Ryegate Town Plan 2018

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Ryegate Planning Commission, 2018

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1. INTRODUCTION

The purpose of this plan is to guide the citizens of Ryegate in making decisions with foresight and flexibility. This Plan looks back at our history, presents information about our present, and attempts to predict our future needs. By doing this, we hope to identify some long-range goals and plans for future growth, seeking balance between preservation of the town's aesthetic beauty and the need to respond to inevitable change.

WHY HAVE A TOWN PLAN?

There are several compelling reasons. It establishes a long-term guide to support decision making on public policy and investments. It also:

- establishes a legal basis for zoning and flood hazard regulations.
- makes the Town more competitive in applying for grants for public and community development investments. (In some grant programs, having a current town plan is required.)
- allows Ryegate to participate in tax incentive programs, such as Village Center Designation (this is described in greater detail in Appendix C).
- gives the Town a voice in the Act 250 development review processes, as well as the Section 248 process for siting energy infrastructure.

Energy generation projects connected to the transmission grid are exempt from zoning and fall under the jurisdiction of the Public Utility Commission (formerly known as the Public Service Board). According to Section 248 of Title 30, applicants must first obtain a Certificate of Public Good (CPG) from the PUC before beginning site preparation or construction of electric transmission facilities, electric generation facilities and certain gas pipelines within Vermont.

While the Town of Ryegate may receive party status in the Section 248 review process, the PUC only been obligated to give the municipal plan "due consideration" (which is not defined in statute) when determining if the proposed energy project will not unduly interfere with development. In 2016, Act 174 established a new set of municipal energy planning standards, which if met, would allow a municipal plan to receive "substantial deference" in the Section 248 review process. Unlike "due consideration," "substantial deference" is codified in statute to mean:

> *…that a land conservation measure or specific policy shall be applied in accordance with its terms unless there is a clear and convincing demonstration that other factors affecting the general good of the State outweigh the application of the measure of policy."*

This plan has been prepared with the standards required to receive Substantial Deference in

mind. The Planning Commission intends to amend the plan by developing more substantive siting standards before seeking certification for Substantial Deference.

Numerous individuals and groups provided comments on sections of the original Plan. During the adoption process, the residents of Ryegate and adjoining towns were invited to two public meetings to give their comments.

A BRIEF HISTORY OF RYEGATE[1]

With the Connecticut located to along the east, and numerous ponds and streams located to the to the west, the town of Ryegate was once a critically important landscape for Native American peoples. Native American archaeological sites dating from the Late Archaic period, ca. 6,000 – 3,000 years ago, through to the time of European contact and beyond have been documented in Ryegate, and many more likely remain undiscovered.

Benning Wentworth, governor of the Province of New Hampshire, chartered 23,040 acres in the southeast corner of Caledonia County to

Richard Jeness and 93 associates on September 8, 1763. This was the town's first speculative real estate transaction. None of the 94 grantees ever saw the land before it was conveyed for one thousand pounds to John Church of Charlestown, New Hampshire in 1767. Church later sold the tract to Reverend John Witherspoon, President of Princeton College.

In 1773, James Whitelaw and David Allen, agents of the Scotch-American Company, purchased the town from Dr. Witherspoon. Whitelaw's survey of the area remains the basis of local property boundaries. In his report to the Scottish investors, he marveled at the fertility of the soil, the abundance of fish in the streams, and the availability of waterpower for sawmills.

[1] Much of this section comes from History of Ryegate, courtesy of Dwight White.

The first buildings in Ryegate were along the Bayley-Hazen Road at Ryegate Corner, the only public highway connecting the Wells River Valley with Barnet, Peacham, and Danville. Ryegate Corner (above) is still in many ways the center of town.

According to the New Hampshire Historical Society, the town was named Ryegate in honor of Baron Reigate, a leading British naval figure and Royal Governor of Jamaica.

Ryegate's first Town Meeting was held in May of 1776, the first child was born in 1774, and the first marriage took place in January of 1777. The first buildings were along the Bayley-Hazen Road at Ryegate Corner, the only public highway connecting the Wells River Valley with Barnet, Peacham, and Danville. A mail route was soon established along this route, and the first Ryegate Postmaster was General James Whitelaw.

The first school was at the site of what is now Blue Mountain Grange Hall. The town was later divided into ten school districts. In 1914 and 1915, a two-year high school was operated in South Ryegate. The District Schools were gradually phased out until only South Ryegate, Ryegate Corner, and East Ryegate had grade schools, with high school students attending schools of their choice in surrounding towns. In 1970 the Blue Mountain Union School was built for students K-12 from the towns of Ryegate, Groton, and the Village of Wells River.

Ryegate may be the only town in Vermont that has had only Presbyterian churches since its charter. The first church, built in 1779, stood in Ryegate Corner at the site of the current Town House. This Church was used by both Associated and Reformed (Covenanter) Presbyterians. Through the years, dissident groups broke away and constructed churches in Ryegate Corner, South Ryegate, and East Ryegate. The East Ryegate church is now owned by the Historical Society.

Railroads were an important factor in the growth and development of Ryegate. The Connecticut and Passumpsic River Railroad began its route to St. Johnsbury in 1850, and the first train of the Montpelier and Wells River Line traversed the Valley in 1873. Farm products, lumber, grain, and thousands of bricks were shipped out of East Ryegate.

Pulp was shipped into the paper mill in East Ryegate beginning in 1906, and millions of pounds of paper were shipped out. From the time it began operation until it closed for the last time in 2001, the paper mill was one of the important industries in town. At various points it produced high-grade news print, ribbon stock, light weight catalog, photo mount, and tablets, to name a few. At its high point in the mid 1900s, employment rose to 140.

In South Ryegate, the railroad allowed the development of the granite industry. Quarries on Blue Mountain and White's Hill supplied finishing sheds in the village. The quarries gradually gave way to a superior grade of granite coming from the Barre area and closed down completely in the 1930s. The Blue Mountain Quarry reopened briefly from 1986 to 1991 and then, in May of 1993, McCullough Crushing purchased it from the Small Business Administration.

Agriculture has played an important role in the history of Ryegate. The early farms were largely subsistence operations, but sold their surplus butter, lumber, and beef to purchase goods, which could not be made on the farm. They also produced large families of sturdy citizens, who

have made their mark on the town and on many other towns in this county. Agriculture continues to play an important role in the economy and landscape of the town. Farms are now fewer, larger, and more mechanized.

Construction on the Ryegate Wood Energy Plant on Route 5 in East Ryegate began in 1991. The plant, completed in November of 1992, provides about 75 jobs and a market for some of the low-grade timber, which is so plentiful in the area.

For those interested in an extensive and most interesting account of the history of Ryegate, two volumes are recommended. The first is a *History of Ryegate, Vermont 1774-1912* by Edward Miller and Frederic P. Wells, published in 1913, which can be found on the town's official web site: www.ryegatevt.org

Its sequel, *The Down of the Thistle - 20th Century Ryegate, Vermont*, was written by Dwight A. White and published in 2006.

The Vision for Ryegate

Ryegate is a rural community that supports its working lands through diversified agriculture and forestry-based enterprise. We strive to balance the needs of the community with a commitment to sustainability and best management practices.

Ryegate supports light industry and home-based enterprises that provide its residents with local employment opportunities, as well as essential goods and services, including daycare.

Ryegate is a model for climate resilience and environmental sustainability. We are committed to making the most of our natural flood attenuation assets, such as floodplains and wetlands. As climate change challenges and alters our traditional land- and recreation-based economies, we will identify new enterprises that are compatible with our rural tradition. We will minimize our carbon footprint through weatherization and efficiency initiatives, and by replacing the use of fossil fuel with renewable resources, where feasible.

Ryegate's traditional development patterns will be preserved by revitalizing existing centers of development to establish a vibrant mix of quality housing options, businesses, community activities, civic functions, and greenspaces. We will also preserve our community's historic elements.

In keeping with our community's rural nature, Ryegate prioritizes and supports land-based recreation, such as hiking, cross-country skiing, cycling, and hunting.

MAINTAIN, EVOLVE, TRANSFORM

To support Ryegate's vision, we will pursue the following priorities over the next eight years within the following timeframes: short-term (1-2 years), mid-term (3-5 years), long-term (5-8 years)

MAINTAIN THE SCENIC AND RURAL BEAUTY OF RYEGATE'S WORKING LANDS AND NATURAL LANDSCAPES.

- Establish and support the efforts of a Recreation Committee. (short-term; Resource: Vermont League of Cities and Towns)
- Identify and map scenic road segments. (mid-term; Resource: Municipal Planning Grant Program)
- Establish a wellhead protection overlay. (mid-term; Resource: Vermont Rural Water Association)
- Complete a Land Evaluation Site Assessment to support and prioritize conservation efforts. This technique, which involves rating lands based on their physical soil characteristics and other locally defined criteria, can be used to prioritize and support land conservation efforts for entities such as the Vermont Land Trust and the Vermont Housing & Conservation Board. (long-term; Resource: Municipal Planning Grant Program)
- Seek the technical support of conservation organizations to establish a town forest and parks. (long-term; Resources: Conservation organizations, land owners)

EVOLVE RYEGATE'S TRADITIONAL CENTERS OF DEVELOPMENT – SOUTH RYEGATE, EAST RYEGATE, AND RYEGATE CORNER -- INTO VIBRANT NEIGHBORHOOD/COMMUNITY CENTERS OF CIVIC, SOCIAL, AND COMMUNITY ACTIVITY.

- Pursue Village Center Designation for South Ryegate, East Ryegate, and Ryegate Corner. (short-term; Resources, Vermont Village Center Program, Northeastern Vermont Development Association)
- Establish an EV charging station in South Ryegate. (short-term; Resources: Vermont Village Center Program, VTrans)
- Equip the historic Town House with accessible bathrooms. (short-term: Resources: Various grant programs, such as the Department of Historic Preservation)
- Pursue master planning funds to establish multi-modal transportation corridors between centers of development and recreation opportunities. (mid-term; Resources: Vermont Village Center Designation Program, VTrans)
- Improve cell and broadband connectivity (mid-term; Resources: grant funding sources such as Northern Borders Regional Commission)
- Explore the possibility of establishing parks or greenspaces in or near village centers.

(long-term; Resources: Conservation organizations, land owners)

- Recruit appropriately scaled businesses, such as retail, to South Ryegate. (long-term; Resources: NVDA, Small Business Development Center, Northern Communities Investment Corporation)

TRANSFORM RYEGATE INTO A MODEL FOR CLIMATE RESISTANCE AND ENVIRONMENTAL SUSTAINABILITY.

- Establish and support the efforts of an Energy Committee. (short-term; Resource: Efficiency Vermont)
- Perform energy audits, efficiency upgrades, and weatherization projects on municipally-owned buildings. (short-term; Resources: Efficiency Vermont)
- Establish a Property Assessed Clean Energy district, which will allow Ryegate property owners to borrow money to pay for energy efficient water heaters, lighting, furnaces, boilers, windows, programmable thermostats, and insulation, as well as solar heating, PV, wind and biomass systems. (mid-term; Resources: Efficiency Vermont, Northeastern Vermont Development Association)
- Establish weatherization plans for 75 structures by 2023. Assist the Energy Committee in tracking number of properties weatherized, as well as dollars and BTUs saved. (long-term; Resources: Efficiency Vermont, Vermont Energy Action Network, Northeast Employment and Training Organization, 3E Thermal, and Heat Squad)

WHAT IS IN THE PLAN?

To be considered a duly adopted plan, a plan must, at a minimum, meet the requirements of Vermont Statute, Title 24, §4382. The Ryegate Planning Commission was mindful of these requirements and took care to integrate state planning goals into this document.

Required element	Where it can be found
OBJECTIVES, POLICIES, AND PROGRAMS to guide the future growth and the development of land, public services, and facilities, and to protect the environment	In addition to the vision statement above, recommended objectives, policies, and programs are integrated into each chapter as appropriate.
LAND USE PLAN, consisting of a map and statement of present and prospective land uses, including: forests, recreation, agriculture, residence, commerce, industry, public, and semi-public uses, and open spaces, areas reserved for floodplain, forest blocks, and areas that require special consideration or designation	Land Use, pages 13-21, and Appendix A: Maps.
TRANSPORTATION PLAN, consisting of a map and a statement of present and prospective transportation and circulation facilities	Transportation, pages 22-25
UTILITY AND FACILITY PLAN, consisting of a map and statement of present and prospective community facilities and public utilities and recommendations to meet future needs	Utilities & Facilities, pages 33-38
Statement of policies on the preservation of **RARE AND IRREPLACEABLE NATURAL AREAS, SCENIC AND HISTORIC FEATURES AND RESOURCES**	Land Use, pages 19-22
EDUCATIONAL FACILITIES PLAN, consisting of a map and statement of present and projected uses and the local public school system	Education, pages 39-40
Recommended program for the **IMPLEMENTATION** of the objectives of the plan	Specific recommendations are in each chapter. An Implementation Plan, identifying resources and timeframes to achieve them is on pages 10 to 11
Statement on how the plan relates to development trends and plans for **ADJACENT MUNICIPALITIES AND THE REGION**	Adjacent Towns and the Region, pages 41-43
ENERGY PLAN, including an analysis of energy resources, needs, scarcities, costs and problems within the municipality; policies on the conservation of energy, the development of renewable energy resources, and patterns and densities of land use likely to result in conservation of energy	Energy, pages 44-57, and Appendix B, which contains information about methodologies used to develop usage estimates and set targets in support of achieving energy goals
HOUSING ELEMENT that includes recommendations for addressing low and moderate-income persons' housing needs	Housing, pages 58-60
ECONOMIC DEVELOPMENT ELEMENT describing present economic conditions and the location, type, and scale of desired economic development, as well as policies, projects, and programs necessary to foster economic growth	Economy, pages 61-63
FLOOD RESILIENCE PLAN that identifies flood and erosion hazard areas, and designates those areas to be protected, as well as floodplains, river corridors, land adjacent to streams, wetlands, and upland forests, to reduce the risk of damage to infrastructure and property	Flood Resilience, pages 26-32

2. LAND USE

GOALS:

- Support and promote the vitality of Ryegate's three village areas by allowing for a vibrant mix of uses in those areas: residential, civic, public and semi-public, and appropriately scaled commercial and industrial uses.
- Support sustainable forestry practices and appropriately scaled and sited value-added processing.
- Support and expand diversified agricultural enterprises.
- Allow for development that protects the economic viability of large parcels historically used for agriculture and forestry.
- Maintain and enhance outdoor recreational opportunities for Ryegate residents and visitors, with a special emphasis on land-based, non-motorized recreation, such as hiking, bicycling, dog walking, and kayaking.
- Protect and improve the quality of ground and drinking water.

POLICIES:

- Support efforts to conserve land through the Current Use Program and conservation easements, such Vermont Land Trust and the Upper Valley Land Trust.
- Place a high priority on conserving scenic beauty, open agricultural land, and natural areas.
- Ryegate residents and wildlife depend on clean air and clean water. The Town should not allow development that adversely affects the quality of air and water.
- We recognize the importance of our agricultural heritage and want the physical structures (barns, silos, sugar houses, etc.) preserved. We want to see the land used as a working agricultural landscape. Harvesting crops, livestock, and seasonal tasks such as sugaring and haying are part of our heritage, and we want to preserve that. One way to preserve this is to have the land used for diversified and/or alternative agricultural enterprises.
- For the health of the environment, our bodies of water need to be protected. Clean drinking water is essential, and we need to protect the aquifer from contamination.

- We also need to anticipate and mitigate flood hazards through the protection of water bodies that retain floodwaters, such as floodplains and wetlands.

LAND USE STRATEGIES

- Consider a Land Evaluation Site Assessment to support and prioritize conservation efforts.
- Explore alternatives to large lot zoning that might provide more flexibility in minimizing fragmentation of working lands.
- Review zoning bylaw to ensure that best management practices are supported around smaller bodies of water and streams.
- Review zoning bylaw to ensure that dimensional standards allow for appropriate screening along scenic corridors.
- Review zoning bylaw to explore the conditional review of residential and related uses before any agricultural land is used for non-agricultural purposes. Review zoning bylaw to ensure that appropriately scaled value-added processing operations to support agriculture and forestry may be sited.
- Review the zoning bylaw to identify opportunities to accommodate higher density development in village centers.
- Support the efforts of the Historical Society to store, archive, and display their collection.
- Pursue Village Center Designation for South Ryegate, East Ryegate, and Ryegate Corner, which will provide tax credits for rehabilitation and fitup of existing structures, and will make applications for historic preservation grants more competitive.
- Publicize availability of grants and incentives as they become available, such as tax credits and Vermont Barn Preservation Grants.
- Enlist the technical support of conservation organizations to identify and conserve lands appropriate for a town forest.

FORESTS

Current

While there is no town-owned forest land, a number of privately owned parcels are managed for a variety of goals including pulp, firewood, logs, chips, and sugaring. The wood product industry is a significant economic contributor to Ryegate residents: trucking, logging, woodchip power plant, and planer mill. According to the 2016 State Report, the total number of acres in Ryegate enrolled in the Current Use Value Program is 9,517.80. Of this total, 6,855.43 acres are in forestry, and 237.53 acres are considered to be “nonproductive” forests. Timber production is not the primary objective on the “nonproductive” forest lands, but they still may contain significant wildlife habitats or environmentally sensitive sites. The balance of enrolled lands,

2,424.84 acres, are in agriculture.

Based on these figures, 44% of the 21,624.82 total acreage of the Town is in The Current Use Value Program. With the exception of lands along Route 91, most of the parcels north of Ryegate Corner and East Ryegate contain enrolled lands.

To qualify, a parcel must be at least 25 acres, and the land must be managed in accordance with an approved forest management plan that is filed with the county forester, who periodically inspects the parcel to ensure compliance with the plan. When a landowner enrolls in the program, the State records a lien on the property in the town land records. The lien is not a permanent deed restriction. Rather, it allows the State to collect a tax if the land is developed. Currently, the tax on the developed portion of the land is 10% of the full fair market value -- which provides a financial incentive to keep the land enrolled. Contrary to popular belief, enrollment does not shift the municipal tax burden on to other property owners, because the State "holds harmless" the municipality for the lost revenues by reimbursing the municipal portion of the tax savings each year. In FY2017 the "hold harmless" payment to Ryegate was $43,250. The FY 2018 hold harmless payment to Ryegate is estimated at $42,903.

Priority Forest Blocks and Habitat Connectors:

When assessing the quality of our forested wildlife habitat, it is critical to think beyond the town's boundaries. The effects of forest fragmentation are minimized when we maintain an ecologically functional landscape that supports the region and beyond. In Vermont, an ecologically functional landscape is one with large areas of connected forest, riparian areas, wildlife habitat, and natural communities. A high degree of diversity and connectivity is needed to be resilient to shifts in ecological processes and to allow species to access required habitat. For single species, this ecological function is especially important, as it allows for genetic exchange among wildlife populations.

The Agency of Natural Resource's new "Biofinder" mapping tool, provides critical insight into the ecological function of Ryegate's largest unfragmented forest blocks, which provide for core habitat, as well as movement east and south of the town's borders. They may be viewed here: http://anrmaps.vermont.gov/websites/B ioFinder2016/

This mapping tool identifies forest blocks larger than 20 acres, which are generally identified at "habitat blocks." Although smaller areas may support some biological diversity and connectivity, such areas provide little interior forest habitat. An assessment of Biofinder data subsets helps to identify priority planning areas for Ryegate, as shown on the maps in Appendix A.

Highest priority interior forest blocks (Ryegate Forest Blocks Map): Areas with high-quality interior, unfragmented core forest cover (i.e. land that is more than 100 meters from the non-forest boundary, are shown in yellow, and include the wildlife management areas.

Highest quality connectivity blocks (Ryegate Forest Blocks and Habitat Connectors Maps): Land or water that function as "stepping stones" between core forest, as well as riparian habitat, or strips of forest cover between developed areas. Blocks include virtually all land north of Witherspoon and East Roads.

Prospective:

Fragmented development reduces the value of forestland - both from an economic and wildlife standpoint. Both habitat and efficient logging efforts benefit from larger parcels of land. The overall 10- acre minimum density should be maintained in the rural portions of Town. Given the strong value residents place on protection of natural areas, consideration should be given to either increasing the minimum lot size or exploring alternatives that maintain an overall low density, such as density-based zoning or planned unit development.

AGRICULTURE

Current:

Ryegate has several dairy farms, as well as a number of family farms that produce feed crops, beef, lamb, wool, pigs, horses, hay, maple syrup, and vegetables. The number of dairy farms has become fewer in the past few years, but many of the farms that have gone out of business are leased by the remaining dairy farms, helping the land to remain open. Non-dairy forms of agriculture are increasing. The volume of maple sugar production has increased of late.

The Vermont Land Trust has helped to conserve 1,346 acres of Ryegate land for agriculture and forestry, in six different parcels. Six other parcels, totaling 1,174 acres, are conserved through the Upper Valley Land Trust. The acreage conserved in the Vermont and Upper Valley Land Trusts amounts to 10% of the total acreage of the town. Conservation easements place a permanent deed restriction on the land, yet they do not relieve the property owner of the tax burden. For this reason, agricultural lands with a conservation easement may also be enrolled in the Current Use Program. As with forestry lands, a parcel needs to be at least 25 acres to be enrolled for agricultural purposes, although there are a few exceptions.

Succession planning among the state's farmers is a major challenge. A 2016 study by the American Farmland Trust found that the vast majority of Vermont farmers aged 65 and older do not have a younger farmer (under aged 45) working alongside them.

While this does not necessarily mean that these senior farmers do not have a succession plan, the future of many of our farms is uncertain.

While a conservation easement keeps the land *available* for the next generation, it doesn't ensure that it will be *affordable*. To meet this challenge, the Vermont Land Trust has added an affordability option to its conservation easements known as "Option to Purchase at Agricultural Value" (OPAV). The option gives the holder of the conservation easement the ability to purchase the farm at its agricultural value if the farm would otherwise be sold to a non- farmer. All new conservation easements carry an OPAV, and in many cases, the OPAV can be added to an existing easement.

Prospective:

Ryegate residents wish to see farming continue and be strengthened. The people of Ryegate have historically had great respect and admiration for its natural landscape. Farming, forestry, and quarrying have played an important role in forming this landscape. The Town will need to become more actively supportive if these are to be an important part of Ryegate's future. As with forestry, the Town should continue to support conservation efforts and Current Use

enrollment to keep agricultural lands unfragmented and commercially viable. The 10-acre minimum lot size should also be considered in this context, and effective alternatives explored.

While State and Federal policies have a great impact on the economic viability of farming, the town can help keep agricultural land available to farmers by zoning areas with good agricultural soils for agriculture as the principal use.

Residential and related uses should be conditional to ensure public review before any agricultural land is used for non- agricultural purposes.

A LESA (Land Evaluation Site Assessment) could help establish the relative agricultural value of land and can help prioritize lands for future conservation and succession planning efforts.

To preserve the beauty of the town, the Planning Commission recommends that property owners keep their fields open. As a last resort, we would recommend that an incentive of a property tax credit be offered for bush hogging open land.

RECREATION

Current:

Town owned sites include: Town Beach at Ticklenaked Pond, playgrounds in South Ryegate and East Ryegate, and Mills Memorial Field in South Ryegate. State- owned sites include fishing access at Symes Pond and Ticklenaked Pond, Wildlife Management Areas (WMAs) on Pine Mountain in Newbury, Roy Mountain in Barnet, and nearby Groton State Forest. Local groups maintain the ball field in South Ryegate, snowmobile trails and the Cross Vermont Trail. Walking, snowshoeing, cross country skiing, ATV use, horseback riding, and mountain biking occur informally on Town roads and private property. Numerous Ryegate residents hunt in various seasons throughout the year. Ryegate attracts hunters and snowmobilers, both locally and from out of the area. Blue Mountain Union School facilities are available to and used by town residents.

Prospective:

The town should support the current recreational activities and look to broaden awareness and access. The town should support regional efforts at building a pool/rec center.

The Connecticut River and the Wells River form a boundary on two sides of the town. We propose that additional access points be developed at suitable locations for kayaking, canoeing, and tubing. The Connecticut River Joint Commissions is a potential resource for river recreation. We support further development and use of the Cross Vermont Trail. We support limiting use of motorized off road vehicles to private lands and VAST/VASA trails.)

RESIDENTIAL

Current:

Ryegate has a mix of owner- occupied, rental and multi-family structures. The bulk of residential structures outside of the three village centers are detached single- family structures.

An analysis conducted by Northeastern Vermont Development Association found that all new residential development from 2005-2014 took place outside of the village centers, reflecting a regional trend toward disinvestment in existing centers in favor of incremental rural residential

sprawl. Continuation of this trend could ultimately undermine the vitality of the village areas and lead to greater demands on road infrastructure and town services.

Prospective:

The majority of Ryegate residents like the current pace of residential development. Residential growth should continue with attention to minimum lot requirements and State wastewater permits. Nevertheless, the Planning Commission should review the current zoning and see if there can be changes to encourage higher density development in village centers.

Minimizing residential building in the more remote areas of town can reduce the taxpayer costs of services including road maintenance, school transportation, and fire protection.

COMMERCE & INDUSTRY

Current:

The bulk of commercial activity occurs in the three village centers and includes automotive body repair, earth moving, trucking, sand and gravel, excavation, ledge products, and trash hauling. We have a veterinary clinic, two gravel pits and two campgrounds, storage unit rentals, and a quarry.

A wood chip power plant opened in East Ryegate in 1992, a welding and steel fabrication enterprise operates out of East Ryegate, and a viable granite shed and pottery factory exist in South Ryegate.

Among its natural resources Ryegate has several gravel and sand pits. Two of the more notable gravel deposits are along the Connecticut River and the Wells River. The value of these lands lies not only in their inherent physical properties, but also because they are resources that directly provide for "public good." Prudent management and use of these resources are essential. Planning associated with these particular natural resources must include a land restoration and site rehabilitation component. Methods for reclamation should include plans for timing and phasing for the restoration, soil replacement, regrading, landscaping, and re-vegetation.

Prospective:

Ryegate's village centers should continue to provide necessary services for local citizens, for example a post office, store, hair salon, and day care. These village centers should be designated as growth areas. We encourage renewed presence of retail business in South Ryegate and support Village Center Designation for these areas in order to encourage reinvestment in income producing properties. For more information about Village Center Designation, see the Housing Plan, and Appendix C: Village Center designation benefits.

Additional light industry should be encouraged as long as there is no undue impact on ground water, light/noise pollution, traffic patterns - in short all the criteria covered by Act 250. There are economic benefits from additional jobs close to home.

Attempts to retrofit currently idle buildings should be encouraged: old granite sheds and creamery in South Ryegate, and the old paper mill in East Ryegate.

PUBLIC AND SEMI-PUBLIC USES

Current:

These include South Ryegate: Library, church, cemeteries (2), Fire Station, Post Office, ball field and playground; Ryegate Corner: Town Office, Town House, Grange Hall, Fire Station, Town Garage, Post Office, church; East Ryegate: Post Office, Historical Society building, Recycling Center, playground; North Ryegate: cemetery. Ryegate's pupils attend nearby Blue Mountain Union School.

Prospective:

Buildings and uses necessary for the conduct of municipal business and provision of public services should be permitted in those areas where the need is anticipated. Generally, such need will be in or near the village centers so as to maximize access to residents.

Consideration should be given to the acquisition of land to create a town forest. Obviously, a sizable public holding of undeveloped land within the community would be suitable as a town forest. Other desirable traits include:

- Forest cover that allows for hiking and/or wildlife viewing;
- Opportunities for passive, non-motorized forms of recreation, such as hiking and running trails;
- Productive forest stands that can serve as an "outdoor classroom" for sustainable forestry practices;
- Wetlands and floodplains that provide wildlife habitat and floodwater attenuation.

Occasionally lands are conserved or deeded to municipalities (sometimes for tax liability purposes). The Town of Ryegate would consider such a conservation effort and would enlist the support of conservation organizations that may be in a position to assist.

RARE AND IRREPLACEABLE AREAS

Although the town owns no land set aside for conservation, Ryegate is blessed with a significant amount of critical wildlife habitat. We have one of the highest deer populations in Caledonia County. Also, the State has two Wildlife Management Areas within town borders. Roy Mountain WMA, which is mostly in Barnet, extends into Ryegate in the northern portion of the town.

Pine Mountain WMA extends into the southwest corner of town, with acreage also in Groton, Newbury, and Topsham.

Steep, remote land, for instance, on Blue Mountain, should not be developed. Likewise, all wetlands need protection from development.

The Town has three ponds within its border. Ticklenaked Pond (48 acres) is used for both swimming and fishing and has a public beach and public fishing access, Upper Symes Pond (20 acres), and Lower Symes Pond (57 acres), which has a public fishing access.

With community support and state funding, the Ticklenaked Pond Association has existed for several years. During the summer, the Association holds monthly meetings and has worked hand-in-hand with state agencies to improve water quality.

Those efforts have successfully heightened awareness and increased the clarity of the water.

The Town should continue to support efforts to improve the quality of water in Ticklenaked Pond and should show continued support for and involvement in the Ticklenaked Pond Association. Given the high priority residents place on water quality, the town should encourage adherence of State septic/wastewater regulations. Increasing minimum lot sizes in shoreline areas may reduce density and, in turn, improve water quality.To minimize runoff, the State enacted the Vermont Shoreland Protection Act in 2014. The provisions of this Act require property owners to obtain a state permit for most development and clearing activities within 250 feet of the shores of lakes that are 10 acres or larger in size. While the three ponds are covered by this law, smaller water bodies and streams require protection, such as maintaining riparian buffers and implementing best management forestry practices to limit clear-cutting along streambanks.

SCENIC FEATURES

Ryegate has a number of scenic viewsheds that should be considered rare and irreplaceable treasures. Route 5 is part of the bi-state Connecticut River Byway, which is a federal designation to raise awareness of the unique historic, cultural, and highly scenic resources the region has to offer. The historic Bayley-Hazen Military Road intersects with Route 5, passing Ticklenaked Pond and Ryegate Corner, and extending to the Barnet town line.

Development along these scenic corridors should be carefully sited and screened as feasible to protect the rural character of these routes. Ryegate's zoning bylaws should be reviewed to ensure that existing setback requirements do not prevent careful site planning. (See Figure 2.1.)

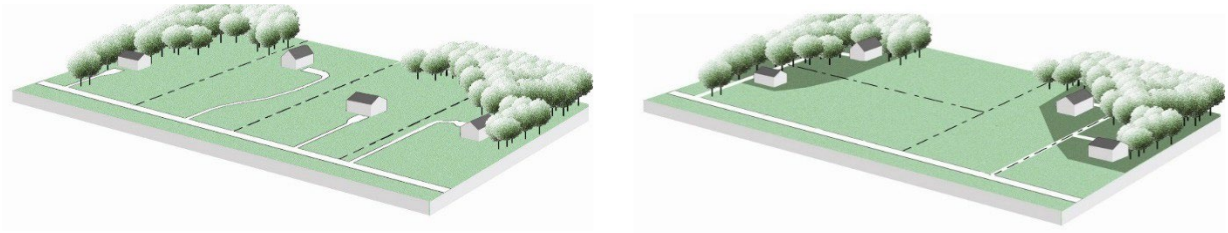


Figure 2.1: The illustration on the left shows how a viewshed can be altered by poor siting planning. Large setbacks place each structure into the middle of a field. By contrast, the illustration on the right shows how reducing setbacks and allowing for shared driveways can lead to better site design.

HISTORIC FEATURES

In addition to the Bayley Hazen Road, Ryegate has numerous building with historic significance, particularly our churches, school houses, and original agricultural buildings. The granite industry has played an important an important part in Ryegate's history. Mountaine Meadows Pottery in the old stone shed is an excellent example of an adaptive reuse that honors our town's rich legacy.

Reminders of Ryegate's history are the old blacksmith shop in Ryegate Corner, which survived the 1941 fire, the Whitehill House in North Ryegate, Long Meadow Inn, an old stagecoach stop on what is now Route 5 in East Ryegate, as well as the East Ryegate church, and our two active churches, South Ryegate Presbyterian Church, and the Ryegate Corner Presbyterian Church. There are eight historic districts: North Ryegate, Mosquitoville, Wormwood, East Ryegate, South Ryegate, Ryegate Corner, Symes Pond, and Bible Hill.

Over time, property owners have maintained or renovated structures, sometimes with public grant money. For example, South Ryegate's Row Houses have been completely renovated, and original lighting has been restored on the Church Street bridge.

The Historical Society, and the Cemetery Commission have made particular efforts in this area. The Historical Society uses the old East Ryegate Church (Whitelaw Hall) for meetings, lectures, and storage.

As the size and complexity of their collection grows, the Historical Society seeks to secure the Whitelaw Hall in East Ryegate. This would include, at the very least, fireproofing and potentially archiving, displaying, and cataloging the collection. This would be a good volunteer effort for local students. The pictures and artifacts should be in a computer data base for ease of access by the public and by researchers.

The town records should also be considered an historic asset. Some were lost in a fire, but the remainder are kept in a vault and are gradually being microfilmed for safe keeping.

ARCHEOLOGICAL RESOURCES

Historic archaeological sites related to early settlement, agriculture, industry and tourism are also likely located within Ryegate's borders.

Cumulatively and individually, these sites and archaeologically sensitive areas constitute tangible links to the rich cultural, religious, social, economic and technological traditions of past generations of Vermonters. These resources can help us understand little known chapters of Vermont's history. Precontact archaeological sites, in particular, are often the only sources of information about the thousands of years of human history before European contact. Historic and archaeological resources are educational and recreational assets to communities and certain sites can be important attractions to locals and potentially even to tourists. The Vermont Division of Historic Preservation hopes that sites will be preserved and protected whenever possible to ensure these vital cultural resources will be available to enjoy, appreciate, and study in the future.

Any questions about particular archaeological sites can be directed to the Division for Historic Preservation's State Archaeologist.

3. TRANSPORTATION

GOALS:

- Support a multi-modal transportation system that is safe, convenient, economic, and energy efficient.
- Reduce reliance on single occupancy vehicles as is feasible for a rural community.
- Protect the integrity of Ryegate's scenic roads.

POLICIES:

- The Town of Ryegate will encourage and explore a full range of appropriately-scaled alternatives to single occupancy vehicles, such as ride sharing, bicycle and pedestrian routes, and public transit.
- There should be no paving of gravel roads, and there should be an effort to preserve the trees lining our roads.
- The speed limit should be enforced.
- Residential, industrial, and commercial development that would impact Ryegate's scenic vistas should be discouraged.

TRANSPORTATION STRATEGIES

- Map scenic road segments.
- Implement an access permit system for curb cuts to minimize erosion and runoffs.
- Promote "complete streets" concepts where feasible, such as portions of Route 5.
- Establish alternative fueling sites.
- Pursue Village Center Designation in order to pursue master planning funds to establish for integrated multi-modal connections and alternative fuel charging stations.

HIGHWAYS AND STREETS

As a rural community Ryegate is quite dependent on its highways and roads. Hence, it is important that the roads be maintained for safe and efficient travel throughout the year.

The major transit routes in Ryegate are US Route 5 and Vermont Route 302, with East Road running from US 5 to Ryegate Corner, and portions of the Bayley-Hazen Road running from the

Barnet Town line to Boltonville Road to VT 302.

Total mileage of Town roads is 64.36 miles.Of this total, 13.96 miles are class 2 roads,

43.46 miles are class 3 roads, and 6.95 miles are class 4 roads.

As there is no reason at this time to increase the number of roads; drivers should respect speed limits on our roads to make them safer for all who use them. At this time, there are no plans for any additional paving of town roads that are currently gravel.

Maintenance priorities include:

- Replacing Creamery Road Bridge: A cost estimate was developed for this through-girder bridge back in 2014, and the minimum cost was $760,000.
- Re-paving the streets in both East Ryegate and South Ryegate villages

PARKING FACILITIES

The Town owns three parking facilities in Ryegate: Town Office lot, Ticklenaked Pond lot, and the Town Hall lot. There are several other private and public lots in town.

At this time, there is a need for additional public parking in Ryegate. We encourage the establishment of an official park and ride on or near Route 302, in East Ryegate village, and other developed centers that would help residents and commuters reduce their reliance on single-occupancy vehicles. Obtaining Village Center Designation for Ryegate's three villages may help the town access funds to establish public park and rides. (For more information about reducing our reliance on single-occupancy vehicles and fossil fuels, read Ryegate's Energy Plan on page 40, as well as Appendix C: Benefits of Village Center Designation.)

MASS TRANSIT

There are no mass transit terminals in Ryegate. People may take a Greyhound bus from White River Junction or Montpelier. Dartmouth Coach bus service to Boston and Logan Airport departs from Hanover, New Hampshire. Amtrak train service leaves from White River Junction for points south. Freight is moved by rail along the spur that parallels the Connecticut River from Newport to White River Junction. Rural Community Transportation (RCT) provides transportation for Ryegate residents to all types of activities throughout the year.

Stagecoach provides bus service from Wells River to Hanover and Dartmouth-Hitchcock Medical Center. The RCT website posts current routes and services.

Additional road-based shuttle or transportation service north to St. Johnsbury, west to Barre/Montpelier, east to Littleton and south to Lebanon, NH would be desirable. There is interest in passenger train service south from the Wells River station to White River Junction. Preferable transportation systems would use alternative fuel, be scheduled to maximize use, and be subsidized for affordability.

BICYCLE ROUTES AND TRAILS

Bicycle travel is becoming more popular as we see more bike tours enjoying our scenic byways each year. The Cross Vermont Trail offers a bike and walking path from Blue Mountain School, past Boltonville, and on to Groton State Forest. The bulk of this trail is on the old railroad bed

and traverses the southern portion of Town. Town roads are generally well suited to bicycling and walking after spring mud season through to the fall.

The existing extensive network of roads and trails could be better used with better education/publicity, better maps and an increased emphasis on safety (speed limit enforcement). While Route 302 has a wide shoulder; Route 5 does not. Any future improvements to Route 5 should include a bike lane or adequate shoulder for safer riding.

In 2011, Vermont's "Complete Streets" billwas signed into law. The legislation is based on a concept that state and town streets, roads and highways should safely accommodate all transportation system users, regardless of age, ability, or what mode of transportation they prefer – walking, biking, driving, or use of transit.

The policy applies when new roads are being constructed, and when paved roads are being reconstructed, rehabilitated, or otherwise maintained.

Typical elements that make up a complete street range from sidewalks, to bicycle lanes (or wide, paved shoulders), shared-use paths, and transit stops. In rural areas examples could be the striping of shoulders on paved roads to accommodate bicyclists and others or the development of a separate multi use path. While it is not possible to retrofit all roads, the Town should advocate for measures that will allow for safe non- motorized uses where feasible.

SCENIC ROADS

Scenic roads are everywhere in Ryegate, from the main highways to the back roads. Scenic qualities include mature trees, long- range views, and historical transportation routes, such as the Bayley-Hazen Military Road. Our most scenic roads afford long range views east to the White Mountains and west to Orange, Topsham, and Groton.

Blue Mountain and Ticklenaked Pond are focal points for many of our scenic roads. Other examples include portions of the following roads: Groton-Peacham, Hall, Witherspoon, Scotchburn, and Stone Road.

AIRPORTS

There are no airports in Ryegate. There are small, rural airports for private planes in Lyndonville, in Berlin, and across the Connecticut River in North Haverhill, N.H. There is an airport in West Lebanon, NH for commuter flights, with larger, international airports in Burlington, VT, Manchester, NH, Boston MA., Hartford, CT, and Montreal, Quebec.

ROADS AND WATER QUALITY

Research and water quality monitoring has indicated that roads are responsible for 6- 10% of phosphorus loads to Lake Champlain, and other waterways, and roads contribute over 10% of sediment loads. Excessive sediment and phosphorus can cause algae blooms, increase water turbidity (cloudiness), and degrade fish and invertebrate habitat.

The 2015 legislative session created a new regulatory framework addressing all work on Town Highways, The Municipal Roads General Permit, as part of the Act 64- the Vermont Clean Water Act. This general permit is intended to achieve significant reductions in stormwater-related erosion from municipal roads, both paved and unpaved.

Municipalities will develop and implement a customized, multi-year plan to stabilize their road drainage system. The plan will include bringing road drainage systems up to basic maintenance standards, and additional corrective measure to reduce erosion. The town is currently working to NVDA to identify erosion-prone road segments connected to water bodies. This work will identify a series of stormwater improvements needed to meet the Municipal Roads General Permit Conditions.

BRIDGE AND CULVERT INVENTORY

The Vermont Online Bridge and Inventory Tool (VOBCIT) database shows that Ryegate has 713 culverts, with the majority found to be in good condition.

The VOBCIT shows that there are 81 culverts in "poor" condition (i.e. about 25% open with serious deficiencies.) Culverts in poor condition are found mostly around theBayley Hazen Road, Hall Road, and Creamery Road. This is due to sediment load which is deposited during storm events. Undersized or "plugged" culverts often result in storm runoff flowing over the road or highway, rather than under it, and damaging or even washing out the roadway. The Northeastern Vermont Development Association (NVDA) annually assists towns in updating their culvert data by hiring consultants to do the field work using GIS and then uploading this to the VOBCIT. The VTrans Maintenance Districts ideally want an inventory done every three years, but NVDA can only do 4-5 towns per year.

NVDA is working to get towns to use VOBCIT to input their annual updates so that they will always have an up to date inventory.

"SHORT" STRUCTURES

VTrans is required to inspect all bridges with a span of 20 feet or longer, whether they are located on a federal-aid system or a town highway. These inspections occur once every two years, and reports of the inspections are sent to the Town.

The bridge and culvert inventory does not, however, contain information on town highway "short structures," which are bridges with a span of less than 20 feet but equal to or greater than 6 feet. These are neither inspected nor prioritized by the state, and no formal system for identifying or assessing them currently exists. In fact, short structures have not been depicted on the Town Highways Maps since 2003. Towns are responsible for the inspection of their own short structures. In 2015, NVDA performed condition assessments on town short structures, classifying them as "Good," "Fair," or "Poor." The conditions assessment will be an important tool for identifying medium- to long-range costs for maintaining, upgrading, and repairing short structures.

PRESENT TRANSPORTATION MAP

The present transportation and facilities map is on file in the Ryegate Town Clerk's office and can be viewed there. Transportation information can also be found on the Base Map in Attachment A.

4. FLOOD RESILIENCE

GOALS

- Mitigate Ryegate's flood hazards in the most cost-effective manner possible.
- Minimize the risk exposure and associated expense to Ryegate tax payers.
- Ensure the Town and its facilities are prepared to meet the demands of the next flood.

FLOOD RESILIENCE STRATEGIES:

- Identify methods for safely reinforcing the bank of unnamed tributary to Wells River in South Ryegate.
- Continue participation in the National Flood Insurance Program and participate in trainings for local officials and property owners when such trainings are available.
- Consider amending the zoning regulations to waive setback requirements so that property owners can locate or relocate structures on less flood-prone areas on the lot.
- Disseminate information on strategies to reduce flood risks, such as freeboarding (elevating structures) and waterproofing.
- Review and evaluate new stream geomorphic data when it becomes available.
- Continue dialog with the public, state and regional agencies, and land conservation groups regarding protection of wetlands and stabilization of erosion prone areas.
- Keep the Local Emergency Operations Plan up to date.
- Update and readopt the Local Hazard Mitigation Plan.
- Research the feasibility of a shelter agreement with the Red Cross.
- Maintain VTrans Road and Bridge Standards to incorporate best practices to minimize washouts and damage.
- Encourage efforts to provide real-time data stream reporting from Wells River, e.g. data trackers that transmit data on flood levels via social media.
- Support NH DEC's efforts to improve flood forecasting relative to dams.

FLOOD RISKS IN RYEGATE

The Town of Ryegate experienced significant flood damage in the May 2011 storm, as well as Tropical Storm Irene. In response to these losses, the town adopted a FEMA-approved Hazard Mitigation Plan. The primary benefit of this plan is that it prioritizes specific risk mitigation actions for the town. It also allows the town to receive FEMA funds for specific projects. Shortly after the adoption of the Hazard Mitigation Plan in 2014, the town received FEMA funds to

purchase a residential structure that had been severely damaged by both flooding events of 2011. The buyout would not have been possible without the Hazard Mitigation Plan, which is set to expire in 2019.

The Hazard Mitigation Plan identified the following hazards as posing the highest risk to Ryegate:

- Flooding
- Hazardous Materials
- Severe Weather (including high winds, hurricanes, tornadoes, and winter/ice storm)
- Structure Fires
- Water Supply Contamination
- Dam Failures
- Highway Incidents

What is Flood Resilience?

Local and regional plans adopted after July 1, 2014 must contain a flood resilience element that identifies appropriate strategies for reducing a community's vulnerability to flood-related damage. Statewide goals are to:

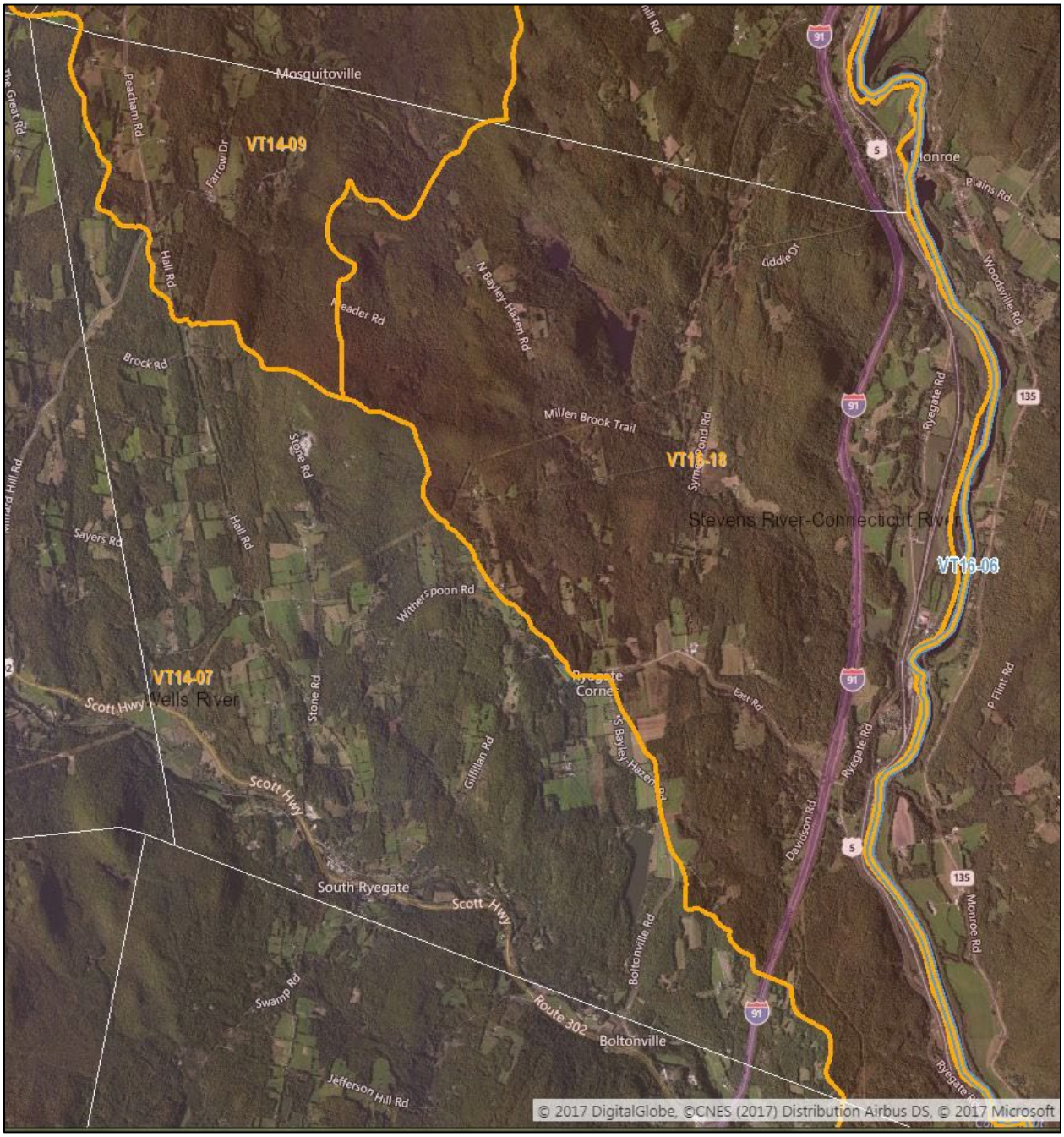
- Avoid new development in areas prone to flooding and erosion. If new development is to be built in such areas, it should not exacerbate flood-related risks.
- Encourage the protection of floodplains and upland areas that attenuate flooding and fluvial erosion.
- Encourage flood emergency preparedness.

This plan incorporates pertinent flood- related information from the Hazard Mitigation Plan where relevant.

EXISTING DRAINAGES

Ryegate is located in two major watersheds, the Stevens and the Wells. Lands in the northeastern portion of the town, including Ryegate Corner and East Ryegate, are contained in the Stevens River-Connecticut River subwatershed, where a number of tributaries drain into the Manchester Brook, which, in turn, drains into the Connecticut River. Most of the northwest corner of town is located in a subwatershed of the Stevens, which drains into Barnet. The southwestern half of the town is contained in the Lower Wells watershed, which contains the Wells River, which ultimately drains into the village of Wells River. (See Figure 4.1.)

Figure 4.1: Ryegate Subwatersheds



Records of major floods in Ryegate go back as far as March 1913, but stream data from the USGS gaging station at the Wells River only goes back as far as 1949. According to the stream data, the 1973 flood remains the highest flood on record, with a crest of 9.82 feet, but Tropical Storm Irene is not far behind, with a crest of 9.03 feet. (For reference, the "flood stage" at this station is six feet.)

South Ryegate essentially functions as a basin for the lower Wells subwatershed, because water from surrounding towns drain there before heading to the village of Wells River. The areas around South Ryegate (Routes 302 along the Wells River), the Creamery Road, and Brown Drive, are particularly vulnerable to flooding and can become isolated when low-lying portions of the road are flooded. Roads and bridges along Routes 5 and 302 have been damaged by flooding, and there have been ice jams at the southern end of Ryegate along the Wells River. Three residential properties in South Ryegate were damaged in the 2011 flooding. One structure was the FEMA buyout.

Another property was damaged when an unnamed tributary to the Wells jumped course and ran under a portion of the property. The damaged portion of the structure was removed by the owner.

Ryegate's public infrastructure was damaged in 2011 as well. The Town received more than $61,000 to repair road washouts by the bridge on old Vt. 302 (the Creamery Bridge Road), as well as washouts at the junction of Witherspoon and Stone Road, and on the North Bayley Hazen Road.

FLOODPLAINS

Floodplains are low-lying areas adjacent to a river channel that become inundated as the rivers rise up and spill out over the bank.

They provide an important ecological function because they store floodwaters. This in turn reduces downstream flood velocities, and reduces the likelihood of riverbank erosion. Floodplains also help to protect water quality by filtering nutrients and impurities from runoff, processing organic wastes, and moderating temperature fluctuations.[2]

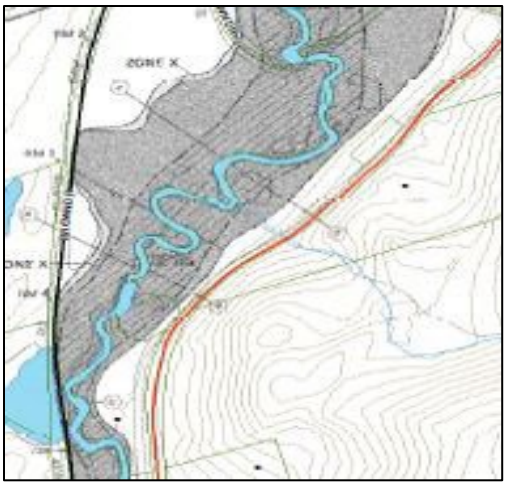


Figure 4.2: This image shows data from the FEMA Flood Insurance Study along the Wells River. The lines crossing the stream channel, indicate that base flood elevation data is available.

Ryegate's mapped floodplains are depicted on a FEMA Flood Insurance Rate Map (FIRM) that was last revised in 1991. The risk information is based on historic, meteorological, hydrologic, and hydraulic data, as well as open-space conditions, flood control works, and development. To prepare FIRMs that illustrate the extent of flood hazard in a flood prone community, FEMA conducts flood insurance studies. Using information gathered in those studies, FEMA engineers and cartographers delineate Special Flood Hazard Areas (SFHAs) on the FIRM. SFHAs are those areas with a 1-percent-or-greater chance of being flooded in any given year. This type of flood is referred to as a base flood. A base flood has a 26-percent chance of occurring during a 30-year period – which just happens to be the term of many mortgages. FEMA has done Flood

[2] Floodplain Management Requirements: A Study Guide and Desk Reference for Local Officials, FEMA 2005

Insurance Studies on the Wells River and the Connecticut River. Other areas in town are "approximate A" areas, which means that no base flood elevations exist, although they are considered by FEMA to be prone to inundation. (See Figures 4.2 and 4.3).

The FIRM and the base flood set a regulatory standard used by the National Flood Insurance Program as the basis for insurance requirements nationwide. Ryegate has been a participant in the National Flood Insurance Program since 1991, which means that development in the mapped SFHAs must meet minimum standards set by FEMA. Because Ryegate regulates development in the SFHA, any property owner in the community – regardless of location – may obtain flood insurance at a rate that is more affordable than the private market.

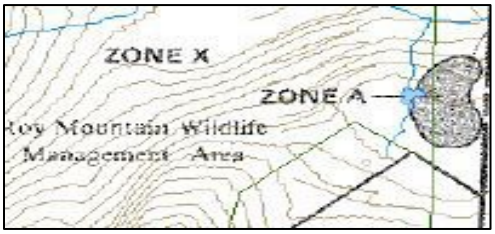


Figure 4.3: This image shows an "approximate A" special flood hazard area in Ryegate. A flood insurance study has not been done, and no base flood elevations are available.

Ryegate's FIRM is not digitized. However, we estimate that there are 27 residential structures located in the SFHA. Most of these structures are single-family homes, but one is a church that can function as an emergency shelter.

FLASH FLOODING

Other flood hazards can form along impervious surfaces, like roadways or clear- cut areas in high elevations, where floodwaters can pick up velocity, particularly from steep slopes. Beaver dams have also been linked to flood damage in Ryegate. The state's Better Backroads Program has road standards to avoid erosion and flashfloods resulting from road design and construction. Upland areas with potential drainage into the South Ryegate area are primarily forested with the capacity to attenuate flood flows. These areas are zoned as "rural lands" or "low density" areas, which should help to limit clear cutting and protect forest cover. Enrollment in the Current Use program provides a valuable benefit as well, because the enrollment establishes a financial incentive to keep the lands undeveloped.

While inundation-related flood loss is a significant component of flood disasters; the more common mode of damage is associated with the dynamic, and often catastrophic, physical readjustment of the stream channel during storm events. These adjustments are often due to bed and bank erosion, debris and ice jams, or structural failure of man- made structures, such as bank armoring.

This explains why Vermont's flood-related losses often occur outside of the mapped SFHAs. In 2015, the State of Vermont developed a map layer depicting "river corridors," which are areas that provide the minimum amount of "wiggle room" needed to accommodate lateral movement of the stream channel. The maps are based on remote GIS data, but are supplemented by actual site investigation, including a 2009 stream geomorphic assessment along the Wells River.

Ryegate's Hazard Mitigation Plan recommended exploring strategies to limit new development

and encroachment into areas that may be subject to fluvial erosion. Initial exploration into regulatory strategies were not supported by the general public, who were particularly wary of more regulations. Nevertheless, the town should have more public dialog on identifying fluvial erosion and other hazards outside of the mapped SFHAs and raise awareness of the inherent risks of encroaching on these areas. One possibility may be to work with land trusts to create easements on lands alongside streams and wetlands with floodwater storage capacity in order to maintain streambank stability.

DAM FAILURE

There are three large hydroelectric dams on the Connecticut River that are upstream of the town and under federal regulation (Federal Energy Regulatory Commission, also known as FERC), as well as the oversight of the New Hampshire Department of Environmental Conservation. They include the Comerford Dam, McIndoe Falls Dam, and the Moore Dam. All are considered "high hazard" dams because of the drainage area needed to absorb the reservoir, plus the potential loss of life and economic losses should such a breach occur. The dams were recently purchased from Trans Canada by Great River Hydro, which is based in New Hampshire. FERC licenses for all three dams expire in 2042.

Table 4.1: Ryegate Dams

Dam Name	NH DEC HAZUS Class	Drainage Area (in acres)
Comerford	High Hazard	1,046,400
McIndoes Falls	High Hazard	1,414,400
Moore Dam	High Hazard	1,024,000

These three dams provide a significant amount of power to the New England grid, and the operating utilities are required to perform routine safety checks, inform the public of inundation plans, and have an early warning system in place. If a large flood event beyond the historic magnitude of the region did occur, there is a possibility that a major breach could inundate the village of East Ryegate. A higher magnitude earthquake could also cause severe damage to the dams.

EMERGENCY RELIEF AND ASSISTANCE FUND

When a community requires public assistance for the repair of roads, culverts and bridges, FEMA funds have traditionally covered about 75% of the loss. Until 2014, the State's Emergency Relief and Assistance Fund (ERAF) has provided half of the matching funds (about 12.5%), and the town has assumed the remainder of the cost.

For federally declared disasters that occur after October 23, 2014, ERAF will contribute half of the required match only if the town has taken all the following steps to reduce flood damage. Otherwise, the level of State funding will be reduced to 30% of the remaining match, which will usually be about 7.5% of the total cost:

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

Currently, the town meets all requirements.

Changes to ERAF funding offer towns an incentive for become more flood resilient: Under ERAF, the Town may receive an increased state match for federally declared losses, if the town adopts flood regulations that are more aggressive than the minimum standards of the National Flood Insurance Program. These above-and-beyond standards typically entail prohibiting most forms of new development in the river corridor, prohibiting most forms of new development in the Special Flood Hazard Area, and requiring structures that are more than 50% damaged to be elevated to at least one foot above the base flood elevation.

Under this scenario, the Town's out-of- pocket expenses would be reduced from 50% of the required match to FEMA funds to 30%.

5. UTILITIES AND FACILITIES

GOALS:

- To plan for, finance and provide an efficient system of public facilities and services to meet future needs.
- Preserve the traditional use of historic buildings within the Town, specifically churches, the Town House, and Grange Hall.
- Improve local technology, including more comprehensive cell service and broad band access.

POLICY:

- 24 V.S.A Section 4413 states that unless reasonable provision is made for public necessities such as public utility power generating plants and transmission facilities; state or community owned institutions and facilities; public or private schools and other educational facilities; churches and other places of worship, convents, and parish houses; public and private hospitals; regional solid waste management facilities; and hazardous waste management facilities, the town cannot regulate their location. It is recommended that uses of this type which are not specifically covered elsewhere in this plan be located so as to be the most compatible with present and planned private facilities.
- The rate of growth within the Town should not exceed the ability of the community and the area to provide facilities and services.

UTILITIES AND FACILITIES STRATEGIES:

- The Town Plan supports the formation of a Recreation Committee to oversee and coordinate public recreational facilities including those on or near the railroad bed, Ticklenaked Pond, South Ryegate ballfield, Symes Pond, and the Connecticut River.
- Acquire or conserve green space or park for community gatherings.
- Support the upgrade and maintenance of both the East Ryegate and South Ryegate water systems.
- We recommend that, in the future, the Town acquire land for the establishment of a Town Forest for use by the townspeople. Benefits of this would include watershed protection, forest products, wildlife habitat, and public recreation and education.

- We support the Fire Department's efforts to maintain and update its equipment. In addition, we support the Fire Department's goals to:
    - *Improve water sources and supplies.*
    - *Add hydrants.*
    - *Purchase a generator for back-up power for the fire station and town garage.*
    - *Improve recruitment and retention of firefighters.*
    - *Support training for safety and competency of Ryegate's firefighters.*
- We will continue to rely upon County and State Law Enforcement as well as on a regional Ambulance Service and Groton-Ryegate FAST Squad.
- Develop source protection plans for community water supplies, which identify all potential sources of contamination and suggest strategies for minimizing the risks coming from these sources.
- Add overlay zone to zoning bylaw for wellhead protection areas to the zoning bylaw.
- Enlist cooperation of land and home owners within wellhead protection areas to help minimize risks of contamination from existing land uses.
- Determine capacity of existing wells and plan for future supply-replacement in case of contamination, and additional supply to accommodate future population growth.
- Consider creating a capital improvements plan, to coordinate upkeep and/or replacement of town facilities, for example, to expand the Town's document vault and add a toilet in the Town Meeting space.

EDUCATIONAL

Please turn to Educational Facilities Plan for information regarding education in Ryegate.

RECREATIONAL

Although there is no formal recreation program in the Town of Ryegate, there is much to do in the outdoors throughout the year. At Ticklenaked Pond there is a public beach where one can enjoy swimming as well as boating and fishing; the pond is maintained by the Ticklenaked Pond Association. Three seasons a year, hiking and biking can be enjoyed on Ryegate's very scenic back roads and byways. Winter brings cross country skiing, snowmobiling, and ice fishing. Downhill skiing can be found at Burke Mountain, an hour north; cultural activities are available in St. Johnsbury and the area of Hanover and Lebanon, New Hampshire.

HOSPITALS

Because theirs is a rural area, Ryegate residents travel to surrounding towns for health care, including Little Rivers Health Care in Wells River, VT, Cottage Hospital and offices in Woodsville, NH, Northeastern Vermont Regional Hospital in St. Johnsbury, Central Vermont Regional Hospital in Berlin, and Dartmouth Hitchcock Medical Center in Lebanon, NH. Ambulance service

is provided by Woodsville Ambulance Service, and Groton/Ryegate FAST Squad assists with primary care. Local Federally Qualified Health Centers provide mental health, limited dental, and primary health care.

Enhanced 911 became a reality on November 17, 1998. Prior to this, a local committee recommended, and the Selectmen adopted, an ordinance naming all of the roads in the Town. A team assigned a number to each building based upon a numbering increment of 5.28 feet. This proved beneficial to emergency providers, as well as others seeking a specific location.

LIBRARIES

A community library in South Ryegate has limited weekly hours. Residents have other options with libraries in Wells River, St. Johnsbury, Groton, Newbury, and the Blue Mountain Union School.

ELECTRICAL UTILITIES

Electrical services are provided by Green Mountain Power, Burlington, and Washington Electric, East Montpelier, Vermont. Ryegate also is home to Ryegate Associates (GDF Suez), a woodchip generating plant that provides power to the New England power grid. The plant has a 22 MW capacity and employs 20 people. There are also several high-voltage transmission lines located in town. Just north of Ryegate on the Connecticut River are three very large hydroelectric dams that provide approximately 638,000 MWh of electricity to the New England Grid. The Comerford Dam, McIndoe Falls Dam, and the Moore Dam have total drainage area required to handle a breach of the dams is calculated at 3.4 MM acres.

(For more information on electrical utilities, see the Energy Chapter.)

TELECOMMUNICATIONS

Ryegate currently hosts two cell towers in town that give communications access to certain parts of town, unfortunately the hilly terrain blocks other areas of town from adequate cell service. The two cell towers are located along Interstate 91 at high elevations and provide service for the I-91 Corridor and Connecticut River Valley area. Cell service begins to become spotty in the western parts of town, including Ryegate Corner. South Ryegate Village has no cell service.

WATER SUPPLY

South Ryegate has a private water system that serves nine households. In 2013, the cooperative responsible for maintaining the system paid for one household to drill its own water system in order to be disconnected. The system dropped below the user threshold to be considered a public system.

East Ryegate village has its own water system. The East Ryegate Fire District No. 2 owns a 174-foot deep gravel well located on the eastern side of the Village between Russell and Wallace Streets. A six-inch water main carries 150 gallons per minute to a 200,000 gallon reservoir situated about 1,000 feet west of Route 5, approximately 100 feet above the Village. This water supply serves about 50 households and the former paper mill site. Hydrants connected to the system provide limited fire protection. The Fire Department goes up the road about a half-mile

to the Ryegate woodchip plant to obtain water for fire service because of the aging infrastructure of the East Ryegate Village Water system. Water pressure is adequate throughout the system.

Ryegate's water resources include the Connecticut and Wells Rivers and their tributaries, Coburn, McLam, Symes and Ticklenaked Ponds. There are homes within 50-100 feet of the water source, which could cause contamination through the use of fertilizers, pesticides, or other chemicals.

Ryegate's zoning districts previously designated source protection areas for community water supplies, but the overlay areas were not accompanied by any specific standards for water quality protection. The Town should consider training and technical assistance from the Vermont Rural Water Association to determine source protection standards that are appropriate for Ryegate.

Due to its rural nature, most of the town relies on springs or private wells for water supplies. Two private water systems in Ryegate Corner have become contaminated by road salt in recent years, and the Town has had to absorb the expense of replacing the systems.

SEWAGE DISPOSAL

East Ryegate Fire District provides sewage for the village; South Ryegate Waste Water District provides sewage for 14 units. The rest of the town relies on private septic systems.

Built in 1985, the East Ryegate sewer system serves 38 residences. Grey water is pumped from a gravity fed cistern to a covered sand filtration complex. Filtered water aerates in a weir and is then tested for coliform counts. If needed, minute amounts of chlorine are added prior to the water's return to the Connecticut River.

The system is permitted by the State of Vermont for 10,000 gallons per day. Currently between 4,000-5,000 gallons are processed each day.

Maintenance projects include possible removal and replacement of the filter sand in the next 5-10 years. Sand effectiveness and water quality are tested regularly with results provided to the State.

The entire system was built with bond funding. Bond payments and annual maintenance are funded by taxation of East Ryegate residents who use the system.

The East Ryegate water system was recently upgraded and revised. Piping was replaced, the stand-by chlorination system was upgraded and the cistern was repaired. The system serves about 55 homes. Samples are tested frequently, and it is rare that any chlorine is required.

South Ryegate's community sewage facility serves 16 residences. It handles 4,000 gallons of sewage per day, below its capacity of 6,000 gallons per day. Built in 1982, it has outlived its expected lifespan. The leach field may require replacement in the near future. The South Ryegate sewer has a holding tank and leach field. It is permitted for 6,000 gallons/day, and about 4,000/day go through it. There is annual engineer testing.

All on-site septic systems (and potable water supplies) are regulated by the State of Vermont. Within the Agency of Natural Resources, the Department of Environmental Conservation is

responsible for this.

Refuse Disposal

Refuse disposal is handled by privately contracted businesses. They transport refuse to approved landfills. Also, the town, in a joint effort with Groton, has recycling opportunities on Friday evenings and Saturday mornings in East Ryegate village.

Ryegate is part of, and supports, the Northeast Kingdom Waste Management District, (NEKWMD) which maintains the required solid waste implementation plan. The recycling center serves a population of nearly 2,200 (Groton and Ryegate) and a seasonal population of 300. The NEKWMD 2016 Report shows that the site generated about 853 tons of waste, with 366 tons (or 43%) diverted to recycling.

The recycling center in East Ryegate has paid staff as well as volunteers from Ryegate and Groton. While the service is free, there is a nominal charge for certain items, such as electronics.

Statewide, diversion rates have stagnated at around 30% to 36% for more than a decade. Act 148 was signed into law in 2015 to introduce sweeping changes to the way we manage wastes.

Act 148 has been phased in over a six-year timeframe to give municipalities and waste districts an opportunity to better align their facilities and services in order to comply with the law. In essence, the Act enforces unit-based pricing (also known as “pay as you throw”) to minimize waste generation, and bans recyclables from the landfill.

Additionally, all organics – such as food scraps and yard wastes – are banned from the landfill by 2020. The NEKWMD reports that 2.82 tons of food scraps were collected at the Ryegate Recycling Center in 2016.

Food scrap hauling – particularly for businesses that generate large volumes of scraps – is a local business opportunity withroom for growth. At least local entity is evaluating this opportunity with the Waste Management District.

Storm Drainage

Storm drainage consists of ditching along town roads and, where necessary, culverts that allow water to run under roads.

First Responders

Ryegate has a volunteer fire department with 20 volunteers and two stations, one in Ryegate Corner and one in South Ryegate.

The Ryegate Corner Station was built in 1981. The South Ryegate Station was purchased by the town in November of 2000. The fire department has a mutual aid agreement with the surrounding towns of Groton, Barnet, Wells River, Monroe and Woodsville, New

Hampshire. Fire fighters are dispatched by Twin State Mutual Aid in North Haverhill, New Hampshire. There are eleven dry hydrants located throughout the town. In the past few years, the fire department has received new radios for emergency communications and cell service is slowly improving around town.

The Town of Ryegate has Mutual Aid Agreements with two mutual aid systems for unlimited resources: Capital Fire Mutual Aid, which encompasses towns all the way to Warren, Vermont, Twin State Mutual Aid Fire Association, which encompasses Groton, Ryegate, and towns all the way to Twin Mountain in the East. The Town now has a 3000-gallon tanker. A command vehicle is in service.

Ryegate and Groton have a FAST Squad of approximately 12 volunteers with training as Emergency Medical Technicians (EMT) and Emergency Care Attendants (ECA). A truck, stationed at the Groton Fire Station, is equipped to carry tools and supplies, but does not transport patients. The Fast Squad stabilizes patients and provides emergency first aid preceding the arrival of Woodsville Ambulance.

DHART, the emergency helicopter from Dartmouth-Hitchcock in Lebanon, New Hampshire serves Ryegate with pre- arranged landing spots and fast emergency transportation. The town pays a yearly appropriation to Woodsville Ambulance, and users of the service are billed. The Fast Squad is currently dispatched by Twin State Mutual Aid in North Haverhill.

The Town of Ryegate is dependent upon the Vermont State Police and the Caledonia County Sheriff's Department for law enforcement. The nearest Vermont State Police Barracks is St. Johnsbury.

OTHER FACILITIES

The Town Office is located on North Bayley-Hazen Road. It houses the offices of the Town Clerk, Listers, and Treasurer, and a postal branch, the Ryegate Rural Station. Located just up Witherspoon Road is the Grange Hall and the Town Hall, the latter used for Town Meetings and elections. The Ryegate Volunteer Fire Department has facilities in both Ryegate Corner and South Ryegate village.

6. EDUCATIONAL FACILITIES

GOALS:

- To broaden access to educational and vocational training opportunities sufficient to ensure the full realization of the abilities of all residents, and promote opportunities for lifelong learning.
- Stay on track to retire long term debts by 2020.
- Maintain flexibility regarding enrollment.
- Factor economic realities with the need for curriculum and physical plant growth.

POLICY:

- While recognizing the need to adhere to the dictates of Act 46, the Town will not encourage any school restructuring which does not include the operation of a pre-K-12 school at Blue Mountain.
- The Town supports promotion of foreign language instruction, sustainable agriculture and forestry, science and math, and alternative energy and environmental awareness in the curriculum.

EDUCATION STRATEGIES:

- Support afterschool enrichment programming.
- Explore potential expansions for increased community use, e.g. senior meals, yoga classes, art classes, and similar continuous improvement activities.
- Support increased access to behavioral health and primary care.

Blue Mountain Union School was built in 1970 to serve the Village of Wells River and the Towns of Ryegate and Groton. Situated on a parcel of land that is located a short distance west of the Village of Wells River north of VT 302, and east of Interstate 91, the building underwent extensive interior renovations in 1998. The facility includes classrooms and a number of special purpose rooms that include a cafeteria, a gymnasium, two computer labs, a beautiful library, two science labs, an art room, a music room, and a classroom furnished with kitchen facilities and equipment. On the grounds surrounding the building are two playgrounds, a tennis court, and athletic fields for soccer, softball, and baseball. A staff of 80-90 teachers, paraprofessionals, clerical staff, cafeteria staff, custodians, and administrators are responsible for the approximately 420 students. The School District's annual report is available at www.bmuschool.org.

Unlike much of the state, the enrollment at Blue Mountain Union has been minimally reduced

over the past five years, and based on the enrollment in the younger grades, it should remain steady or increase over the next several years. Students from Ryegate currently make up about 43% of the total number. Historically, tuition students constitute approximately 5% of the student body.

Adult education options are available nearby through, the Community College of Vermont, Riverbend Career & Technical Center, and LNA certification at nearby extended care facilities.

Installed in 1998, a wood chip fired boiler provides heat to BMU and saves money for the taxpayers. The boiler is carbon neutral. A solar panel demonstration project is producing about $300 worth of electricity annually. BMU has also partnered with Groton Community Solar as an "offtaker" and purchaser of solar-produced electricity. The school plans to continue exploring creative ways to increase the use of renewable energy, thus reducing its carbon footprint.

Routine maintenance is ongoing, including gym floor resurfacing and carpet replacement which will need to be completed in the near future.

Table 6.1: Blue Mountain Union School Student Enrollment Data (As of January 5, 2017)

Grade Level	Groton	Ryegate	Wells River	Other	Total
Preschool 3 Years Old	8	2	1		11
Preschool 4 Years Old	6	12	3		21
Kindergarten	15	6	6		27
Grade 1	9	19	5		33
Grade 2	11	25	4		40
Grade 3	13	11	1		25
Grade 4	12	12	5		29
Grade 5	11	18	5		34
Grade 6	13	14	3		30
Grade 7	15	13	9		37
Grade 8	11	10	3		24
Grade 9	8	16	3	5	32
Grade 10	11	5	4	2	22
Grade 11	7	8	8	3	26
Grade 12	6	10	4	3	23
Home school taking courses	1				1
School choice				4	4
Total student enrollment	157	181	64	17	419

7. Adjacent Towns and the Region

GOAL:

- To work creatively with communities to implement plans and to improve the quality of life.

STRATEGY:

- Maintain Ryegate's representation on the NVDA board.

ADJACENT COMMUNITIES

The Town of Ryegate is bordered by Groton, Peacham, Barnet, and Newbury, with the Connecticut River (and New Hampshire) as the town's eastern border. Surrounding towns are very similar topographically. Each of the Vermont towns involved has several small villages within the town. These towns have active farms, and the residents want to keep it that way and encourage more agricultural development, according to responses on questionnaires and adopted plans. Each has rolling hills with a blend of fields and woods.

Ryegate has a mutual aid agreement with all the towns surrounding it and with New Hampshire towns across the river. Twin State Mutual Aid is dispatched out of Haverhill, New Hampshire.

Ryegate and Groton have worked closely together in the areas of emergency response and recycling.

Directly to our east is the Connecticut River and the New Hampshire towns of Bath and Monroe. They are similar geographically to Ryegate. Monroe (2010 Census population 788) has an active planning commission, and the town enforces a zoning ordinance and flood hazard regulations. Bath (2010 Census population 1,077 also has an active planning commission, maintains a master plan, and enforces a zoning ordinance, subdivisions regulations, flood hazard regulations, and an ordinance for large wind towers.

Haverhill (2010 Census population 4,697) is the county seat for Grafton County, a large county in the center of the state. Woodsville is the biggest village in Haverhill and has encouraged development, although some centrally located storefronts remain empty. This development has included the establishment of a Walmart which has had a significant impact on the local economy.

There are currently no grocery or convenience stores in Ryegate. Woodsville, St. Johnsbury, and Barre are common places of employment and commercial destinations for Ryegate residents.

The land use goals of Ryegate's neighbors are similar to our own. Most plans have in common the following goals:

- To preserve the rural character of the town by maintaining the historic settlement pattern of the town center.

- To encourage appropriate development of business and economic activity.
- To protect the natural and historic features of their landscape.
- To maintain and improve the quality of the air, water, and land.
- To ensure that public facilities grow sustainably with the growth of the town's population.

The current status of planning and zoning among Ryegate's neighboring towns is as follows:

Groton: Town Plan adopted May 18, 2017. Zoning bylaw in effect and last updated November 15, 2012.

Peacham: Town Plan adopted February 29, 2012. The plan expired in early 2017, but the town has an active planning commission that is working on an update. The most recent version of the zoning and flood hazard bylaws were adopted February 28, 2017.

Barnet: Town Plan adopted August 10, 2015. Zoning bylaws are in effect and were last updated October 9, 1997, but the Barnet Zoning District map was updated on April 1, 2013. Roy Mountain Wildlife Management Area straddles the Barnet-Ryegate town boundary. This is managed by the State of Vermont, and there are no conflicting land uses.

Topsham: Town Plan adopted September 25, 2012. The town has no zoning bylaw in effect.

Newbury: Town Plan adopted August 19, 2015. The town has zoning regulations adopted June 18, 2012. The town also has subdivision regulations in effect, last adopted March 5, 1996.

THE REGION

Ryegate is a member community of Northeastern Vermont Development Association, the regional planning commission and economic development corporation serving Caledonia, Essex, and Orleans Counties. The town of Ryegate has regularly appointed a representative to serve on NVDA's board.

NVDA's Regional Plan was last updated and adopted in 2018 and is currently being considered to receive Substantial Deference in the Section 248 process.

The Regional Plan notes the importance of preserving traditional development patterns and supporting the vitality of the region's village centers, such as South Ryegate, East Ryegate, and Ryegate Corner.

The following regional plan goals pertaining to village centers and traditional development patterns may be relevant to Ryegate:

- Established centers will be an economically vital mix of commercial and residential uses, and will offer a variety of housing types available at different price points to support long- term sustainability.
- Towns will be supported in identifying and implementing strategies that reverses the current trend of new residential development occurring primarily outside of centers.
- Traditional development patterns will be maintained and linear "strip" development will

be avoided. Historic structures, community facilities, and other buildings will be preserved and adapted for reuse. Brownfield sites will be reclaimed.

- Assist communities applying for designation under the Vermont Downtown, Village Center, and/or Neighborhood Development Programs where appropriate to encourage mixed- use development (residential, commercial and appropriate light- industrial) in centers.
- Encourage adaptive reuse of historic structures through tax incentives, tax credits, grants, and loans, assistance in location of funding, etc.
- Encourage desired town center development through investment, maintenance, and expansion of appropriate infrastructure (sidewalks, water and sewer, parking, public spaces, etc.).
- Support beautification efforts in town centers and downtowns.
- Encourage towns to plan for community recreational and social needs.

For rural areas – and Ryegate has many – the regional plan has the following relevant goals:

Avoid the development of agricultural lands with auto-dependent residential subdivisions by encouraging towns with land use regulations to lower the permitted residential density in agricultural zones, coupled with planned unit development or clustering provisions to ensure efficient and well- designed developments.

Support local conservation efforts.

Encourage community open space plans and recreation infrastructure, recognizing that privately-held land will not be available unless protected through the purchase of conservation and access easements.

8. ENERGY

GOALS:

- Encourage the efficient use of energy and the development of renewable resources.
- Support the expansion of solar, hydro, and wind as sources of electricity.
- Decrease the region's reliance on fossil fuel as a source of heat by increasing the use of efficient wood heat systems and biomass.
- Encourage the replacement of fossil fuels with electricity generated from renewable resources.

OBJECTIVES AND STRATEGIES

OBJECTIVE: MAINTAIN FOREST RESOURCES AND FOREST HEALTH AS A PREREQUISITE TO A SUSTAINABLE WOOD ENERGY FUEL SUPPLY.

- Consider a Land Evaluation Site Assessment to support and prioritize conservation efforts.
- Explore alternatives to large lot zoning that might provide more flexibility in minimizing fragmentation of working lands.
- Enlist the technical support of conservation organizations to identify and conserve lands appropriate for a town forest.

OBJECTIVE: ENCOURAGE CONSERVATION BY INDIVIDUALS AND ORGANIZATIONS IN RYEGATE.

- Establish an Energy Committee to spearhead outreach and education on efficiency improvements and fuel switching opportunities.
- Encourage the Town to adopt a policy that taxpayer financed building or maintenance projects must consider energy efficiency and future energy costs.
- Increase awareness of the benefits of efficiency and weatherization programs offered through agencies such as Efficiency Vermont, NETO/HEAT, Heat Squad, and others.
- Encourage awareness of and adherence to state and national efficiency building codes (e.g. Residential Energy Standards and Commercial Building Energy Standards).
- Explore the possibility of establishing a training program at the River Bend Career & Technical Center that allows trainees to perform no-cost or low-cost energy audits on residences.

OBJECTIVE: DECREASE THE USE OF FOSSIL FUELS FOR HEATING.

- Use the Community Energy Dashboard to crowdsource information regarding efficiency and fuel switching success stories.
- Plan for Town buildings and vehicles to transition away from oil-based energy and toward alternative fuels.
- Consider becoming a "clean energy district" and participate in the PACE program (Property Assessed Clean Energy). This would provide consumers with options to more affordably implement grid-tied renewable energy systems.

OBJECTIVE: PROMOTE THE DEVELOPMENT OF MORE ENERGY EFFICIENT BUILDINGS.

- Consider the use of innovative zoning incentives, including density bonuses or tax stabilization for mixed-income developments, universal access design, and small footprint housing.
- Encourage increased use of public transit and reduce reliance on single-occupancy vehicle trips.
- Establish additional park and rides, preferably with an EV charging station.

OBJECTIVE: PROMOTE A SHIFT AWAY FROM GAS/DIESEL VEHICLES TO ELECTRIC OR OTHER NON- FOSSIL FUEL TRANSPORTATION TO NON-FOSSIL FUEL OPTIONS.

- Promote the development of charging stations to facilitate increased use of electric vehicles.

OBJECTIVE: PROMOTE AND EXPAND THE USE OF NON-MOTORIZED INFRASTRUCTURE, SUCH AS BICYCLING AND WALKING.

- Pursue funding opportunities to promote master planning, e.g. VTrans Local Transportation Facilities, Better Connections Grants.
- Pursue Village Center Designation to become eligible for the Better Connections Grant Program.

OBJECTIVE: ENCOURAGE THE DEVELOPMENT OF ALTERNATIVE ENERGY RESOURCES IN TOWN. FOCUS ON RENEWABLE ENERGY SOURCES SUCH AS WIND, SOLAR, AND HYDROELECTRIC.

- Minimize local regulatory hurdles (zoning) for installation of such systems.
- Support solar panel safety training programs for fire fighters and first responders.

Note: Energy use estimates and energy and fuel switching targets were prepared by NVDA, with assistance from the Department of Public Service. More information about the data, sources,

and methodologies can be found in Appendix B.

ENERGY USE BY SECTOR

The citizens of Ryegate are able to purchase energy for their heating and lighting needs from a variety of sources. Electric grid access is available from Green Mountain Power and the Washington Electric Co-op. Petroleum based products (propane, fuel oil and kerosene) are sold and delivered by several local distributors. Diesel and gasoline are sold at local gas stations, all located outside of town.

Firewood can be purchased from numerous local suppliers or cut on one's own land.Currently there appears to be ample supply of these traditional energy sources.

With time the imbalance between world- wide demand for and supply of oil may affect both the price and availability of petroleum products.

According to NVDA estimates, heating (space and water) is the largest energy use in Ryegate, accounting for a little less than half of all energy use. Transportation is the second largest use. Electricity usage accounts for the smallest share. (See Table 8.1)

What is a BTU?

Fuels come in a variety of measurements – by cord, by gallon, by kilowatt – so this plan converts units of measurement into British Thermal Units (BTUs) in order to compare their energy output consistently.

According to the US Energy Information Administration a BTU is the measurement of the quantity of heat required to raise the temperature of one pound of liquid water by 1° F at the temperature that water has its greatest density (approximately 39 °F.)

One BTU is a miniscule amount, so BTUs are often measured in the millions (MM BTUs).

Table 8.1 Energy Use by Sector

Sector	MM BTUs	% of All Energy Use
All Heating	68,180	46.3%
Heating, Residential	60,955	41.4%
Heating, Non- residential	6,654	4.5%
Heating, Seasonal	571	0.4%
Transportation	60,057	40.8%
Electricity	18,952	12.9%
TOTAL	146,474	

(Source: NVDA and Efficiency Vermont)

CURRENT HEATING CONSIDERATIONS

Year-round residences are the largest contributor to Ryegate's heating costs. Collectively, total energy use for heating all occupied units in Ryegate accounts for about 60,955 MM BTUs annually at an annual cost of $826,650.

Fuel oil is the most prevalent fuel source for Ryegate residents, although home-owners also rely heavily on the use of wood. Renters, who typically have less control over their choice of heating sources, are less likely to use wood and are far more likely to rely on fuel oil or propane.

With fluctuations in the price of oil in recent years there has been a shift towards more wood-based heat sources, including outdoor wood boilers. The State of Vermont regulates the siting and installation of outdoor wood boilers, and there are minimum required setbacks and stack heights that need to be adhered to when these are installed. Communities have the option of enforcing more stringent standards.

Compared to other towns in the Northeast Kingdom, seasonal use does not contribute significantly to Ryegate's energy consumption patterns, but it should be considered in long-range planning endeavors, particularly since the region is likely to see continued conversion of seasonal units to year 'round.

While wood is readily available in Ryegate, the age of older less energy-efficient homes might still drive up heating costs. In fact, the age of Ryegate's housing stock is probably the most significant contributor to heating energy use. According to ACS 5-year estimates, 41% of Ryegate's owner- occupied housing stock predates 1940. Older structures are likely to be "leaky" and poorly insulated, which can nearly double the average thermal use from 45,000 BTUs per square foot to as much as 80,000 BTUs per square foot.

Blue Mountain School, which is actually in Wells River, is not included in the energy use estimates, but it clearly represents a significant energy use for Ryegate, as the town supports the school and actively participates in critical decisions about maintaining the facility. Since 1998, the 77,000 square foot facility has been heated with woodchips, producing more than 39,000 net BTUs per square foot. The wood chip system, which was installed in 1998, reduces annual heating costs by roughly one-third over the cost of heating entirely with fossil fuel.

FUTURE HEATING CONSIDERATIONS

In order to meet the statewide energy goal of meeting 90% of energy needs through the use of renewables, Ryegate must pursue two strategies:

- Reduce overall heat energy consumption through aggressive weatherization and efficiency upgrades; and
- Switch from fossil-fuel heat to clean renewable sources.

Energy efficiency is, generally, the most cost-effective method of saving energy and reducing the Town's carbon footprint. Therefore, it is recommended that residents pursue energy efficiency solutions first, such as home energy audits and energy efficiency retrofits, before investing in the installation of renewable energy systems. The 2016 Vermont Comprehensive Energy plan states that efficiency will ensure an affordable and stable cost of doing business,

increase entrepreneurship opportunities, improve labor market conditions, drive production, and drive improvements in demand-side thermal and electric efficiency and conservation.

The targets in Table 8.2 provides an idea of the scale by which these strategies must be carried out if we are successful in meeting statewide energy goals.

Table 8.2: Weatherization and Fuel-Switching Targets for Ryegate

Weatherization	2025	2035	2050	Fuel Switching	2025	2035	2050
Estimated # of residences	4740	502	532	New efficient wood heat systems in residences	244	200	145
% of households to be weatherized	20%	33%	33%	% of residences with wood heat systems	51%	40%	27%
# of households to be weatherized	95	165	177	New heat pumps in residences	72	153	194
				% of residences with heat pumps	15%	30%	36%
Estimated number of commercial establishments	13	13	14	New efficient wood heat systems in commercial establishments	3	4	6
% of commercial establishments to be weatherized	8%	13%	23%	% commercial establishments with wood heat systems	24%	29%	32%
# of commercial establishments to be weatherized	1	2	3	# commercial establishments with heat pumps	1	2	3
				% commercial establishments with heat pumps	9%	16%	23%

Source: NVDA, with assistance from the Department of Public Service. (Note: Efficiency Vermont has compiled some historic data on thermal improvements, which can be found in Appendix B. This data helps to provide an idea of the kinds of projects that will help Ryegate meet the above weatherization targets.)

WEATHERIZATION RESOURCES

Many newer and a few older Ryegate dwellings have been built with attention to conservation of energy. Among those techniques are copious insulation, maximizing southern exposure, and earth- sheltering.

NETO/HEAT has an office in St. Johnsbury, and they provide weatherization assistance.

Efficiency Vermont provides many incentives for residences and businesses to make efficiency improvements in lighting and weatherization.

NVDA has provided energy efficiency audits for municipal buildings in Ryegate. There are specific recommendations that the town can act on to save money. Their reports identified a total savings of 82.4 MM BTUs among all three buildings, with varying payback periods.

Vermont provides a tax credit that investors can claim in addition to the federal credit.

Efficiency Vermont maintains an online database of rebates and incentives small- scale renewables and efficiency improvements. (http://programs.dsireusa.org/system/program/detail/2325). With regards to municipal tax, Vermont law allows municipalities to waive the property taxes for solar facilities and any land, not to exceed one-half acre, on which it is built.

Property-Assessed Clean Energy (PACE) Districts allow property owners to borrow money to pay for such things as energy efficient water heaters, lighting, furnaces, boilers, windows, thermostats, and programmable insulation, as well as solar heating, PV, wind and biomass systems. The amount borrowed is typically repaid via a special assessment on the property over a period of up to 20 years. In Vermont, local governments are authorized to create PACE Districts to provide financing. Participating property owners must agree to a special assessment and lien on the property and pay a one-time, non-refundable fee to support the reserve fund created to cover losses in the event of foreclosure of participating properties. The district may release a lien on a property once the property owner has met the terms of the loan.

The Vermont Residential Energy Code— Residential Building Energy Standards (RBES)—was passed by the Vermont State Legislature in May 1997 to establish standards to promote energy conservation in all new residential construction. Unfortunately, there are few opportunities to enforce compliance except through zoning, if the zoning ordinance requires a Certificate of Compliance. The Town should consider ways to amend zoning to ensure that energy standards are met.

Ryegate could benefit from a local energy committee who can coordinate outreach and initiatives in pursuit of 2050 goals. Efficiency Vermont and NVDA are available to assist in establishing and training local energy committees around the region.

FUEL-SWITCHING OPTIONS IN RYEGATE

Although cord wood continues to be a popular choice in the region, wood pellets, which are cleaner burning and more efficient than cord wood, are gaining popularity among residents. Stoves and furnaces can be controlled by a thermostat. Their prices have remained relatively stable, although there have been some shortages in recent heating seasons.

Geothermal, or “ground source heat pump systems”, extract natural low-temperature thermal energy from the ground during colder months for heating, and transfer thermal energy from the building to the ground in warm months for cooling. A geothermal system in Vermont can save roughly $1,000 to $2,000 annually in heating costs and have a “simple payback time” of between 10-20 years. This technology operates much like a refrigerator, utilizing a heat pump, heat exchanger, and refrigerant. While geothermal systems do require electricity to operate the pumps, the systems generally deliver between three to five times more heat than the electrical energy they consume (depending on the type of system).

Geothermal pumps require excavation and duct work, pricing the technology out of reach for many residents. In recent years, however, manufacturers have developed similar air-sourced heat pumps that operate more consistently over Vermont’s vast temperature ranges. Also called “cold climate heat pumps” or “mini splits”, these units can be two to three times more

efficient than propane and fuel oils. Unlike geothermal units, they do not require excavation or duct work and can be much less expensive to install. Cold climate heat pumps have the capacity to heat about only 50% to 70% of a building, depending on the size and layout of the structure. Ryegate's older housing stock, which is characterized by multiple ells or wings, may be difficult to heat with heat pumps alone, but the pumps may be effective for boosting colder underserved zones. They also may be useful in outdoor workspaces. Despite recent improvements in effectiveness on cold days, a backup heating source is usually required for sub-zero temperatures.

Biofuels may be an option for Ryegate residents as well. These are discussed in greater length under "Future Transportation Options".

CURRENT TRANSPORTATION ENERGY CONSIDERATIONS

Energy use in transportation is most greatly influenced by the development patterns of the region. According to NVDA estimates, long commutes and incidental trips require NEK residents to drive an average of 14,000 miles per year. That means collectively, Ryegate residents drive 11.2 million miles annually, accounting for more than $1.1 million in fuel costs. Nearly all of this energy is non-renewable. Ethanol currently accounts for all renewable transportation energy usage – about 6% of total BTUs.

As of January 2017, there were no plug-in electric vehicles (EVs) registered in Ryegate. Nevertheless EVs have the greatest potential to reduce Vermont's statewide greenhouse gas emissions. "Refueling," which is as simple as plugging into an electric outlet, costs the equivalent of about $1.00 per gallon.

The nearest EV dealership to Ryegate is in St. Johnsbury, and there are dealerships in White River Junction and Barre.

The nearest public charging station is in Danville (Marty's First Stop), and it is the only fast-charging station within a 15-mile radius. A number of public charging stations have also been established around the NEK, and several exist outside of the region in Plainfield, Bradford, and Barre. Clearly more public charging infrastructure is needed, as an EV driver making a single trip to St. Johnsbury could be stranded there for at least an hour. While energy providers in pursuit of Tier III credits will likely continue to offer rebates and incentives for Ryegate residents to purchase EVs, more public charging infrastructure will be needed to support expanded EV use.

FUTURE TRANSPORTATION ENERGY CONSIDERATIONS

In order to meet the statewide energy goal, Ryegate must pursue two strategies:

- Reduce reliance on light-duty vehicles
- Switch from to non-fossil fuel burning heat sources.

Achieving the first strategy is a tall order in a rural community, where development patterns directly impact energy use, especially in regards to individual behaviors. With limited transit infrastructure, the region is dominated by single-occupancy light-duty vehicles. Residents typically commute to disparate labor market areas, reducing opportunities for carpooling. VTrans offers grant assistance to municipalities who wish to establish park and rides on

municipal, state, or leased property on or near state highways. Mixed-use, higher density neighborhoods encourage more pedestrian use. The following land use principles encourage reduced transportation energy consumption:

Encourage the location of new development in or near traditional village and city centers to reduce both sprawl and the number of vehicle miles driven. Compact, mixed-use development can reduce residents' reliance on the automobile, vehicle miles traveled, and inherent system energy costs — including energy costs associated with maintaining roads and related infrastructure.

Targeting economic and residential growth within areas intended for more concentrated development allows people to walk to their destinations and makes public transit services between growth centers more economically feasible. Clustering and other energy efficient development patterns should be encouraged. Alternative transportation accommodations, such as bike and pedestrian lanes, can help to reduce reliance on vehicles.

Additionally, improved telecommunications infrastructure in this region has the potential to reduce annual VMTs by allowing more workers to telecommute.

Given the vast majority of Ryegate residents are employed outside of the community, ride sharing is another opportunity to reduce transportation consumption. There is one park and ride facility in South Ryegate at the fire station. This lot is maintained by the Town of Ryegate. It is lit and available for use 24 hours a day, but there are no bicycle racks or charging outlets for EVs.

While smart growth principals are worthy goals for Ryegate, they remain in many ways aspirational, with a number of land and socio-political constraints. An analysis of long-term development trends in the region has shown that market demands favor scattered and dispersed development. Village Center Designation, which offers tax credits to incentivize reinvestment in traditional areas of development, may be one way to reverse this trend.

Despite the lack of infrastructure and rough terrain, the majority of light-duty vehicles are expected to be powered by electricity by the year 2040.

Table 8.3: Transportation Fuel Switching Targets for Ryegate

	2025	2035	2050
Projected number of light-duty vehicles in the area, by year	900	1,013	1,139
Number of vehicles powered by electricity	109	348	749
% of vehicles powered by electricity	12%	34%	66%
Number of vehicles using bio-fuel blends	742	510	89
% of vehicles using bio-fuel blends	82%	50%	8%

Source: NVDA, with assistance from the Department of Public Service. Projected number of vehicles in the area is estimated to be roughly commensurate with projections of population and households. EV estimates assume a gradual increase in EV fuel economy from 3 miles per kWh to 4 miles per kWh by 2050. Bio-fuel estimates assume a gradual increase in fuel economy to 40

mpg by 2050.

Biodiesel is commonly made from soybeans, rapeseed (canola), and sunflowers; all of which can be grown in Vermont. Biodiesel can be blended with diesel up to 5% (B5) to be safely used for on-road vehicles. Higher blends, including pure biodiesel (B100) can be used in off-road equipment and farm vehicles. Black Bear Biodiesel, located just outside of the region in Plainfield, is a B100 fueling station.

Research has found that oilseed crops, when grown in rotation with other crops, can help to support sustainable, diversified, and profitable agricultural enterprises. The Vermont Bioenergy Initiative, a program of the Vermont Sustainable Jobs Fund, provides early-stage grant funding, technical assistance and loans to producers. Oilseed production may help existing farmers develop an additional revenue stream. over the same period.

CURRENT ELECTRICITY USE CONSIDERATIONS

Customers are primarily residential, and the counts have been fairly steady (about 590 residential customers) over the most recent three-year period. Residential customers have reduced their average use in recent years – from 24 MMBTUs per customer, to 23. Similar data for commercial and industrial users is not available, but this sector has seen a 4% increase in overall use over the same period.

Efficiency measures tracked by Efficiency Vermont and VEIC indicate that Ryegate utility customers have achieved an overall reduction in 146,829 kilowatt hours and a thermal savings of 175 MM BTUs over the most recent three-year period (2014-2016).

FUTURE ELECTRICITY USE CONSIDERATIONS

While electricity is currently the smallest energy use in Ryegate, its use will increase exponentially as users of fossil fuels convert to electricity generated from renewable resources, such as heat pumps and EVs. Efficiency upgrades are therefore essential in making this transition possible.

Table 8.4: Upgrade and Efficiency Targets for Ryegate

	2025	2035	2050
Estimated number of residential customers	711	753	799
% of residential customers to upgrade electrical equipment	26%	39%	54%
# of residential customers to upgrade electrical equipment	187	293	430

Source: NVDA, with assistance from The Department of Public Service (Note: Efficiency Vermont has compiled some historic data on thermal improvements, which can be found in Appendix B. This data helps to provide an idea of the kinds of projects that will help Ryegate meet the above weatherization targets.)

GENERATION AND DISTRIBUTION

Green Mountain Power serves the major portion of Ryegate (see Attachment B, Figure B.4 Electric Utility Service Territory Map). Washington Electric Coop serves the northwest corner of

community along the Peacham Road and Bayley Hazen Road. Both utilities have become increasingly involved with the issues and policies associated with renewable energy production, particularly distributed, small- scale power generation.

Ryegate currently generates upward of 180,000 MWh of renewal energy (See Appendix B, Table B.9: Energy Generation in Ryegate). The woodchip plant and Dodge Falls Hydro account for the bulk of generation. The woodchip plant uses propane as a startup fuel, but the primary source is biomass. Two smaller projects are sited on the Wells River, right on the Town's border, in Newbury.

Residential-scale net-metered projects currently generate more than 56 MWh. In addition, there are two hot water solar systems. A few homes are 'off-the-grid.' To date there have been no residential-scale wind or hydro projects.

GENERATION POTENTIAL IN SUPPORT OF STATEWIDE ENERGY GOALS

Ryegate's new net generation in support of 2050 goals is 331 MWh. This is based on the town's share of the regional population.

Existing generation in Ryegate does not count toward this target, but the region already has a low net generation target, mainly because of the existing generation, such as the region's hydro facilities, the Ryegate Power Plant, and industrial wind production in Sheffield and Lowell. The region's net generation target for new solar ranges from 246 MW to 377 MW. There is no regional net generation target for wind. It is possible that the solar development proposed for the town's gravel pit – a statewide preferred location-- could make substantial progress toward meeting the municipal target.

Ryegate has sufficient land for the orderly development of solar, according to NVDA's mapping analysis. These maps, which are to be used to gauge overall siting potential rather than a definitive siting tool, identify known constraints, as well as potential constraints:

Known constraints are areas not likely to be developed for renewable energy because they contain one or more of the following: vernal pools; river corridors; FEMA floodways; significant natural communities; rare, threatened and endangered species, national wilderness areas, wetlands (Class 1 and Class 2).

Possible constraints are areas that would likely require mitigation because they contain the one or more of the following: agricultural soils; special flood hazard areas (outside of the floodway); protected (conserved) lands; deer wintering areas; Act 250 mitigated agricultural soils; hydric soils, and highest priority forest blocks.

Proposed regional constraints: NVDA's regional plan has long held that rural areas should receive very little commercial or industrial development unless it occurs in an established industrial park, or in an area specifically designated in the local bylaw or plan as being well suited to such uses. Lands with an elevation of 2,000 feet or more merit consideration as a special class of rural lands that should be protected from any large- scale commercial or industrial development characterized by a constructed height of 100' or more, and an acre or more of permanent site disturbance, such as clear- cutting. These lands, as indicated on attached siting potential maps, contain one or a combination of factors that make them

unsuitable to such development – contiguous forest cover; sensitive wildlife and plant habitat; conservation lands and recreational assets; managed forestland; and headwaters and ephemeral surface waters, which are highly vulnerable to erosion and man-made disturbance. This high-elevation forest cover must be kept unfragmented for the attenuation of flood flows, the benefit of wildlife habitat and linkage, and public enjoyment through passive recreation.

Table 8.5: Siting Constraints

Known Constraints (Statewide Layer Developed In Support of Act 174)	Regionally Unsuitable Areas (NVDA Regional Plan)	Possible Constraints (Statewide Layer Developed in Support of Act 174)	Local Constraints
Vernal pools River corridors Floodways State significant natural communities Rare, threatened and endangered species Natural wilderness areas Class 1 and 2 wetlands	Lands with elevations of 2,000 ft or more	VT agriculturally important soils Special flood hazard areas Protected and conserved lands Deer wintering areas Vermont conservation design highest priority forest blocks Hydric soils	Open agricultural fields Scenic Viewsheds (See solar resources map): Witherspoon Drive between Dickey Drive and Renfrew) Ticklenaked Pond from South Bayley Hazen to Cedar Drive Peacham Road from Mosquitoville Road to the Barnet Town Line

PREFERRED SITES

- Roof-mounted systems;
- Systems located in proximity to existing commercial or industrial buildings;
- Areas with no known or possible constraints that are near existing hedgerows or other topographical features that naturally screen the entire proposed array;
- Former brownfields;
- Facilities that are sited in disturbed areas, such as gravel pits or former quarries;
- Working farms, where more than 50% of the energy generated by the solar development is used by the farm;
- Community projects: Local group net metered solar facilities shared by multiple community subscribers who receive credit on their electricity bills for their share of the power produced; and
- Any preferred areas as mapped on Ryegate's solar resources map.

SITING STANDARDS FOR SOLAR:

All ground-mounted solar facilities shall be sited and screened so that visual impacts are mitigated when viewed from public streets, scenic viewpoints, and/or adjacent properties. Screening shall be year-round. If topography alone does not provide sufficient screening, a combination of materials (such as trees and shrubs) shall be used to create a naturalized screen rather than a large expanse of uninterrupted, uniform material. Plantings that die or become diseased shall be replaced within six months.

Screening for solar developments projects along the three view sheds cited above shall be held to a higher standard. Solar projects shall not be visible within a thousand feet of a passenger vehicle travelling on these roads. All mid-scale solar projects proposed this these landscape areas shall have a landscape impact analysis completed by a certified landscape professional.

Although the Town does not support the siting of commercial energy development on agricultural lands, it supports the integration of on-farm solar generation into active agricultural uses that can help farms reduce expense, generate extra income, and remain viable. The town supports siting solar on existing farm structures, or the creation of buffers between organic and non-organic production areas, or in a manner that does not degrade soil or water quality.

All utility scale solar facilities shall be sited only on preferred sites.

SOLAR CLASSIFICATIONS

Small-Scale: defined as solar electricity and transmission facilities up to and including 15 kW capacity.

Mid-Scale Solar: defined as solar electricity generation and transmission facilities greater than 15 kW capacity and less that or equal to 150 kW capacity or up to two acres of developed area including fencing, whichever is greater.

Large-Scale Solar: (also known as "utility-scale") defined as a solar electricity generation and transmission facility 150 kW or greater in capacity or more than two acres of developed site area, whichever is greater.

SITING CONSIDERATIONS FOR SOLAR

The potential of rooftop solar – now a preferred site under the new net metering rule – should not be overlooked. While not every rooftop is viable, a conservative estimate of one out of every ten residential structures could produce considerable output by 2050. There is also some limited opportunity for rooftop commercial, which might include barns and other outdoor structures.

The Northeast Kingdom has a robust agricultural economy, and there is concern over the impacts of siting ground-mounted solar in a manner that fragments productive agricultural soils, effectively removing farmland from production for decades.

NVDA encourages municipalities to explore and identify local constraints that minimize farmland fragmentation. These measures may include agricultural overlays (regulatory), as well as conservation easements (non-regulatory. A number of land exploration tools, such as viewshed analyses, land evaluation and site analyses (LESAs) can help municipalities prioritize

agricultural lands for protection. NVDA encourages local planning commissions to seek technical assistance.

SITING CONSIDERATIONS FOR WIND

The regional plan does not plan for additional utility scale wind, so wind potential is calculated assuming an average output of 9.5 kW (residential), based on average capacity of existing installations in the region. Ryegate does not have a significant concentration of high elevation lands that are suitable for siting large-scale wind, and we anticipate that wind development will likely be of a farm or residential scale.

Existing small turbines in the region are sited in very low-density areas and on farmland. NVDA strongly urges municipalities to consider density in their specifications, as even small wind turbines can produce noise that is incompatible with many residential areas. This can be established through the use of noise ordinances or through required distances from nearby residential uses.

SITING CONSIDERATIONS FOR METHANE

Methane, a common gas found in the environment, can be burned to produce electricity. Large amounts of methane are produced through the anaerobic digestion of manure, agricultural wastes, and other organic wastes. Both large farms and landfills offer the best potential to utilize this resource. The only large-scale landfill in the region is already being utilized for methane generation, there is still significant potential for siting methane in the region.

The procedure also destroys harmful pathogens, reduces water quality impacts, reduces manure odors, and provides a new source of income to local farmers.

Existing on-site systems are costly, and until new technologies are available, only make economic sense for larger farms. (Central methane digestion systems do allow smaller farmers to process animal wastes, but trucking is involved, and this may be a challenge, given the town's rural terrain and harsh winters.) If state and federal grants, tax credits, and incentives remain in place to combat the high start-up costs, manure- methane generation should be expanded in the region's energy mix. The town encourages Ryegate's farmers to work with NVDA and the region's food system leadership group to secure access to technical services, grants, and other incentives to refine and maximize digester technologies.

Even though Ryegates's generation potential exceeds 120,000 MWh, it is important to remember that these are conservative estimates that account for contingencies. For example, Ryegate has 770 acres with potential for development. About eight acres are required to produce 1 MW of solar power. Obviously, not every prime acre is actually available. Property owners may not be interested in leasing their land, interconnection costs may be too high in some areas, and certain sites may still be unsuitable due to neighbor objections or other factors. Regional estimates therefore assume a more conservative estimate of 1 MW for every 60 acres.

Table 8.6: Ryegate Generation Potential

	Total MW	Total MWh Output	Assumptions/Contingencies
Residential Rooftop Solar	.23	284.5	Assumes 1 for every 10 existing residential structures (58 residences) with a 4 kW capacity.
Commercial Rooftop Solar	.02	24.5	1 out of every 10 small commercial structures, under 40,000 s.f., with a 20 kW capacity. Ryegate does not have many commercial structures per se, but a barn could have some rooftop solar.
Ground Mounted Solar	12.84	15,747.8	1 MW for every 60 acres of prime solar acres
Wind	0.10	170.4	9.5Kw for every 25 acres of prime wind
Methane	20	105,120	20 MW per one farm digester
TOTAL GENERATION POTENTIAL	33.19 MW	121,347.2 MWh	

9. HOUSING

GOAL:

- To ensure the availability of safe and affordable housing in an amount sufficient to meet the needs of Ryegate's citizens.

STRATEGIES:

- Pursue Village Center Designation in order to provide incentives for improved affordable, workforce, and senior housing.
- Make information on accessory dwelling units available to property owners.

PRESENT CONDITIONS

The 2010 Census reported 620 dwelling units in Ryegate. Of these, 478 were occupied and the remaining 142 were vacant. 109 of the 142 vacant dwelling units were held for seasonal, recreational or occasional use. Most of Ryegate's units (80%) have 5 or more rooms. About 65%

(406) of Ryegate's occupied units are owner occupied, 60% of which are mortgaged, and 40% owned free and clear.

As is typical of the Northeast Kingdom, the growth in housing stock from the previous decade has outpaced population growth. Housing stock increased by nearly 10% from the 2000 Census, while population only increased by a little over 2%.

This disparity is not the result of an increase in "seasonal" residents: the number of vacant units for seasonal, recreational, or occasional use remained virtually unchanged. A partial explanation for this disparity, however, is the trend toward smaller, non-family households, which largely consist of householders who live alone. In 2000, the average household size was 2.64 persons, with families accounting for nearly 75% of all households. In 2010, the average household size dropped to 2.46 persons, with families accounting for just a little over 70% of all households.

Fewer Ryegate residents are homeowners than the previous decade: the share of owner-occupied units dropped by 2%, while the share of renter-occupied units increased by 2% over the same period. There was an absolute increase in renter-occupied units over the same period, from 57 to 72 units.

Whether for owner-occupied or renter- occupied, the primary forms of housing in Ryegate are single-unit structures and mobile homes. The latest American Community Survey 5-year estimates shows that there are only six structures with 3 or 4 units in town.

About one half of Ryegate's housing has been built since 1959. This rate of building amounts to 6 new homes per year. Nearly all (97%) of the units have complete plumbing and kitchen facilities.

AFFORDABILITY

A household's total housing costs should be 30% or less of the household income in order to be considered affordable. While the 30% rule generally applies to housing costs for all income brackets, Vermont statute sets different income limits for owner-occupied housing and for rental housing. Rental housing is classified as "affordable" if it serves households earning no more than 80% of area median income (AMI), while owner-occupied housing is considered affordable if it is priced to serve households earning up to 120% of AMI. This change in statutory definition accounts for the number of higher income individuals who still have difficulty finding suitable housing.

The 120% threshold is often referred to as "workforce" housing. It is typically used to describe housing for those who are gainfully employed in occupations that are essential to a community, such as teachers, healthcare workers, first responders, as well as occupations that may pay relatively lower incomes, such as food services, retail, hospitality and tourism. It does not typically include age- or income-restricted housing, nor is it generally supported through the use of subsidies.

By contrast, many affordability programs, such as HUD, are income-restricted -- up to 80% of the AMI. According to 2017 data from the Vermont Housing Finance Authority, there are seven rental units in Ryegate that are income-restricted. None are age-restricted.

According to latest American Community Survey data, 37% of Ryegate homeowners with a mortgage pay more than 30% on housing costs. Among homeowners without a mortgage, that share drops to 19%. Renters are least likely to find affordable options, with 52% paying more than 35% of their income on gross rent.

The limited number of affordable housing units is our most pressing issue. Creative use of multi-unit buildings, partnering with State and Federal housing agencies and private initiatives will be needed to increase the stock of affordable housing. Rural Edge (formerly Gilman Housing Trust) is the regional housing developer, and they assist communities with development of affordable (income-restricted) housing.

Similarly, Ryegate's aging population creates the need for senior housing so they can age locally, be near to family, and contribute to their community.

There are few incentives in place to rehabilitate workforce housing stock, which is a critical issue in Ryegate since a number of housing units have deferred maintenance. The possible incentives that do exist are:

- Village Center Designation: Tax credits for fit-up of income-producing properties, such as mixed use and multi- unit dwellings, may be available to incentivize private property

owners, if the Town can obtain Village Center designation.

- Accessory unit dwellings: With relatively few caveats, Vermont statute protects this use as a permitted use of an owner-occupied dwelling. In 2017 the Town updated its zoning bylaw to ensure compliance with this statutory provision.

10. ECONOMIC DEVELOPMENT

GOALS:

- Encourage home-based enterprises and businesses.
- Encourage the growth of retail and service-based businesses that will meet the needs of Ryegate residents.
- Encourage and promote safe and affordable daycare opportunities.

POLICIES:

- Ryegate will benefit from the creation of covered employment opportunities that are closer to home. To that end, we encourage light industry, as long as there is no undue impact on groundwater, noise pollution, traffic impacts, and light pollution.
- Economic growth should be appropriately scaled and should be encouraged in existing villages, especially South Ryegate.
- The Town supports the sales of local agriculture and wood products as they help to keep Ryegate's working lands viable.

STRATEGIES:

- Pursue Village Center designation, which can offer tax incentives to owners of income producing properties in return for important code and accessibility improvements.
- Ensure that Ryegate residents know how to access technical assistance and capital, such as business planning through the Small Business Development Center, Working Lands Enterprise Grants, and local revolving loan funds.
- Continue to review and evaluate zoning bylaws to ensure that home-based enterprises can be appropriately sited in residential areas.
- Continue to review and evaluate zoning bylaws to ensure that value-added processing and non-traditional agriculture and forestry uses can be appropriately sited.
- Improve broadband and cell connectivity.
- Work with educational institutions to match student skill sets with local employers' needs.

RYEGATE'S WORKFORCE

According to American Community Survey (ACS) Five Year Estimates (2012-2016), there are 551 Ryegate residents in the labor force, 528 of whom are employed. About 13% of the workforce are self-employed in their own unincorporated businesses, which is slightly higher than county-wide rate (10%) and the statewide rate (9%).

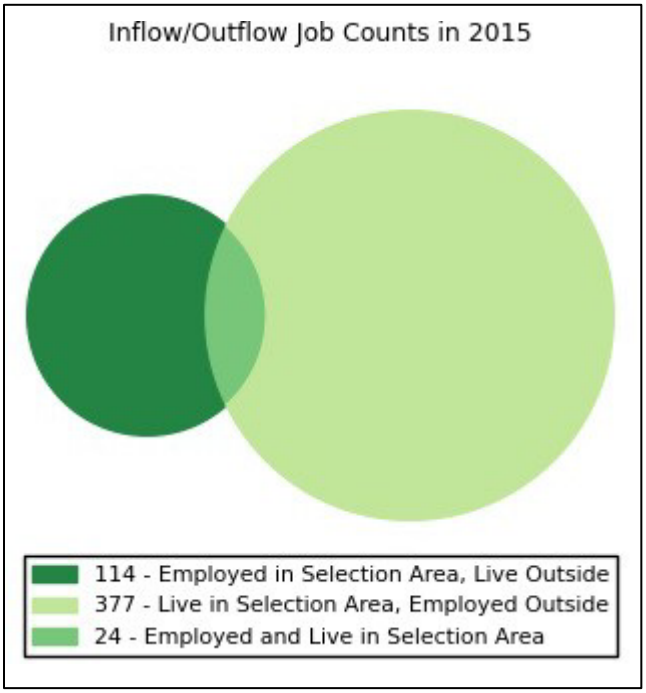
Latest Census data show that the vast majority of Ryegate's workforce who are not self-

employed work outside of town. (See Figure 10.1) This data comes from Longitudinal Employer-Household Dynamics (LODES), a mapping tool published by the Census bureau and based on W-2 forms. About 65% are employed in locations in Caledonia County. The rest are employed in myriad locations, including Grafton County (NH), Lamoille, Washington, and Orange Counties.

Covered employment opportunities in Ryegate (non-self-employment positions that are subject to Vermont Unemployment Compensation Law) are relatively limited. According to the Vermont Department of Labor, there are 25 covered employment establishments with a total of 114 employees. Only seven are employed in the public sector (e.g. federal, state, or local government). The remainder are employed in small private establishments, including goods production; construction; trade, transportation, and utilities, and professional and business services.

Life in the Northeast Kingdom has long been marked by chronic underemployment and lagging personal incomes. Caledonia County's unemployment rate is currently at 4.2% -- a marked improvement from the depths of the Great Recession -- but it still outpaces the statewide rate of 3.0% and is the fourth highest county rate, behind Orleans, Essex, and Lamoille Counties. According to the latest ACS Five-Year Estimates, Ryegate's mean household income is $53,502, which is higher than the county mean ($46,931), but lower than the statewide mean ($56,104).

Figure 10.1 Inflow/Outflow Job Counts



According to ACS estimates, 151 of those in Ryegate's workforce have children between the ages of 6 and 17, and about 85% of those workers are from households with all parents in the workforce. Meanwhile 31 of those in Ryegate's workforce have children under the age of 6, and 100% of those workers are from households with all parents in the workforce. It is therefore reasonable to assume that access to reliable and affordable childcare is critical for Ryegate's working families. Ryegate's zoning allows for home-based daycares (handling up to six children) as a permitted use of a single-family home and allows for larger daycare centers in the village areas, and in the commercial areas along Route 5.

There is currently one registered home daycare in Ryegate. Wells River has one daycare provider that can handle up to 59 children.

ACT 77 AND LOCAL WORKFORCE DEVELOPMENT

Act 77 was signed into law in 2013 in order to create a public education system in which every student graduates, and every student is college- and career-ready. At the heart of the legislation is the "Flexible Pathways to Graduation" concept. The concept is not built on a rigid

preselected menu of courses, rather it incorporates a variety of education options, including work-based learning. This approach to learning provides a valuable opportunity to enrich the skills of Ryegate's future workforce.

THE LAND-BASED ECONOMY

Logging and forestry provide a source of income and continue to be an important part of Ryegate's culture and identity. And, although dairy farming is severely challenged by current market conditions, Caledonia County still enjoys a fairly diversified agricultural economy, such as value-added processing, and vegetable and meat production. While most forms of traditional agriculture and forestry operations are exempt from zoning, it is important to ensure that local bylaws provide for non-traditional uses, such as on- site processing, tasting rooms, and sales of goods not primarily produced on the farm. These uses may help keep our working lands viable.

Recreation also presents a valuable opportunity for Ryegate, with its proximity to Groton State Forest and access to the Vermont Cross Trail. While tourism and other recreation-based enterprises can lead to jobs and increased spending, it is also important to remember that access to recreation has much broader benefits in terms of economic recruitment and workforce development. Research has shown that access to public lands, open spaces, and recreation correlates to higher levels of income and attracts higher wage jobs more rapidly than communities without such amenities.[3]

[3] Center for American Progress. "The Government Should Begin to Measure America's Powerful Outdoor Economy," January 2015