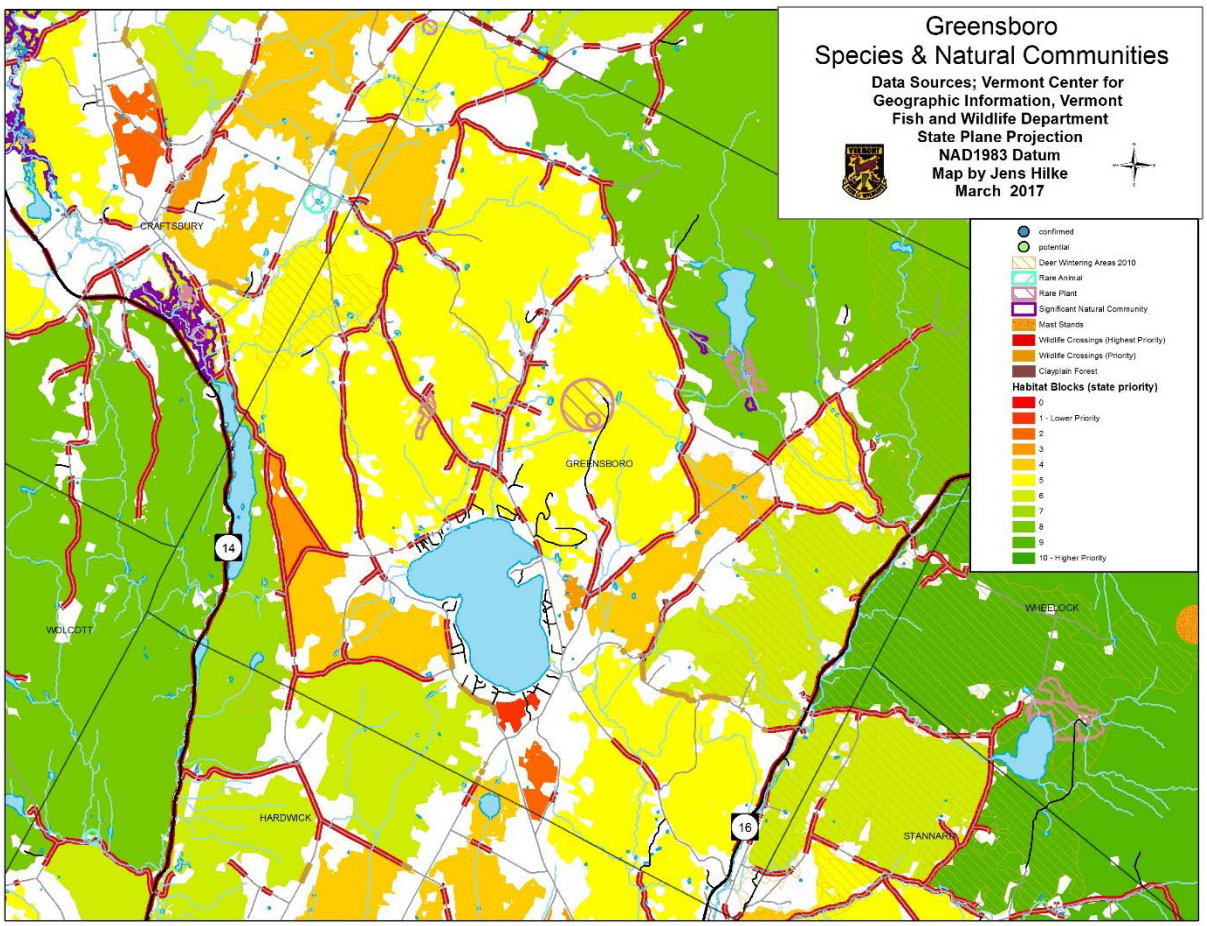


Figure 3: Greensboro Species & Natural Communities

Rare and endangered plants include a stand of Lycopodium sabinifolium (Savinleaf Groundpine) on Baker Hill.

The bird life in Greensboro is chronicled by The Annual Bird Count (see the History of Greensboro, Appendix 16 "Birds of the Greensboro Area"). The common loon is frequently seen on Caspian Lake, and nested there successfully in the summer of 2016, due to the construction of a floating nesting habitat and floating signs not to disturb.

The Greensboro Bend PLACE Study

This summary presents a series of conservation recommendations arising from the work of the Greensboro Bend Place-based Landscape Analysis and Community Engagement (PLACE) Program. The Greensboro Bend PLACE Program's goal is to expand the community's relationship with their surroundings through concurrent social and landscape analyses. Lauren Sopher completed this work as part of her Master's of Science degree in the Field Naturalist and Ecological Planning Program at the University of Vermont. These conservation recommendations represent her findings on opportunities to care for and utilize the town's natural resources. The complete report is located in the Appendix.

The stories of people and the land are intertwined—one cannot be considered without the other. Through public and private conversations with community members and ecological field work, Lauren developed conservation recommendations for Greensboro Bend that fall into three major themes: street beautification, healthy rivers, and forests and farms. Many of these recommendations also apply to Greensboro at large. These land management practices will maintain and improve human health and safety, economic prosperity, and Greensboro's innate beauty for current and future generations.

Street beautification using native plants will provide aesthetic and ecological value to the community. Native trees, shrubs, and herbs are critical to robust ecosystems. These plants thrive in the local climate and support the food and habitat needs of native wildlife, such as birds, bees, and butterflies. Invasive species have a negative impact on forest health, human health, and our wallets. Planting native species is a win-win for people and the environment.

Healthy rivers support healthy people and the places where they live. Flood resilience, wildlife habitat, water quality, and river bank stability are made possible by riparian buffers—vegetated areas that border rivers, lakes, and wetlands. Intact riparian areas help prepare us for the northeast's rapidly changing climate. Community planting projects, whether for street beautification or riparian buffers, present an opportunity for folks to work together on common goals.

Forests and farms define Vermont's landscape—this also stands true for Greensboro. The forested section of northeast Greensboro Bend and the fields of south Greensboro Bend were consistently identified as areas that folks want to remain undeveloped. There are voluntary opportunities for private landowners to manage their land in an undeveloped state, with the support of local, state, and federal resources.

In addition to providing tangible health and quality of life benefits, these recommendations can maintain and expand the community's sense of hope for and pride in Greensboro Bend—now and into the future.

The Greensboro Conservation Commission sponsored this project and the Association of Vermont Conservation Commissions Fund, the Greensboro Conservation Fund, and the Greensboro United Church of Christ Pleasants Fund generously provided supporting funds.

FLOOD RESILIENCY

Vermont Statutes Act No. 16 states that as of July 1, 2014, municipal and regional planning must contain a Flood Resilience Element. This chapter must identify flood and fluvial erosion hazard areas and designate those areas to be protected, including floodplains, river corridors, land adjacent to streams, wetlands, and upland forests to reduce the risk of flood damage to infrastructure and property. It must also recommend policies and strategies to protect the town from flooding.

Background

Flooding risk is a function of a number of issues, including the nature of the watershed, the topography of the land surface and its rate of change, and man-made structures that may affect the flow of storm-related water.

Greensboro lies within two watersheds: the Upper Lamoille River watershed, and the St. Francois watershed (a sub-basin of the Lake Memphremagog watershed). The Upper Lamoille River watershed is fed by an area of about 720 square miles, beginning at the headwaters in Greensboro. Most of the streams in Greensboro ultimately drain into the Lamoille River (the only exception is Eligo Lake, which drains to the St. Francois watershed). Whetstone Brook and Whitney Brook drain into Lake Memphremagog. Figure 1 shows the boundaries of the two watersheds in Greensboro.

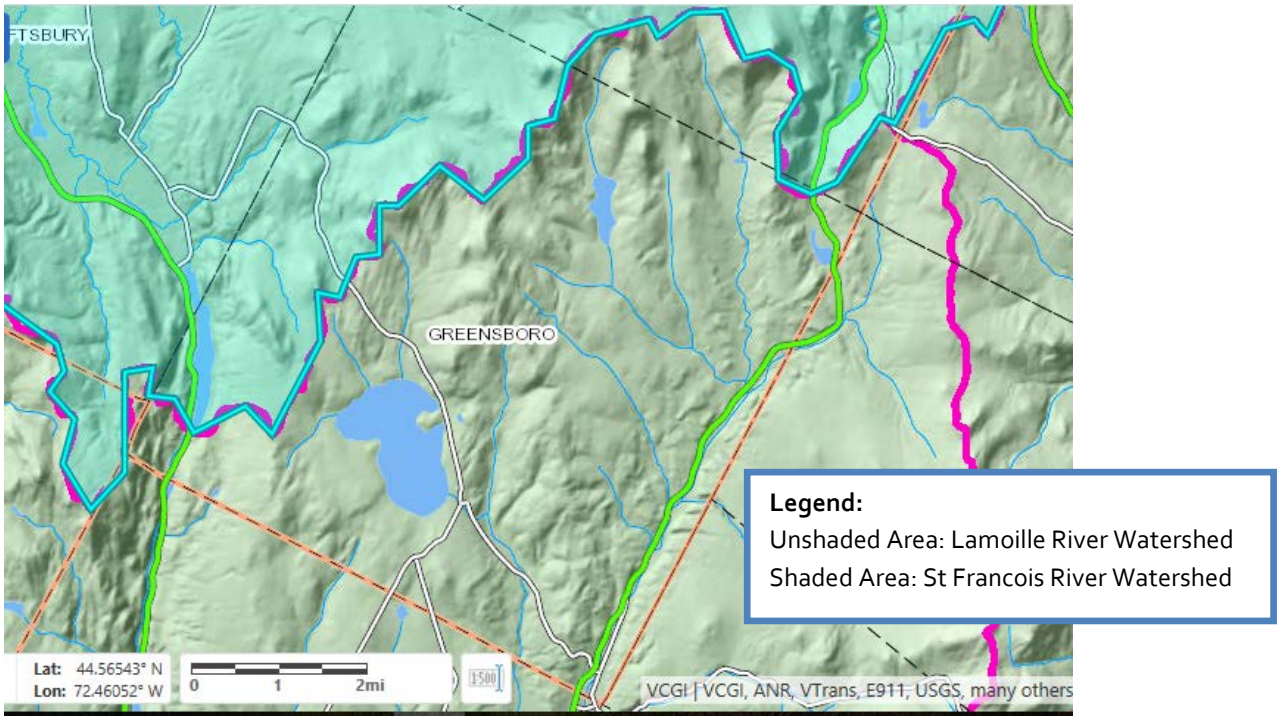


Figure 1-1: Watersheds in Greensboro, Source: VCGI

Greensboro is characterized by topography that varies considerably across the town. For example, the highest location in the town is an un-named hill about a mile northwest of Paddock Hill (2200 ft), followed by Paddock Hill and Barr Hill (2100 ft). The lowest parts of town are the shore of Eligo Lake (1000 ft) and Greensboro Bend (1200 ft).

Rapid changes in topography over short distances (i.e., slope steepness) can create conditions during heavy rain events where damaging soil erosion can occur. Figure 2 shows the slope as a percent, for Greensboro. The figure shows that there is a significant amount of land area in the town where slopes are well above 10%. The steep areas are cause for concern about soil erosion.

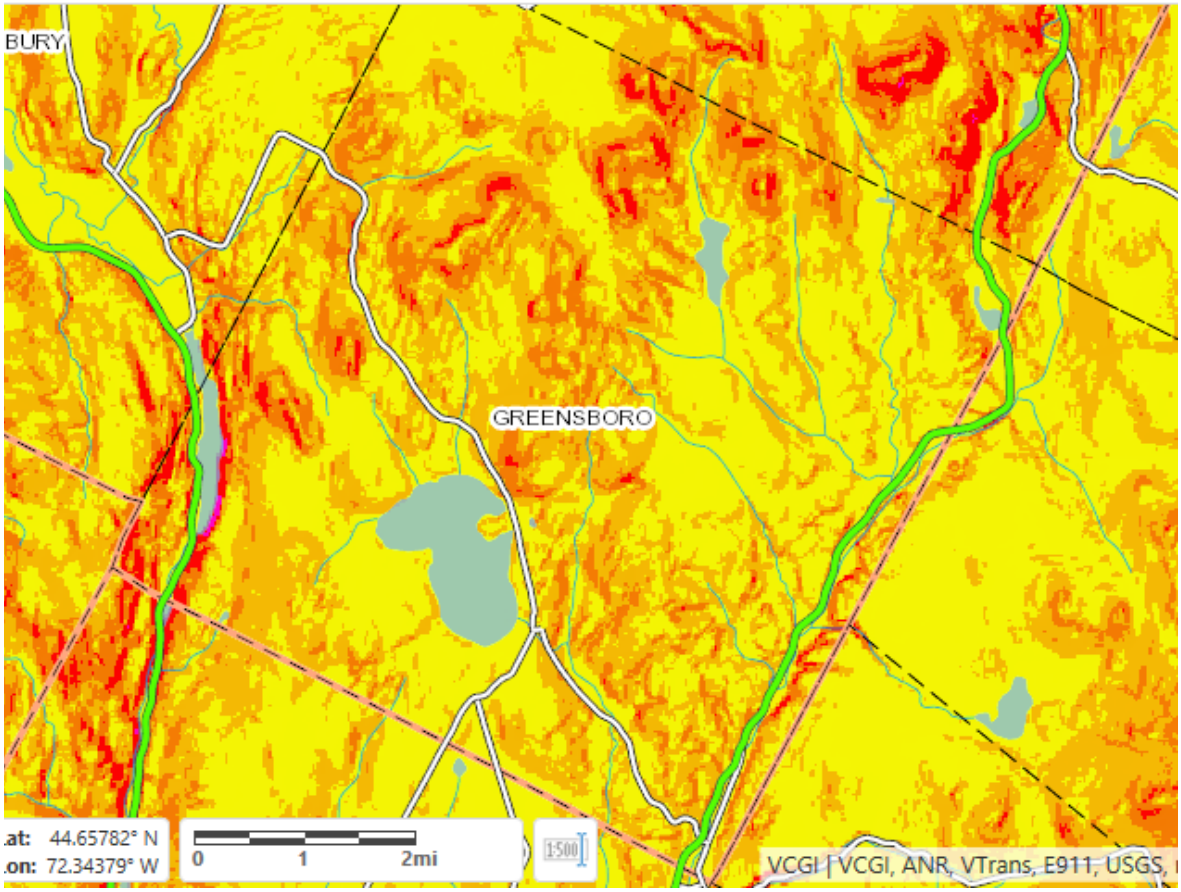


Figure 2: Slope as Percent, Source: VCGI

Flooding Risks

Flooding risk arises from a number of physical attributes in Greensboro, such as floodplains, river, or river corridors, streams, uplands, wetlands, and roads (including culverts and bridges).

Floodplains

Floodplains are important features that provide for temporary storage of water during major rain storms as well as reducing the water flow velocity and commensurate erosion. A floodplain encompasses the area where a river typically meanders during high flow periods. However, floodplains also are areas with relatively high probability of flooding. Greensboro's floodplains have not been digitally mapped. The only source data is from the Federal Emergency Management Agency (FEMA) maps called FIRMS, or Flood Insurance Rate Maps. The most recent FIRM prepared for Greensboro was created in 1985.

The Vermont Department of Conservation created a map of Special Flood Hazard Areas (SFHAs) within Greensboro. The SFHAs are land areas that are within Zone A on the FIRMS, which denote areas in the 100-year floodplain. This map is shown in Figure 3. There are 88 buildings in the SFHAs in Greensboro, which comprises about 11% of the buildings in the town. Most of these are located along the shores of Caspian Lake, in addition to a few buildings in Greensboro Bend.

Photo Credit: Dorothy Miller Armstrong

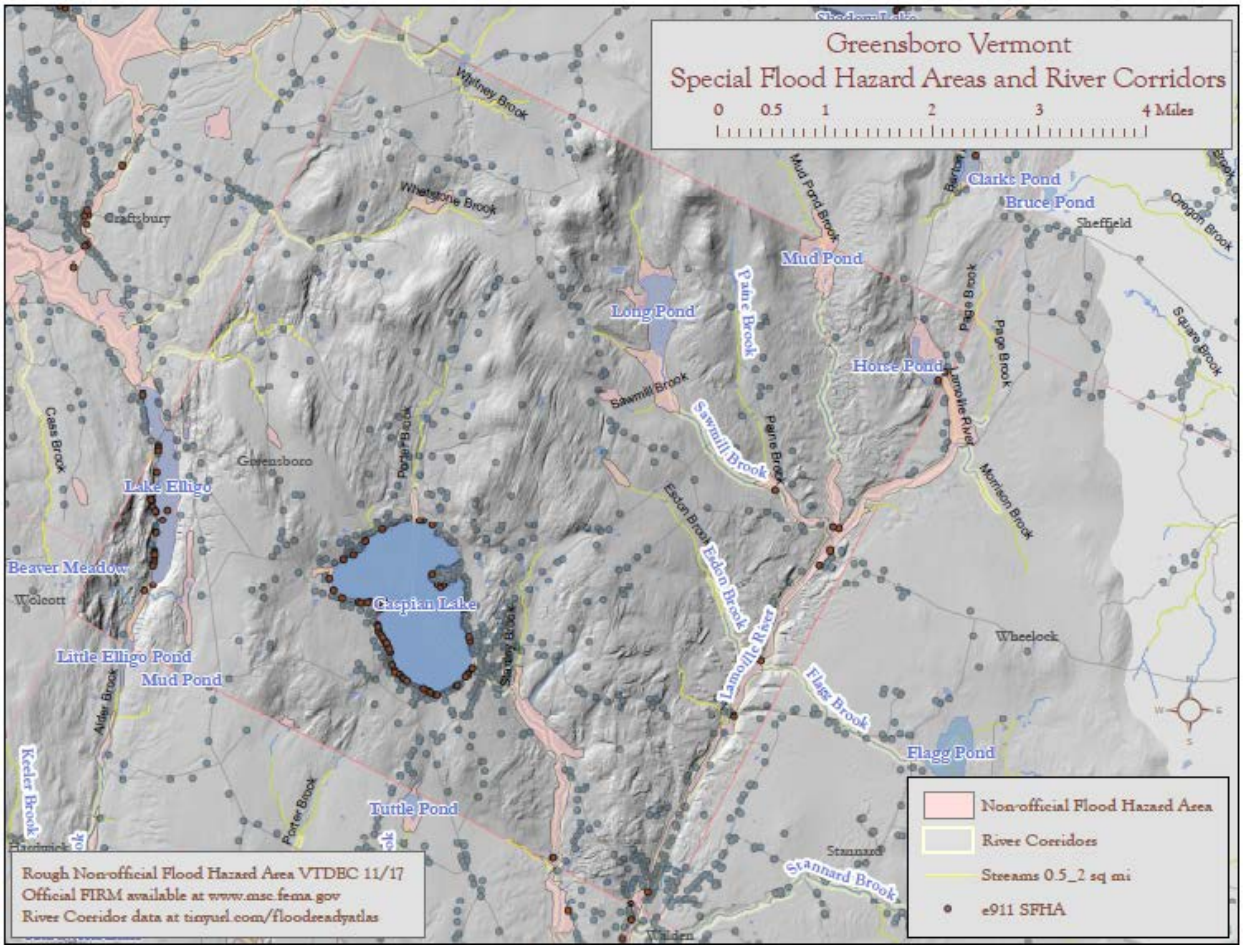


Figure 3: Greensboro Flood Hazard Areas and River Corridors

River Corridors

The mainstem of the Lamoille River originates in the northwest corner of the Town of Wheelock, at the outlet of Horse Pond (which is located in Greensboro). It flows 84.9 miles in a generally westerly direction until it empties into outer Mallett's Bay of Lake Champlain ten miles north of Burlington. From its headwaters to the mouth, the river descends approximately 1,200 feet and drains a 706 square mile watershed.

A river corridor includes both the channel and the adjacent land. The purpose of the zone is to identify the space a river needs to re-establish and maintain stable "equilibrium" conditions. In other words, if the river has access to floodplain and meander area within this corridor, the dangers of flood erosion can be reduced over time. River corridors are equivalent to fluvial erosion hazard areas. Note that special flood hazard areas (SFHA) represent the floodplain denoted as Zone A on the FIRM maps. The SFHAs are smaller than the river corridors.

About two-thirds of Vermont's flood-related losses occur outside of mapped floodplains, and this reveals the fundamental limitations of the FIRMs. A mapped floodplain makes the

dangerous assumption that the river channel is static, that the river bends will never shift up or down valley, that the river channel will never move laterally, or that river beds will never scour down or build up.

Fluvial Erosion Hazard Areas (FEH) have been delineated for some communities based on studies of particular stream and river reaches. An FEH is essentially equivalent to a River Corridor . Both delineate the extent of the meander belt. A River Corridor includes the meander belt and the riparian buffer area required for a naturally-stable channel.

The Vermont Agency of Natural Resources (ANR) mapped the major river corridors for the state, including the Lamoille River and Greensboro Brook, Mud Pond Brook and Sawmill Brook. The river corridor varies in width for the three streams, and is about 450 ft for the Lamoille River along Greensboro Bend. Figure 4 shows an enlarged view of the River Corridor for Greensboro Bend.

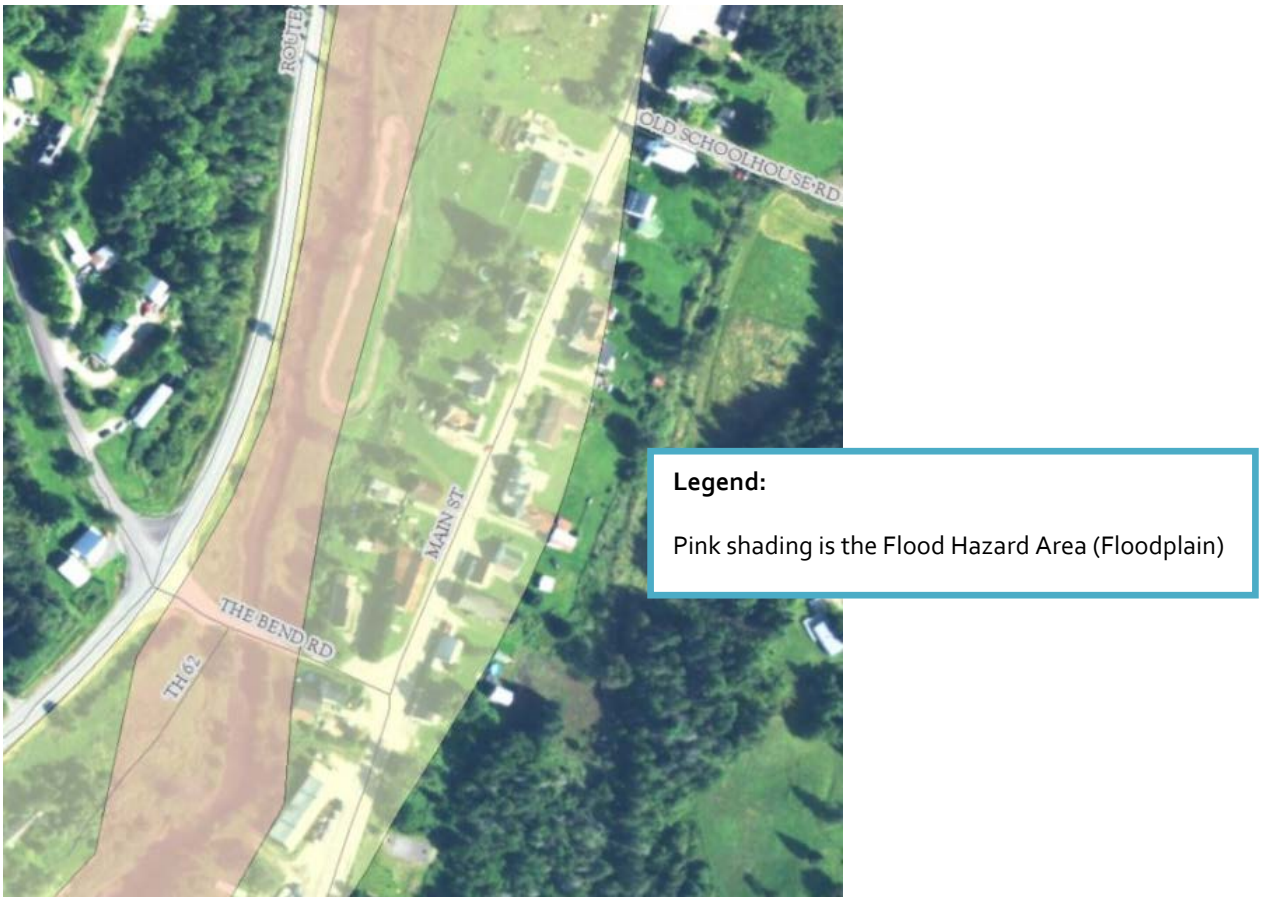


Figure 4: Greensboro Bend Flood Hazard Area and River Corridor

Land within the RCPA will experience heightened risk from erosion and flooding. Therefore, the state encourages towns to restrict development in river corridors. Doing so can help

streams lose flood energy in undeveloped areas and help prevent flood damage to existing riverside development from getting worse.

There are benefits to Greensboro if the town adopts bylaws that restrict encroachment into designated river corridors. See the section on Regulatory Issues below.

Uplands

While upland areas, which consist primarily of forests, do not present a great flooding risk, they do impact flooding and soil erosion downstream.

Forests limit erosion and the ability of water to transport sediment that can cause water quality problems when forest vegetation and organic debris on the forest floor slow and infiltrate surface water during storms. Forested lands contribute the lowest amounts of nutrients, sediment and other pollutants into Vermont streams per acre compared to other land uses.

Forest blocks are areas of contiguous forest and other natural habitats, frequently spanning multiple ownerships. Greensboro's forest blocks are primarily forests, but also include wetlands, streams, lakes, ponds, and rock outcrops. Forest blocks protect water quality, provide flood storage, and protect habitat for fish and wildlife. Forests also provide shading to moderate water temperatures, and act as a carbon sink.

Best management practices must be applied in upland areas. Development, which involves clearing and increased runoff, should be discouraged in areas of steep slopes (>20%).

On parcels over 25-acres, landowners may be eligible to enroll forestland in Vermont's Use Value Appraisal Program (also known as Current Use). For forestland to be eligible it must be managed according to a 10-year forest management plan that provides for continued management for forest products which meets minimum plan and management standards and is approved by the Department of Forests Parks and Recreation (VFPR). Landowners with riparian areas and forested wetlands are encouraged to manage for protection of these sites during any forest management.

Streams

Headwater streams make up a large proportion of the total length and watershed area of fluvial networks in Greensboro, and are partially characterized by the large volume of organic matter and invertebrate inputs from the riparian forest. Organic matter entering these streams consists of leaves, woody debris, detritus, and sediment. For example, while each headwater stream in the Caspian Lake watershed is short and narrow, they collectively can impact lake water quality during and after large storm events.

Identifying and implementing priority conservation practices for forest landowners at the headwater stream level is important in watershed management for several reasons:

- Controlling soil erosion on logging trails
- Restoring forest riparian buffers along streams
- Stabilizing erosion-prone soils

Wetlands

Wetlands provide many benefits, including water quality protection, wildlife habitat, recreation, and flood protection. All Class I and II wetlands are protected by the Vermont Wetlands Program. These rules require buffer zones within 100 feet of Class 1 wetlands, and 50 feet of Class II wetlands. Any activity in a Class I or II wetland requires a state permit. We can further protect wetlands by adopting setbacks and zoning that would allow review of development plans for wetland impacts.

Those wetlands that provide water quality protection at the highest level are a priority for protection in the Lamoille River Basin. These wetland types include those that attenuate sediment, filter overland runoff from flooding and stormwater, support fisheries, and provide refuge for wetland dependent species.

All of the wetlands in Greensboro are Class II or Class III wetlands.

Dams

Dam failures can be a source of flooding risk. There are three dams in Greensboro. Two of them are privately owned and are rated low hazard potential by the state. The earthen dam at Caspian Lake was built in 1929 and reconstructed in 1948. The dam is seven feet high and 205 feet in length. Approximately 2300 ac-ft of water is stored in Caspian Lake under normal conditions.

The Caspian Lake Dam, because of the storage volume, is called a "jurisdictional dam" by the Dam Safety section of the Vermont Department of Conservation. This dam is classified as "significant hazard potential" by the Dam Safety section because a dam failure could result in "a few fatalities and/or appreciable economic loss". Dams with this classification must be inspected every 3-5 years; however, the inspections are voluntary on the part of dam owners.

The owner of the Caspian Lake Dam is Hardwick Electric. The most recent inspection of the Caspian Lake Dam occurred on June 27, 2017. The visual inspection was conducted by the Facilities Engineering Division of the Vermont Department of Environmental Conservation.

The findings of the inspection are summarized here:

- Based on the visual inspection of the dam, the condition is considered poor.
- The downstream slope of the dam on one side of the spillway is covered with trees in excess of 30 inches in diameter.
- The spillway condition appears poor. Some concrete is deteriorating, with exposed rebar. The concrete footing appears to be separating from the remainder of the structure.
- The concrete wall adjacent to the left abutment is in a state of failure, and not considered stable, having rotated outwards toward the lake.
- The dam does not meet the current standard of providing 1.5 feet of freeboard during the spillway design flood.

The inspection report recommends that a professional dam safety engineer be retained to specify the repairs needed to bring the dam into compliance with the State requirements, including concrete repairs and tree removal.

Roads and Culverts

Roads, culverts and bridges are important facilities that can be sources of flooding problems and can conduct nutrients and sediment to streams, and then to lakes. Therefore, it is essential that Greensboro maintains its roads and associated facilities in good condition. Greensboro has 69 miles of town roads, in addition to 582 culverts.

Vermont has a number of initiatives to help towns with maintaining roads and culverts:

- The Better Roads Program, which publishes a Better Back Roads Manual, and operates a Better Roads grant Program
- The Vermont Department of Fish & Wildlife published guidance for the design and replacement of road crossings and culverts, called "Guidelines for the Design of Stream/Road Crossings for Passage of Aquatic Organisms in Vermont".
- The Vermont Department of Environmental Conservation, Watershed Management Division prepared the Stormwater Infrastructure Mapping Project Report, dated February 2017 to supplement the existing drainage data collected by the town and with the intention of providing a tool for planning, maintenance, and inspection of the stormwater infrastructure. This report and associated mapping, will assist Greensboro and its residents with emergency preparedness for large rainfall events or spring snowmelt runoff events by helping to keep drains and culverts open, thereby minimizing localized flooding.

The Vermont Agency of Transportation created VTCULVERTS, an inventory of culverts and bridges in Vermont. The VTCULVERTS database shows that Greensboro has 582 culverts, of which 355 are in Good condition and 152 are in Fair condition. Only 65 culverts are in "Poor" condition and none are in Critical or Urgent condition. This data was compiled by the NVDA in 2015.

Act 64, the Vermont Clean Water Act, requires VDEC to develop a new Municipal Roads General Permit (MRGP). The MRGP will require Greensboro to conduct Road Erosion Inventories (REIs) for hydrologically connected municipal road segments. The ANR Natural Resources Atlas shows hundreds of road segments in the town that will be included in this regulation.

Greensboro will also be required to develop Road Stormwater Management Plans for all hydrologically connected road segments not meeting MRGP standards. Greensboro would then be required to implement the Road Stormwater Management Plans over a period of time defined by the MRGP.

Regulatory Issues

The Vermont Rivers Program has created a Flood Resilience Scorecard for the Lamoille River Basin. The scorecard reflects the actions communities have taken to implement the state's flooding guidelines. Greensboro is rated medium flood resiliency. Medium is achieved when a community has adopted the four mitigation measures needed to qualify for the 12.5% public assistance match (listed below). Greensboro can reach the high level of flood resiliency by satisfying the requirements of the River Corridor Protection Program (protecting river corridors from further encroachments).

There are a number of regulatory programs that deal with flooding.

National Flood Insurance Program (NFIP)

Greensboro participates in the NFIP and regulates development in the flood hazard areas according to the minimum standards established by FEMA. These regulations control the use and construction of structures in the flood hazard areas. An important benefit to adopting the rules is that it allows all property owners in Greensboro to purchase flood insurance – whether or not the property is located in a Special Flood Hazard Area (SFHA). Homeowner's insurance policies do not cover flood damage.

Greensboro currently regulates development in the SFHA in accordance with FEMA's minimum standards. If new development is to occur in the SFHA, it must meet certain standards, such as elevation and floodproofing.

The NFIP prepares the Flood Insurance Rate Maps or FIRMs, as discussed earlier.

Emergency Relief Assistance Fund (ERAF)

The ERAF provides a state-funded match for Federal Public Assistance through FEMA if Greensboro meets FEMA requirements. When a community requires public assistance, FEMA funds generally cover 75% of the loss. For federally declared disasters that occur after October 23, 2014, ERAF will contribute half of the required match (12.5%) only if the town has taken all the following steps to reduce flood damage:

- Adopt the most current Town Road and Bridge Standards (which can be found in the VTrans Orange Book: Handbook for Local Officials).
- Adopt flood regulations that meet the minimum standards for enrollment in the National Flood Insurance Program.
- Maintain a Local Emergency Operations Plan (adopt annually after town meeting and submit before May 1).
- Adopt a FEMA-approved Local Hazard Mitigation Plan.

Greensboro has satisfied these requirements; therefore, the Town is eligible for a 12.5% match.

Local Emergency Operations Plan (LEOP)

An LEOP is a guide for activities immediately following a disaster, when it is critical that procedures be in place to respond to situations where health and safety are concerned. The LEOP establishes an incident command system, designates an operations center, and identifies local resources needed in a disaster. Maintaining an up-to-date LEOP is required for a 12.5% match in funding from the state Public Assistance Fund.

Local Hazard Mitigation Plan (LHMP)

The LHMP takes the LEOP to another level. The purpose of the LHMP is to provide education about the possible hazards and vulnerabilities in the town, identify methods to mitigate the risks, and enlist governmental agencies, organizations, businesses, and the public.

The latest LHMP revision was dated 2016. Mitigation strategies were proposed based upon the hazards and vulnerabilities identified. These strategies included the following:

- Integrate LHMP into the Town Plan and bylaws.
- Update flood hazard bylaws to prohibit new structures in floodplains.
- Require new critical facilities to be located one foot above the 500-yr flood elevation.

- Support education and public outreach regarding hazards.
- Develop and implement a Fire Prevention Plan for the villages.

River Corridor Easement Program

The intent of this program is to provide a financial incentive to landowners to allow for passive restoration of channel stability by allowing the natural erosive forces of the river to establish its least erosive form over time. Under a river corridor easement, the landowner sells their river channel management rights within the meander belt width corridor of sensitive and erosive streams. Agriculture and silviculture are permitted within the river corridor easement area. The three primary components of a river corridor easement are:

- Transfer of channel management rights to a land trust.
- No new structures/development within the river corridor.
- A minimum 50 ft. riparian buffer of native woody vegetation whose location floats with the river.

Critical Facilities

Critical facilities are essential to a community's resilience and sustainability. In general, there are two kinds of facilities that a community would consider "critical" during and after a flood:

- Those that are vital to the health and safety of the public before, during, and after a flood, such as emergency responders, schools, and shelters; and
- Those that, if flooded, would exacerbate the problem, such as a hazardous materials facility, power generation facility, water utilities, or wastewater treatment plant.

Because they are defined by their ability to quickly and efficiently respond to and recover from floods, critical facilities should never be flooded, and their critical actions should never be conducted in floodplains if at all avoidable.

Greensboro does not have any critical facilities in the Special Flood Hazard Area or in the recently delineated river corridors.

REGIONAL COMPATIBILITY

The purpose of this section is to examine the plans of our adjacent communities, and the regional plan, to ensure that our plan is consistent, or compatible, with these plans. The adjacent towns to Greensboro are Glover and Craftsbury to the north, Hardwick to the south, Stannard to the east, and Wolcott to the west. Each of these towns has published town plans. Also, the Northern Vermont Development Association (NVDA) Regional Plan was reviewed.

The review took into consideration issues such as potential land use conflicts that could occur at town boundaries, development trends, and major regional initiatives.

The Northern Vermont Development Association (NVDA) Regional Plan was reviewed to evaluate the compatibility of the Greensboro Town Plan with the Regional Plan.

The following is an excerpt from the goals and strategies of the NVDA Regional Plan:

- Forest Land - sustainable forests
- Agriculture - preserve productive farmland
- Recreation - support year-round recreational opportunities
- Land Development - support established village centers
  - support a variety of housing at different price points
  - protect against fragmentation of rural lands
- Energy - support the use of renewable energy
  - encourage energy efficiency
- Education - pursue opportunities for shared facilities between municipalities
  - support education for all ages
- Telecommunications - support efforts to address gaps in broadband and cell coverage
- Emergency Services - support local efforts for disaster planning
  - discourage development in flood prone areas
- Stormwater - support Green Stormwater Infrastructure
- Wastewater - support the development of community wastewater systems
- Culture - promote local and regional tourism
  - Preserve historic downtowns
- Housing - Seek a balance of workforce, affordable and market rate

	housing
	- Help communicate with housing studies
• Economic Dev	- Assist towns in their economic development efforts
• Natural Resources	- protect the quality of the region's water
• Flood Resiliency	- Encourage towns to restrict development with river corridor
	- Encourage towns to limit clearing and impervious coverage on steep slopes (>20%)

While these strategies do not represent the entire list of strategies in the NVDA Regional Plan, they do show that when compared to Greensboro's Town Plan, there is consistency. Many of Greensboro's policies and actions are similar to NVDA's strategies.

The village of Hardwick serves as one of the main hubs for the area and provides the surrounding towns with essential services, such as healthcare. The close proximity of Hardwick thus allows the surrounding towns to retain their rural character. Craftsbury, with its historic Craftsbury Common, is rural in character, similar to Greensboro, Stannard and Glover. Wolcott's town center sits along Route 15, and also is rural. A review of the Town Plans for these communities showed that the problems confronted by these towns are similar to those in Greensboro, such as:

- Safeguard water quality and natural resources
- Expand broadband
- Support an aging population
- Achieve a balanced housing solution
- Expand sustainable recreational opportunities
- Develop tourism as an economic opportunity

No conflicts with these plans were observed. Greensboro will continue to monitor progress in adjacent communities, and seek opportunities for multi-town initiatives.

Photo Credit: Greensboro Free Library

CHAPTER 3

COMMUNITY RESOURCES

UTILITIES

Sewer and Water

Greensboro has no public sewer system; all residents and businesses have their own septic systems and leach fields. If the population grows, the demand for effective wastewater systems will also grow. The ability to develop within the village will likely become more challenging. One possible remedy is to pursue funds from the Department of Natural Resources to develop wastewater treatment facilities.

The land use goal in this plan states:

"To ensure that a large majority of future growth in residential and commercial land uses occurs in the two areas designated in this Plan as Village Districts in order to preserve the historic settlement patterns of compact villages surrounded by rural countryside"

This will become increasingly difficult, or even physically impossible, without a village sewer system or some of the newer septic technologies.

There are now two small public water systems providing potable water. One is in Greensboro Bend, and currently serves 13-15 residents, a church, a store, the Four Seasons of Early Learning pre-school, and additional residential properties. The other system serves the Village of Greensboro and part of the summer community on Caspian Lake. Both systems serve fewer than 250 residences, schools, offices and businesses. Their water sources are drilled wells. Both systems are Fire Districts (#1 and #2) established by the Legislature; neither is part of Greensboro's town government. Both are operated and financed entirely by the residents who purchase their service.

The Greensboro Village system was very outdated, with constant leakages. As a result of this and potential problems with water quality, the State of Vermont required a massive replacement of the system. In 2013 – 2014 the Greensboro Village system (GFD#1) installed new water lines from the reservoir to the Village and up to the Country Club. This also included new water lines to Black's Point. These new lines were double the diameter of the previous lines in order to meet the firefighting capacity as required by State Statutes. In 2015, the water lines were extended to the new firehouse, and in 2016 the Highland Center for the Arts extension was installed with an 8" diameter pipe and one hydrant.

Solid Waste

Greensboro is a member of the Northeast Kingdom Waste Management District, which provides the solid waste planning, hazardous waste collection, education, state compliance reporting, facility certification, grant applications, and the collection and processing of

recycling material from Greensboro's recycling center. Greensboro maintains a recycling center located behind Town Hall. It accepts sorted materials for recycling such as paper, cardboard, glass, aluminum and tin cans, batteries, fluorescent bulbs, e-waste (TVs, computers, electronics), food scraps, and metal. It is open Saturdays 9 to 11am and in the summer on Wednesdays 3:30 to 5:30 pm. Trash is accepted on a pay-by-the-bag basis when the center is open. Homeowners and businesses can contract with haulers for the pickup of their trash and recyclables.

With the help of volunteers the town operates a Giving Closet in the Town Hall for the free exchange of clothing and household items.

The replacement and upgrading of the recycling center buildings will be a future consideration.

Telecommunications

With the rapid growth of telecommunications technology, Greensboro must regularly review its telecommunications infrastructure, and prioritize improving community access. High speed internet is available in parts of Greensboro, fiber optic internet is available in Greensboro village, satellite internet and television is available in remote areas, and cellular phone service has been much improved, though coverage is uneven. 95% of Greensboro residents now have internet access. Free wi-fi is available at Town Hall, and higher speed, fiber optic wi-fi is available at the SPARK business incubator/co-working space, and will soon be available in the Greensboro Free Library. Phone, DSL internet, and fiber optic internet service are provided by Consolidated Communications. Cable television is provided by Comcast, and is limited to Greensboro Bend. Cell coverage is available via Verizon and AT&T.

Locating cellular towers is a sensitive issue in a rural landscape like Greensboro. However, there is recognition that compromise in the telecommunications area is necessary.

Electricity

Electric service delivery is provided by Hardwick Electric Department, a not-for-profit municipal utility located in Hardwick, Vermont.

FACILITIES

Police, Fire, and Rescue Services

Police: In 1980 the first Chief of the Hardwick Police Department was hired and began 24-hour coverage with a staff of three officers.

In April of that year, the Town of Hardwick entered into a contract to provide police coverage for the Town of Greensboro, leading to the hiring of a fifth officer. Greensboro contributed 20% of the Department budget in exchange for 48 hours of coverage per week. The Town of Greensboro renegotiated their contract in 1991 to contribute 22½ percent of the budget for 54 hours of service a week. In 1991, a budget was approved to add a sixth officer and a seventh was added 10 years later.

In January 2013, the Hardwick Police Department moved to its new location at 56 High Street, which is now known as the Town Public Safety Building.

All newly hired police officers are required to attend an initial 16-week Police Academy training in Pittsford. All officers attend training on a regular basis provided by the Vermont Criminal Justice Training Council. The Department's service area includes approximately 75 square miles, including the Towns of Hardwick and Greensboro. The Department is unique in Vermont in providing coverage in two counties, Caledonia and Orleans.

Police vehicles include four cruisers. Each officer is equipped with a body camera recording system. The Police radio systems were upgraded to digital format in 2012, and feature in-car mobile radios, portables and the base station. The upgrade included the addition of a digital radio repeater, located on West Hill.

The Department works closely with the area schools, domestic violence advocates, and the prosecutor's office for Caledonia and Orleans Counties, as well as other law-enforcement and state agencies. The Lamoille County Sheriff's Department provides holiday, weekend and after-hours dispatching services for the Hardwick Police Department.

In July of 2012, the Department became a member of the Caledonia Special Investigation Unit, and assigned a Hardwick officer as a detective to the unit. The detective is charged with investigating crimes of a sexual nature against children, adults and the elderly. The organization of County Special Investigation Units was mandated by the Vermont Legislature.

The Department currently maintains a staff of 8 full-time Certified Police Officers, 2 part-time Police Officers, a Dispatcher/Administrative Secretary and a part-time Dispatcher. The Officers consist of a Chief of Police, Sergeant, Corporal, Detective and uniformed Patrol Officers.

Fire: The Greensboro Fire Department (FD) is made up of 23 volunteers and no paid staff. Many firefighters attend regular classes to keep up with the new techniques for fighting fires. Firefighters are also trained in water rescue on winter ice.

The FD averages 35- 40 calls per year, and receives an average of 6 mutual aid calls per year. The Department belongs to Rural Vermont Mutual Aid, which started with four towns and has grown to six towns. There are also agreements with two other towns in the area. If the FD calls for aid from one of the other towns, it costs Greensboro nothing; likewise, the Department pays all its own costs if it is called to aid another town.

The current fire station, located on the southern end of Greensboro Village at Tolman Corners, is a new 68'x80' structure with five bays for equipment, a bathroom, and a meeting space. The new fire station was built in 2013-2014, after receiving voter approval at the 2013 Town Meeting. Including the addition of a new water line, the new fire station was built for approximately $900,000. When the station was built, 2 new hydrants from Country Club Road were added to the fire station. When the Highland Center for the Arts was built, an additional hydrant was added at the Center. To date, #2 Engine has been upgraded to a 2006 engine acquired from Florida, with no other new additions. Greensboro Fire Department has a total of 4 trucks in service.

The new station, unlike its predecessor, is adequate for the needs of Greensboro, and is a designated emergency shelter. The Fire Department also has a new dispatch system. As a result of the 911 system, all local towns go through Lamoille County dispatch. Hardwick and Greensboro have their own frequencies, so that local firefighters no longer have to hear all calls, but rather can be paged if necessary.

Emergency Medical Services: Greensboro is fortunate to have emergency medical services provided by the Hardwick Rescue Squad (HRS), a volunteer ambulance service based in the neighboring town of Hardwick. HRS was formed in 1967, and currently has 45 volunteer members living in the greater Hardwick area. HRS responds to all trauma and medical calls, and provides support at Fire Department calls within the service area. There is one paid employee, who staffs the facility four days a week, and in addition to being on-call, performs various administrative duties. This employee holds an Advanced EMT credential. HRS is licensed at an "Advanced Life Support" level with one Paramedic living in Hardwick.

The HRS provides 24-hour service to seven towns and transports patients to the emergency departments of four different hospitals. Copley Hospital in Morrisville is the primary hospital and also serves as the overseeing Medical Direction. HRS is a member of the State of Vermont Emergency Medical Services District #4, and maintains mutual aid agreements with neighboring EMS services. An on-call crew of two EMTs and one driver is scheduled at all times. Should a second call come in while the on-call team is committed, other members will

answer to form an additional crew. Often, should there be a call in an outlying town such as Greensboro, an HRS member from that town will go directly to that location as a "First Responder" to assess and stabilize the situation prior to the arrival of the ambulance. Dispatching is performed by the Lamoille County Sheriff's Department through the E911 system. All HRS members are equipped with a portable radio. An additional resource is an "Active 911" application utilized by squad members with smart phones which gives a dispatch tone, description, and location for all dispatched emergencies.

One major challenge for HRS is the limited cell coverage in the region. Not only does it limit verbal communications, with proper cell coverage the HRS could transmit EKG findings directly to the hospital for analysis. Depending on the location, radio communications can be limited as well. The implementation of the E911 system has greatly improved response time and accuracy. All property owners are encouraged to clearly mark their property access with the blue E911 signs available through the Greensboro Fire Department.

HRS operates with two fully outfitted four-wheel-drive ambulances: one a 2014 Ford F450 diesel and the other a 2017 Ford F350 diesel placed in service July 2018. Each ambulance is equipped with radio communications, Stryker power stretchers, Zole cardiac monitor/defibrillators capable of obtaining 12 leak EKG's, plus the necessary trauma and medical supplies and equipment. These vehicles are expected to be replaced on an eight year schedule.

HRS responds to 500 to 600 calls per year. The overall operating budget for 2018 is $250,000. The HRS does charge fees for services. Expected service income for 2018 is $200,000. The towns in the HRS service area appropriate the remaining $50,000. Town appropriations are figured using a five year moving average based on-call volume in each town. Greensboro's appropriation for 2018 was $7,386, which amounts to 14.77% of the call volume over the past five years. The HRS greatly appreciates the Town's unquestionable support.

Challenges faced by Hardwick Rescue Squad are the lack of cellular service in this area as stated above. In addition, recruiting new, especially younger volunteers, can be a challenge. Time requirements for initial certification, continuing education and credentialing, monthly meetings/training, and most of all promising time to be on the schedule are a major life commitment. To encourage new members, HRS conducts EMT classes yearly. Members who are certified as CPR instructors offer CPR courses to the general public and businesses.

Health Services

Northern Counties Health Care, Inc. in Hardwick provides health services to the residents of Greensboro. NCHC is the largest Federally Qualified Health Center in Vermont. NCHC offers primary medical care, dental care, home care, hospice, and maternal and child care.

Copley Hospital, a 50-bed medical facility located in Morrisville, is Greensboro's principal, regional health care facility. Copley has recently seen an expansion in budget, programs, and staff to better serve the needs of the regional community. Patient visits, surgeries, hospital bed occupancies, and outpatient services have all increased dramatically in recent years. In response, the hospital has opened a new out-patient clinic, and established a working relationship with the University of Vermont (UVM) Medical Center (formerly the Fletcher Allen Medical Center), Vermont's largest medical facility, to provide specialist services closer to home.

Greensboro Town Hall, Grange Building, and Town Garage

The town hall houses the town offices. There are four town staff; one full-time town clerk, two part-time town clerks, and one part-time zoning administrator who is responsible for Bylaw compliance. There are four large rooms on the ground floor of the building, with three rooms being utilized by the Lakeview Union Elementary School. The fourth room, the "Collier Room," is used for various meetings and events. The town hall is a designated emergency shelter. A back-up generator has been installed. There is also an unused third floor which does not currently meet ADA rules for accessibility. The Town Hall is one of Greensboro's designated emergency shelters.

In June of 2012, the historic Grange building next to the United Church of Christ (UCC) was purchased by the town for $8,000. It is intended to use this building for meetings and other community functions. The Town of Greensboro received a $70,000 grant from the Preservation Trust of Vermont, in conjunction with the Freeman Foundation, to be used on refurbishing the building. There has been discussion in recent years to consider refurbishing the Grange building into the Town Clerk's office, which it had originally been.

The Greensboro Town Garage houses an office for the 3 full-time road crew personnel, along with a shop to repair and maintain the fleet of Town vehicles. It also has a large detached shop for storage and more maintenance space.

Greensboro Free Library

The Greensboro Free Library (GFL) has a staff of one part-time librarian and two additional part-time employees, and relies on approximately 77 hours per week of volunteer commitment. Each week, the GFL is open 29 hours in the winter and 39 hours in the summer. The library's budget in 2017 had and income of $93,619 and expenses of $102,293 (with a deficit of 8,675). This resulted in a net income (deficit) after depreciation of (16,114). The towns of Greensboro and Stannard typically grant an appropriation of $25,000 and $375 respectively, and the remaining income came from private donations, grants, bank interest and dividends. The library building is owned by the town.

The chart below compares the GFL with libraries of similarly sized communities around the state. Greensboro was the second-highest town with the highest circulation per capita in 2015 (32.28). The high number of patron visits is likely due to frequent visits by members of the large summer community.

	Greensboro Free Library (2017)	**Statewide Averages for Similarly-Sized Communities (2011)**
Patrons	2,454	940
Collection Size	15,480	11,320
Circulation	11,466 (25% juvenile visits)	9,739
Patron Visits	11,495	7,436

The library offers many things, including regular programming for children with weekly story hours, puppet shows, homeschoolers' program, and summer workshops. A MakerSpace has been added to encourage young patrons to experiment, create and learn. Last year, adults enjoyed book discussions of *Lives of Girls and Women*, *The Spectator Bird*, and *My Name is Lucy Barton*. Other adult programs included *A Short Time to Die* by Greensboro authors Susan Bickford, Cheese-Making with Dr. Catherine Donnelly and Mateo Kehler, and Is Torture Ethically Justifiable? with David Brahinsky. The Universal Class Program offers over 500 online continuing education courses over the internet. Recorded books may be downloaded for listening and there are online databases from the Gale Group for research using newspaper and periodical articles for a wide range of topics.

The library is keeping up with 21st century technology. Since 2006, it has had fast broadband internet service, and in 2018 is upgrading its service to fiber optic internet. It is now a popular wi-fi hotspot, attracting people to sit in their cars, sit on the porch, or bring their laptops and smartphones inside to use it. One-on-one instruction with a computer tutor is available. The library web site can be found at https://greensborofreelibrary.org and on Facebook. Twelve computers are available to the public, all with internet access. Approximately 65 people per week use the computers.

In 2009, the library was renovated. Access was improved for handicapped accessibility, more parking was added and the interior was re-done. Upstairs, there is now a public meeting room for up to 49 people, and a year-round book sale. More space was added at that time for the collection and the energy efficiency of the building was improved. The children's room was renovated in 2011.

A busy library is a sign of a healthy community, and indeed, the Greensboro Free Library is an active, dynamic place. It continues to be an important cultural facility for Greensboro and surrounding towns, and is considered by many to be the heart of the community. As a community cornerstone, it provides resources and programs for lifelong learning, enrichment and access to the world of information. To keep the small library open, well-stocked, and well-equipped is an ongoing financial challenge that is embraced by the community.

Lakeview Elementary School

Greensboro's K-6 student population is served by Lakeview Union Elementary School. Six Greensboro citizens serve on the Lakeview Union School District Board alongside two representatives from Stannard. Greensboro's 7-12th grade student population is served by Hazen Union School. Two Greensboro residents serve on the Hazen Union School District Board with representatives from Hardwick and Woodbury.

Lakeview Union School consists of two "campuses." Built in 1957, the original structure of the "upper campus" contains classrooms for grades K-3, a conference room, and specialized learning spaces. In 1983, the community built an addition to this structure. Since then, the upper building has housed the library, office space, bathrooms, a kitchen, and the school's multipurpose room in addition to classroom spaces. Led by a teacher's initiative, parent, staff, and community volunteers spent many hours in the summer of 2016 repainting both the main hallway and the three main classrooms in the upper building of Lakeview. Our "lower campus", a Greensboro landmark, was the original school building. Built in 1910, it houses the Town Clerk's Office, classrooms for grades 4-6, and the art/music room.

The Lakeview Union Elementary School is used by the public for a number of activities. The gym is used for men's evening basketball, town meetings, and social occasions.

The school's core faculty currently consists of 5 full-time, Vermont-licensed classroom teachers. The school also employs a full-time principal and administrative assistant. Lakeview shares music, art, and PE teachers with two other schools in the Orleans Southwest Supervisory Union and employs a part-time library/media specialist. Lakeview looks forward to continuing to share art, music, and PE teachers with neighboring schools and enhancing partnerships with area nonprofit organizations, and anticipates working with other schools to provide additional opportunities for our students in areas such as science and world languages.

The Lakeview team values Greensboro's rich cultural heritage, rooted in agriculture, forestry, and a vibrant summer community, and is developing collaborative learning opportunities that build bridges between the school and the towns. To that end, they are building community partnerships with area businesses, such as Pete's Greens in Craftsbury, The Willey's Store in Greensboro, and Jasper Hill Farm in Greensboro, that could provide educational opportunities

for students outside the classroom. Classes also utilize both the Greensboro Free Library programs and visit the museum at the Greensboro Historical Society.

Greensboro Historical Society

The Greensboro Historical Society (GHS) is one of the most active historical societies in the state, thanks to many volunteers who give their time, creativity and enthusiasm, as well as to strong support from the Town of Greensboro. In 2017, the society had a total of 259 memberships, some individuals and some families, (adding 101 donors who were not life members to 158 life members). The annual budget that year was $21,120, to which the Town of Greensboro donated $1,500.

The barn-like exhibit hall which GHS added in 2010 to its home on Breezy Avenue, the former historic library building, displays each summer the treasures of one of Greensboro's founding families in a permanent exhibit: *The Hill Family Legacy: One Family's Early Greensboro,* which creates the setting of varied aspects of life in Greensboro in the 19th and early 20th centuries. The archival storage and work space beneath the hall houses Greensboro artifacts, records, documents, photos, books, CDs, tapes, and postcards. Archivists work there regularly to accession items to make them available for use in research. In the entry room of the building, there is a new exhibit each summer. Recent exhibits have included "Health Care in Greensboro", "Water Power in Greensboro", and "Old Toys". In 2017, over 500 people visited the popular "China Hands" exhibit, which featured four Greensboro families and their experiences in China before WWII.

The society regularly sponsors lectures, seminars and both annual winter and summer meetings on various historical topics, as well as a lively summer ice cream social and fall book sale. It publishes an annual literary journal, *The Hazen Road Dispatch*, and recently celebrated the society's 40th anniversary with an anthology of the best articles of the past 40 years. It publishes semi-annual newsletters, and has published booklets such as an architectural tour of the village and memoirs, which are sold in the society bookstore. It recently helped sponsor an archaeological dig to unearth artifacts relating to a Blockhouse near Caspian Lake. Members work with Lakeview Union School on projects which involve children with their local history, including historical walks in town and tours of the museum. Traditionally, it has a float in the 4th of July Parade.

The society has a Facebook presence and an excellent website, which can be visited at www.greensborohistoricalsociety.org. The website includes videos and oral tapes of interviews and meetings, ongoing genealogical information, program information, Greensboro High School yearbooks, Hazen Road Dispatches, cemetery records, and more.

There are numerous sites in the state register for Greensboro (as shown in the Basemap in the Appendix). While many of the properties are privately owned, making it difficult to mandate their preservation, it should be noted that Criterion 8 of Act 250 will be triggered if a project falls under Act 250 jurisdiction.

Church Public Facilities

There are three churches in the Town of Greensboro; the United Church of Christ (UCC) in Greensboro Village and St. Michael's Catholic Church and the Methodist Church, both in Greensboro Bend. All three churches have facilities for public meetings, including Town Meeting. The UCC has a large attached facility known as Fellowship Hall, which is available and frequently used for area meetings, performances, music group rehearsals, wedding receptions, etc. In addition, there is a large space below Fellowship Hall, which is occupied by WonderArts and the SPARK business incubator.

St. Michael's has a separate facility known as St. Michael's Parish Hall, which is available for public interest meetings and which can be rented for private functions. The Methodist Church has a large area below the sanctuary which is used for public meetings.

Greensboro Nursing Home

Greensboro Nursing Home (GNH), with a total of 30 available beds, is one of the community's largest employers with 42 full-time employees, 24 part-time employees, and a payroll of approximately $2.5 million annually. It is a nonprofit organization with a board of trustees made up of members from the community. This allows the organization to be flexible to local needs and to offer only the services that are needed. All revenue is channeled back into the facility's operations and maintenance, continuing to improve the quality of services. The mission statement of the Greensboro Nursing Home is to: *"Provide the highest quality of care to the residents of our community regardless of their ability to pay."* Since it is locally owned and operated, the organization provides its services to all members of the community. In addition to providing health care to seniors, the GNH also provides Meals on Wheels to seniors at home, loans equipment at no charge to those in need, provides private day care services, and answers questions about Medicare and Medicaid.

Highland Center for the Arts

The Highland Center for the Arts is a venue for locally and nationally sourced performances, exhibitions, and events serving the residents and artists of Vermont's Northeast Kingdom. The main stage features exceptional drama, music, and dance performances. The center also offers school collaborations, skill share classes, yoga and movement , music workshops, and weekly movies. The facility features the Hardwick Street Café, and an art gallery which showcases an ever-changing exhibit of paintings, sculptures, and photos. The Highland Center for the Arts is one of Greensboro's three designated emergency shelters, along with the Town Hall and the Fire Station.

ENERGY CONSERVATION

Introduction

It is important that Greensboro works towards a more sustainable energy environment, which will bring many advantages to the town, including reduced use of fossil fuels, lower environmental impacts, and lower energy costs. In addition, new regulations in Vermont have greatly impacted the contents of this chapter of the Greensboro Town Plan.

This chapter begins with a review of the regulatory environment and a discussion of an energy strategy for Greensboro. The following sections address energy use, energy conservation, renewable energy resource analysis, and policies for energy conservation.

Regulatory Background

The 2016 Vermont Comprehensive Energy Plan specifies the following energy goals for Vermont:

- Reduce total energy consumption per capita by 15% by 2025, and by more than one third by 2050
- Meet 25% of the remaining energy need from renewable sources by 2025, 40% by 2035, and 90% by 2050
- Meet the 25 by 25 goal for renewable energy (25% in-state energy supply for all energy uses by 2025)

These state goals, through statute as indicated below, are passed on to Regional Planning Associations and municipalities.

In addition, 24 V.S.A Chapter 177, Article 4302 (Municipal and Regional Planning and Development) states that a regional plan and a town plan must address the following:

- Policies and actions on the conservation of energy
- Policies regarding the siting and development of renewable energy resources
- Policies that address the patterns and densities of land use that will result due to energy conservation

With regard to the siting and development of commercial energy generation facilities, specifically solar and wind projects, these projects are under the jurisdiction of 30 V.S.A Chapter 5, Article 248a. These energy projects are exempted from local permitting. Project developers must obtain a Certificate of Public Good (CPG) from the Public Service Board.

Therefore, the local municipality (i.e., Greensboro) will not have control over the location of these facilities. The only involvement available to a municipality is through public hearings in the CPG process.

In 2016, the Energy Development Improvement Act (a.k.a. Act 174) was passed to address this situation. If a municipality meets the standards of Act 174, it will receive a "determination of energy compliance" or "substantial deference" to land conservation measures adopted by the municipality. These land conservation measures, or "siting criteria", are included in the Town Plan, and provide Greensboro with more control over siting.

In addition, Act 174 specifies the specific actions that must be included in the Energy Chapter of town plans and undertaken by municipalities to comply with the Act and qualify for "substantial deference":

- An analysis of electric, thermal, and transportation energy use
- A policy statement regarding the implementation of energy efficiency measures
- A policy statement on how energy conservation will impact the patterns and densities of land development
- Identification of potential areas for the siting and development of renewable energy resources as well as areas that are unsuitable for siting of renewable energy facilities

Furthermore, to qualify for "substantial deference," Act 174 specifies that a municipality also must comply with all of the requirements for a Regional Plan as described in 24 V.S.A. Chapter 177, Subchapter 3, Article 4348a. These requirements include the key elements in a town plan, such as Flood Resilience, Housing, Land Use, Utilities and Facilities, Energy, Transportation, Economic Development, Natural Resources, Educational Facilities, and Historic Structures.

Lastly, Act 174 requires a municipal plan to comply with state energy policy goals, including:

- Greenhouse gas reduction goals under 10 V.S.A Article 587(a): 50% reduction from 1990 levels by 2028 and 75% reduction by 2050.
- The 25 by 25 goal for renewable energy under 10 V.S.A Article 580: 25% in-state renewable supply for all energy uses by 2025.
- Meet building efficiency goals under 10 V.S.A Article 581.

These goals are projected to be met by implementing the energy use goals in the Comprehensive Energy Plan.

In summary, there have been a number of changes to the requirements of the Energy Element of a town plan since the last Greensboro Town Plan was prepared that require an in-depth analysis of renewable energy resource development and energy efficiency methods with the goal of reducing energy use and greenhouse gas emissions.

An important change is the concept of "substantial deference." As described above, until Act 174 was promulgated, municipalities had no control over the siting and development of major energy resources in their towns. This was the sole responsibility of the Public Service Board. Act 174 provides an additional way for a municipality to exert some control over the siting of energy facilities. With the 2016 Vermont Comprehensive Energy Plan and Act 174 requiring more stringent energy conservation goals, municipalities may face the siting of large, commercial solar and wind projects proposed by developers. Act 174 allows a municipality to qualify for "substantial deference" and, thereby, have more tools to control siting of renewable energy projects.

Greensboro Energy Strategy

How should Greensboro approach an energy strategy? Possible benefits of developing and implementing an energy strategy are:

- Cost savings from installing energy efficiency facilities in existing buildings and requiring energy efficiency technology in new buildings
- That cost savings will be available to increase investments in the community
- A cleaner environment due to greater use of renewable technologies
- Local influence over renewable energy facility siting and development
- A stronger feeling of community where residents collaborate on reducing energy consumption and greenhouse gas emissions

What are the challenges to implementing an energy plan? For a small community like Greensboro, the primary challenge is manpower. Ideally, an energy committee is needed to help implement the actions required to comply with the regulatory requirements mentioned above. Greensboro has not had an energy committee for a number of years.

As of this writing in 2018, the Planning Commission believes that an energy plan that complies with the state energy goals and Act 174 will benefit Greensboro, particularly with regard to the influence our community can have over the potential siting and development of renewable energy facilities. This approach requires Greensboro to comply with the regulatory environment described earlier.

Energy Use

The first part of the energy plan describes the current conditions with regard to energy use. This becomes a baseline from which goals are set. An energy profile is presented that addresses energy use for transportation, heating, and electricity.

We begin with some background on state and regional energy use data. Vermont's total energy use is the lowest in the country, and Vermont is among the lowest in energy use per capita. However, the state ranks as one of the highest in energy expenditures per capita. This provides impetus to employ more renewable resources and implement more energy efficiency methods.

While nearly all of Vermont's in-state electric generation is renewable (hydroelectric, solar, wind, biomass, co-generation), it comprises only about 25% of total energy use in the state.

In the Northeast Kingdom, the NVDA data shows that about 40% of energy consumption is related to transportation, and nearly 50% in residential and commercial heating. Residential heating is still at about 50% fuel oil use, followed by about 20% for wood and 20% for propane.

The highest cost fuel in the Northeast Kingdom is electricity ($43/mmBTU), followed by, followed by propane ($34/mmBTU), and fuel oil or wood at about $20/mmBTU.

Efficiency Vermont has been helping businesses and residences install energy efficiency measures in the Northeast Kingdom. They are conducting roughly 6000 projects per year here.

With regard to transportation use in the Northeast Kingdom, more than 50% of greenhouse emissions come from transportation.

Moving on to Greensboro, the Northern Vermont Development Association (NVDA) has provided data on energy use for our community. The assumptions regarding this data can be found at http://www.nvda.net/OrleansEnergyEstimates.php

Transportation

Total vehicles: 618	Avg. annual vehicle miles travelled (VMTs) per vehicle: 14,000	Total annual VMTs: 8,652,000
Fossil Fuel: 357,878 gal. 43,396 MMBTUs	Ethanol: 33,395 gallons 2,998 MMBTUs	Total: 36,394 MMBTUs $884,864

Non-residential Heating

Estimated number of commercial buildings: 27

Average annual heating load per building: 784 MMBTUs

Estimated total heat energy consumption: 21,163 MM BTUs

Residential Heating

Total energy use for occupied households: 41,358 MMBTUs

Total cost for energy: $519,484

Total energy use for heating – seasonal households: 3,301 MMBTUs

Occupied Residential Heating by Fuel Source:

Fuel	HHs	Annual Use	% Use	% of Use/Owner	% of Use/Renter	% of Cost
LP/Gas	54	56,638 gal	16.8	17.1	14.6	27.7
Fuel Oil	6	101,932 gal	46.9	43.4	70.7	43.8
Electricity	151	158,974 kWh	1.9	1.4	4.9	4.6
Wood	109	532 cords	33.9	37.4	9.8	23.2
Coal	2	10 tons	0.6	0.7	0.0	0.7

Electricity Use:

	2014	2015	2016	Total
Commercial & Industrial	1,881,402	1,762,722	730,910	4,375,034
Residential	2,313,659	2,295,687	1,253,888	5,863,234
Total	4,195,061	4,058,409	1,984,798	10,238,268

Existing Renewable Energy Use:

Energy Type	Capacity in Megawatts (MW)	Capacity/Megawatt Hours (MWh)
Solar	0.1	83.8
Wind	0.12	57.7
Biomass	0.15	788

The data comes from the Renewable Energy Atlas, which can be accessed on the Vermont Community Energy Dashboard. If actual production data is not available, outputs are estimated using the following methodology:

MWh of energy = (number of MW) * (8,760 hours per year) * (capacity factor)

The capacity factor for solar is 0.14, wind is 0.20 for small residential and 0.35 for commercial, and hydro is 0.4.

Energy Conservation

Fulfilling the goals of the 2016 Comprehensive Energy Plan requires two overarching actions: reducing energy use and replacing fossil fuel sources. Reducing energy use is attained by reducing energy demand through energy conservation. Methods to accomplish this include weatherization, efficiency, and reducing energy waste. New building construction should meet the Act 250 mandated "stretch codes." New renewable energy sources such as solar, wind and hydro must replace fossil fuel use. Electrification of transportation (electric vehicles) and heating (heat pumps, use of wood pellets) is a key goal.

This section presents energy conservation and expanded renewable energy targets for Greensboro.

Residential and Commercial Thermal Efficiency Targets:

	2025	2035	2050
Estimated number of households	341	362	384
% of households to be weatherized	19%	31%	32%
# of households to be weatherized	65	114	121

Estimated number of commercial buildings	29	30	32
% of commercial building s to be weatherized	5%	9%	15%
# of commercial buildings to be weatherized	2	3	5

These projections estimate a 6% increase in number of housing units/commercial establishments over each period. Weatherization projects are assumed to achieve an average of 25% reduction in MMBTUs for residential units and 20% for commercial establishments, although some weatherization projects can achieve deeper savings. *Increasing* the average savings will *decrease* the weatherization targets.

Electricity Efficiency Targets

	2025	**2035**	**2050**
Estimated number of residential customers	512	543	575
% of residential customers to upgrade electrical equip.	24%	35%	48%
# of residential customers to upgrade electrical equip.	121	190	278

Since there are generally more utility customers than households, this figure multiples projected number of households by 1.5. It can be assumed that the share of commercial businesses with upgraded equipment is comparable.

Thermal Fuel Switching Targets for Residential and Commercial

	2025	**2035**	**2050**
New efficient wood heat systems in residences	167	137	99
% of households with wood heat systems	49%	38%	26%
New wood heat systems in commercial buildings	5	6	8
% of commercial buildings with wood heat systems	16%	19%	25%
New heat pumps in residences	50	104	132

% of households with heat pumps	15%	29%	35%
Estimated commercial buildings with heat pumps	2	3	5
% of commercial buildings with heat pumps	6%	11%	15%

Fuel Switching Targets for Transportation

	2025	**2035**	**2050**
Projected # of light-duty vehicles in area	698	785	883
# of vehicles powered by electricity	71	225	785
% of vehicles powered by electricity	10%	29%	55%
# of vehicles using bio-fuel blends	69%	42%	7%

The projected number of vehicles in the area is estimated to be roughly commensurate with projections of population and households. Estimates assume a gradual increase in EV fuel economy from 3 kWh per mile to 4 kWh per mile by 2050.

Renewable Energy Resource Analysis

Meeting the 2016 Comprehensive Energy Plan goals will require more electricity to move from a fossil fuel economy to a renewable energy economy. Each region of the state has a set of generation targets. Wind is not one of the planned generation technologies in the Northeast Kingdom.

The siting and development of new renewable energy projects must balance environmental quality and natural resource protection with energy production.

Renewable Energy Production Potential

The NVDA computed the renewable energy production potential for Greensboro.

Energy Type	**Capacity Megawatts (MW)**	**Capacity Megawatt hours (MWh)**
Residential rooftop solar	0.34	421

Small commercial rooftop solar	0.05	66
Ground-mounted solar	15.95	19,561
Wind	0.41	727
Hydro	0.007	24.53
Total Generation Potential	16.76	20,800

This analysis uses maps produced by NVDA and evaluated only prime areas (no known constraints). Rooftop solar is calculated at 10% of structures (including seasonal residences) and assumes 4kw capacity for residential, 20kW for small commercial, and 200 kW for large commercial. NVDA is not planning for additional utility scale wind, so wind is calculated assuming an average output of 9.5 kW (residential), based on average capacity of existing installations in the region.

This estimate assumes no locally designated restraints, which may reduce generation capacity. Statewide preferred locations include rooftops (and other structures), parking lots, previously developed sites, brownfields, gravel pits, quarries, and Superfund sites. *Locally* preferred locations that are not included in the statewide categories must not be impractical for developing a technology with regard to the presence of the renewable resource and access to transmission/distribution infrastructure.

In summary, the table above shows the approximate renewable generation "potential" for Greensboro. This is not a goal, which is discussed below.

Siting Potential

The regulations mentioned earlier require that a mapping analysis be conducted to identify potential sites for renewable energy development. The NVDA prepared a set of maps (solar, wind, and biomass) for Greensboro. The purpose of the maps is to determine whether there is sufficient land to meet the Greensboro renewable energy target, discussed below.

Figure 1 shows the potential for wind energy development in Greensboro. While there is land identified, the area is small, and the probability that a commercial facility would be proposed is very low.

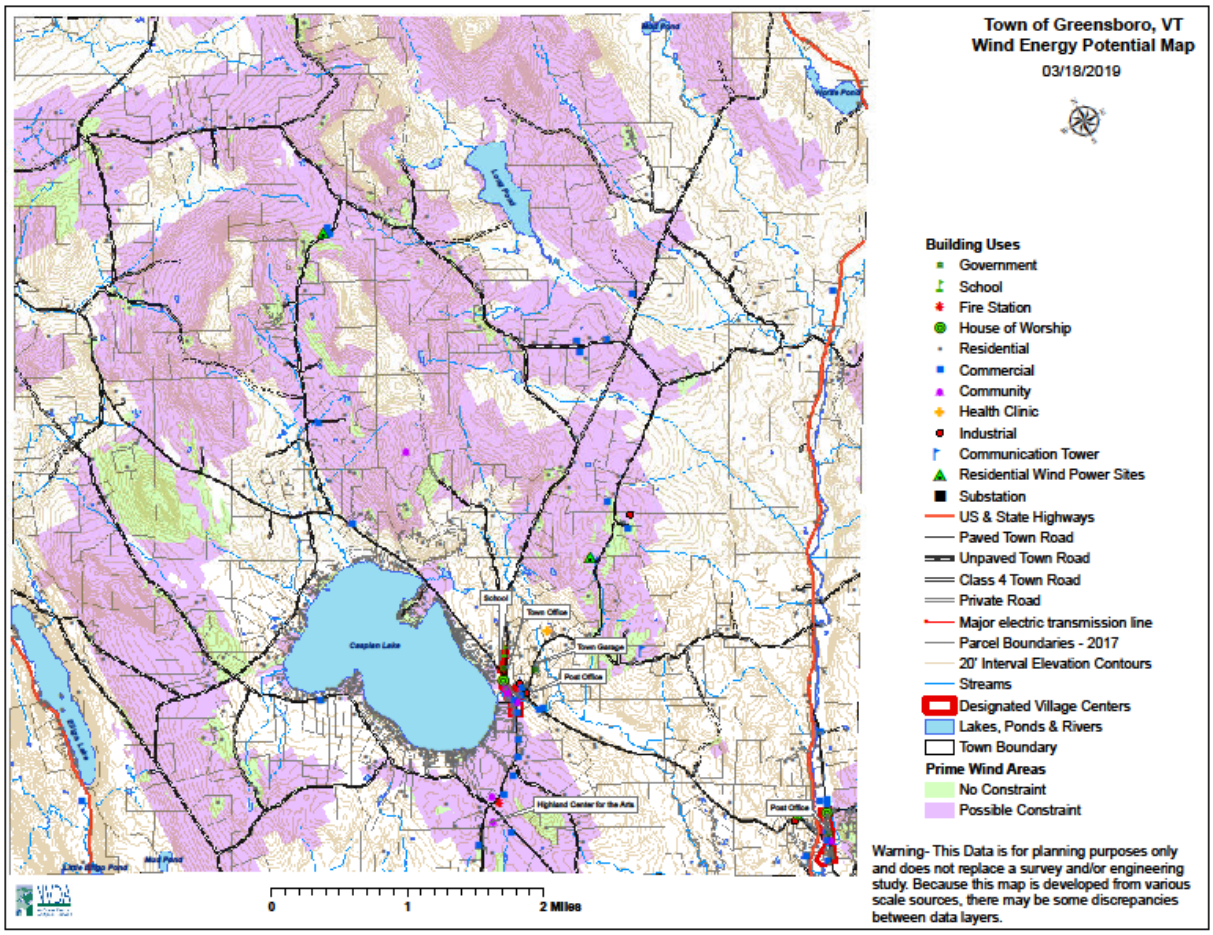


Figure 1. Wind Energy Potential for Greensboro

Figure 2 shows the potential for woody biomass resource development through "sustainable harvesting". This is not a viable business in Greensboro. There is a biomass facility at the Gebbie Farm, but further biomass facility development in Greensboro would require a large number of cows.

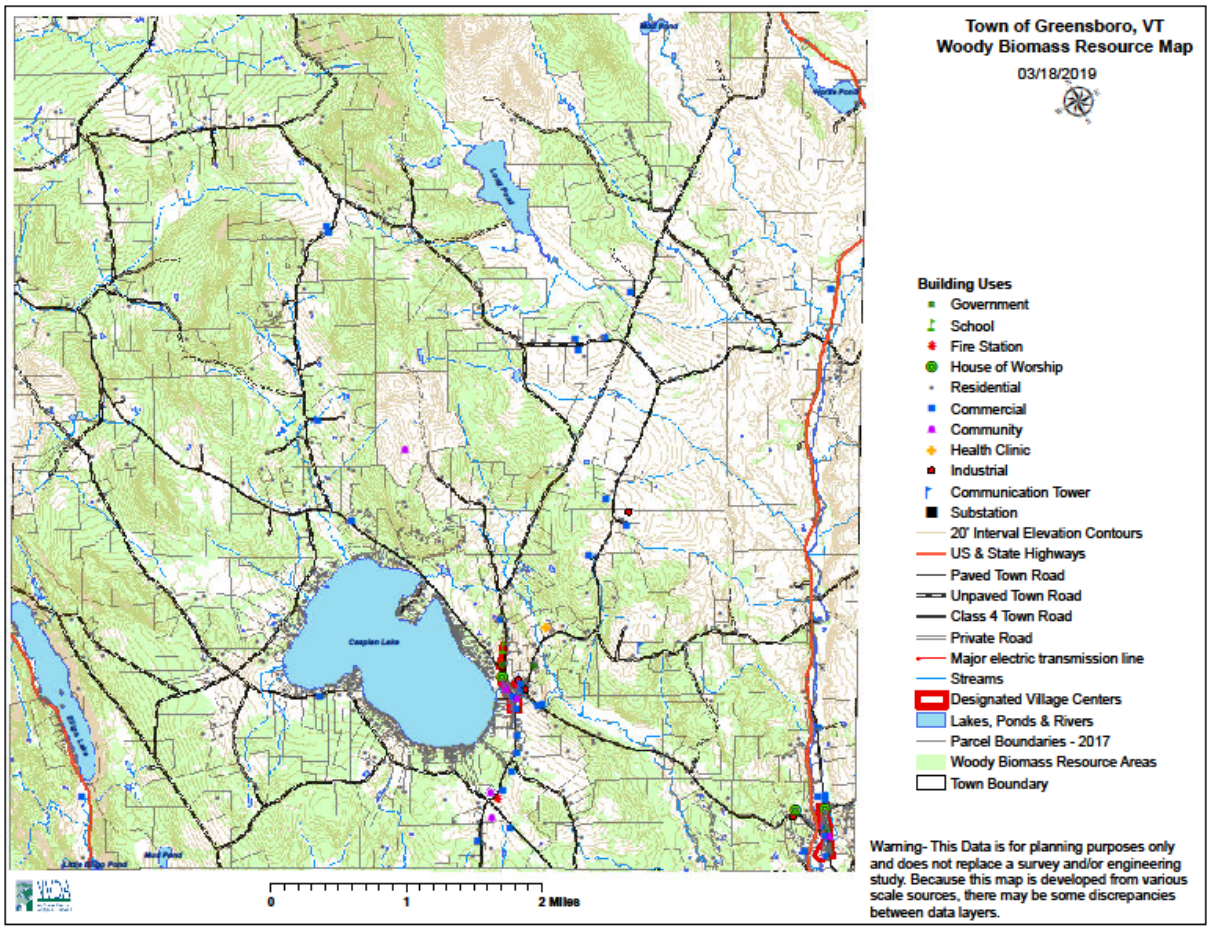


Figure 2. Woody Biomass Resource Map

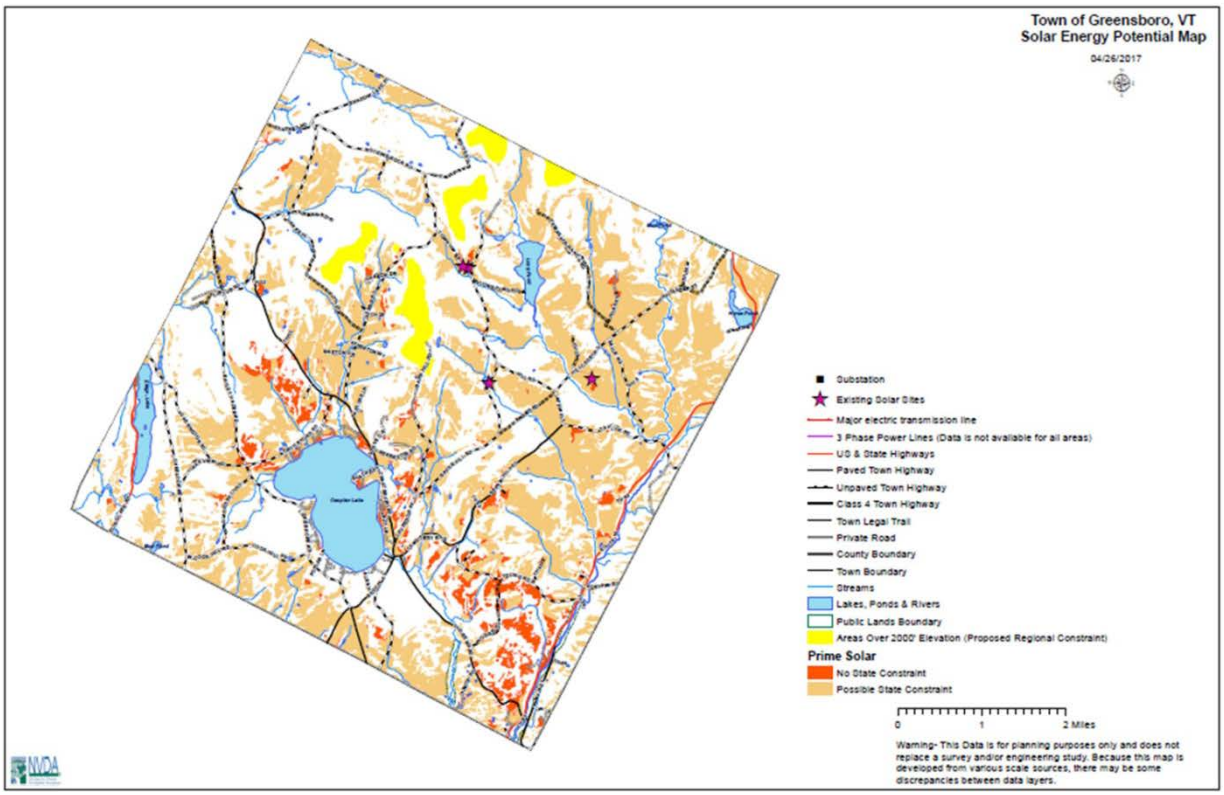


Figure 3 Solar Energy Potential for Greensboro

The areas in red comprise the lands with the potential for development of large solar energy projects (i.e., ground mounted projects). These areas have no "state constraints," as discussed below.

The solar map was created by applying the following "avoidance criteria" (State-imposed Criteria are known siting constraints that are unsuitable for development, and Other Criteria are potential constraints, some of which may be mitigated):

State-imposed Criteria:	Other Criteria:
Vernal Pools	Prime Agriculture Soils
Flood Hazard Areas	Conserved Areas
River Corridors	Deer Wintering Areas
Wetlands	Major Forest Blocks
	Lands Above 2000 ft (Regional Constraint)

Looking at the solar map, the red areas indicate the high priority locations based upon the criteria stated above. The red areas comprise 479 acres. Since this is an estimate based upon digital data available, the actual area may be less. However, if we apply NVDA's conservative

number of 60 acres needed per megawatt for solar development, we get a possible eight megawatts. Once again, the actual number could be less if a detailed site selection study was completed.

In summary, Greensboro has the potential of developing up to eight megawatts of solar power, which is far in excess of our goal, as described below.

Greensboro Solar Generation Target

The state assigned renewable energy development targets to each region. NVDA's target is 18,680 megawatt-hours (a megawatt-hour is a unit for measuring power that is equivalent to one million watts used continuously for one hour).

Greensboro's target was computed by multiplying the percentage of the population in the NVDA region that is in Greensboro by 18,680. The resulting target is 216 megawatt-hours. This is equivalent to 0.176 megawatts (MW) or 176 kilowatts (kW).

Obviously, Greensboro has plenty of land to develop this amount of solar power. For example, if we assume that all of the target will be met by rooftop solar, we would need 176 kW of solar. A typical home solar rooftop installation is 4 kW. Therefore, we would need about 44 rooftop solar systems to meet our goal.

Site Selection Criteria for Greensboro

Greensboro can apply our own siting criteria for ground-mounted commercial solar installations that are proposed. The following criteria are suggested:

Preference Criteria (favorable land for solar):

- Gentle slopes (typically less than 5 percent)
- Close to existing transmission (higher voltages) or distribution (lower voltages) electric lines
- Availability of access for the tie-line from the project to the grid
- Lack of shading features, such as tall trees or large structures
- South facing slope
- Suitable soils for installing 5-10 ft piles for foundations

Avoidance Criteria:

- Vernal pools
- Wetlands
- Floodplains
- River corridors
- Sensitive habitat
- Conserved lands (One conservation easement in Greensboro allows for installing up to one acre of renewable energy facilities in a specified area for commercial energy production)
- Elevations over 2000 ft
- Deer wintering areas
- Major forest blocks
- Prime agriculture soils

These criteria will be used by Greensboro to evaluate the quality of proposed commercial renewable energy project sites.

Minimizing Project Impacts

Projects that are proposed also must adhere to the following requirements:

- Landscaping the project boundary that impinges on other private land or streets. A landscaping plan shall be included with the site plan.
- Maximum height of solar field is 15 ft.
- Physical access shall be restricted using fencing, which must be shown on the site plan.
- The solar field shall be located at least 50 ft from any lot line under separate ownership.
- Access shall be provided for emergency vehicles, including a perimeter road.

EDUCATION

High-quality education has always been a priority for the residents of Greensboro and continues to be.

Greensboro School District began in 1892, while the history of the education of Greensboro's children begins a hundred years earlier, in 1794. By 1838, there were twelve neighborhood school districts in Greensboro, each with their own school houses within walking distance from home for students. In 1870, the legislature authorized "the town system", which rendered schooling a function of town government and eliminated the need for these small school districts. By 1910, a new elementary school was necessary, as well as a larger space for town meeting, and the new Greensboro Village school opened in 1913. The high school closed during the last wave of state-wide consolidation in 1968, during which Greensboro, Hardwick, and Woodbury formed Hazen Union. The last high school class graduated from Greensboro in 1968, and Hazen Union opened its doors in 1970. Greensboro Elementary ceased to exist in February 1988, and became Lakeview Union School. The school operates in a building originally constructed in 1956 and expanded in 1985 rather than in the original town school. It currently serves 55 students in grades K through 6 from the communities of Greensboro and Stannard.

The education of Greensboro's youth is currently overseen by three different governing boards. The communities of Greensboro, Craftsbury, Wolcott, Woodbury, Stannard, and Hardwick comprise the Orleans Southwest Supervisory Union (OSSU). Until 2019, Greensboro Town School District was a non-operating district responsible for budgeting for universal Pre-K for Greensboro's preschool students. Greensboro's K-6 student population is served by Lakeview Union Elementary School. Budgeting for Pre-K now falls under the jurisdiction of the Lakeview Union School, although the school itself does not operate a Pre-K program. Six Greensboro residents serve on the Lakeview Union School District Board alongside two representatives from Stannard. Greensboro's 7-12 student population is served by Hazen Union School. Two Greensboro residents serve on the Hazen Union School District Board alongside representatives from Hardwick and Woodbury.

An important educational institution in Greensboro is the Four Seasons of Early Learning (FSEL) in Greensboro Bend, which, since 1973, has provided preschool education for children. FSEL operated throughout 2017-2018, with 10 full-time employees working together to implement changes that reflect best practices in early education. During the 2017 - 2018 school year, FSEL served 47 children from 40 families residing in Greensboro and surrounding towns in two classrooms. 37 students attend the preschool while 10 are served in the infant-toddler program. As a partner of the Orleans Southwest Supervisory Union, the pre-school's staff collaborates with other professionals within the District which allows the preschool to educate

and care for all students within the community with a lens on a student's individual needs. The population of FSEL shares similar statistics with Lakeview Union. For example, during 2017 - 2018, 63% of the students enrolled qualified for free or reduced lunch. While this number changes slightly from year to year, historically the pre-school's population is one of the neediest in the Northeast Kingdom. Because access to a superior preschool improves the educational outcomes of Greensboro's students, the local Greensboro community appreciates and offers robust support to this important establishment.

Lakeview Union Elementary (LUE) School is an integral part of the town and community. LUE is the town's principal educational facility and is located in Greensboro village. In 2017-2018 it served 64 total students, of whom 43 come from Greensboro (67%), 18 from Stannard (28%), and three from outside the immediate area. The student enrollment at Lakeview has generally remained steady, declining only 0.6% over the last 10 years [-0.6%]. As compared to the Vermont state average Free & Reduced Lunch Rate of 39%, Lakeview's FRL rate is 59% (April 2018).

Most Greensboro students attend middle school (7th and 8th grades) and high school at Hazen Union High School. HUHS served 314 students in 2017-2018 SY of whom 48 came from Greensboro. Regional vocational programming is located at the Green Mountain Technical Career Center (GMTCC), located in Johnson, VT, with an ancillary facility next to Hazen Union. GMTCC trains high school students in a number of trades, included automotive maintenance, building construction, electrical work, food preparation, and other disciplines. At HUHS, teacher student ratios were 8.71:1 in 2016-2017 SY vs. the state's average of 10.57:1.

To comply with the requirements of Act 46 of 2015, our boards submitted a proposal to the State Board of Education (SBE) and the Agency of Education (AOE) which argued that we could continue serving our communities with our current board structures and still meet the goals of the Act. Despite the AOE's recommendation that we continue with our current board structure, the SBE determined in October 2018 that the Lakeview, Greensboro, Hardwick, and Woodbury elementary districts, along with only the Pre-K of Stannard, be merged by June 30, 2019. The remaining districts in OSSU will not be consolidated at this time.

During the winter and spring of 2019, the boards have been working to build a unified budget and craft Articles of Agreement for the new district. Concurrently, the Lakeview, Greensboro, and Stannard districts joined a lawsuit against the State Board and the AOE that argued that the SBE's implementation of the final stages of Act 46 was unlawful and that Act 46 itself is unconstitutional. In addition, the Vermont Legislature is working on a bill that would delay implementation of these forced mergers for another year to allow the courts a chance to rule on our case. During the spring of 2019, the boards are consequently not only preparing for merger but also for the possibility of a legislative delay or a favorable court ruling that would

enable us to continue operating as we have since 1988. Just as the closure of our high school and formation of Hazen Union in 1968 marked a major shift for our community, so too will this final stage in the implementation of Act 46.

The citizens of Greensboro prioritize the value of education and value the presence of a school in the community, and will therefore base future decisions on these principles. In addition, because the demographics of Greensboro's population illustrate that the older residents continue to be a major portion of the citizenry, the promotion of lifelong learning is an influencing factor in the Town Plan Education Goals and Action Steps.

Photo Credit: Eric Erwin

HOUSING

Introduction

Greensboro has historically been characterized by a socially and economically diverse population, united by a strong commitment to community, and which could be described as having a mutually exclusive housing composition. There is a distinct line, both economically and functionally, between the two major housing types in town. On one hand, the village centers and surrounding rural areas are typical of any small Vermont town. On the other hand, the regions surrounding Caspian Lake and Eligo Lake represent a largely tourism-based, vacation home housing for families that have been coming to summer here for generations. These two distinct groups play an important role in the character of Greensboro while also creating a unique and challenging situation in the creation of economically accessible housing. Our Housing Goals, Policies and Actions seek to respect and preserve these distinct groups, and to retain the rural character of the town while seeking to make Greensboro a livable community for all incomes.

Greensboro exhibits a great need for moderately priced housing, which for the purposes of this Plan, is defined as housing which is affordable to an individual or couple where both persons are gainfully employed in the Greensboro area. People who work in Greensboro's current industries and retail outlets, such as Jasper Hill Cheese, Hill Farmstead Brewery and Willey's, have difficulty finding affordable places to live in their workplace town, due to both the cost of housing and the lack of affordable housing stock.

A thriving community needs people of all ages and incomes. Retention of a resident workforce supports community common values. It protects the ecosystem from the impacts of long commutes by responsibly locating housing in our neighborhoods, and a resident workforce is more likely to invest socially, civically, and economically in the community in which they live. Providing housing opportunities that support a resident workforce will help to maintain an economically and socially diverse population with generational continuity – a characteristic of a healthy community with a high quality of life. Additionally, offering a variety of housing options allows residents to stay in the community long-term. The stability and cultural memory brought by long-term residents integrates understanding and appreciation of a community's rich history with efforts for the future, and the existing valued community character can be maintained.

Community Survey

The following questions addressed housing or housing development in Greensboro:

1. "How would you characterize the rate of residential development?" Full-time residents thought that the rate of residential development in Greensboro Village was about right, but more development was needed in Greensboro Bend. Part-time residents agreed with respect to Greensboro Village, but had no opinion regarding the Bend.

2. "What types of residential development should be encouraged in Greensboro?" Full-time and part-time residents felt that single-family homes, single-family rental units, senior housing and cluster housing would be options for the village and the Bend, with somewhat more preference for single-family homes. More development should be discouraged around Caspian Lake and Eligo Lake. Part-time residents were split between those encouraging single-family, senior housing and cluster development in the village and the Bend, and others who felt that development should be discouraged in the village.

3. "How affordable do you consider your residence to be?" Regarding full-time residents, 7% said their home was unaffordable, 42% said barely affordable, and 51% said affordable. For part-time residences, 18% said their home was unaffordable, 52% said barely affordable, and 30% said affordable.

Housing Characteristics

Much of the housing data still comes from the decennial 2010 census. However, housing has not changed significantly in the past seven years.

According to the 2010 U.S. Census, there are 762 housing units in Greensboro. Of this number, 329 units (43.2%) were considered occupied households. Four hundred and six of the 433 "vacant" units are classified as seasonal or recreational homes that are not occupied year-round and are typically only used during seasonal tourist periods. This percentage of vacation units (56.8%) is very high in comparison to Orleans County (24.4%) and Vermont (15.6%).

Of the 329 year-round occupancy housing units, 83% are owned by their occupants, which is about 12.3% higher than the percentage of owner-occupied units in the state. However, it is important to note that a number of the vacation homes in town are rented during the summer months. These summer rentals are not included in the U.S. Census statistics for rental units. The Census statistics are calculated only for those considered year-round households.

Since 2010, twenty-seven new houses were built in Greensboro (five were vacation homes). This represents a growth rate of about 3% in seven years.

Moving on to housing prices, the following table summarizes the full-time and vacation houses sold in 2016 and the first half of 2017 (source: www.housingdata.org):

Year	# Residences	# Vacation	Average Sale Price	Median Sale Price
2016	9		$210,444	$215,000
2017	3		$306,740	$345,219
2018		8	$257,600	$225,650

Here are 2017 housing prices from Trulia:

Greensboro	$285,000
Greensboro Bend	$210,000
Glover	$179,000
Craftsbury	$299,000
Hardwick	$160,000

The Zillow Housing Price Index for Vermont in 2017 was $225,000. Similar data for Orleans County is $200,000.
Finally, 45% of the housing stock in Greensboro was built before 1939.

The Greensboro Planning Commission, in partnership with the NVDA, conducted a Community Survey in 2016. Several questions were directed towards housing:

- 61% (231) of respondents said they were seasonal residents
- 88% of the part-time residents own their home
- 91% of full-time respondents own their home
- 78% of full-time respondents said there are no occupants 18 or under living in their homes
- Both full-time and part-time residents said they thought the rate of development in the Shoreline District is too fast
- 110 of 321 respondents said they would support "specialty housing" in or near the village centers (specialty housing includes senior housing, moderately priced housing for people and families who work in Greensboro)

Another major impact on future housing needs is related to a higher proportion of Greensboro residents above the age of 65 (23.2%) versus the Orleans County and Vermont percentages (17.7% and 14.6% respectively), and the below-average proportion of residents under the age of 18 (19.4%) when compared to Orleans County (21.3%) and Vermont (20.7%). Based on trends since 2010, the population continues to become increasingly skewed towards higher ages. Greensboro has historically attracted more retirees as a culturally vibrant and recreationally attractive community. As the trend for the population aging with the current median age at about 58 years, it will further increase the already large portion of the town population above retirement age.

Development Patterns

State planning goals guide future development towards village centers and neighborhoods adjacent to village centers, discourage linear development along major highways, and avoid fragmenting forests and other natural areas.

However, development in Greensboro, as well as other towns in the Northeast Kingdom according to the NVDA, has been dispersed almost throughout the town over the past ten years, with little new development in the existing village centers. Figure 1 shows the locations of new housing for the past ten years.

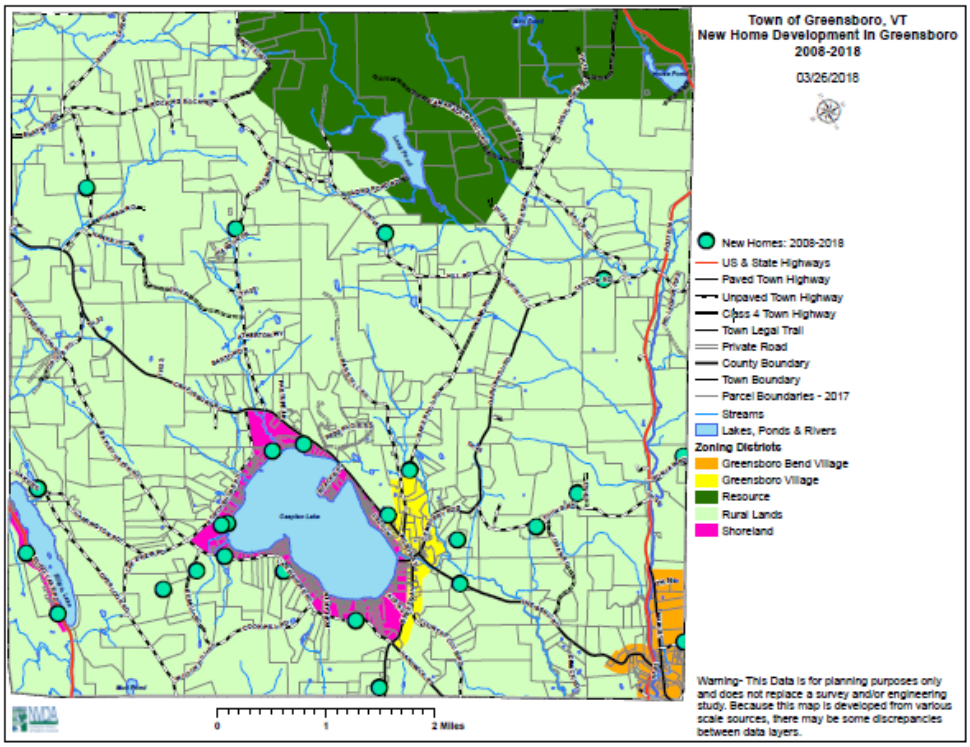


Figure 1: Greensboro Housing Development Pattern 2008-2018

From Figure 1, there were a total of 25 homes built in Greensboro during the ten-year period 2008-2018. Thirteen homes were built in the Rural District, nine in the Shoreline District, three in the Village Districts, and none in the Resource District.

Affordability

According to HUD, a household's total housing costs should be 30% or less of the household income in order to be considered "affordable". Housing costs for homeowners include principal, interest, taxes, insurance, and association fees. For renters, costs include rent, utilities, and association fees.

About 34% of our Community Survey full-time respondents indicated that taxes were the most important contributor to housing costs, and 30% of part-time respondents agreed. Only 16% of full-time residents said the mortgage was the most important factor in housing costs.

The approximate income needed to afford housing in Greensboro and stay under the 30% of income dedicated to housing is as follows (source: American Community Survey, 2009-2013):

Housing Type	Income Needed
1 Bedroom	$25,000
2 Bedroom	$30,000
3 Bedroom	$38,000
4 Bedroom	$42,000

Next, we look at the household income distribution in Greensboro based upon the 2010 census:

Mean of top 20%	$119,000
Mean of 4th Quintile	$56,700
Mean of 3rd Quintile	$33,300
Mean of 2nd Quintile	$27,700
Bottom 20%	$15,800

This data shows that at least 30% of the residents of Greensboro may have trouble meeting the goal of 30% of income devoted to home costs.

This result is consistent with American Community Survey 2009-2014 data on housing units that exceed the 30% household income level for home expenses (own and rent):

Housing Cost as % of Household Income	Gross Rent
35.7%	28%

The NVDA, in their 2015 Plan, presents data obtained from HUD they call "the hidden cost of rural living," which accounts for both housing costs and transportation costs for Orleans County. For comparison, the median income for a family of four with two commuters is $41,618. The NVDA indicates that homes will be unaffordable when these costs exceed 45%:

Average Cost of Housing as a % of Income	Average Cost of Transportation as a % of Income	Location Affordability Index
26% - $10,821	35% - $14,566	61% - $25,387

The table shows that a family with two commuters would pay about 61% of their income for housing costs and transportation costs. While this data is averaged, it does indicate the potential for problems meeting family budgets.

In summary, affordability is a problem in Greensboro. The main factors contributing to this situation is that most homes in Greensboro are single family, and there is very limited turnover of existing housing stock. Adding to this problem is that the median home value based upon ACS 2009-2013 data is $246,000, and based upon the ACS 2012-2016 data is $287,500. At this value, the carrying cost of a home with a mortgage is about $15,000 per year. Clearly, Greensboro is in need of less expensive homes, ideally in the area of $200,000 or less to enable more families to meet or approach the 30% income for home costs.

Housing for Greensboro

Greensboro needs housing for those who are employed in occupations such as teachers, first responders, healthcare workers, retail and food services, and other occupations that are prevalent in the area. Young families need better access to housing. In addition, more senior housing may be required as residents in Greensboro grow older.

Further, it is important that Greensboro attract young people who will fill job openings in Greensboro. Note that the age distribution of Greensboro continues to increase; the current median age is about 58 years, which has been in the rise for years. This trend is unsustainable if Greensboro is to continue being a community for all ages.

In summary, new moderately-priced housing stock is needed. This could include mixed-use housing, manufactured housing, accessory housing, or planned unit development (PUDs). Mixed-use housing can be a combination of residential and commercial, serving a diversity of populations and income levels. PUDs, which are allowed in the Bylaws, may include both residential and commercial units, and must include open space. Manufactured housing, or prefabricated housing, can be a source of less expensive homes when installed on smaller parcels.

Developing these types of new housing stock will offer numerous social and economic benefits to Greensboro by promoting vitality of our village centers (especially Greensboro Bend), and partially reversing the trend towards dispersed development.

Greensboro began the Bend Revitalization Initiative (BRI) in 2018 to address housing needs in the Bend Village, as well as other initiatives. The BRI became a Town-approved Steering Committee in September, 2018. The BRI is focused on two housing issues: the need for more moderately-priced housing, and the need to renovate existing houses in the Bend.

Photo Credit: Wikipedia user Magicpiano

ECONOMIC OPPORTUNITIES

Introduction

Economic development is closely related to the health and well-being of community members. Economic opportunities are at the heart of a sustainable community. This should be the goal of Greensboro.

What is a sustainable community? Here are the criteria that define a sustainable community:

- A solid social fabric where community members share values and work towards a common goal
- Policies and infrastructure that support small businesses
- Increasing use of renewable energy
- Efficient energy use
- Supportive housing policies
- Strong education opportunities for all community members
- An infrastructure that supports community growth
- Thriving village centers
- Preservation of open space
- Transportation options, such as biking and walking paths and trails
- Active artistic, cultural and religious facilities that bring the community together

Reference: Toward Sustainable Communities
Mark Roseland
New Society Publishers, 2012

Having a sustainable community does not necessarily mean a community with a high rate of growth, which can have negative impacts. The emphasis in Greensboro should be on "investment" and not "growth". Investment can reinvigorate, restore, and redevelop areas of the town.

Note that all of the above criteria are interrelated. Therefore, developing a sustainable community requires that we look at this as a system of connected parts that we need to improve on a continuous basis.

A successful economic development effort in Greensboro requires the participation of many segments of our community, including the Selectboard, the Northern Vermont Development Association, various agencies of the State of Vermont, the businesses in Greensboro, non-profit organizations, and other interested parties and individuals.

Both Greensboro Village and the Bend Village are Designated Village Centers. Having this designation provides opportunities for training and financial incentives, including tax credits, grants for historic buildings, and priority considerations for grants from various state agencies, such as ACCD, VTrans, ANR, and VCDP. For example, Willey's Store received $80,000 in tax credits for repairs and a new building façade.

Community Survey

The survey asked how far workers in Greensboro had to travel from home to work. The results are shown in Figure 1.

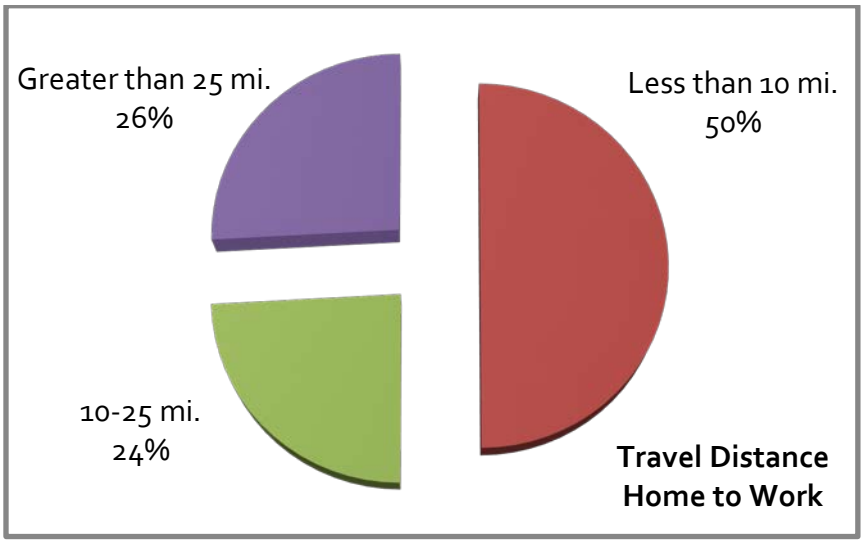


Figure 1: Travel Distance from Home to Work for Greensboro Workers

These data indicate that 50% of all workers surveyed in Greensboro who travel to work must travel at least ten miles each way. To some degree, this result is due to the lack of affordable housing in Greensboro.

The survey also asked "what types of commercial development should be encouraged in Greensboro". The results are shown in Figure 2.

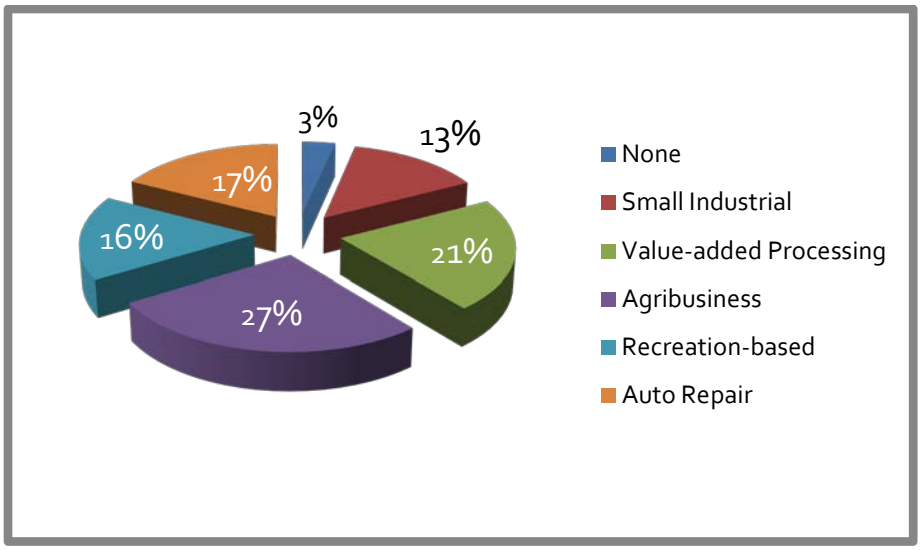


Figure 2: Commercial Development That Should be Encouraged

Value-added processing includes craft breweries and cheese manufacturing. Agribusiness was defined as farms that sell fruits and vegetables and supply farm markets and cafes. Clearly, there is a strong preference for agriculture-related businesses (note that Jasper Hill was included in Value-added processing). Interestingly, only 3% said Greensboro should have no new commercial development.

The survey asked where these new businesses should be located. The majority of respondents said they should be located in or near the Greensboro village or Greensboro Bend village.

Selected Economic Data

Greensboro has a diverse business community, and is the home to over 50 businesses, most of which are shown in Table 1. The table shows that Greensboro businesses employ about 225 people. Thirty-five Greensboro retail businesses generated tax receipts amounting to about $7 million in 2017.

Business	Full Time	Part Time	Total
Bien Fait	0	4	4
Blondes in Heaven	1	1	1
Borealis Studios Inc.	2	0	2
Balsam Capital Management	1	0	1
Cassie's Corner (summer)	0	6	6
Circus Smirkus	8	1	9

Caspian Lake View Farm	2	0	2
Four Seasons of Early Learning	11	1	12
Gebbie's Maplehurst Farm	4	3	7
Greensboro Barn	1	3	4
Greensboro Bend Post Office	0	2	2
Greensboro Free Library	0	4	4
Greensboro Garage	5	1	6
Greensboro Nursing Home	30	12	42
Greensboro Post Office	1	0	1
Highland Center for the Arts	10	12	22
Highland Lodge	7	0	7
Hill Nursery/Gardens Made Beautiful	1	0	1
Hill Farmstead Brewery	16	0	16
Jasper Hill Farm	75	5	80
Justin Foster Building & Remodeling	1	1	2
Krinshaw Studios	1	0	1
Lakeside Looks Salon	1	0	1
Lakeview Inn Cathy Donnelly	0	2	2
Lakeview School	13	14	27
Lamoille Valley Lumber	1	0	1
Little Creek Canoes & Kayaks	1	0	1
M A Snyder Construction	1	2	3
Miller's Thumb (summer)	2	2	4
Mountain View Country Club (summer)	2	9	11
Northern Mechanical	2	0	2
Northern Vermont Traffic Control	7	0	7
Per's Smoked of Vermont	1	0	1
Russ & Son Painting	1	2	3
Sawmill Brook Farm	1	2	3

Successful Consultant Training LLC	1	0	1
Smith's Grocery	4	4	8
Thornhill Farm	1	2	3
W H Smith Real Estate Appraisers	1	0	1
Warren Hill Trucking/Hill Group	4	10	14
Willey's Store	15	15	30
Wonder Arts	1	2	3
Yoga Light	1	1	2

Table 1 – Greensboro Businesses

Table 2 shows some selected economic data for Vermont, Orleans County and Greensboro, taken from the American Community Survey 2012-2016. Orleans County and Greensboro are in rural Vermont, which is indicated in the data. Several figures stand out in this table. First, the use of food stamps is higher in Greensboro than most locations in Vermont. Second, Greensboro's work force includes a higher percentage of workers who work at home. Third, the percentage of adults in Greensboro who are in the labor force is 53%, an indication of the relatively high median age in our town. Finally, 30% of workers in Greensboro travel greater than 35 minutes to and from work.

Data Type	Vermont	Orleans County	Greensboro
Median Earnings	$30,747	$26,702	$20,750
Retirement Income	$21,000	$18,600	$24,400
Food Stamp/SNAP Use	13.6%	17.2%	19.3%
Below 100% Poverty Level	5.6%	7%	3.6%
100-150% Poverty Level	5.2%	7.4%	5.1%
Working at Home	6.7%	7.4%	16.4%
In Labor Force	66.3%	58%	53%
>35 min. Travel Time to Work	18%	18%	30%

Table 2: Selected Economic Data for Greensboro, Orleans County & Vermont

The Greensboro Economy by Business Sector

Greensboro has several active business sectors, including retail, arts/cultural, leisure/hospitality, commercial/light industrial, and agriculture.

Retail: Greensboro has several retail establishments, both in Greensboro Village and Greensboro Bend.

Arts/Cultural: Greensboro is very fortunate to have so many arts organizations and programs for a small town, covering theater, music and art.

Leisure/Hospitality: Greensboro has two bed and breakfast inns, and a country club that offers golf, tennis and social programs.

Commercial/Light Industrial: Greensboro has several commercial/light industrial firms in transportation and brewing.

Agriculture: Agriculture is an important business in Greensboro. We have dairy farms, cheese making, nurseries, maple syrup farms, and fruit and vegetable farms. These businesses help preserve open space and rural landscape in Greensboro, offer opportunities for recreation, provide supplies of local meats, fruits and vegetables through farm stands and pick-your-own, and contribute to the local economy.

Businesses in Greensboro

Interviews with Key Business Leaders

Face-to-face interviews were held between the Planning Commission and the fifteen largest businesses in Greensboro by employment. About twenty questions were used in each interview. Here is a summary of the findings:

- Of the total of 215 employees working at the businesses interviewed, only 22 lived in Greensboro (10%).
- A number of business owners were cognizant of a "social divide" in Greensboro between the summer residents and the year-round residents.
- There are few sources of investment for starting or expanding businesses in Greensboro.
- Most businesses try to source needed supplies locally.
- 90% of businesses interviewed indicated that workforce housing is needed in Greensboro to enable businesses to hire more people.

- Internet connectivity, including speed, reliability, and availability, is a problem for most businesses in Greensboro.
- A majority of businesses interviewed felt that a business liaison on the Selectboard would be beneficial.
- Businesses support adding new businesses at infill locations in Greensboro Bend.
- Half of the businesses interviewed said that finding new hires was difficult, primarily because of high taxes, lack of housing, and concern about schools.
- The business owners would like to see the following new businesses in Greensboro: an Internet Café; more tourism; food service technologies; agriculture-based businesses; and a print shop.
- Many businesses are interested in adding renewable energy to their facilities.
- There was support for a wastewater treatment system in Greensboro Village, an ease in restrictions on signage, and loans for small businesses.
- A small number of businesses felt that the Greensboro Selectboard was somewhat supportive of businesses; however, a larger number of business owners thought that the Selectboard was slightly negative to somewhat negative towards business.

Creating Economic Opportunities

The town can't create business on its own; however, actions can be taken to improve the business climate in Greensboro. Over time, this will serve to show prospective business owners, or existing owners, that building or expanding a business in Greensboro can be profitable. The Bend Revitalization Initiative, first mentioned in the Housing section, is also addressing the need for new business activity in the Bend.

The following are examples of actions that should be undertaken to improve and sustain the business climate in Greensboro:

Support business growth policies: Work with the Selectboard to make changes to the Bylaws that would support and encourage new, responsible and sustainable business formation at an appropriate scale.

Improve Internet access and speed: Improving broadband access and speed is an important issue for operating businesses from home, as well as helping other businesses flourish.

Encourage new business growth at infill locations in and adjacent to the village centers: Development in infill locations (available lots in or adjacent to the two village centers, or existing structures that could be adapted to other uses) help make better use of limited space.

Improve the local jobs-housing balance: Local businesses need additional workers. Housing in Greensboro is too costly for many of these workers. Making additional housing available would provide more workers to Greensboro businesses, and would help the local economy in general.

Preserve open space and support recreational opportunities: Maintaining Greensboro's rural character is important to attract working families to Greensboro.

Support primary education and increase access to workforce education/training: Clearly, education and workforce training is key to creating a strong workforce.

Create a network of leading business owners in Greensboro who are willing to mentor potential new business owners: Local business leaders can be an important source of advice to prospective business owners.

In addition, there are many organizations in the Northeast Kingdom that offer assistance to prospective new business owners and existing owners who wish to expand. For example:

Grant Opportunities: There are many sources of funding for new businesses in northeastern Vermont. The Northern Vermont Development Association (NVDA) lists dozens of grants available from Vermont agencies and the federal government.

Heart of Vermont Chamber of Commerce: The Chamber of Commerce offers various resources to support businesses in the Hardwick-Greensboro area.

Vermont Small Business Development Center: This organization provides business mentors and advisors, as well as other resources, including training and workshops for Vermont business owners.

Small Business Association Vermont: The SBA is an excellent source for business assistance. They publish a magazine called Small Business Vermont Content, which provides business ideas and sources of assistance.

Center for an Agricultural Economy: This organization provides advice to farm businesses, including food businesses.

Photo Credit: Dorothy Miller Armstrong

Photo Credit: C.F. Armstrong

CHAPTER 4

GOALS, POLICIES, AND ACTIONS

LAND USE GOAL, POLICIES & ACTIONS

Goal

Maintain and enhance the town's rural and agricultural character, by encouraging future residential and commercial growth in and adjacent to the Village Districts and discouraging sprawl.

Policies

1. Preserve undeveloped land through conservation tools such as the Greensboro Land Trust, the Vermont Land Trust, the Vermont Housing and Conservation Board and other similar tools and programs.
2. Evaluate zoning or development standards that allow lot sizes that enable development of housing and small businesses in or immediately adjacent to Village Centers (see Housing Policies and Actions for more on this topic).
3. Support agri-tourism that promotes business success and preserves agricultural land.
4. Encourage farmers to work with the Northeast Organic Farming Association.
5. Support an attractive environment in Greensboro for the general well-being of the residents and visitors.

Actions

1. Establish a zoning ordinance that requires landscaping to reduce visibility and adds certain restrictions for ground-mount solar projects that are installed in Greensboro.
2. Encourage farmers to join the Current Use Program.
3. Review the bylaw that allows PUDs and determine if it is up to date and appropriate to attract investors.
4. *Consider an ordinance that would regulate the outdoor storage of motor vehicles and structures in significant disrepair that present either a public health and safety risk or threat to our natural resources.*

Actions in italics were deemed a priority by the Planning Commission, and will be targeted for implementation first. Note that actions may be implemented by various groups, such as the Selectboard, Bend Revitalization Initiative, Planning Commission, Conservation Commission, Road Department, or others.

TRANSPORTATION GOAL, POLICIES & ACTIONS

Goal

Maintain Town roads in good condition while minimizing erosion impacts and increasing opportunities for safer walking and bicycling.

Policies

1. Strive to reduce speeds of motor vehicles in the vicinity of the Village Center and the Bend by employing traffic calming measures.
2. When major maintenance or paving is conducted on road segments, efforts will be made, where feasible, to include a four foot wide walking path adjacent to the road.
3. Support/encourage energy efficient transportation.
4. Maintain the roads and culverts in Greensboro to promote safe driving conditions while minimizing erosion and sediment input to Caspian Lake.

Actions

1. Investigate the feasibility of upgrading the ballfield parking lot with gravel/staymat and advocating its use as a park and ride location.
2. *Request grant writing help from NVDA to compete for a VTrans/ACCD Better Connections Grant to assist the Town with improving the Greensboro Village's walking path system, in stages, from the ballfield, down Breezy Avenue, onto Craftsbury Road to Highland Lodge.*
3. The Town will continue to apply for road repair and maintenance grants to defray costs to the town.
4. The Town will utilize the VTCULVERTS database to continue to improve road infrastructure with the goal of reducing fluvial erosion impacts on local watersheds and lakes.
5. Continue to improve sidewalks in the Village and the Bend.
6. *Investigate traffic calming options suggested by Local Motion, including addressing the four corners intersection at the ballfield.*
7. *Evaluate options to increase the number of parking spaces in Greensboro Village while maintaining its rural character.*

RECREATIONAL AND CULTURAL RESOURCES GOAL, POLICIES & ACTIONS

Goal

Continue to support our existing recreation and cultural facilities and events while encouraging the development of expanded recreational and cultural opportunities for the community of Greensboro, and expand tourism.

Policies

1. Support the use and expansion of recreation opportunities and facilities in Greensboro.
2. Encourage the maintenance and expansion of the winter recreation trails.
3. Encourage the Mountain View Country Club to provide access to the tennis and golf facilities at a reasonable rate.
4. Continue to support the summer swimming program at the Caspian Lake public beach and encourage and support the Town of Hardwick to protect and improve the public beach area.
5. Encourage and support increasing the recreation opportunities for senior citizens including cultural, intellectual and physical activities.
6. Support groups and facilities which provide cultural and artistic experiences and opportunities in Greensboro.
7. Support the expansion of artistic and cultural opportunities for all age groups in Greensboro.

Actions

1. *Compile and publish a pamphlet(s) to describe and map the recreation and cultural facilities and opportunities in Greensboro.*
2. Build a bicycle route around Caspian Lake, including a bicycle lane on Craftsbury Road so that bicyclists can bike around all of Caspian Lake in safety.
3. Encourage and support the extension of the Lamoille Valley Rail Trail through Greensboro Bend, and installation of an attractive "station."
4. Investigate the feasibility of hiring a part or full time recreation/cultural director or partner organization to coordinate, develop and expand the recreation/cultural activities in Greensboro to both serve the residents of Greensboro and encourage the expansion of tourism.

NATURAL RESOURCES GOAL, POLICIES & ACTIONS

Goal

Stewardship with integrity over all of Greensboro's natural resources, including open fields, forests, animal and plant habitats, streams, lakes, and scenic landscape in a manner that protects and enhances the town's ecological health and biological diversity for the benefit of current and future residents.

Policies

1. Establish conservation priorities that will preserve agricultural land, evergreen and deciduous forests, important wildlife habitat, water resources, river corridors, wetlands, stream and lake shorelines and scenic view sheds.
2. Protect the water quality of the Town's lakes, streams, and watersheds against degradation by pollution, runoff and erosion.
3. Investigate paths to improving wastewater systems in the Village and in the Bend, which will serve to improve water quality in our streams and lakes
4. Preserve Caspian Lake shoreline and ridgeline view sheds from any further development.
5. Support the continuation and expansion of the State of Vermont Current Use Program, administered by the Division of Property Valuation and Review, Department of Taxes, to tax farm and forest properties at their productive value rather than their development potential. Encourage the participation of Greensboro property owners in that program.
6. Develop a policies to protect Greensboro's groundwater by regulating the construction of new or expanded commercial, agricultural or industrial activities that extract and sell groundwater, and ensure that proper reclamation plans are created for earth extraction operations.

Actions

1. *Inventory and map the natural resources in Greensboro, including contiguous forest habitats, to create a map of "Areas of High Public Value" that will provide a guide for future land conservation efforts.*
2. Preserve lake water quality.
   A) Request that the Greensboro Land Trust/Conservation Commission update the Caspian Lake Feeder Stream Study conducted in 2013 and suggest specific actions and Bylaw changes to improve lake water quality. Apply for a grant from VDEC.

B) Request that the Conservation Commission evaluate further actions needed and Bylaws amendments required to protect lake water quality from all potentially harmful actions on Caspian Lake.

C) Amend the Town Bylaws to create a 100 foot buffer along streams.

D) Work with the Greensboro Road Department and others, including farmers, landowners and Greensboro Association members, to identify further actions that will control stormwater runoff (utilize the 2017 Greensboro Stormwater Study) into Caspian Lake. These actions may require change to the Town Bylaws.

E) Amend the Town Bylaws to minimize runoff impacts from development on steep slopes. Require extraordinary stormwater controls for development of slopes of 15-25% and prohibit development on slopes greater than 25%.

3. *Conduct public outreach to a) educate shore land property owners in order the reverse the negative trend in shore land vegetation and aquatic habitat; b) to implement best management practices consistent with the Vermont LakeWise program; c) to control milfoil and other aquatic nuisances, and d) educate property owners adjacent to the lake to keep their septic systems properly maintained.*
4. Work with the State of Vermont to evaluate the best water level of Caspian Lake to be maintained in order to have the least amount of impact on aquatic habitat and to protect lakeshore habitat.

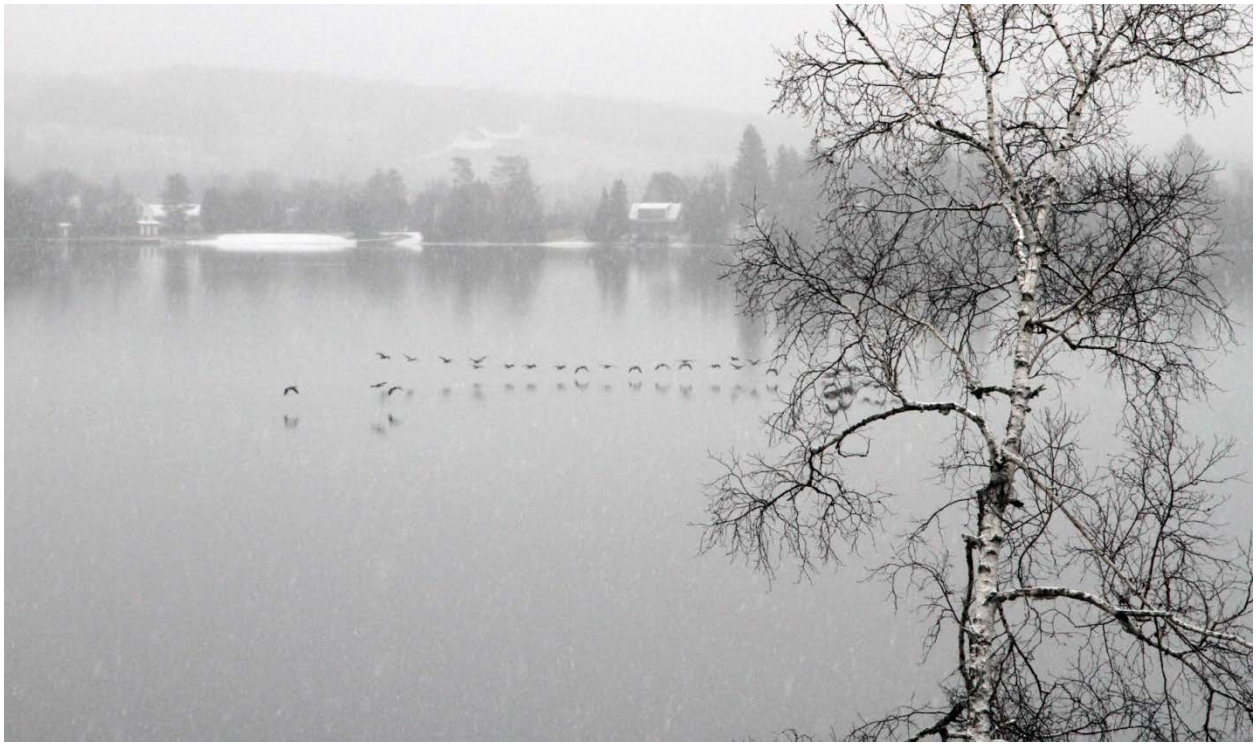


Photo Credit: Karin Newhouse Photography

FLOOD RESILIENCY GOAL, POLICIES & ACTIONS

Goal

Ensure that the Town and its facilities are prepared to meet the demands of a major flood event, and limit adverse impacts to Greensboro residents, properties, and Town infrastructure.

Policies

1. Ensure that all potential flooding-related risks in the Town are recognized and evaluated.
2. Ensure that the Town's transportation infrastructure information is up to date.
3. Protect Greensboro's natural flood protection assets, including floodplains, river corridors, land adjacent to streams, wetlands, upland forested areas, and the Caspian dam.
4. Limit use in Flood Hazard Areas and River Corridors to recreation and agriculture. This may require a change in the Town Bylaws.
5. Ensure that the Town can receive the maximum level of assistance in the event of a federally-declared disaster.

Actions

1. Work with NVDA to import updated data on condition of roads and culverts into the VTCULVERTS.
2. Conduct public outreach to educate residents about flood impacts and actions that residents can take to minimize these impacts.
3. Review and revise Greensboro flood hazard Bylaws as needed to ensure continued enrollment in the National Flood Insurance Program.
4. Participate in regional road foreman trainings and Transportation Advisory Committee meetings to stay abreast of flood resilience measures for the Town's roads and bridges;
5. Develop and adopt changes to the Bylaws that will protect erosion-prone and floodwater storage areas (i.e., River Corridor Protection Areas) from additional development and encroachment.
6. Update the Bylaws to require a 100 ft structure setback from all perennial streams (Tate Brook, Wright Brook, Porter Creek, Cemetery Brook, Stanley Creek) and ensure that development adjacent to the 100 ft buffer zone comply with the most stringent erosion protection standards.
7. Work with Hardwick Electric to engage a professional dam safety engineer to evaluate the Caspian lake dam condition, recommend repairs needed, and provide a cost estimate for the indicated repairs and tree removal at the Caspian Lake dam.

ENERGY CONSERVATION GOAL, POLICIES & ACTIONS

Goal

Encourage energy conservation and the use of renewable energy while protecting against the visual and environmental impacts from these technologies.

Policies

1. Promote the use of weatherization and energy efficiency for both homes and businesses in Greensboro.
2. Encourage the use of renewable energy systems in residential, commercial, and municipal applications.
3. Promote the reduction of transportation energy demand and the use of renewable energy sources for transport.
4. Encourage energy conservation through preservation of the rural character of the town and its two village centers.
5. Maximize the potential locations for the development of renewable energy sources that will enable the town to meet its renewable energy targets.
6. Support the formation of a Greensboro Energy Committee to address energy conservation and renewable energy development goals.

Actions

1. *Provide information on the latest energy codes and energy efficiency techniques to those who require permits from the Zoning Administrator.*
2. Adopt Bylaws that require all Act 250 projects (residential and commercial) to follow the latest Act 250 "stretch goals", along with a plan of how energy conservation measures will be implemented.
3. Encourage the town to implement appropriate energy efficiency projects in municipal buildings. Review current energy audits and conduct new audits where appropriate.
4. Create a renewable energy ordinance, or Bylaw change, that states specific restrictions for development, including setbacks, landscaping, and protection of ridgelines, and lakeshore viewsheds that will protect the town's rural and agricultural character.
5. Facilitate carpooling by creating and maintaining a park-and-ride location in the town.
6. Promote the continued expansion of walking and biking paths in the town.
7. Establish a collection of energy conservation and renewable energy information in the Greensboro Library.
8. Embark on an outreach program to educate home and business owners regarding the benefits of energy conservation, energy efficiency, and renewable energy use. Emphasize that a)electricity plays a major role in our future energy mix, and b) demand-side management of electricity usage is critical.
9. Establish an Energy Committee in Greensboro.
10. *Promote high speed internet to support remote work as an alternative to commuting.*

EDUCATION GOAL, POLICIES & ACTIONS

Goal

Provide education facilities and programs that allow Greensboro children and residents of all ages, to become, or continue to be, productive and responsible citizens.

Policies

1. Maintain a quality school system for both current and future residents.
2. Keep Lakeview Union Elementary School open as long as economically feasible.
3. Develop school budgets that balance the need for a quality educational experience and an affordable cost to Greensboro taxpayers.
4. Encourage long-distance learning opportunities through improved digital platforms in order to support a wide array of enrichment and learning opportunities for all ages.

Actions

1. *Strengthen the role that the Lakeview School building plays in the community, including providing access to school facilities for community events and activities, including learning opportunities for all ages.*
2. Encourage local businesses to team with Lakeview, Hazen, and GMTCC so as to: enrich the K-12 educational experience; demonstrate relevance of the curriculum; and promote an interest in jobs available locally.
3. Offer opportunities for community engagement in the planning for possible changes in the Greensboro School Districts.
4. Support infrastructure improvements in internet connectivity speeds.

HOUSING GOAL, POLICIES & ACTIONS

Goal

The long-term sustainability of Greensboro depends upon the availability of adequate housing for all residents, including seniors and the workforce, that are energy efficient and compatible with the character of the community.

Policies

1. Support initiatives that will require new homes to meet the recommendations of Efficiency Vermont.
2. Support policies that will encourage rehabilitation or development of homes for our workforce, including young families, which will promote local economic development.
3. Consider Bylaws that require installation of erosion controls where steep slopes (>30%) are graded to reduce erosion and protect our streams and lakes.
4. The Planning Commission supports studying the concept of expanding the Greensboro Bend Village and Greensboro Village districts to accommodate more moderately priced housing, and exploring potential changes to the current Rural Lands District zoning.
5. Protect ridgelines from development impacts.

Actions

1. Estimate the housing demand in Greensboro at various levels of income as a first step in a housing market study.
2. Investigate the development of Planned Residential Developments (PRD's) and accessory development units.
3. Encourage the use of renewable energy technologies for both residential and commercial development.
4. *Develop a Bylaw to allow a density bonus in and immediately adjacent to the Greensboro Village and Greensboro Bend village districts if the proposed development addresses workforce, or affordable housing.*
5. *Consider the establishment of a new district adjacent to The Bend village district, where parcel sizes would be reduced to encourage more housing.*
6. *Survey homeowners in the Bend, and help interested owners renovate their homes via volunteers and grants.*
7. Form a team to develop moderately-priced homes in Greensboro.
8. Apply for a municipal planning grant to evaluate options to attract moderately priced housing to Greensboro.
9. *Investigate the potential to nominate a home or structure in the Bend for historical preservation, and seek preservation funds to renovate the structure.*

FACILITIES GOAL, POLICIES AND ACTIONS

Goal

Ensure that the facilities in Greensboro, including solid waste recycling, water services, telecommunications infrastructure, energy infrastructure, and public safety facilities are serving the community in an appropriate and environmentally sound manner.

Policies

1. Ensure that the specific uses in the Town Bylaws are up to date.
2. Ensure that the energy and telecommunications infrastructure is properly serving the community.

Actions

1. Evaluate the specific uses listed in Article 4 of the Town Bylaw and update as necessary.
2. Change the setback requirements for signage (Minimum Setback) to 25 feet throughout Greensboro.
3. Evaluate the need for 3-phase power in Greensboro.

Photo Credit: C.F. Armstrong

ECONOMIC OPPORTUNITIES GOAL, POLICIES & ACTIONS

Goal

A sustainable Greensboro, where prosperity contributes to and drives quality of life must support existing local businesses and attract new small businesses that are compatible with and preserves Greensboro's rural character.

Policies

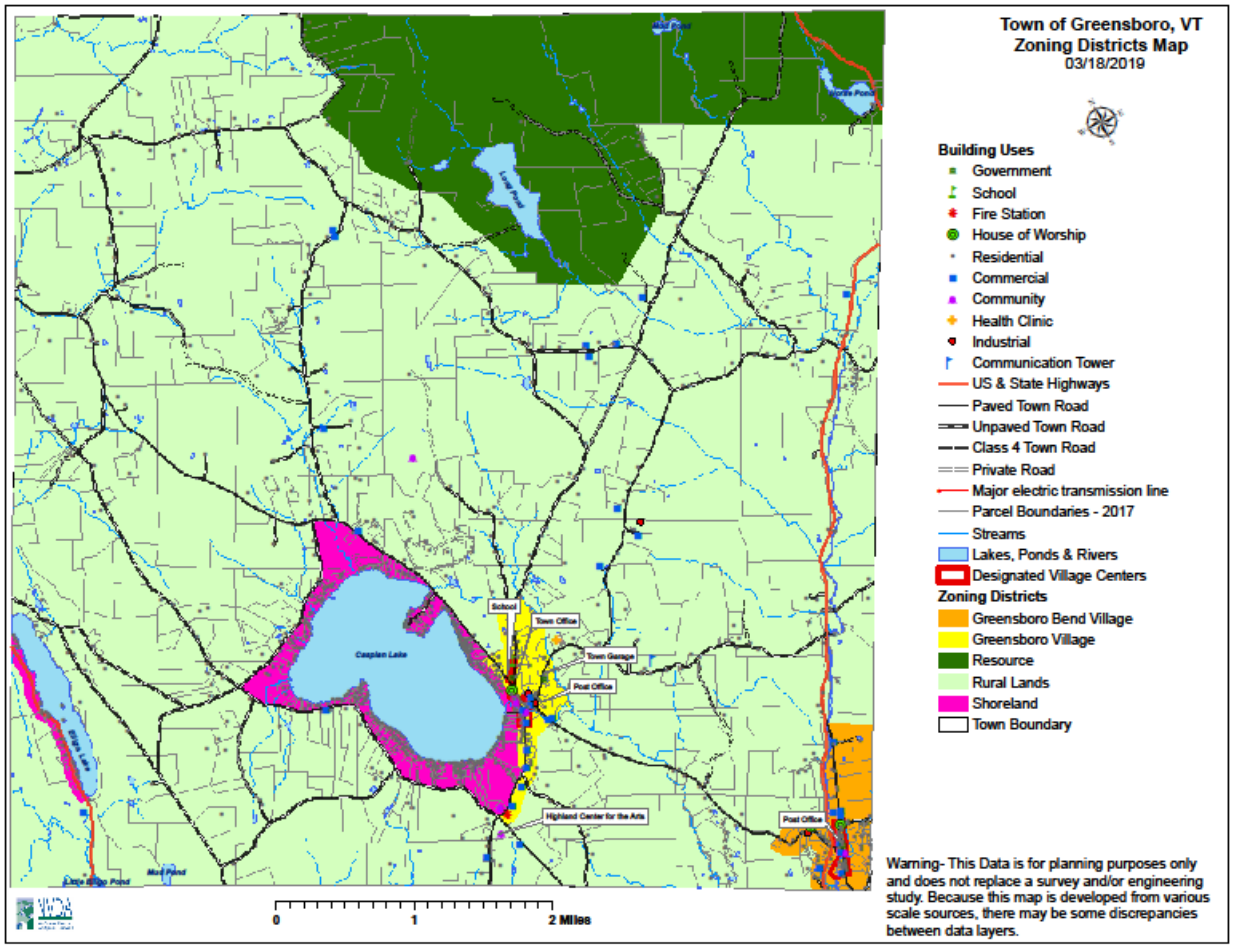
1. Work with the Heart of Vermont Chamber of Commerce and the Northern Vermont Development Association (NVDA) to attract business to Greensboro and support existing businesses.
2. Work with Consolidated Communications to improve internet connectivity in Greensboro, and work with AT&T and Verizon to improve cell coverage.
3. Lower barriers that stifle economic growth and develop incentives that would promote responsible growth at scale in Greensboro.
4. Encourage residents to buy from local businesses.
5. Maintain and improve the Town's infrastructure, including road, town buildings, sidewalks, and recreation facilities to attract visitors and new businesses.

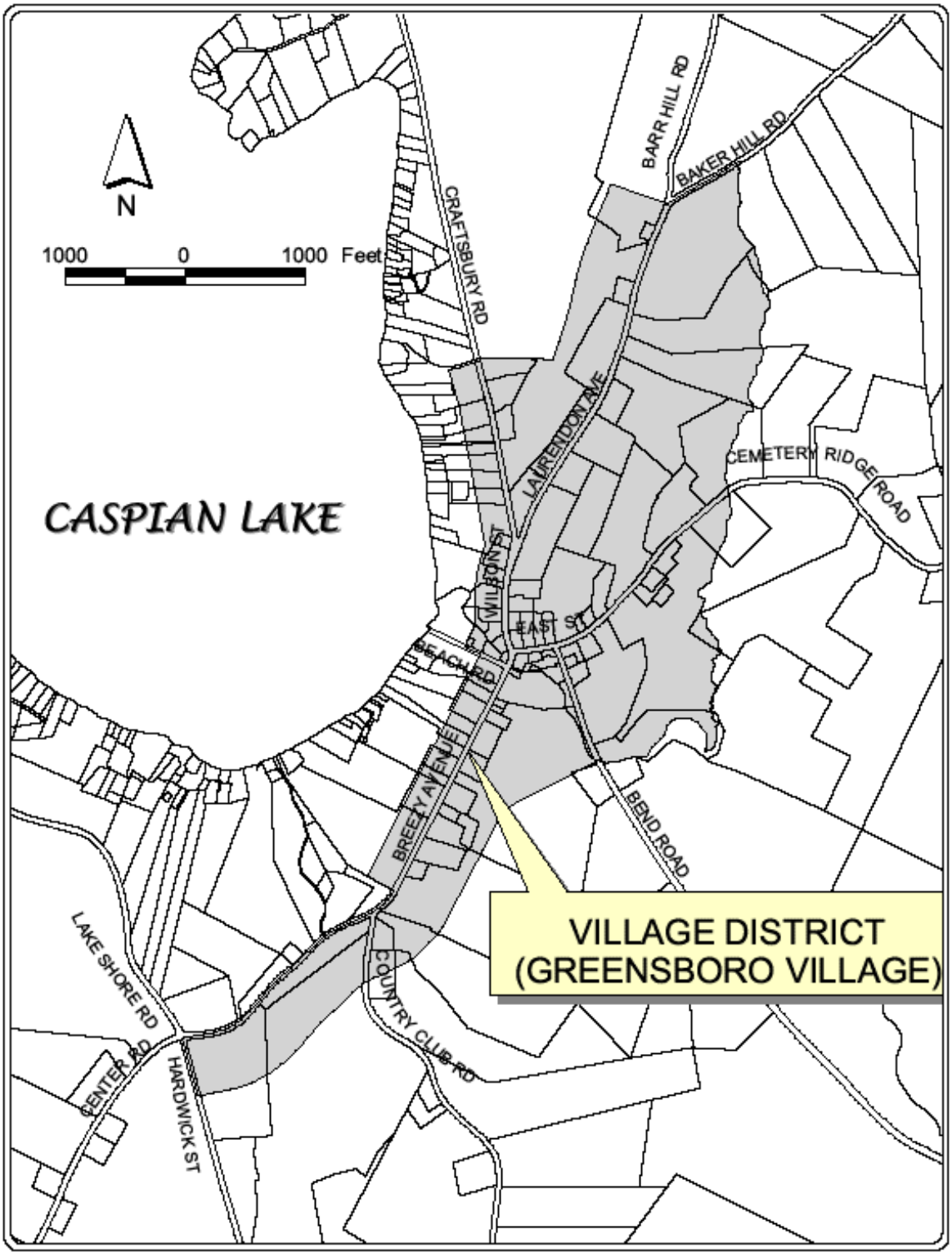
Actions

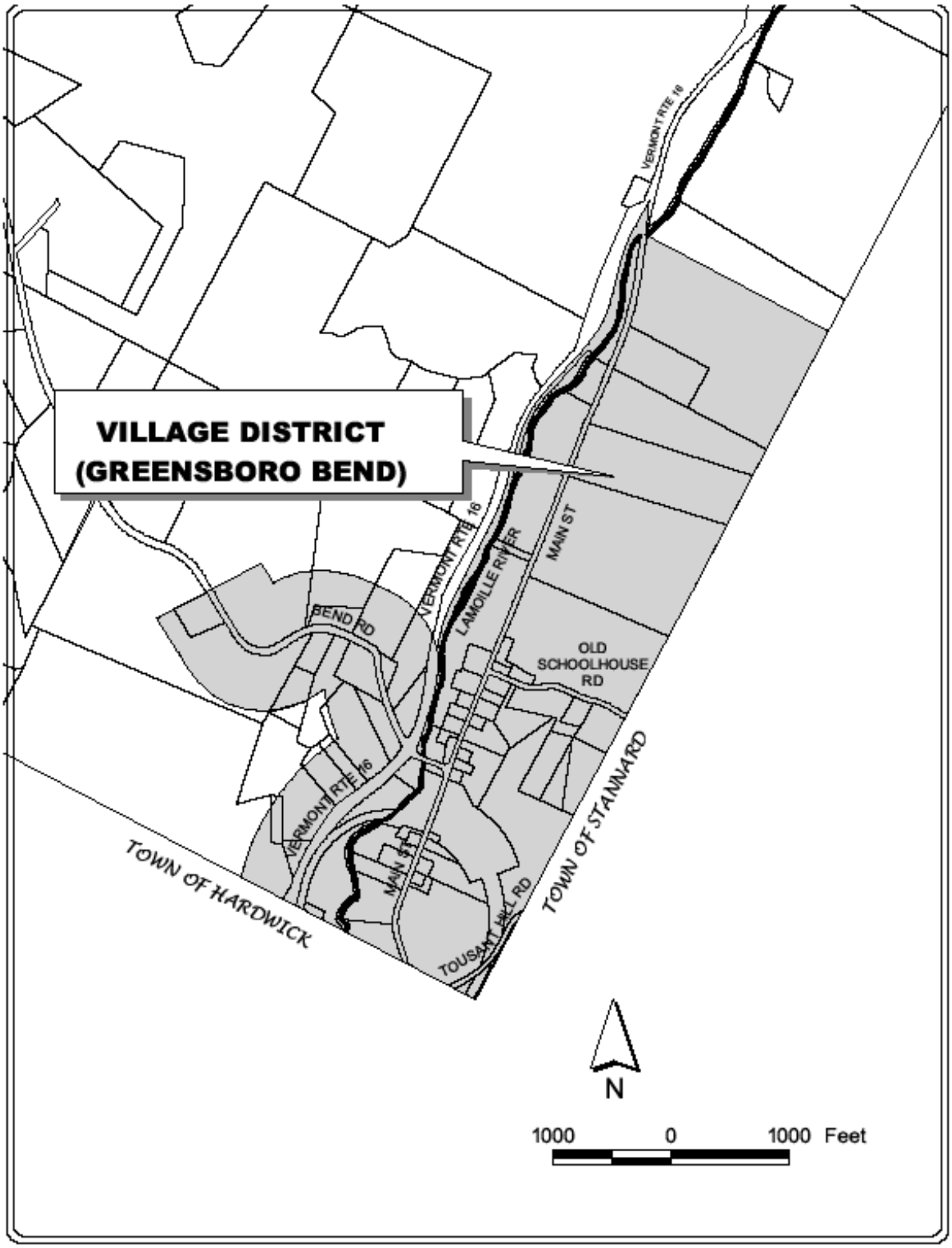
1. Create a small business support team (e.g., a network of leading business owners in Greensboro) with materials in the Greensboro Library that offers help to job seekers and individuals interested in starting new home-based or small businesses in Greensboro.
2. Explore feasibility of installing a community-based wastewater system (e.g., package treatment plant or community septic system) in Greensboro Village that would support the local businesses and municipal facilities.
3. Support organizations and events that contribute to the success of local businesses, such as the Farmer's Market and the SPARK business incubator/co-working space.
4. Request that the Selectboard assign a liaison responsible for outreach to and advocacy for Greensboro business owners.
5. *Apply for a capacity-building grant for the Bend as a precursor to seeking a municipal planning study grant for the Bend.*

Photo Credit: Courtesy Photo, Hill Farmstead Brewery

APPENDICES


Town of Greensboro, VT
Zoning Districts Map
03/18/2019
Building Uses
Government
School
Fire Station
House of Worship
Residential
Commercial
Community
Health Clinic
Industrial
Communication Tower
US & State Highways
Paved Town Road
Unpaved Town Road
Class 4 Town Road
Private Road
Major electric transmission line
Parcel Boundaries - 2017
Streams
Lakes, Ponds & Rivers
Designated Village Centers
Zoning Districts
Greensboro Bend Village
Greensboro Village
Resource
Rural Lands
Shoreland
Town Boundary
Caspian Lake
School
Town Office
Town Garage
Post Office
Highland Center for the Arts
Post Office
0
1
2 Miles
Warning- This Data is for planning purposes only and does not replace a survey and/or engineering study. Because this map is developed from various scale sources, there may be some discrepancies between data layers.


N
1000 0 1000 Feet
CASPIAN LAKE
CRAFTSBURY RD
BARR HILL RD
BAKER HILL RD
LAURENDON AVE
CEMETERY RIDGE ROAD
WILSON ST
EAST ST
BEACH RD
BREEZY AVENUE
BENID ROAD
LAKE SHORE RD
CENTER RD
HARDWICK ST
COUNTRY CLUB RD
VILLAGE DISTRICT
(GREENSBORO VILLAGE)


VILLAGE DISTRICT
(GREENSBORO BEND)
VERMONT RTE 16
MAIN ST
LAMOILLE RIVER
BEND RD
OLD
SCHOOLHOUSE
RD
TOUSANT HILL RD
TOWN OF HARDWICK
TOWN OF STANNARD
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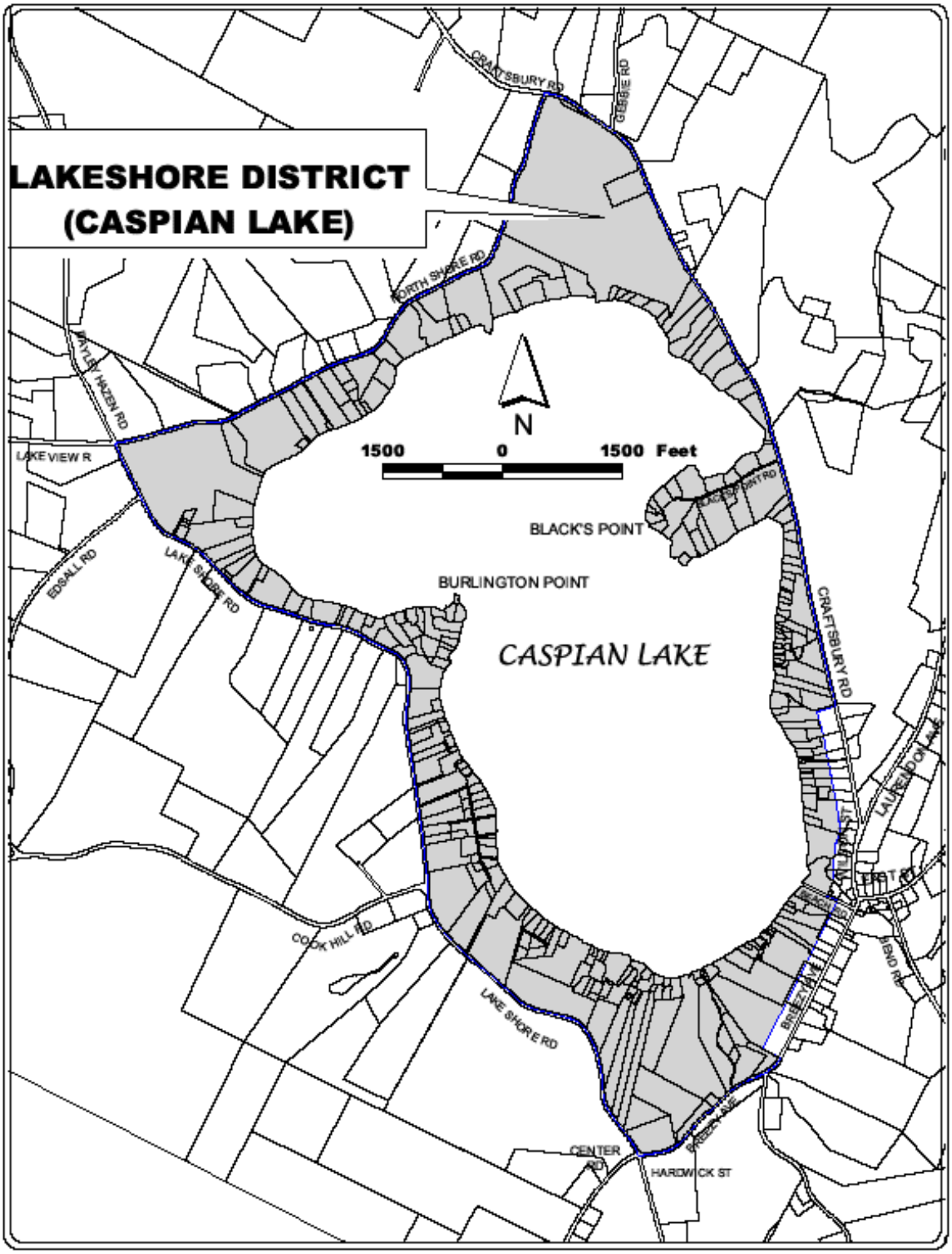
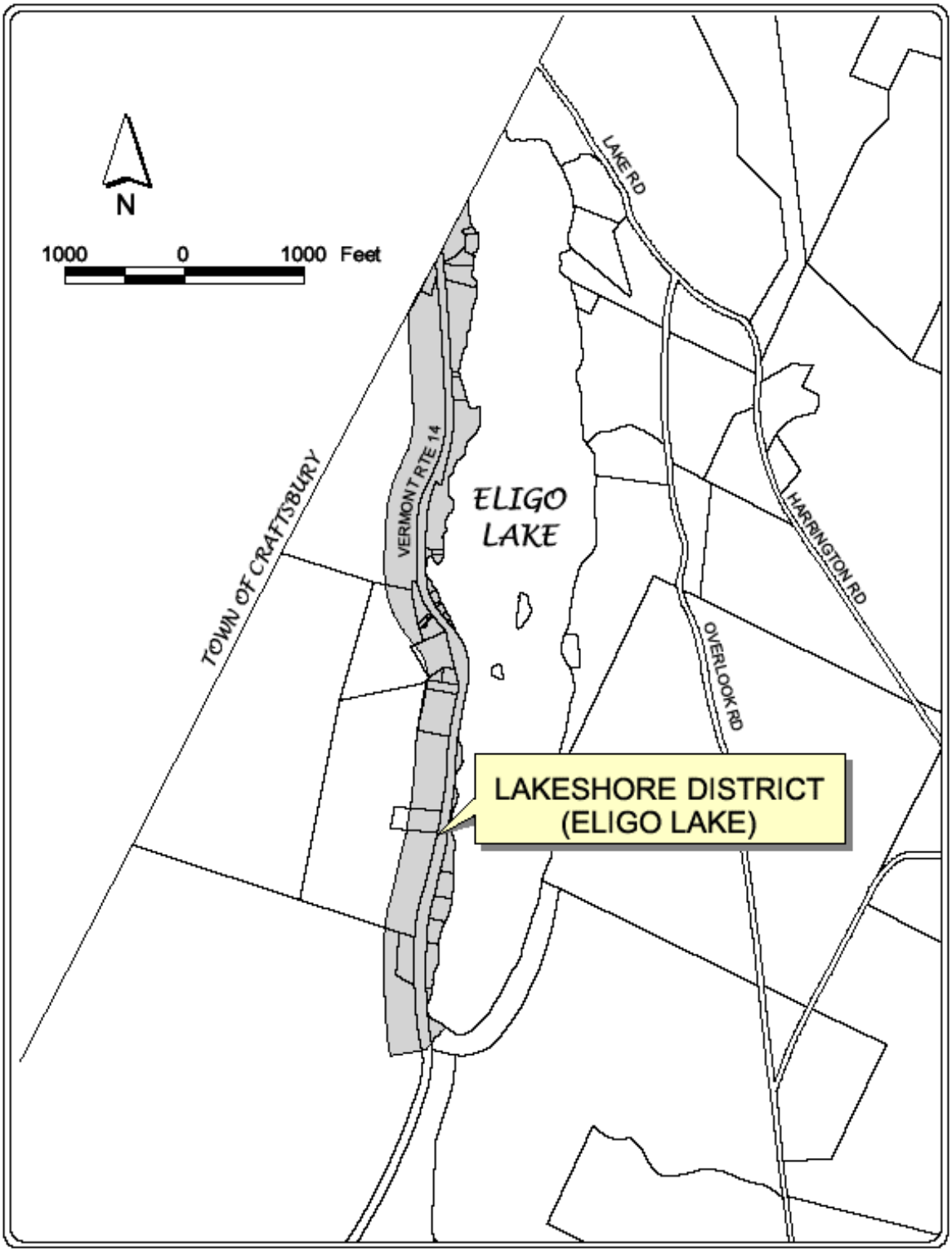
0
1000 Feet


LAKESHORE DISTRICT
(CASPIAN LAKE)
CRAFTSBURY RD
GEBBIE RD
NORTH SHORE RD
PATTEN HAZEN RD
LAKE VIEW R
N
1500
0
1500 Feet
BLACK'S POINT
BURLINGTON POINT
CASPIAN LAKE
EDGEHILL RD
LAKE SHORE RD
CRAFTSBURY RD
LAUREL DR LNE
COOK HILL RD
LAKE SHORE RD
BREEZY AVE
GREEN AVE
CENTER RD
HARDWICK ST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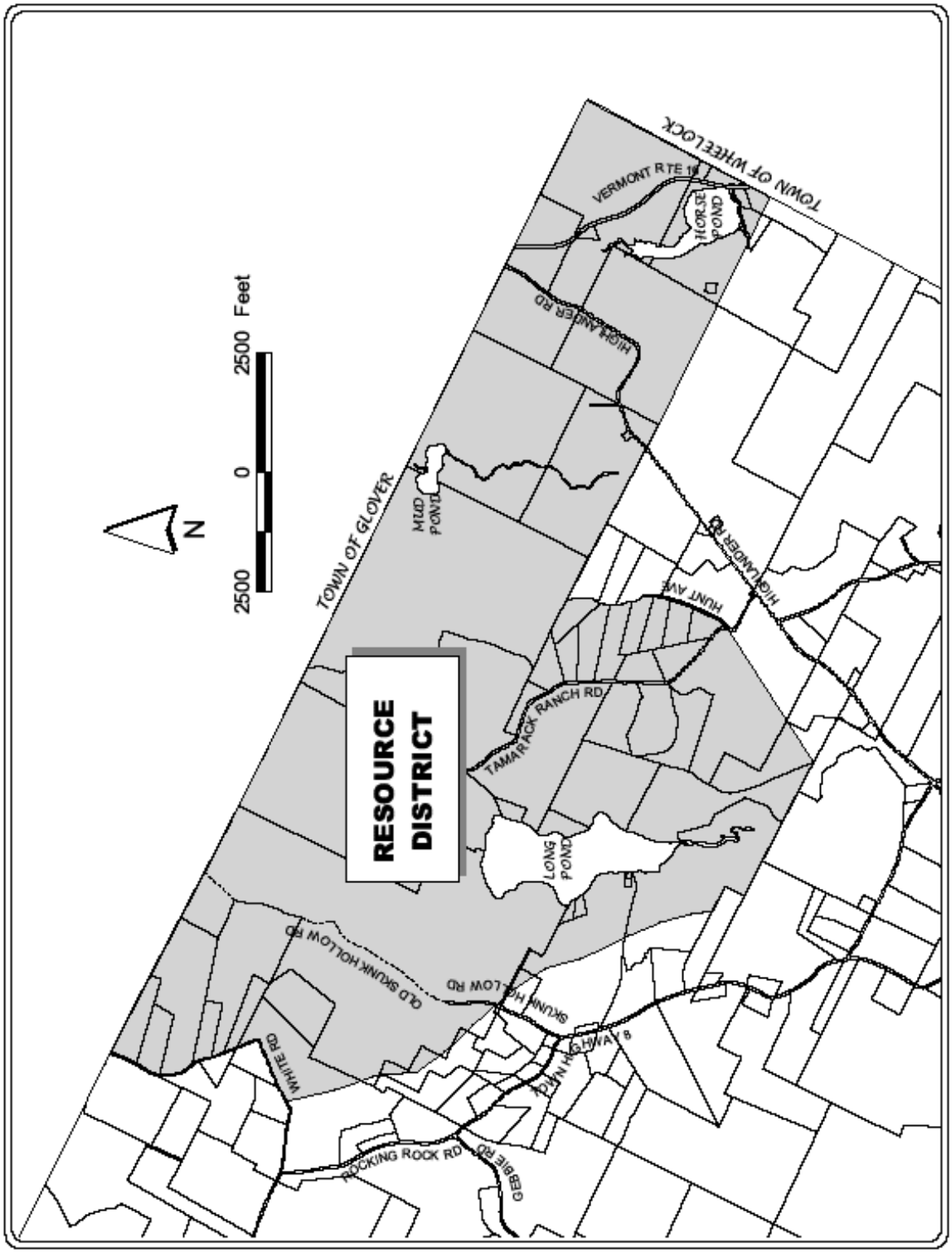
LAKE RD
VERMONT RTE 14
ELIGO
LAKE
TOWN OF CRAFTSBURY
HARRINGTON RD
OVERLOOK RD
LAKESHORE DISTRICT
(ELIGO LAKE)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2500
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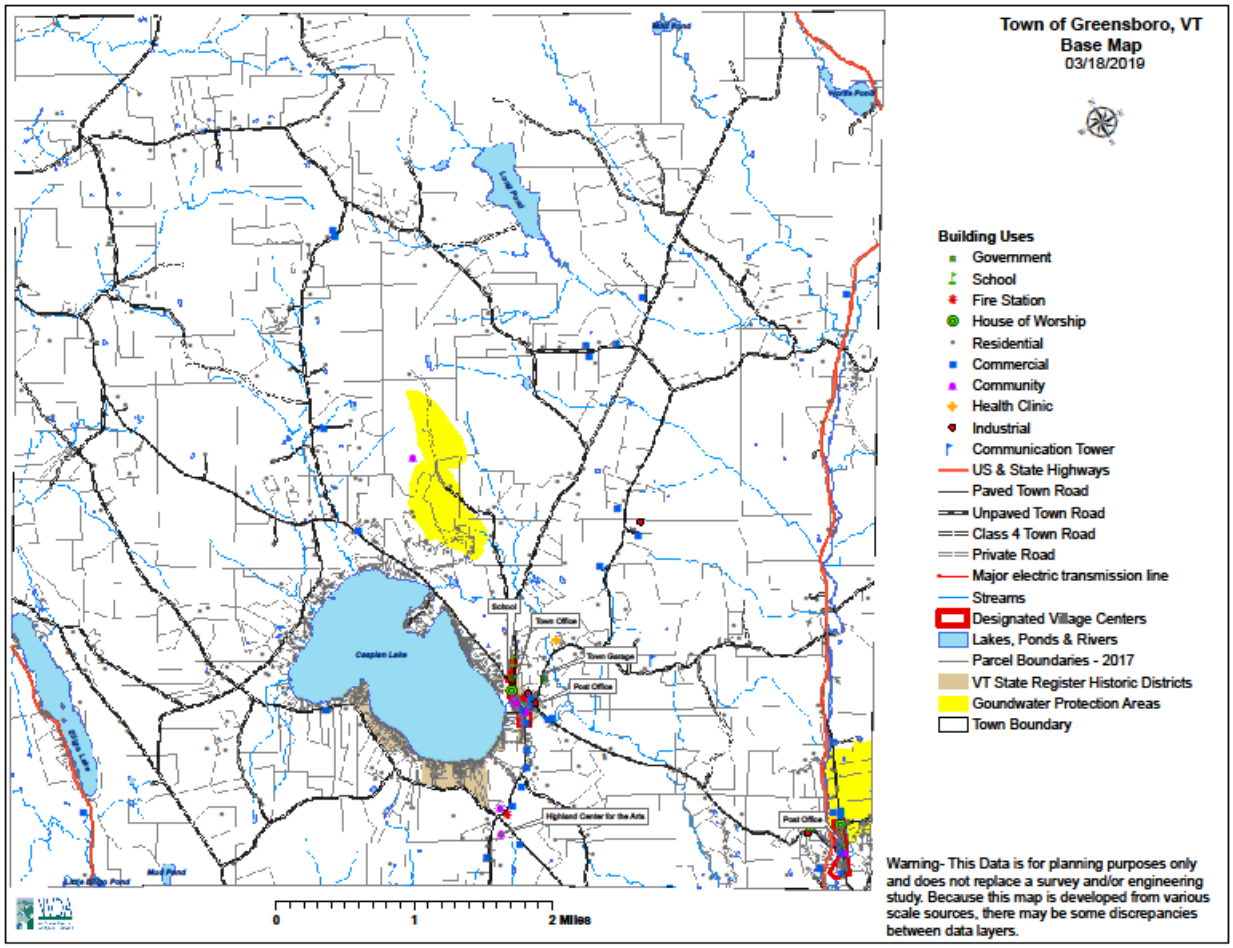
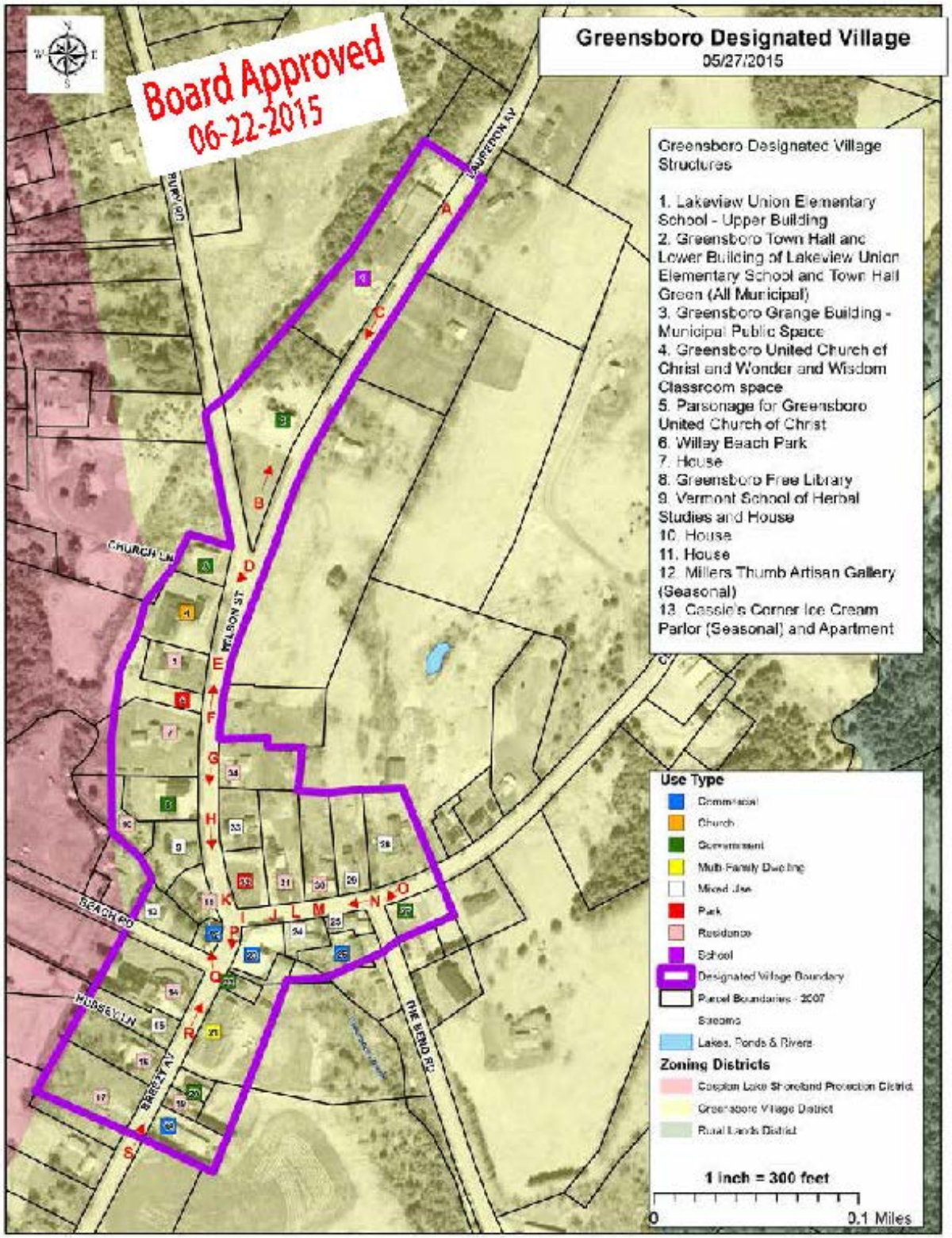
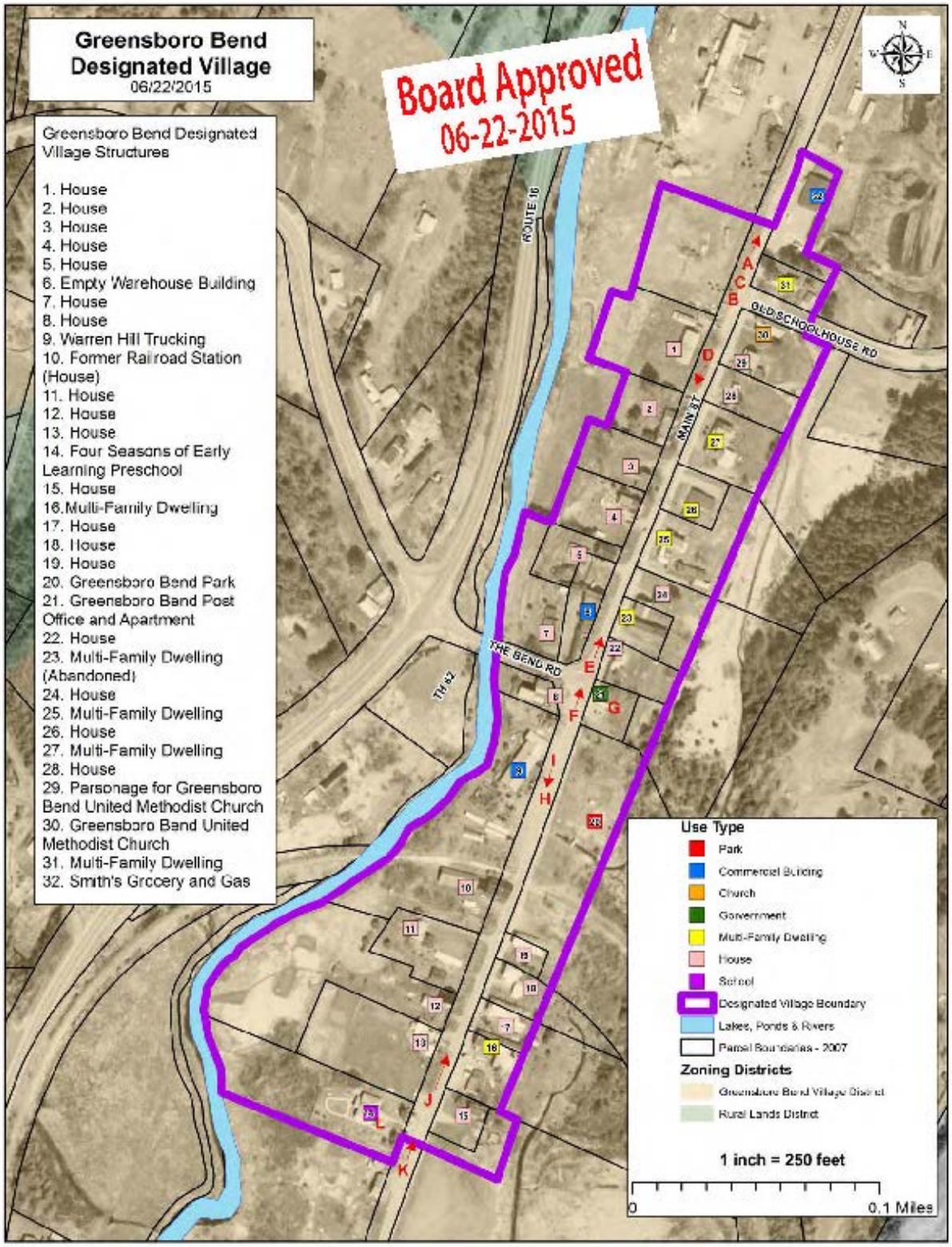
RESOURCE DISTRICT
TOWN OF GLOVER
TOWN OF WHEELOCK
VERMONT RTE 16
HORSE POND
HIGHLANDER RD
MUD POND
HUNT AVE
TAMARACK RANCH RD
LONG POND
OLD SKUNK HOLLOW RD
SKUNK HOLLOW RD
TOWN HIGHWAY 8
WHITE RD
ROCKING ROCK RD
GEBBIE RD


Town of Greensboro, VT
Base Map
03/18/2019
Building Uses
Government
School
Fire Station
House of Worship
Residential
Commercial
Community
Health Clinic
Industrial
Communication Tower
US & State Highways
Paved Town Road
Unpaved Town Road
Class 4 Town Road
Private Road
Major electric transmission line
Streams
Designated Village Centers
Lakes, Ponds & Rivers
Parcel Boundaries - 2017
VT State Register Historic Districts
Goundwater Protection Areas
Town Boundary
Caspian Lake
School
Town Office
Town Garage
Post Office
Highland Center for the Arts
Post Office
0
1
2 Miles
Warning- This Data is for planning purposes only and does not replace a survey and/or engineering study. Because this map is developed from various scale sources, there may be some discrepancies between data layers.


Greensboro Designated Village
05/27/2015
Board Approved
06-22-2015
Greensboro Designated Village Structures
1. Lakeview Union Elementary School - Upper Building
2. Greensboro Town Hall and Lower Building of Lakeview Union Elementary School and Town Hall Green (All Municipal)
3. Greensboro Grange Building - Municipal Public Space
4. Greensboro United Church of Christ and Wonder and Wisdom Classroom space
5. Parsonage for Greensboro United Church of Christ
6. Willey Beach Park
7. House
8. Greensboro Free Library
9. Vermont School of Herbal Studies and House
10. House
11. House
12. Millers Thumb Artisan Gallery (Seasonal)
13. Cassie's Corner Ice Cream Parlor (Seasonal) and Apartment
Use Type
Commercial
Church
Government
Multi-Family Dwelling
Mixed Use
Park
Residence
School
Designated Village Boundary
Parcel Boundaries - 2007
Streams
Lakes, Ponds & Rivers
Zoning Districts
Caspian Lake Shoreland Protection District
Greensboro Village District
Rural Lands District
1 inch = 300 feet
0
0.1 Miles
LAURELDON AV
RURY LN
CHURCH LN
WILSON ST
BEACH RD
HUSSEY LN
BREEZY AV
ONE MILE RD


Greensboro Bend
Designated Village
06/22/2015
Board Approved
06-22-2015
Greensboro Bend Designated Village Structures
1. House
2. House
3. House
4. House
5. House
6. Empty Warehouse Building
7. House
8. House
9. Warren Hill Trucking
10. Former Railroad Station (House)
11. House
12. House
13. House
14. Four Seasons of Early Learning Preschool
15. House
16.Multi-Family Dwelling
17. House
18. House
19. House
20. Greensboro Bend Park
21. Greensboro Bend Post Office and Apartment
22. House
23. Multi-Family Dwelling (Abandoned)
24. House
25. Multi-Family Dwelling
26. House
27. Multi-Family Dwelling
28. House
29. Parsonage for Greensboro Bend United Methodist Church
30. Greensboro Bend United Methodist Church
31. Multi-Family Dwelling
32. Smith's Grocery and Gas
ROUTE 16
MAIN ST
OLD SCHOOLHOUSE RD
THE BEND RD
TH 82
A
B
C
D
E
F
G
H
I
J
K
L
Use Type
Park
Commercial Building
Church
Government
Multi-Family Dwelling
House
School
Designated Village Boundary
Lakes, Ponds & Rivers
Parcel Boundaries - 2007
Zoning Districts
Greensboro Bend Village District
Rural Lands District
1 inch = 250 feet
0
0.1 Miles

The Greensboro Bend PLACE Program
Conservation Recommendations, Full Report

Photo Credit: Kyle Gray

Lauren S. Sopher | February 22, 2019
Field Naturalist & Ecological Planning Graduate Program
Department of Plant Biology, University of Vermont
Greensboro Conservation Commission, Project Sponsor

FIELD NATURALIST &
ECOLOGICAL PLANNING
PROGRAM

Report Summary

This report presents a series of conservation recommendations arising from the work of the Greensboro Bend Place-based Landscape Analysis and Community Engagement (PLACE) Program. The Greensboro Bend PLACE Program's goal is to expand the community's relationship with their surroundings through concurrent social and landscape analyses. Lauren Sopher completed this work as part of her Master of Science degree in the Field Naturalist and Ecological Planning Program at the University of Vermont; these conservation recommendations represent her findings on opportunities to care for and use the town's natural resources.

The stories of people and the land are intertwined—one cannot be considered without the other. Through public and private conversations with community members and ecological field work, Lauren developed conservation recommendations for Greensboro Bend that fall into three major themes.

In summary:

1. **Street beautification**: use native plant species to enhance Greensboro's natural beauty.
2. **Healthy rivers**: take care of Greensboro's rivers and their adjacent lands.
3. **Forest and farms**: sustain and enhance Greensboro's working forests and farms.

Many of these recommendations apply to Greensboro at large. These practices will maintain and improve human health and safety, economic prosperity, nature and its benefits, and Greensboro's beauty for current and future generations.

Street Beautification

Use native plant species to enhance Greensboro's natural beauty.

Recommendations

1. Prioritize native species when considering new planting projects.
2. Reference the resources below to cross-check future plant purchases.

Background & Justification

Street beautification using native plants will provide aesthetic and ecological value to the community. Native herbs, vines, shrubs, and trees are critical to robust ecosystems [1, 2]. These plants thrive in the local climate and support the food and habitat needs of native wildlife, such as birds, bees, and butterflies. Non-native plant species that become invasive species have a negative impact on ecosystem health, human health, and our wallets; they disrupt forest regeneration, wildlife habitat, and recreational activities and are expensive to manage [3, 4, 5]. Planting native species is a win-win for people and the environment.

Nature, including street trees, positively impacts human health and well-being [6, 7, 8, 9, 10, 11, 12]. One researcher states, "...having natural elements or settings in the view from the window contributes substantially to residents' satisfaction with their neighborhood and with diverse aspects of their sense of well-being" [13]. For example, greenness along Main Street and within "Our Community Park" in Greensboro Bend could help promote neighborhood satisfaction, physical activity, and social cohesion [14, 15, 16].

Resources

- **Native Plants | Background Information**
  - Go Botany
    New England Wild Flower Society
    Provides users with a tool to search New England's plant species.
  - Native Plants Species List*
    Greensboro Bend Town Analysis Report
    Lists native species observed in Greensboro Bend during Lauren Sopher's field work in 2018.

- New England Native Garden Plants
  New England Wild Flower Society
  Enables users to search for native plant species in our ecoregion, the Northeastern Highlands, by characteristics such as "attracts songbirds", "salt tolerant", and "low maintenance".
- State of New England's Native Plants In Brief
  New England Wild Flower Society
  Documents a comprehensive assessment of New England plant communities.

- **Native Plants | Purchase Information**
  - Native Conservation Tree and Shrub Sale
    - Contact
      Orleans County Natural Resources Conservation District
      Sarah Damsell, District Manager
      802-334-6090 ext.7008 | sarah.damsell@vt.nacdnet.net

- **Invasive Plants**
  - Invasive Terrestrial Plants of Vermont: Guide to Identification, Prevention, and Management*
    The Nature Conservancy, Vermont
    Illustrates herbs, vines, shrubs, and trees that are invasive in Vermont in a durable fold-out guide.
  - Vermont Invasives
    University of Vermont Extension, the Vermont Department of Forests, Parks and Recreation, the Vermont Department of Environmental Conservation, and the Nature Conservancy, Vermont
    Profiles invasive terrestrial plants, forest pests, and aquatic invaders, with resources on identification, biology, management options, and Vermont distribution.

Healthy Rivers

Take care of Greensboro's rivers and their adjacent lands.

Recommendations

1. Sustain and enhance vegetated riparian buffers, ideally 100 feet wide, on either side of the Lamoille River.
2. Maintain and improve brook trout habitat in the Lamoille River and its tributaries by providing naturally stable, shaded banks and minimizing silt deposition.
3. Consider partnering with the Vermont Fish & Wildlife Department or the Vermont River Conservancy to improve public access for fishing and paddling and education about the Lamoille River.
4. Consider working with the Vermont Department of Environmental Conservation to determine if bridge upgrades along the mainstem of the Lamoille River would minimize constriction of the river and promote its natural flows.

Background & Justification

Healthy rivers support healthy people and the places they live. Flood protection, fish and wildlife habitat, clean water, and river bank stability are made possible by riparian buffers—vegetated areas that border rivers, lakes, and wetlands. Intact riparian areas help prepare us for severe storms and summer droughts, which are predicted to become more frequent and severe as a result of climate change [17]. Community planting projects, whether for street beautification or riparian buffers, present an opportunity for folks to work together on common goals.

Greensboro Bend is in the headwaters of the Upper Lamoille River. The Lamoille Tactical Basin Plan highlights three prominent stressors to the overall health of the Upper Lamoille [18], which directly impact its values to Greensboro Bend and the entire 706 square mile drainage basin of the Lake Champlain Basin. The first is flow alteration, defined as any human-induced change in the natural flow of the river, stream, lake, or reservoir levels, including Caspian and Hardwick Lakes [19]. The second is encroachment by structures, roads, railroads, improved paths, utilities, and other development into natural areas such as floodplains, river corridors, wetlands, lakes and ponds, and the buffers around these areas [20]. The third is excessive channel erosion, defined as excessive erosion that occurs in some channel locations, while excessive deposition occurs in other locations, up and down the length of a stream [21].

East Hardwick, Greensboro Bend, and Stannard have close cultural and ecological ties. The confluence of Stannard Brook and the Lamoille River is in East Hardwick, immediately downstream of the Lamoille River in Greensboro Bend. In the Lamoille River Tactical Basin Plan, Stannard Brook is highlighted as a priority sub-basin for remediation, due to encroachment, channel erosion, and land erosion. The plan proposes the following actions to address these issues: develop a stormwater management project for the town sand storage area, complete a Stream Geomorphic Assessment and river corridor plan to identify stressors and prioritize projects, and monitor. Additionally, many bridges along the Lamoille River mainstem and major tributaries are currently undersized, according to the *The Upper Lamoille River Stream Geomorphic Assessment, Phase 2 Report, Greensboro and Hardwick*, published in 2009. Addressing the remediation of Stannard Brook and the Lamoille River through a partnership between communities would bring economic and ecological benefits to the area.

An influx of recreationists in Greensboro Bend will likely follow the impending construction of the "Morristown to Greensboro" section of the Lamoille Valley Rail Trail. In south Greensboro Bend, a portion of the west bank of the Lamoille River is managed by the Vermont Fish and Wildlife Department for the purpose of public access, specifically fishing.

Brook trout in particular hold cultural, recreational, and ecological value in Greensboro. The upland streams of the Lamoille River Watershed supply cold water to the mainstem. These small streams provide habitat for self-sustaining native brook trout, as well as blacknose and longnose dace, creek chubs, longnose suckers, and slimy sculpins [22]. There is an opportunity for private landowners, the Fish & Wildlife Department, and a partnering organization, such as the Orleans County Natural Resources Conservation District, to work together on a restoration project that supports healthy rivers and a healthy community.

Resources

- **Riparian Buffer Restoration Projects**
  - Native Conservation Tree and Shrub Sale
    Enables people to purchase plants that are native to Vermont.
    - Contact
      Orleans County Natural Resources Conservation District
      Sarah Damsell, District Manager
      802-334-6090 ext.7008 | sarah.damsell@vt.nacdnet.net
  - Quick Guide for Waterfront Landowners*
    Vermont Fish & Wildlife Department, Vermont Agency of Natural Resources
    Provides background information about the importance of riparian areas—ideal for landowners with properties adjacent to a stream, lake, or wetland.

- Riparian Buffers and Corridors Technical Papers
  Vermont Agency of Natural Resources
  Explains the function and value of 100-foot buffers.
- The Lake Champlain Basin Atlas
  Provides resources about the Lake Champlain Basin, including interactive maps and educational fact sheets.
- The Lamoille River Tactical Basin Plan
  Assesses the health of the Lamoille River Basin and outlines current and future actions and strategies to address its major stressors.
- Trees for Streams
  Supports people in planting vegetated buffers along streams—ideal for landowners with riverside property.
  - Contact
    Orleans County Natural Resources Conservation District
    Sarah Damsell, District Manager
    802-334-6090 ext.7008 | sarah.damsell@vt.nacdnet.net

- **Bridge Upgrades**
  - The Upper Lamoille River Stream Geomorphic Assessment, Phase 2 Report, Greensboro and Hardwick
    Caledonia County Natural Resources Conservation District
    Outlines recommendations for the section of the Lamoille River in Greensboro Bend, including a Bridge and Culvert Assessment of the Upper Lamoille River.
    - Contact
      Department of Environmental Conservation, Vermont Agency of Natural Resources
      Danielle Owczarski, Watershed Coordinator
      802-490-6176 | danielle.owczarski@vermont.gov

- **Brook Trout Habitat**
  - The Vermont Partners Program
    Helps to restore wetland, riparian, in-stream, and upland habitats.
    - Contact
      U.S. Fish and Wildlife Service
      Lake Champlain Fish and Wildlife Conservation Office
      Chris Smith, Fish and Wildlife Biologist
      802-662-5303 | chris_e_smith@fws.gov
  - Vermont Trout in the Classroom
    Supports students in raising brook trout from eggs in their classroom and releasing them into a state-approved stream.

- Contact
  Trout Unlimited
  Joe Mark, Lead Facilitator
  802-236-3816 | joe.mark@castleton.edu

- **Public Access and Education**
  - Contact
    Vermont Fish & Wildlife Department, Vermont Agency of Natural Resources
    Will Eldridge, Aquatic Habitat Biologist
    802-585-4499 | william.eldridge@vermont.gov
  - Contact
    Vermont River Conservancy
    Richarda Ericson, Development and Outreach Director
    802-229-0820 | vrc@vermontriverconservancy.org

Forests & Farms

Sustain and enhance Greensboro's working forests and farms.

Forests | Recommendations

1. Community initiatives work with the priorities of individual landowners.
2. Community initiatives support landowners who are interested in maintaining and improving the ecological value of their property.
3. Consider forest blocks and wildlife connectivity in town planning decisions.
4. Support residents' stated value of Greensboro Bend's undeveloped character by considering the creation of a town forest.

Farms | Recommendations

1. Community initiatives work with the priorities of individual landowners.
2. Community initiatives support efforts to integrate ecological considerations into farm management decisions, such as planting riparian buffers.

Background & Justification

Forests and farms define Vermont's landscape—this also is true for Greensboro. The forested section of northeast Greensboro Bend and the fields of south Greensboro Bend were consistently identified as areas that folks valued for their undeveloped character. There are voluntary opportunities for private landowners to manage their land in an undeveloped state, with the support of local, state, and federal resources.

Greensboro Bend is located in the biophysical region of Vermont known as the Northern Vermont Piedmont. The region is characterized by hills and rivers, a moderate climate—cooler and moister than the Champlain Valley and warmer and drier than the Northern Green Mountains—and fertile soils derived from calcium-rich bedrock. These factors influence the assemblage of plants and animals found in Greensboro Bend [23].

Forests

Two forest types, Lowland Spruce-Fir Forest [24] and Northern Conifer Floodplain Forest (or Boreal Floodplain Forest) [25], are highlighted in these recommendations, for the following reasons:

- These forests are distinctive upland (Lowland Spruce-Fir Forest) and wetland (Northern Conifer Floodplain Forest) communities in Greensboro Bend.
- These forests are either large in area (Lowland Spruce-Fir Forest) or readily visible to the public via the Lamoille Valley Rail Trail, Vermont Route 16, and Main Street.
- These forests have large restoration potential (Northern Conifer Floodplain Forest). This forest type has an S2 state rank—defined by the Vermont Natural Heritage Inventory as rare in the state, occurring at a small number of sites or occupying a small total area in the state [26].

Lowland Spruce-Fir Forest

This forest is characterized by the following plants:

Trees	
Abundant Species	**Occasional Species**
– Balsam fir – Red Spruce	– Black spruce – Northern white cedar – Paper birch – Red maple – Tamarack – White pine – White spruce – Yellow birch
Herbs	
Abundant Species	**Occasional Species**
– Bluebead lily – Bunchberry – Common wood sorrel – Intermediate wood fern – Shining clubmoss – Whorled aster	– Canada mayflower – Goldthread – Pink lady's slipper – Twinflower

This forest is associated with the following animals:

Animals	
Mammals	**Birds**
– Deer mouse – Fisher – Moose – Porcupine – Red fox – Red squirrel – Southern red-backed vole – White-tailed deer	– Blackpoll warbler – Red-breasted nuthatch – Ruby-crowned kinglet – Swainson's thrush – Yellow-bellied flycatcher – Yellow-rumped warbler

Northern Conifer Floodplain Forest (or Boreal Floodplain Forest)

This forest is characterized by the following trees:

Trees	
Abundant Species	**Occasional Species**
– Balsam fir – Balsam poplar – Black ash – Black cherry – Northern white cedar – White spruce – Yellow birch	– Red maple – Silver maple
Herbs	
Abundant Species	
– Ostrich fern – Sensitive fern	

This forest is associated with the following animals:

Animals	
Mammals	**Birds**
– American beaver – Mink – Raccoon – River otter	– American woodcock – Canada warbler – Common merganser – Hooded merganser – Ruffed grouse – Yellow warbler – Wood duck

Alluvial Shrub Swamp

This community is related to the Northern Conifer Floodplain Forest. It is distinguished by the dominance of shrubs.

This community is characterized by the following plants:

Trees
Abundant Species
– Black willow – Boxelder
Shrubs
Abundant Species
– Speckled alder
Herbs
Abundant Species
– Ostrich fern

This community is associated with the following animals:

Animals	
Mammals	**Birds**
– American beaver – Mink – Muskrat – River otter	– Alder flycatcher – Common yellowthroat – Gray catbird – Veery – Yellow warbler

Birds are significant indicators of ecosystem health. The Birder's Dozen represents 12 of the 40 forest birds that the Audubon Vermont Forest Bird Initiative is working to protect. Five of the Birder's Dozen were seen or heard in Greensboro Bend during Lauren Sopher's field season in 2018: Black-throated green warbler, Chestnut-sided warbler, Veery, White-throated sparrow, and Wood thrush. These birds are easy to identify by sight or sound, use a variety of forest types for feeding and breeding, and in one case—the wood thrush—show long-term declines in their global populations.

Forest blocks, wildlife connectivity blocks, and riparian networks in Greensboro Bend are locally and regionally important. Forest blocks, defined as areas of contiguous forest that are unfragmented by roads, development, or agriculture, support ecological functions, such as air and water quality and predator-prey relationships. Wildlife connectivity blocks are a network of forest blocks that provide terrestrial connectivity across Vermont, adjacent states, and Canada; they support the ability of wide-ranging animals to move across their range and supply suitable habitat for plants and animals in the face of climate change. Riparian networks, defined as, lakes, rivers, streams, and ponds and their associated corridors, allow species to travel along corridors to find suitable habitat and provide habitat for wildlife that heavily rely on riparian areas for survival, including beaver, otter, and mink [27].

Farms

The undeveloped character of Greensboro's agricultural land reflects its rural traditions. Productive, affordable agricultural land can go hand-in-hand with the protection of its ecological value.

Two Important Farmland soil types, Prime Farmland (Prime) and Additional Farmland of Statewide Importance (Statewide), defined by the USDA Natural Resources Conservation Service, Vermont, predominate in Greensboro Bend [28]. These soils are the foundation for the community's fertile croplands and pastures.

The farms of Greensboro present numerous voluntary opportunities for landowners to sustain and enhance their land. Recognition of ecological functions, paired with what folks value—the undeveloped character of the land—enables landowners and the community to make informed decisions about their natural resources for current and future generations.

Forests | Resources

- Backyard Woods Program
  Vermont Urban & Community Forestry
  Helps landowners who own between 5 and 25 acres understand why their backyard woods matter in a six-week online program that incorporates activities, discussion forums, videos, webinars, and field walks.
- Foresters for the Birds
  Audubon Vermont and the Vermont Department of Forests, Parks and Recreation
  Assists voluntary landowners to integrate the practices of timber and songbird habitat management.
  - Contact
    Jared Nunery, Orleans County Forester
    802-586-7711 ext.169 | jared.nunery@vermont.gov
- Use Value Appraisal Program—"Current Use"
  Vermont Department of Forests, Parks and Recreation, Vermont Agency of Natural Resources
  Enables eligible private lands where owners practice long-term forestry or agriculture to be appraised based on the property's value of production of wood or food rather than its residential or commercial development value.
  - Contact
    Jared Nunery, Orleans County Forester
    802-586-7711 ext.169 | jared.nunery@vermont.gov
- Vermont Conservation Design
  Vermont Fish & Wildlife Department, Vermont Agency of Natural Resources
  Identifies areas of ecological priority across Vermont's landscape at different scales.
  - BioFinder
    Vermont Fish & Wildlife Department, Vermont Agency of Natural Resources
    Displays the Vermont Conservation Design data via an online mapping tool.
    - Contact
      Jens Hawkins-Hilke, Conservation Planner
      802-461-6791| jens.hilke@vermont.gov
- Vermont Coverts
  Nonprofit
  Enables landowners to make well-informed decisions that meet their forest management goals and enhance diverse wildlife habitat and healthy ecosystems.
  - Contact
    802-877-2777 | info@vtcoverts.org
- Vermont Woodlands Association
  Nonprofit

Advocates for the management, sustainability, perpetuation, and enjoyment of forests through the practice of excellent forestry.

Farms | Resources

- Conservation Reserve Enhancement Program (CREP)
  Helps voluntary landowners retire cropland into protective vegetation.
  - Contact
    Vermont Agency of Agriculture, Food & Markets
    Ben Gabos, CREP Coordinator
    802-461-3814 | ben.gabos@vermont.gov
- Environmental Quality Incentives Program (EQIP)
  Supports voluntary agricultural producers in a manner that promotes agricultural production and environmental quality as compatible goals.
  - Contact
    U.S. Department of Agriculture
    Natural Resources Conservation Service (NRCS) Vermont
    Newport Service Center
    Sarah Damsell, District Manager
    802-334-6090 ext.7008 | sarah.damsell@vt.nacdnet.net
- Farmland Access Program
  Connects farmers with affordable farmland.
  - Contact
    Vermont Land Trust
    Jon Ramsay, Director of Farmland Access Program
    802-533-7705 | jramsay@vlt.org
- The Vermont Farmland Conservation Program
  Focuses on retaining quality agricultural land in strong farming regions of the state.
  - Contact
    Vermont Housing and Conservation Board
    Nancy Everhart, Farmland Conservation Director
    802-828-5066 | nancy@vhcb.org

* Hard copies available at the Greensboro Free Library