

# 2015 – 2023 LAMOILLE COUNTY REGIONAL PLAN



## *A Policy and Reference Guide*

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Names in italics denote members of the Board who have since stepped off

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All photographs and maps are used courtesy of Lamoille County Planning Commission unless otherwise noted.

A copy of this plan and maps can be read and downloaded by visiting [www.lpcvt.org](http://www.lpcvt.org).

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# Executive Summary

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The Lamoille County Regional Plan (the Plan) is a policy and reference document developed by and for the Lamoille County Planning Commission (LCPC) to address issues of common concern among the municipalities of the region. Under Vermont State Statutes, a regional plan guides and coordinates efficient and economic development of the region (see 24 VSA §4302) to promote health and safety of residents and guides how land is used. As one of the fastest growing counties in Vermont, this Plan serves as a source of information and resources available to municipalities and other partners. It offers a forum for further discussion while providing LCPC with policies and action steps towards achieving regional and municipal goals and objectives that allow the region to grow demographically and economically, while maintaining the recreational, scenic, and resource base critical to our area.

This plan is used to:

- Reflect overall growth trends within the region and address issues of concern at the local and regional level
- Support the goals and issues of the region's communities as expressed in their municipal plans
- Serve as a guiding document for the Lamoille County Planning Commission Board of Directors to direct ongoing activities and develop new initiatives to serve the region and its communities
- Provide a basis to evaluate and review development projects proposed under 10 VSA Chapter 151: State Land Use and Development Plans (Act 250) and 30 VSA §248 (Public Service Board)
- Serve where needed to determine compatibility of state and federal agency plans affecting land use with regional and local planning and development priorities
- Provide information and regional concerns for municipal planning endeavors

Needs and priorities will likely vary in different areas of the County and change or evolve over the eight year lifetime of this Plan. To meet the unique needs of Lamoille County's fifteen municipalities and the Region's diverse social, physical, and cultural landscapes, this Plan should be used as a "Cookbook" rather than a single "recipe." For example, at a single point in time, one municipality may be focused on redeveloping its village center or downtown and may find the chapters on Economic Development, Housing, and Land Use most relevant, while another may be focused on conserving agricultural or forest land and may find "Section3: Our Sense of Place" most useful.

The Regional Plan is structured so that each chapter stands on its own, while also providing appropriate context to understand how it plays into a bigger, region-wide picture. Throughout the Plan development process, the Regional Plan Committee attempted to weave together relevant subjects, trends, and livability principles, such as health, wellness, and economic opportunity, into each chapter of the Plan.

The Plan is also cognizant of the fact that the majority of municipalities in Lamoille County do not have local planning staff. Each chapter is divided into a brief Strategy and a longer Background and Inventory. By reviewing the Strategy section, a reader can get a quick snapshot of key objectives, policies, and action items. Readers wanting more information have the option to review the Background and Inventory, which contains data, maps, and analysis that was used to inform the Strategies. In some cases, the Background and Inventory also provides an overview of relevant studies and projects that have been completed by LCPC, municipalities,

other regional partners, or State agencies.

The Strategy section of each chapter outlines key objectives relevant to the topic area. These objectives are outlined in aggregate below. Readers are encouraged to review the discussion of each objective in the body of this Plan.

### **Economic Development**

- *Adapt to changing demographics*
- *Invest in vital infrastructure*
- *Technological innovation*
- *Maintain a high quality of life to attract and keep residents and visitors*
- *Mobilize community resources to improve access to health care and coordination of services and to promote a culture of wellness*
- *Encourage and protect the working landscape*
- *Lamoille County is fortunate to have rich earth resources such as sand and gravel. Wise utilization of these resources enhances the regional economy.*

### **Housing**

- *Provide for the full housing continuum*
- *Ensure a diverse and affordable housing stock*
- *Consider the costs of housing plus transportation*

### **Transportation**

- *Address safety issues*
- *Maintain and manage existing infrastructure*
- *Enhance mobility by providing transportation alternatives*
- *Maintain the Lamoille County aesthetic, environment, and quality of life*
- *Integrate land use planning and transportation planning*
- *Support regional and local economic vitality*

### **Energy**

- *Reduce Lamoille County's dependence on non-renewable energy sources.*
- *Energy generation, transportation, and consumption should be cost efficient and economically beneficial to residents*
- *Diversify the region's large and small scale energy production*
- *Encourage local energy production by utilizing existing assets*
- *Energy generation projects are sited in a way that minimizes impacts to natural resources and aesthetics while encouraging efficient land use design, as identified in the Lamoille County Regional Plan, and respecting goals and objectives of municipal plans*

### **Telecommunications**

- *Adopt a 10-year plan for Lamoille County telecommunications towers and coverage*
- *Complete cellular and mobile phone coverage for all of Lamoille County*

- *Complete Wi-Fi or broadband coverage, or future compatible Internet technology, for all of Lamoille County*

### **Land Use**

- *To guide growth into Center and Enterprise Areas*
- *To encourage compact development and protect the working landscapes*
- *To protect the region's natural systems and valuable agricultural and silvicultural resources*

### **Recreation**

- *Ensure Lamoille County integrates recreation into the daily functions of the built environment.*
- *Lamoille County's recreation network requires public landowners, private landowners, and user groups in order to thrive*
- *Private property owners are the primary stewards of the County's recreational opportunities – Private property must be respected*
- *Recreation is pivotal to Lamoille County's economy*
- *The working landscape provides diverse outdoor recreational opportunities*

### **Working Lands**

- *Ensuring the viability of diverse agricultural and forest-based enterprises*
- *Private property owners are the primary stewards of the County's working landscape -- Private property must be respected*
- *Public Lands contribute to the County's working landscape*
- *Lamoille County is home to diverse wildlife resources, including large blocks of unfragmented core forest habitat.*
- *The working landscape provides diverse outdoor recreational opportunities*

### **Water Resources**

- *Lamoille County has abundant high quality water resources that support a variety of recreational, ecological, and economic uses*
- *Healthy riparian areas are restored and maintained*
- *Water resources that provide public recreational opportunities or are areas of significant historical, scenic, and recreational value are protected*
- *Wetlands and floodplains are restored and protected*
- *Lamoille County's groundwater and surface waters are uniformly of high-quality*

### **Flood Resilience**

- *Communities are flood resilient when they are able to anticipate, prepare for, respond to, and recover from significant floods*
- *Development is concentrated in areas safe from flooding*
- *Development in flood prone areas is protected from flooding damages and does not cause an adverse impact to downstream areas.*
- *Floodplains and upland forested areas are protected.*
- *Ditches and water control structures for transportation infrastructure such as roads and trails are*

*adequately designed, constructed, and maintained.*

- *Local communities are well-prepared for flooding emergencies*

### **Public Safety**

- *Protect public safety in each of the four phases of emergency management -- Preparedness, Response, Recovery, and Mitigation*

### **Human Services**

- *All children deserve the opportunity to grow and develop in a safe, respected environment.*
- *Ensure health and wellness needs, services, and facilities are available, affordable, and sufficient for Lamoille County residents and visitors.*

### **Public Facilities and Services**

- *Community investments such as educational, cultural, recreational, healthcare, and municipal services will aid in attracting economic development opportunities*

*Note: This plan was developed by the LCPC Board of Directors, its staff, its member municipalities, and local/ regional/ state partners. It serves the needs of the Lamoille County region while containing 12 elements as identified in 24 VSA §4348(a) and shall be consistent with four broad planning goals and 14 specific goals under 24 VSA §4302. The following crosswalk is provided to assist the reader with ensuring consistency to statutory requirements.*

*A list of commonly used acronyms found throughout the plan is located in Appendix A.*

2015 – 2023 LCPC Regional Plan Crosswalk of Statutory Requirements



	Required Plan Elements/Maps [§4348(a)]:	Pages
1. Statement of basic policies to guide future growth and development of land and of public services and facilities, and to protect the environment		Section 1: pages 1, 9 Section 3: page 134
2. Land use element (and map) and statement of present and prospective land uses, including: (A) areas proposed for forests, recreation, agriculture, residence, commerce, industry, public, and semi-public uses, open spaces, and areas which require special consideration (B) areas within the region that are likely candidates for state designation programs (C) developments with a potential for regional impact, as determined by the regional planning commission (D) present and prospective location, amount, intensity, and character of such land uses and the appropriate timing or sequence of land development activities in relation to the provision of necessary community facilities and services (E) areas that have the potential to sustain agriculture and recommendations for maintaining them		Section 3: pages 134 – 165
3. Energy element, which may include an analysis of energy resources, needs, scarcities, costs, and problems within the region, a statement of policy on the conservation of energy and the development of renewable energy resources, and a statement of policy on patterns and densities of land use and control devices likely to result in conservation of energy		Section 3: pages 93 – 123
4. A transportation element (and map) consisting of a statement of present and prospective transportation and circulation facilities, and recommendations to meet future needs for such facilities, with indications of priorities of need, costs, and method of financing		Section 3: pages 61 – 92
5. A utility and facility statement (and map) of present and proposed: a. Local and regional community facilities b. Public utilities c. Existing and proposed recreational facilities d. Public sites, public schools, buildings, and facilities, state office buildings, hospitals, libraries e. Power generating plants and transmission lines, f. Wireless telecommunications facilities and ancillary improvements g. Water supply h. Sewage disposal i. Refuse disposal j. Storm drainage k. Recommendations to meet future needs for those facilities, with indications of priority of need		Section 3: pages 93 – 97, 124 – 127, 134 – 153 Section 4: page 167 – 170, 205, 219 Section 5: pages 260 – 287

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<p>6. A <b>statement of policies</b> on the preservation of rare and irreplaceable natural areas, scenic and historic features and resources</p>	<p>Section 2: page 30; Section 4: page 181</p>
<p>7. <b>Implementation program</b> for the plan's objectives including a recommended investment strategy for regional facilities and services based on a capacity study of the elements in this section;</p>	<p>Section 1: pages 12 – 16 (also see all Action Items)</p>
<p>8. Statement of <b>how plan relates</b> to development trends/plans for adjacent municipalities and regions</p>	<p>Section 1: pages 20 – 21 (and throughout)</p>
<p>9. A <b>housing element</b> that identifies the need for housing for all economic groups in the region and communities.</p>	<p>Section 3: pages 39 – 60</p>
<p>10. An <b>economic development element</b> that describes present economic conditions and the location, type, and scale of desired economic development, and identifies policies, projects, and programs necessary to foster economic growth</p>	<p>Section 1: pages 22 – 26</p>
<p>11. A <b>flood resilience element</b> that:          (i) identifies flood hazard and fluvial erosion hazard areas, based on river corridor maps and designates those areas to be protected, including floodplains, river corridors, land adjacent to streams, wetlands, and upland forests, to reduce the risk of flood damage to infrastructure and improved property; and          (ii) recommends policies and strategies to protect the areas identified and designated under subdivision (11)(A) of this subsection and to mitigate risks to public safety, critical infrastructure, historic structures, and public investments.</p>	<p>Section 4: pages 221 – 243</p>
<p><b>B. Consistency with Broad State Goals</b> [§4302] Plans must show consideration/evidence of a continuing planning process that includes:</p>	<p>Pages</p>
<p>1. Coordinated, comprehensive planning process</p>	<p>Section 1: pages 10 – 11</p>
<p>2. Citizen participation at all levels of the planning process</p>	<p>Section 1: pages 10 – 11</p>
<p>3. Consideration of use of resources, consequences of growth to region and state</p>	<p>Section 1: pages 9 – 10</p>
<p>4. Working creatively with other municipalities to develop, implement plans;</p>	<p>Throughout</p>
<p><b>C. Consistency with Specific State Goals</b> [§4302] Plans must make substantial progress towards attainment of the following goals (*or explain why goal is not applicable):</p>	<p>Pages</p>
<p>1. Plan development to maintain historic settlement pattern of compact villages surrounded by open countryside, including:</p>	<p>Section 1: pages 1 – 4, 9; Section 3: pages 134 – 154</p>
<p>(i) Encouraging intensive residential development primarily in areas related to community centers and discouraging strip development along highways</p>	<p>Section 3: 134 – 154</p>
<p>(ii) Encouraging economic growth in growth centers and / or village and urban centers</p>	<p>Section 3: pages 134 – 154; Section 1: pages 22 – 26</p>

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<p>(iii) Reinforcing the character and planned growth patterns of public investments, including infrastructure</p>	<p><b>Section 3: pages 134 – 154</b></p>
<p>2. Provide a strong and diverse economy</p>	<p><b>Section 1: 22 – 26</b></p>
<p>3. Broaden access to educational and vocational training opportunities</p>	<p><b>Section 5: pages 173 – 281</b></p>
<p>4. Provide for safe, convenient, economic, and energy efficient transportation systems</p>	<p><b>Section 3: pages 61 – 92</b></p>
<p>(i) Highways, air, rail, and other transportation means should be supported and integrated</p>	<p><b>Section 3: pages 61 – 92</b></p>
<p>5. Identify, protect and preserve important natural and historic features of the Vermont landscape, including</p>	<p><b>History chapter; Section 3: page 94; Section 4: pages 181 – 201; 202 – 262</b></p>
<p>(i) Significant natural and fragile areas</p>	<p>“</p>
<p>(ii) Outstanding water resources, including lakes, rivers, aquifers, shorelands, and wetlands</p>	<p>“</p>
<p>(iii) Significant scenic roads, waterways, and views</p>	<p>“</p>
<p>(iv) Important historic structures, sites, or districts, archaeological sites and arch. sensitive areas</p>	<p>“</p>
<p>6. Maintain and improve the quality of air, water, wildlife and land resources</p>	<p><b>Section 4: 181 – 243</b></p>
<p>7. Encourage the efficient use of energy and the development of renewable energy resources</p>	<p><b>Section 3: 93 – 123</b></p>
<p>8. Maintain and enhance recreational opportunities for residents and visitors, including identifying, providing, and protecting public access to noncommercial outdoor recreational opportunities, where applicable</p>	<p><b>Section 4: 167 – 180</b></p>
<p>(i) Growth should not diminish outdoor recreation activities</p>	<p>“</p>
<p>(ii) Public access should be identified, provided, and protected where appropriate</p>	<p>“</p>
<p>9. Encourage and strengthen agricultural and forest industries, including:</p>	<p><b>Section 3: 134 – 165, Section 4: 181 – 183, 185 – 194</b></p>
<p>(i) protection of long-term viability of agricultural and forest lands and maintenance of low overall density</p>	<p>“</p>
<p>(ii) encouraging the manufacture and marketing of value-added agricultural and forest products</p>	<p>“</p>
<p>(iii) encouraging use of locally-grown food products</p>	<p>“</p>
<p>(iv) encouraging sound forest and agricultural practices</p>	<p>“</p>
<p>(v) planning public investment so as to minimize development pressure on agriculture and forest land</p>	<p><b>Section 3: 134 – 165</b></p>
<p>10. Provide for the wise and efficient use of natural resources, facilitate the appropriate extraction of earth resources and proper restoration and preservation of aesthetic qualities</p>	<p><b>Section 1: 21 – 26</b></p>
<p>11. Ensure the availability of safe and affordable housing, inc:</p>	<p><b>Section 3: pages 39 – 60</b></p>
<p>(i) Encouraging housing to meet the needs of a diversity of social and income groups in the community, particularly for citizens of low and moderate income.</p>	<p>“</p>

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<p>(ii) Ensuring that new and rehabilitated housing is safe, sanitary, located conveniently to employment and commercial centers, and coordinated with the provision of necessary public facilities and utilities.</p>	<p>“</p>
<p>(iii) Identifying sites for multi-family and manufactured housing in locations similar to those generally used for single-family conventional dwellings.</p>	<p>“</p>
<p>(iv) Allowing accessory apartments within or attached to single family residences.</p>	<p>“</p>
<p>12. Finance and provide an efficient system of public facilities and services to meet future needs (e.g. fire, police, EMS, schools, water, sewage, &amp; solid waste)</p>	<p><b>Section 3: 141 – 144, Section 5: 246 – 248; 260 – 262; 273 – 274</b></p>
<p>13. Ensure the availability of safe and affordable child care</p>	<p><b>Section 5: 260 – 266</b></p>
<p>14. A flood resilience element that:          (i) identifies flood hazard and fluvial erosion hazard areas, based on river corridor maps provided by the Secretary of Natural Resources pursuant to 10 V.S.A. § 1428(a) or maps recommended by the Secretary, and designates those areas to be protected, including floodplains, river corridors, land adjacent to streams, wetlands, and upland forests, to reduce the risk of flood damage to infrastructure and improved property; and          (ii) recommends policies and strategies to protect the areas identified and designated under subdivision (11)(A) of this subsection and to mitigate risks to public safety, critical infrastructure, historic structures, and public investments.          (B) A flood resilience element may reference an existing regional hazard mitigation plan approved under 44 C.F.R. § 201.6.</p>	<p><b>Section 4: pages 221 – 243</b></p>

# LCPC: The Organization, the Vision, and the Mission Statement

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## Who We Are

The Lamoille County Planning Commission (LCPC) provides planning and technical assistance for our member municipalities and the public, while remaining consistent with federal and state requirements. Our work results in the development and implementation of plans that support sustainable development and improve the region's quality of life and environment.

The legal basis and powers for LCPC as a regional planning commission stem from Vermont laws as stipulated in 24 VSA §4301 et seq., as amended, 24 VSA §4345 et seq. LCPC was chartered by the municipalities of Lamoille County on February 13, 1964 as the Lamoille County Development Council, with an amendment to the original charter dated February 9, 1988 to change the name to Lamoille County Planning Commission, Inc. LCPC is funded in part through the State of Vermont property transfer tax as outlined in 24 VSA §4306(a).

## Our Vision

Our vision is for Lamoille County to remain the model of the ideal Vermont lifestyle, embodied by stewardship of the land, accessible recreation, nurturing the arts, historic preservation, and stimulating a culture of innovation. LCPC strives to encourage collaboration and support sustainable growth and the independence of our unique communities.

## Our Mission

Lamoille County Planning Commission is a non-profit organization dedicated to providing planning, information, and technical assistance to guide future growth and mutual understanding among municipalities and regional partners.

## Our Goals

- Assist municipalities in the region in quality planning to guide future growth and mutual understanding among the region's municipalities and adjoining municipalities.
- Ensure that planning decisions are educated decisions that are made at the local level.
- Develop and provide information about Lamoille County and its communities to aid in the educated local decision-making process.
- Facilitate the exchange of information and resources between local, state, and federal governments.
- Balance the region's economy with the natural environment and resource base.
- Support and encourage other local/regional organizations working towards the betterment of all of Lamoille County.

## Plan Themes

To fulfill the Lamoille County Planning Commission's vision and mission, this plan was developed under three primary objectives:

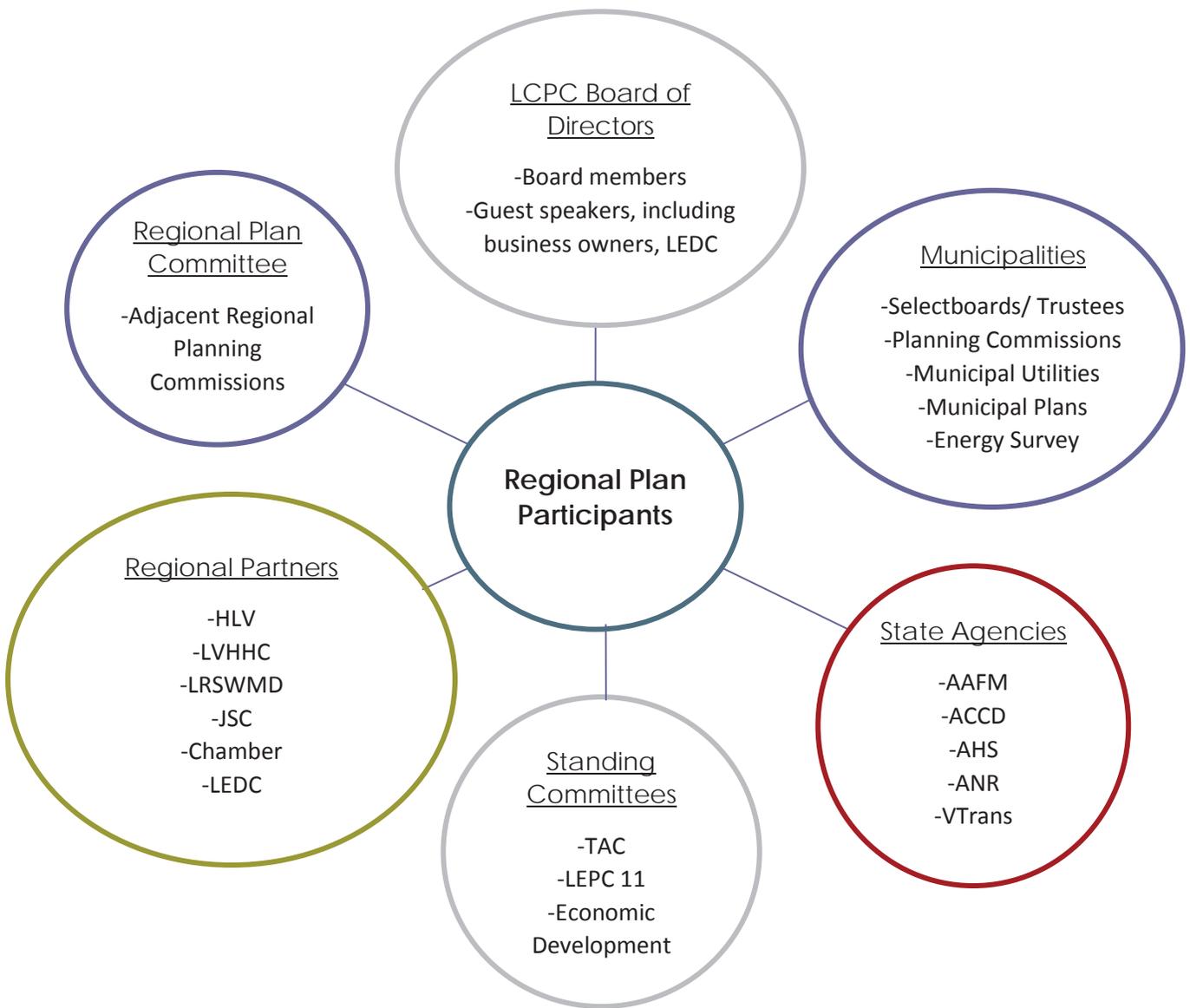
1. **To guide growth into compact settlements**, whether historic or new, for efficient land use and development.
2. **To protect the region's natural and working landscapes** by promoting thriving, compact village centers surrounded by rural countryside.
3. **To guide growth that promotes sustainability** of the region's rural natural systems, valuable agricultural and silvicultural resources, and recreation amenities.

## Our Planning Process

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No planning process is complete without including the constituents – the people who will be most impacted by the plan. Throughout the three years it took to develop the *Lamoille County Regional Plan*, the following stakeholders and parties were involved:

- Members of the **Lamoille County Planning Commission Board of Directors** participated at different levels of the Regional Plan update. The **Regional Plan Committee** met monthly to review draft chapters, discuss strategies and policies, gather background information, and engage with interested parties. The **Executive Committee** reviewed each chapter prior to sending it to the Board of Directors for Board-level review and approval. At Board meetings, representatives had in-depth discussions, presentations, and panel guests focusing on topics in the Plan. Other LCPC Committees, such as the **Transportation Advisory Committee**, **Economic Development Committee**, and **Local Emergency Planning Committee #11**, had targeted dialogues that added to the Plan.
- **Member municipalities' municipal plans** provided a foundation for this plan. Some municipalities were in the process of updating their plans and others had recently completed a plan amendment. This information was collated into the Regional Plan. A theme of this Plan is respect for the local planning process, thus, this Plan is based on the goals, objectives, and visions of our 15 municipalities.
- **Municipal officials and volunteer board members** provided invaluable feedback and insight into the Plan's development. Members of Selectboards, Boards of Trustees, Planning Commissions, Conservation Commissions, Clerks, Road Foremen, managers of municipal utilities, and Emergency Management Directors all contributed to the plan's text, policies, and goals. A municipal roundtable was held at the November 2014 Board of Directors meeting to review and discuss the first half of the Plan. Invitations were extended to all municipalities and comments were received via email and in person.
- **State agency representatives** sat on Committees, reviewed draft chapters, and provided statistics and data that enriched the Plan. Vermont Agencies of Agriculture, Food, and Markets, Transportation, Natural Resources, and Commerce and Community Development reviewed the plan.
- Prior to and during chapter draft development, **regional organizations, including partners, business representatives, non-profit agencies, service providers, and workforce development groups**, were included. In some cases, LCPC staff met with various groups and agencies and in other instances, presenters discussed topics with the Board of Directors.
- **Adjacent Regional Planning Commissions** from Central Vermont Regional Planning Commission, Chittenden Country Regional Planning Commission, Northeastern Vermont Development Association, and Northwest Regional Planning Commission met with the Regional Plan Committee to review the Lamoille County Future Land Use Map, draft chapters, and compatibility statement.
- **Members of the public** were invited to engage with LCPC through Facebook, newspaper notices and press releases, public meetings, an energy survey, and word-of-mouth.



# Implementation Plan

The following table presents a summary of action items that will be implemented throughout the coming planning cycle and beyond. Some items have a lifespan beyond this plan’s eight years. This is done to recognize that planning is a long-term process that can take many years to achieve the vision. Additional action items are found throughout each section of the plan and will be implemented as resources allow. Funding for implementing this plan will occur through annual workplans and contracts with the Agencies of Commerce and Community Development and Transportation and the Department of Public Safety, with additional funding from grants, municipal appropriations, and contracts with partner organizations. The Plan will also be implemented through regulatory proceedings described below.

	Action Item	Timeframe
	<i>What</i>	<i>1 - 2 years, 3 - 4 years, 5 - 6 years, 7 - 8 years, ongoing, or beyond 8 years</i>
	Continue to provide municipal assistance for bylaw updates, municipal planning, grant assistance, and other tasks. LCPC will provide municipal assistance to achieve compatibility with the policies in this regional plan as well as with applicable state statutes.	Ongoing
	Develop a strategic plan for the organization to further refine the identified actions in this plan. Conduct a periodic review of the strategic plan to ensure its course is followed. Conduct an evaluation of progress made implementing this plan at the 2-, 4-, and 6- year marks after adoption.	1 - 2 years
	Conduct a review of the Substantial Regional Impact criteria and update as necessary to meet the purpose of VT State statute, municipalities, and regional interests.	0 - 1 year
	Provide outreach to economic development organizations, the business community, and municipal officials about state permitting and LCPC’s role in the state permitting process.	0 – 2 years
Economic Development	Assist communities with appropriate state center designation and work with municipal or regional entities to obtain funding to install or improve municipal services.	Ongoing
	Encourage development in Center Areas as identified on the Future Land Use Map by working with local and regional entities to identify vacant and underutilized lands and buildings for commercial and/or industrial development.	Beyond 8-years
	Collaborate with Lamoille Economic Development Corporation (LEDC) and/or local community economic councils to advance economic development strategies. Host meetings, at least annually, between local and regional economic development partners to coordinate strategies for workforce development, marketing, planning, and infrastructure needs, or other topics as necessary to facilitate a coordinated, collaborative economic growth strategy for Lamoille County.	Ongoing
	Work with municipalities and regional partners to encourage regional and multi-town economic development strategies.	Beyond 8-years
	Continue to assist municipalities with regulatory updates that encourage flexible standards to promote new economic activities and provide necessary supports to grow the local economy.	Ongoing
Housing	Along with member municipalities, conduct a county-wide housing study and needs assessment. This study will address the full “housing continuum” and will include an analysis of housing availability and affordability, including “specialized housing”. The study will recommend strategies for increasing availability and/or affordability where they are lacking within housing types of the continuum.	3 - 4 years
	Work with municipalities to designate Growth Centers and Neighborhood Planning Areas.	Ongoing
	Assist municipalities in pursuing State and Federal funding to assist in the installation and/or upgrade of improved municipal services to service housing developments, particularly within Center Areas.	Beyond 8-years

	Conduct trainings throughout the region on land use tools and creative solutions to address housing needs, including, but not limited to form based codes, PUDs, density bonuses, alternatives to large lot zoning, voluntary and compulsory inclusionary zoning and types of subdivisions, and other creative solutions to address housing needs. Trainings will be tailored for Planning Commissions, Development Review Boards, and other municipal decision-makers.	Ongoing
Transportation	Continue to work with the Green Mountain Byway Steering Committee and the Smugglers Notch Partnership to implement recommended projects and update management plans. Work with interested communities to extend the Green Mountain Byway north.	Update plans as necessary; provide ongoing assistance
	Update/ Develop Corridor Management and Access Plans to address access management, bicycle/ pedestrian mobility, wildlife connectivity, and scenic resources. Plans include but are not limited to: Rt. 100 Corridor Plan and Access Management Plan, including the northern section through Eden, and Rt. 12 Corridor Plan, Rt. 15 Access Management Plan.	5 - 6 years
	Conduct periodic needs assessment to determine whether the region's public transit services are meeting the needs of Lamoille County and work to expand and improve public transit.	Ongoing
	Participate and coordinate with VTrans in the design phase of State highway projects and during intersection improvement projects. Multi-modal connectivity with roundabouts and other traffic calming devices shall be included. Pedestrian needs shall be included in state highway projects, especially in and near Center Areas.	Ongoing
	Actively participate in the implementation of the Lamoille Valley Rail Trail (LVRT) and promote its economic benefits. Pursue municipal connections to the LVRT, as well as other direct pathway connections between municipalities.	Beyond 8-years
	Integrate bicycles with other transportation modes through techniques such as bicycle racks on transit vehicles, bike parking, improvement of shoulders, and construction of multi-use paths.	Beyond 8-years
	Work with municipalities, VTrans, and other stakeholders to develop a Bicycle and Pedestrian Master Plan for Lamoille County. As part of this process, revisit and update the 1997 "Regional Bicycle Routes" map.	5 - 6 years
	Assist municipalities with developing transportation infrastructure inventories and capital budgets in an effort to effectively manage municipal highway infrastructure and prioritize improvement projects.	Ongoing
	Use a needs assessment and data for infrastructure system upgrades: Utilize data such as traffic volumes, highway sufficiency and bridge sufficiency ratings, and high crash location data to assist in the regional project prioritization process.	5 - 6 years
Energy	Research and identify state, federal, or cost-sharing opportunities to fund local transmission line upgrades and expansion of existing 3-phase power. Partner with electric utilities and communities to establish a capital plan for the County to upgrade transmission lines to better meet energy demands.	3 - 4 years
	Map and analyze the locations of existing utilities and infrastructure to determine the relationship between utilities and an efficient power grid system in order to meet gaps and address barriers for future planning and development.	5 - 6 years
	As municipalities update their zoning, ordinances, and municipal plans, LCPC will work with planning commissions to encourage and promote the use of alternative energy.	Ongoing
	Work with municipalities, utility companies, and local economic development partners to identify appropriate locations siting energy producing facilities. This includes, but is not limited to: funding mechanisms to encourage a biomass production facility in Lamoille County, preserving the viability of existing energy producing capacities, and encouraging expansion of future local hydroelectric facilities, as permitted within environmental standards.	Ongoing
	Develop clear, concise regulations and municipal plan goals in municipal plan updates and bylaw revisions for siting energy facilities.	Ongoing

Land Use	Explore and develop alternatives to wastewater infrastructure, such as innovative wastewater treatment options and development of decentralized wastewater systems. Work with municipalities to develop community wastewater management districts serving Center Areas and/or to develop low-interest loan programs for septic repair and upgrades. Provide language to the State Environmental Protection Rules to encourage greater use of “Innovative/Alternative Systems and Products” and waterless waste treatment options.	Beyond 8-years
	Coordinate and educate municipalities to plan for controlled and guided growth through use of locally appropriate tools such as municipal plans, infrastructure inventories and assessments, capital budgeting, public grants and loans, and innovative financing structures.	Beyond 8-years
	Identify existing vacant or underutilized structures, industrial sites, and brownfield sites that could be redeveloped and/or reused. Assist with redeveloping these sites.	Beyond 8-years
	Work with municipalities to reduce the appearance of “strip development” along state highways, facilitate infill and redevelopment in areas of existing strip development rather than extension of strip development, and minimize pressures for additional strip development in adjacent municipalities.	Ongoing
	Encourage minor revisions to Vermont Neighborhood Development Area (NDA) program rules to make the designation more effective in rural areas.	3 - 4 years
	As new developments are proposed, work with developers and municipalities to ensure future developments must not place an undue burden on the ability to provide public and community services, such as schools, roads, water, sewer, emergency access, etc. Where such services are impacted, including services that are provided by entities other than the host municipality, the developer should be required to provide financial or other mitigation.	Ongoing
	Encourage and promote the implementation of a range of conservation concepts in planning, which could include: transfer and/or purchase of development rights, land trusts, conservation easements, covenants, land use tax incentives, and clustering to allow for the retention of open space whether it is scenic vistas, agricultural lands, wildlife management areas, or public lands.	Ongoing
	Target the Working Lands Area for protection associated with off-site mitigation from other sites within Lamoille County. To ensure that off-site mitigation best meets the needs of local communities, off-site mitigation payments may be made to local Land Trusts with proven records of land conservation and ongoing stewardship.	Ongoing
	In Rural and Working Lands Areas, protect the viability of agriculture and forest lands by supporting development designed to mitigate the impacts from parcel fragmentation and to provide continued accessibility to resource lands. When development of agricultural and forest lands occurs, development should be clustered in such a way so as not to negatively impact the continued viability of any remaining or adjacent agricultural operations. Consideration should also be given to the loss of open space and recreational resources when developing agricultural and forest lands.	Ongoing
Identify infrastructure limitations to support industrial development in Enterprise Areas and Center Areas. Assist municipalities in pursuing funding and financing to address these limitations, provided such investments support the three primary land use objectives described in this plan.	Beyond 8-years	
Telecommunications	To encourage the expansion of telecommunication and broadband networks to serve all areas of Lamoille County, adopt a 10-year plan for telecommunications towers and coverage.	1 - 2 years
	Work with workforce development agencies and human service providers to provide training in essential digital skills among the County’s workforce. Ensure that efforts by various agencies are coordinated to minimize duplication of services.	3 - 4 years
	Implement tools and provide resources for public, high speed internet access in villages and downtowns. Such tools include, but are not limited to, development of public access Wi-Fi zones, establishment of tele-centers, or development of publicly accessible “internet cafes.”	Ongoing
	Work together with municipal representatives, regional resources, and developers to plan for the enhancement and expansion of telecommunication infrastructure. As technology advances, adjust plans for telecommunication improvements accordingly.	Ongoing

Recreation	Work with municipalities, developers, and state and regional partners to incorporate outdoor recreation facilities and amenities into future plans, including sidewalks and connections to existing recreation facilities or trails; work to ensure continued public access to noncommercial outdoor recreational opportunities, such as lakes and hiking trails; and identify, provide, and protect recreation opportunities wherever appropriate.	Ongoing
	Working with strategic public and private partners, assist in developing a regional marketing plan that unifies the Region's diverse recreation offerings.	5 - 6 years
	Local and regional recreation guides highlight a region's recreation offerings. LCPC will assist with efforts to develop regional and local recreation guides and provide funding opportunities to user groups to create guides or maps.	Ongoing
	Encourage a coordinated trail system and network that connects similar uses to one another throughout the County, building on the strengths that each facility provides. Support efforts and facilitate interested partners to develop projects leading to regional year-round multi-use trails, such as the Lamoille Valley Rail Trail, Stowe-Morristown Path, and other inter-municipal trails.	Beyond 8-years
	Explore how best to responsibly incorporate appropriate public access into publicly funded conserved land through studies, public information gathering, and other research.	0 – 3 years
Working Landscapes	Work with municipalities, LEDC, and other economic development agencies to identify viable uses for the County's lower quality timber.	Beyond 8-years
	To prevent undue fragmentation of farm and forestland, work with local communities to investigate innovative tools for maintaining the working landscape. Tools include alternatives to traditional "large lot zoning" such as density averaging and Planned Unit Developments, density transfers/transfer of development rights, and overlay districts.	Ongoing
	Protect critical wildlife crossings, significant habitat and important natural and scenic resources, as identified on maps and policies found throughout this plan, during project development and implementation, including but not limited to: municipal plans and bylaws, Act 250 and Section 248 proceedings, and transportation projects.	Ongoing
Water Quality and Flood Resilience	Mitigate floodplain encroachments wherever and whenever possible. Mitigation may include flood proofing, property acquisitions, "compensatory storage," floodplain reconnection/re-vegetation, and/or implementation of projects identified in a river corridor plan or local hazard mitigation plan. Support planning for, funding of, and implementing mitigation projects to reduce damage in flood hazard areas.	Beyond 8-years
	Complete the remaining geomorphic assessments as identified by LCPC and the Vermont Department of Environmental Conservation.	7 - 8 years
	Work with State partners, communities, and community partners to accurately map and reflect river corridors and erosion areas. Assist municipalities in implementing wetland, fluvial erosion, river corridor, and riparian buffer protections to preserve these resources.	3 - 4 years
	Work with municipalities, developers, and regional partners to encourage land use practices that use appropriate erosion control techniques. Assist in identifying eroded stream bank stabilization in accordance with appropriate professionally accepted standards.	Ongoing
	All flood zone calculations should be made more accurate. Work with appropriate partners to encourage the update of flood zones and maps using current technology, data, and trends.	Beyond 8-years
	Encourage and work with communities to adopt NFIP and river corridor bylaws and standards. Encourage municipalities to adopt flood hazard regulations that strengthen protections in the flood hazard and river corridor areas.	5 - 6 years
	Support regional and local coordination to identify potential sources of groundwater contamination. Work with municipalities to develop and implement long-term groundwater protection measures.	Ongoing
	Support municipalities acquiring title or easements to the wellhead protection areas and recharge areas serving municipal and community water supplies.	Ongoing
	Work with municipalities to conduct periodic wastewater facilities analysis to determine the remaining capacity of systems based on projected growth and to determine if any system weaknesses exist.	0 – 5 years
Assist municipalities in identifying suitable areas of development outside of flood hazard and river corridor areas.	Ongoing	

	Pursue funding to conduct road erosion assessments in all Lamoille County towns.	0 - 2 years
Public Safety	Assist municipalities in adopting and updating all-hazard mitigation plans, emergency operations plans, flood hazard regulations, and other planning documents to strengthen emergency preparedness and community resiliency.	Ongoing
	Proper training and equipment is essential to emergency response. LCPC staff will continue proper training to respond to anticipated disasters and assist emergency responders and municipal officials with access to proper training and equipment.	Ongoing
	LCPC staff are becoming an integral part of the Incident Command Team at the State Emergency Operations Center. Continue efforts to provide regional and statewide response capability.	Ongoing
	Assist communities in developing rural water supply plans for emergency response.	7 - 8 years
	Assist communities with efforts to access, repair, and upgrade dry hydrants through grant funding and capital planning, and increase total number of dry hydrants available in rural areas of the county.	Beyond 8-years
Human Services	Work with communities to utilize healthy community design principles, such as walkable and bikable communities, access to healthy food, access to parks and recreation, and mixed-use development.	Ongoing
	Support services, facilities, and opportunities for the aging population to remain active members of the community.	Ongoing
	Evaluate the need for enhancing child care facilities and services in the county. This includes: conducting a needs assessment and evaluation of suitability and availability of space in public buildings to be used as child care facilities; working with municipalities to address identified needs for child care facilities or services; assisting employers and child care facility operators with access to financing child care facilities, and supporting initiatives to develop child care facilities where a need is proven.	Beyond 8-years
	Offer free child care at LCPC sponsored events, which may attract wider participation by parents and guardians. Encourage municipalities and other partners to do the same at their meetings and events.	Ongoing
	Develop measures to track and account for the impact of creative arts-based businesses and entrepreneurs in Lamoille County.	5 - 6 years
Public Facilities and Services	Collaborate with regional and local partners to improve and identify new parks, recreation, and green spaces as well as strategies to build vibrancy throughout the region.	Ongoing
	Working with schools, municipalities, parents, and other organizations, find creative ways to improve safe walking routes to school and reduce student time on busses. Aid in linking and developing trails systems and recreation facilities throughout the region.	Ongoing
	Encourage schools and school facilities to be disaster resilient. Many schools also serve as local emergency shelters so equipping them with generators and increasing flood resiliency is important.	Ongoing
	Support and work closely with public facilities and solid waste management organizations in appropriate siting for new facilities for waste collection.	3 - 4 years
	Encourage new infrastructure to support implementation of Vermont's Universal Recycling law, including increased accessibility to composting sites for organics diversion.	5 - 6 years

## Regulatory Uses of the Regional Plan

### Public Service Board (Section 248 Hearings)

The Vermont Public Service Board is a quasi-judicial body empowered to review and issue a Certificate of Public Good for all new electrical, gas transmission, generation, and telecommunications facilities (30 VSA 248). Under the requirements of this statute, the Board is required to find that a proposed project:

- Will not interfere with the orderly development of the region;
- Is needed to meet present and future demand; and

- Will not have an undue adverse effect on aesthetics, historic sites, air and water purity, the natural environment, and the public health and safety.

30 V.S.A. 248(b)(1) stipulates that Vermont’s Public Service Board (PSB) may not issue a certificate of public good for a proposed utility facility unless the PSB finds that the facility “will not unduly interfere with the orderly development of the region with ***due consideration having been given to the recommendations of the municipal and regional planning commissions.***” LCPC participates in PSB proceedings and determines conformance with the Regional Plan is in accordance with the “Lamoille County Planning Commission’s Role in Act 250 and State Permitting” Policy, as most recently amended by the Board of Directors.

### Vermont’s Land Use and Development Law, Act 250

Vermont’s Land Use and Development Law (VSA Title 10, Chapter 151), commonly known as Act 250, was established in 1970 as part of a statewide planning and development control effort in response to rapid growth across the state. Act 250 reviews and issues permits to applicable residential, commercial, industrial developments, and public facilities. Permit decisions are based on the applicant’s demonstration that the proposed project meets 10 specific criteria outlined in Statute. Under Criteria 10, Before the Act 250 District Commission may grant an Act 250 permit for a proposed development, the District Commission must find that the development is ***“in conformance with any duly adopted local or regional plan or capital program.”*** [10 VSA 6086(a)(10) – “Criteria 10”]

Under state law, Regional Planning Commissions are a statutory party to review projects within the region, and in some cases outside the region. LCPC participates in Act250 proceedings and determines conformance with the Regional Plan is in accordance with the “Lamoille County Planning Commission’s Role in Act 250 and State Permitting” Policy, as most recently amended by the Board of Directors.

### What is Substantial Regional Impact

Substantial Regional Impact (SRI) relates primarily to Act 250 and Section 248 Public Service Board proceedings. In both Act250 and Section 248, all applications must conform (Act 250) or give due consideration to (Section 248) ***to both the local and regional plan.*** In these proceedings, State Statute [24 VSA 4348 (h)] requires that “the provisions of the regional plan shall be given effect to the extent that they are not in conflict with the provisions of a duly adopted municipal plan.... to the extent that such a conflict exists, the regional plan shall be given effect if it is demonstrated that the project under consideration in the proceedings would have ***a substantial regional impact.***”

There are several key points to remember regarding substantial regional impact:

- There is ***no statewide definition for Substantial Regional Impact.*** Rather, Statute [24 VSA 4345a (17)] requires each regional planning commission to define “substantial regional impact” in its regional plan.
- The Regional Plan’s definition of Substantial Regional Impact is NOT used to determine whether a proposed development is or is not in conformance with the Regional Plan. ***A substantial regional impact can be positive or negative.*** As such, the definition below does not identify development projects that are “bad” or should be opposed, but characterize those projects that may influence more than one community and/or the Region as a whole.
- Substantial Regional Impact is NOT a threshold for the Regional Planning Commission (RPC) providing comments related to an Act 250 or Section 248 application. In fact, ***Statute requires the RPC to appear***

**before the Act250 District Commission and the Public Service Board** to aid them in making determinations regarding conformance with the Regional Plan regardless of whether there is a Substantial Regional Impact [24 VSA 4345a (13) & (14)].

## Lamoille County Substantial Regional Impact Definition and Thresholds

For the purposes of this plan and for all purposes defined by Statute, Lamoille County Planning Commission establishes the following thresholds as the definition of substantial regional impact in Lamoille County. To the degree possible, these thresholds or organize to corresponded to the chapter headings in the Regional Plan

### Economic Development

- Location of a new employer or expansion and/or relocation of an existing employer which is estimated to create the following number of new jobs within five years of any and all final permit approvals:
  - 50 jobs in a Town with a population of 2,500 or more (inclusive of Villages).
  - 30 jobs in a Town with a population less than 2,500 (inclusive of Villages).

*(Note, for purposes of this criteria, the number of new jobs shall be measured based on total number of individuals employed, not full-time-equivalents)*

### Housing

- Removal or demolition of 10 or more units of housing that is affordable to a household earning up to 120% of the host community's median household income.

### Transportation

- A development that would substantially affect capacity or safety of the transportation network, as measured by one or more of the following:
  1. Results in (a) 75 or more new daily trips, or (b) total new daily trips equal to or greater than 5% of the Average Annual Daily Traffic of the roads immediately servicing the project, whichever is less *(Note: number of trips will be based on a traffic study, and/or the most recent ITE Trip Generation Manual if no such traffic study is available)*
  2. Contributes to a reduction in the peak hour Level of Service (LOS) below LOS D, unless a municipal plan approved in accordance with 24 VSA 4350(b) indicates that LOS F and/or E is acceptable to maintain desired development patterns and/or bike/pedestrian access. *(Note: LOS will be based on a traffic study, or available VTrans data if no such traffic study is available)*.
  3. Creates or exacerbates documented safety issues, including but not limited to high crash locations and corridors, and corridors or segments scheduled for systemic local road safety program improvements. *(Note: Related documentation and reports are available through Vtrans and/or the Lamoille County Planning Commission)*
  4. Has the potential to adversely impact local roads in another town. Potential adverse impacts include, but are not limited to heavy vehicles, temporary construction traffic, noise, air quality, roadway conditions, and/or bicycle and pedestrian safety.
  5. Has the potential to exacerbate a transportation related concern raised by the legislative body of another municipality or identified in the Plan of another municipality in accordance with 24 VSA 4382(8).

### Energy/Telecommunications

- A development that would necessitate a capacity upgrade on sub-transmission networks (34.5kV or greater) or the bulk transmission system (115kV or greater), or any other substantive capital improvement.

### Land Use

- Residential Development that creates:

- 50 or more housing units in a Center or Enterprise Area, or
- 20 or more housing units in the Rural/Working Lands, Working Lands/Forest, or Working lands/Floodplain area(s).
- Commercial, Industrial or other Non-Residential Development that creates:
  - 50,000 square feet gross floor area or more in a Center or Enterprise Area, or
  - 20,000 square feet gross floor area or more in the Rural/Working Lands, Working Lands/Forest, or Working lands/Floodplain Area(s)
- Expansion/creation of a public water supply or public sewer/wastewater system outside of a Center or Enterprise Area.
- A development located in a part of the region (other than a Center or Enterprise Area) which does not presently contain development of similar type and scale and has the potential to have impacts beyond the Town in which it is located.
- A development lying within two or more municipalities

#### **Water Resources, Flood Resiliency, and Working Lands**

- A development that has the potential to adversely impact the following wildlife travel corridors identified in the Regional Plan, or other wildlife travel corridors identified in a municipal plan or by the Vermont Department of Fish and Wildlife:
  - Willow Crossing Area on Route 15 near the Cambridge/Johnson Town Line
  - Route 118 in Eden and Belvidere
  - Route 12 in Elmore
  - Area of Route 100 north of North Hyde Park Village at the Eden Town Line
  - Shutesville Hill area on Route 100 near the Stowe/Waterbury Town Line.
- A development that has the potential to adversely impact the following ridgelines identified in the Regional Plan, or other ridgelines identified in a municipal plan:
  - Mount Elmore
  - The Worcester Range
  - Mount Mansfield and
  - The Sterling Range
  - the Woodbury Range
  - Butternut Mountain
  - Belvidere Mountain
- A development in which off-site mitigation associated with the project, such as the acquisition of development rights or similar vehicles, may directly result in the reduction of the value of property (ies) on the grand list of a municipality other than the host municipality.
- Any development within a 100-year floodplain or river corridor, based on the most recent FEMA FIRM maps, VTANR River Corridor Maps, or site specific study.

#### **Public Safety, Education, Culture and Community, and other Public Facilities and Services**

- A development that has the potential to adversely impact the community services of a neighboring municipality.
- A development generating demands which has the potential to adversely affect public safety services (police, fire, EMS, etc) provided by two or more municipalities, including the host municipality, and/or which may require those entities to make major investments in personnel, equipment, vehicles, dispatch/communications, or other capital infrastructure.
- A development generating student numbers that may adversely affect school capacities in one or more neighboring communities and/or union schools.

# Compatibility Statement

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The 2015- 2023 Lamoille County Regional Plan (the Plan) was developed in consultation with representatives of and input from our 15 member municipalities. The Plan focuses development to areas best able to accommodate growth. Member municipalities exhibit Vermont’s historic settlement pattern of development, with the majority of growth directed towards compact areas surrounded by the rural countryside. The Plan and municipal plans seek greater affordability in the cost of living. Agriculture, forestry, and other resource-based uses are encouraged throughout municipal plans and this Plan as well as commercial and industrial uses in areas best able to accommodate that type of development. LCPC reviewed the goals and policies contained in municipal plans, as well as other plans in the region, to ensure compatibility between the goals and policies in this Regional Plan and other plans. If incompatibilities are interpreted, LCPC will work with municipalities to resolve the issues.

## **Compatibility with Adjacent Regions**

Cooperation among and between neighboring regions is integral to ensuring growth and development occur at rates that insure Lamoille County’s municipalities can continue to provide services and resources. As Chittenden County continues to urbanize and its housing costs increase, the western part of Lamoille County feels greater pressures on its roads and housing needs. Future public transportation services in Lamoille County will expand travel accessibility to residents, students, visitors, and job seekers in Lamoille County and neighboring regions. To the northeast, significant development proposals, should they reach their full and desired potential, may impact Lamoille County residents, environment, and infrastructure. Vermont’s “Agricultural Renaissance”, driven in part by Hardwick’s agriculture and food economy, may impact eastern Lamoille County’s agri-entrepreneurial opportunities. As recreation evolves into more year round use, activities like the Lamoille Valley Rail Trail will continue to expand recreation and economic opportunities, and require inter-regional coordination.

Communities recognize the need to work collaboratively in order to achieve their own goals. For example, Conservation Commissions are strengthening relationships between residents of municipalities in and out of Lamoille County based on geography. Critical wildlife corridors or invasive species do not adhere to municipal boundaries and building partnerships between Lamoille County organizations and their counterparts in other regions allows concerned parties to address issues before they become problems.

Further, what is happening outside of Lamoille County’s borders can influence residents’ quality of life perceptions and expectations of the County and services offered within its borders. Lamoille County takes pride in offering a high quality of life to its residents. The Plan seeks to find a balance between maintaining existing services and developing at a pace which accommodates changes to year round and seasonal housing stock, schools, roads, workforce, natural resources, health, and culture.

While Lamoille County is impacted by its neighbors, it is important to consider how changes in Lamoille County can impact our neighbors. It has often been stated throughout this plan that Lamoille County is one of the fastest growing counties in Vermont. The costs of land and housing have already been demonstrated to be more affordable in Lamoille County than in adjacent regions. Lamoille County’s openness to business expansion, land values, municipal incentives, proximity to major transportation networks, and available technical assistance combined with a high quality of life make it an attractive place for commercial, industrial, and residential growth or relocation. The Regional Plans of Lamoille County’s neighbors do not present any conflicts but leave open many opportunities to collaborate:

**Central Vermont Regional Planning Commission** (*adjacent municipalities: Calais, Waterbury, Woodbury, Worcester*):

Through the *Central Vermont Regional Plan*, Washington County recognizes a need to preserve and promote a viable agricultural economy, culture, and land base. Adjacent municipalities share similar characteristics to their Lamoille County counterparts. Many Lamoille County residents work in Washington County. The Montpelier/ Barre area provides significant civic resources for Lamoille County residents. In the future, residential and commercial development pressures in Montpelier/ Barre may creep towards Lamoille County. An area of immediate impact is future road projects in Waterbury, particularly around the Interstate 89 interchange and Route 100, which may affect both visitor and commuter traffic in Lamoille County. Upcoming projects may increase and facilitate smoother traffic flows. LCPC works closely with CVRPC in many project areas, particularly transportation planning and initiatives.

**Chittenden County Regional Planning Commission** (*adjacent municipalities: Bolton, Underhill, Westford*): Adjacent municipalities in Chittenden County are designated as “Rural Planning Areas with village center” where, according to CCRPC’s *ECOS Plan* (2013), growth is not planned for or encouraged in these areas. Rural Planning Areas are characterized by low-density development and a working landscape with sensitive and protected areas. Chittenden County is frequented by Lamoille County residents for work, entertainment, and other civil services. Chittenden County’s labor shed draws from Cambridge and parts of Lamoille County, where housing is often more affordable. Both Cambridge and Stowe fall within a 45-minute commute zone to Chittenden County communities.

**Northeastern Vermont Development Association** (*adjacent municipalities: Albany, Craftsbury, Greensboro, Hardwick, and Lowell*): Areas of Caledonia and Orleans County are primarily forested with towns identified as village centers which provide services for residents. NVDA’s *Regional Plan for the Northeast Kingdom* (2015) identifies a need to protect recreation lands, prevent loss of wetlands, maintain historic development patterns, enhance the movement of goods while reducing commercial traffic, and better integrate land use and planning. The Plan recognizes that Morristown- Waterbury is a Labor Market Area potentially impacting Craftsbury, Greensboro, and Hardwick. Proposed developments in Newport, Burke, and Jay are expected to draw workers from adjacent communities, particularly those from Lamoille County; proposed job growth may also spur new housing and/or commercial developments through Lamoille County. The Plan also recognizes that the “success of value-added agricultural enterprises in Hardwick over recent years has had some effect on developments in Wolcott”. Future development projects may reverberate throughout Lamoille County in ways large and small, including housing needs, schools, transportation, and workforce development. Full impacts are still unknown. Cooperation and collaboration between NVDA and LCPC is strongly encouraged to facilitate growth and development reasonable for Lamoille County’s municipalities. Future transportation improvements should seek to foster smooth, efficient multi-modal transportation through the regions. Strengthening the connection between Wolcott and Hardwick’s agricultural enterprises could benefit both municipalities and both regions.

**Northwest Regional Planning Commission** (*adjacent municipalities: Bakersfield, Fairfax, Fletcher, Montgomery*): Franklin County has generally maintained a traditional pattern of densely settled villages surrounded by farm and forest land, although recent high growth rates have led to scattered residential development. Adjacent municipalities’ land use areas are similar to Cambridge, Waterville, and Belvidere (“Conservation & Forest Resource Planning Area” and “Agricultural Resource Planning Area”). No major development projects are discussed in the *Plan for the Northwest Region* (2015) or made known through other means. Shared impact areas with Lamoille County include water quality, transportation increases, and wildlife habitat management. Franklin County and western Lamoille County share many public safety resources and a Vermont Agency of Transportation district.

## Economic Development: Strategy

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Economic development is an integral part of the planning process. Through an understanding of where our economic strengths and weaknesses lie, and our long term needs and goals, we can plan for growth of our communities at a pace which local and regional infrastructure can sustain. The regional economic development planning effort must incorporate the challenges, needs, and successes of its communities in order to set the long-term vision for the region while meeting the goals of individual communities.

A diversified and dynamic economic development plan illustrates the interdependence between high quality of life, a clean environment, high-paying jobs, regional income, public revenue, and greater opportunities for individuals.

This Plan takes a new approach to economic development. The Strategy provides an overview of the economic structure and vision for Lamoille County. Throughout the Plan, economic development opportunities, challenges, policies, and programs are discussed in individual chapters. It is LCPC's vision to integrate economic development priorities into a holistic planning approach. For our regional economy to grow and thrive, we need stable infrastructure that includes high speed internet access, transportation, parking, and wastewater; an educated, healthy, and skilled workforce; natural resources; sound land use policies, and a vision for future development; a diversity of energy sources; affordable housing; access to affordable food, recreation, and cultural activities; and all of the amenities that make Lamoille County a desirable place to live. Economic development is achieved through investment in all aspects of planning.

A healthy, vital, and sustainable economy is required to balance human, natural, and capital resources to provide the public with a strong social safety net, environmental protection, and high-quality public services, quality roads, and good schools. The Regional Plan's economic development objectives are:

***Adapt to changing demographics:*** Lamoille County's working age population is higher than state average. While the County's population of retirees continues to grow, this population can provide experience, knowledge, and resources to younger groups. Finding appropriate and affordable housing for a variety of residents on the housing continuum is vital to the workforce. More demographic data can be found on page 32.

***Invest in vital infrastructure:*** Today, infrastructure is more than water, waste, and electricity. It requires phone, data, and internet accessibility, parking, renewable energy, innovative wastewater treatment, universal recycling, and stormwater management. New developments planned around existing infrastructure can lower costs while re-thinking site design can lower new development costs. Infrastructure is framed in Transportation (page 69), Land Use (page 137), and Energy (page 96).

***Technological innovation:*** To remain competitive in a changing economic environment, LCPC recognizes the value of technological advancement through cellular service, high speed internet, and fast paced expansion of new technological trends. Technology is changing rapidly. Municipalities can support these changes by encouraging responsible telecommunications towers, home-based businesses that rely on Wi-Fi (and its future equivalent), and adapting regulatory and non-regulatory practices to meet the demands of new and small businesses. Existing businesses must recognize the need to collaborate, coordinate, and experiment with new business models. Read more in the Telecommunications chapter (page 127).

***Maintain a high quality of life to attract and keep residents and visitors:*** As the recreational heart of Vermont, Lamoille County is fortunate to offer abundant recreation activities year round. Mobile and aging "Baby Boomers", families, and the professional workforce all settle in Lamoille County for its recreation, culture, scenic beauty, safe neighborhoods, and access to transportation. Excellence in academics, affordability, a burgeoning arts and food scene, and community cohesiveness are supported here. More information is found in the Public Facilities chapter (page 275) and Recreation chapter (page 170).

**Tourism is an economic engine for Lamoille County.** Recreation, agriculture, arts and culture, historic resources, scenic landscapes, and food and beverages are vital components to bringing visitors to Lamoille County from throughout Vermont, the northeast, the United States, and even across international borders. This Plan recognizes the importance of sustainable growth and development of the tourism industry to the region's economy. More information can be found in Recreation (page 170) and Working Lands (184) chapters.

**Mobilize community resources to improve access to health care and coordination of services and promote a culture of wellness:** Social and environmental factors contribute to our overall health and well-being. Community design, our transportation systems, access to goods and services, and safe and affordable housing are all examples of environmental conditions that have significant impacts on health. Find out more in Housing (page 41), Transportation (page 69), and Human Services (page 263).

**Encourage and protect the working landscape:** Renowned for its beauty, 80% of Lamoille County is covered in forests. The agricultural renaissance flourishing in Vermont is alive in Lamoille County. Read more in the Working Landscapes chapter (page 184) and Water Resources chapter (page 204).

**Lamoille County is fortunate to have rich earth resources such as sand and gravel.** Wise utilization of these resources enhances the regional economy and provides a local source of materials critical to regional infrastructure. Reuse of exhausted mines and gravel pits may also create opportunities to address other important regional needs.

### **Impact of the Economic Recession**

It is common for economies to rise and fall, but the economic recession that shook the world from 2008 – 2010 reverberates throughout Lamoille County. In the 1990s, Lamoille County experienced a job growth rate that was almost twice that of the entire state. From 2000 – 2010, the net number of jobs increased by only 62; 9% of that increase was seen in 2009 – 2010.

The “Services” industry sector accounted for the majority of job growth of the early 2000s. Since 2006, employment in the “Natural Resources and Mining” sector, as defined by the National A Industrial Classification System (NAICS), grew 140%, increasing wages 68% while Services increased just over 1% during the same time.

From 2000 to 2010, Lamoille County wages increased 37%, a rate higher than experienced by the State. Data indicate that wage growth has increased higher in job categories where lower wages were already felt.

### **Trends in Jobs and Wages**

The composition of the Lamoille County economy today is a reflection of the changes that have occurred in the region's economic base over the past business cycles.:

- The Services industries account for 7,734 jobs, or 73% of all Lamoille County jobs. The number of service establishments increased 7.4% from 2000 to 2010 while the number of employees increased only 1.9%. This phenomenon can in part be attributed to the size and growth of the travel and tourism industry over the period.
- As the number of manufacturing jobs decreased 41% from 2000 to 2010, wages increased 36%.
- In 2010, Consumer Durables Manufacturing (products sold directly to consumers or consumer dealers – “heavy” goods) included eight sectors, 28 establishments, and 341 jobs.
- The same pattern can be seen in the Nondurables Manufacturing sector. The Food, Textiles and Printing and Publishing industries accounted for 80% of the sector, approximately 225 jobs in 2000. Now, non-durables manufacturing includes seven sectors and 14 establishments for 102 jobs.
- The Construction sector has seen no change in employment since 2000. The number of establishments increased 12% from 2000 to 2010. This sector has seen growth in specialization, with more contractors performing skill-specific activities.
- The Services sectors employment accounted for approximately 73% of all Lamoille County jobs.

- Leisure and Hospitality is still the largest industry within the Services sector with over 3,048 jobs in 2010, the majority of these jobs in hotels. This sector contains the ski area employment.
- The Health Services industry has historically played a significant role in the region. In 2010, the Education and Health Services sector included 1,532 jobs, a significant increase from 1990 but only a slight increase from 2000.
- Retail accounts for almost 13% of all jobs in the County.

### **Earth Resources**

Although not as prominent as in other regions of the state, Lamoille County has a mining and quarrying tradition that continues today. Talc, soapstone, and asbestos were a primary earth resource in the past.

Today, gravel is the primary earth resource being extracted in the region. Lamoille County is one of the most gravel rich counties in the state. The Lamoille River basin drainage area provides sand and gravel deposits. These resources have played an important role in the development that has occurred in the region over the past decade. They serve the economy by providing fill, building foundations, road material, septic systems, jobs, and tax revenue.

Gravel resources also play an important economic role to the towns and individuals that own and operate them. Municipally owned gravel pits lower the cost of purchasing and transporting gravel. Privately owned pits provide income, tax revenue, and jobs. However, development and growth that fuels the demand for the region's sand and gravel also impacts their availability. Those lands that are most likely to contain sand and gravel deposits are also in high demand for development. Once development has occurred, the sand and gravel resources beneath them are no longer available. A majority of the impacts relating to gravel extraction are site specific (i.e. noise, air quality, aesthetics) and are typically addressed at the local level or through the Act 250 process.

To control runoff and limit the aesthetic impacts of abandoned pits, Act 250 generally requires that sand and gravel pits be restored or re-vegetated once they are no longer in operation. In some cases, exhausted pits can be restored and used for other purposes, such as providing leveled land for housing or other development. Given the need for land for both housing and industrial land, LCPC should consider partnering with owners of existing pits and regional economic development entities to determine potential long term uses for pits once commercial grade gravel or sand has been extracted. A viable redevelopment plan can provide for needed regional development needs while offsetting the owners' costs for restoration.

## **POLICIES AND ACTION ITEMS**

**Policy:** *LCPC strives to create an environment that encourages business expansion, creation, and relocation, employing Lamoille County residents in jobs that pay livable wages and benefits.*

### **Action Items:**

- Conduct a needs assessment with strategic partners to identify and pursue specific industries and businesses for Lamoille County's municipalities and the Region.
- Assist communities with appropriate state center designation and work with municipal or regional entities to obtain funding to install or improve municipal services.
- Consider a study where shared resources may increase partnership with other organizations supporting economic development in Lamoille County.

**Policy:** LCPC encourages economic development which prioritizes diversification of the Region’s economic base through the expansion of existing companies and/or the addition of new companies, including value-added industries.

**Action Item:**

- Encourage development in Center Areas as identified on the Future Land Use Map by working with local and regional entities to identify vacant and underutilized lands and buildings for commercial and/or industrial development.
- Encourage State offices to locate in Lamoille County Center Areas.
- Work closely with municipalities and business owners to diversify recreational opportunities through emerging trends and new investments or re-investments in existing recreation infrastructure.

**Policy:** The economy of Lamoille County should continue to encourage and enhance recreation and related recreation activities, organizations, and industries to ensure the vitality of the Region’s tourism industry and quality of life.

**Action Items:**

- Ensure regional growth does not diminish the value and availability of outdoor recreational activities.
- Use recreation as a tool to preserve land and promote land stewardship while encouraging economic development opportunities that consider impacts to natural resources.
- Encourage new businesses and entrepreneurial activity in recreation sectors.
- Outdoor activities, such as mountain biking, that diversify the region’s year-round tourism economy are encouraged.
- Working with strategic public and private partners, assist in developing a regional marketing plan that unifies the Region’s diverse recreation offerings.
- Encourage the publication of local and regional recreation guides to highlight the Region’s recreational offerings and provide funding opportunities to user groups to create guides or maps.
- Encourage a coordinated trail system and network that connects similar uses to one another throughout the County, building on the strengths that each facility provides.
- Foster communication and cooperation between schools, municipalities, and sporting organizations to build a coalition of recreation enthusiasts in small communities.

**Policy:** Supports the manufacturing and marketing of value-added agriculture and forest products and new opportunities that allow working lands enterprises to remain viable.

**Action Items:**

- Work with developers and municipal boards to include the “Right-to-Farm” concept in municipal planning and planned residential developments / planned unit developments.

**Policy:** To ensure a predictable and streamlined permitting process, LCPC will work with municipalities to provide clear standards to assess applications for commercial, industrial, and agricultural developments.

**Action Items:**

- Upon request, LCPC will assist municipalities with zoning ordinance revisions to promote compatibility between land uses.
- Work with municipalities to develop planning documents that:

- Support home-based businesses
- Facilitate the housing development process by identifying appropriate lands for use
- Encourage diverse and appropriate economic opportunities

**Policy:** LCPC encourages efforts to coordinate the development of business incubation in the region to support entrepreneurial activity and new business development, in cooperation with strategic partners.

**Action Items:**

- Collaborate with Lamoille Economic Development Corporation (LEDC) and/or local community economic councils to advance economic development strategies.

**Policy:** LCPC encourages efforts that build regional capacity to access sufficient sources of capital to adequately fund the expansion and development of Lamoille County businesses.

**Action Items:**

- Work with municipalities and regional partners to support the enhancement of the economic base of rural areas through local and regional planning that provide for a limited amount of suitable and compatible commercial and industrial activity.
- Work with municipalities and regional partners to encourage regional and multi-town economic development strategies.

**Policy:** LCPC supports municipal efforts to purchase and operate gravel pits for use on local roads.

**Action Items:**

- Provide technical and grant writing assistance to municipalities seeking to purchase sand/gravel pits for municipal use.
- Encourage State level regulations that do not unfairly burden municipal sand and gravel pits.

**Policy:** This Plan recognizes the importance earth resource extraction plays in maintaining local infrastructure, providing local employment, and in supporting economic development.

**Action Items:**

- Recognizing that earth resources are integral to supporting economic and efficient development, sand and gravel pits should be permitted, provided all State and local regulations are met.
- Operators of sand and gravel pits are encouraged to consider potential restoration and reuse of the site to further community and regional goals once the resource is exhausted.

# Section 2: Getting to Know Lamoille County



## History

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Lamoille is the youngest county in Vermont. It was chartered by the state in 1835. Before that, the area that now contains the 10 towns of Lamoille County was distributed, at various times, among Chittenden, Franklin, Rutland, Washington, and Orleans Counties. At the time of its incorporation, the county contained 12 towns. The towns of Mansfield and Sterling, both located in the most mountainous part of the county adjacent to Smugglers' Notch, were eventually disbanded and their acreage distributed to other towns. The county attained its current boundaries by 1855. It is not definitively known where the name Lamoille originated. The most commonly accepted explanation is that it is a corruption of the French for Seagull – La Mouette.

Many of the towns were chartered in 1781, although settlement did not commence until after. The first white settlers harnessed the power of the rivers in the county by building grist mills and saw mills along their course. Potash and whiskey were early exports. Most settlers practiced subsistence farming, raising sheep and pigs for meat and cows for dairy. Dairy farming soon became predominant and butter and cheese were early exported out of the county. With the advent of the railroads and better methods of refrigeration, liquid milk became a staple crop.

Lamoille County is currently, and has historically been, a major producer of maple products – originally sugar and subsequently syrup. Many farmers today can remain viable because of their extensive sugar bushes.

Within the towns, denser settlements became villages, many of which are still in existence. Hyde Park, Johnson, Morristown and Stowe all currently contain an incorporated village while Cambridge has two – Cambridge Village and Jeffersonville. These villages are the historic heart of the county.

### **Pre-contact Native American Occupation**

Native Americans have lived in Vermont for at least 12,900 years. Lamoille County offered a pathway between the Green Mountain uplands and Lake Champlain and between the Winooski River to the south and Lake Memphremagog in the north. Although no permanent settlements have been identified, the remains of stone tools and hearth sites attest to occupation as far back as the Early Woodland Period (c 1000 BC). Native Americans in this period would have occupied seasonal camps, exploiting local resources such as fish, grains and other foodstuffs, and raw materials. Gold could be found in Stowe, copper in Eden, and lead in Belvidere. Ochre and talc can also be found in the county and were probably exploited as well, although no direct evidence of their exploitation has yet been found. These seasonal camps were probably occupied year after year.

Because these seasonal camps were so ephemeral, they left little in the way of material remains. A general survey of sites in the county was undertaken in 1985, using local informants and surface reconnaissance. This method found 14 prehistoric sites, 13 find spots (locations where evidence consisted of a few, or only one, item), and 1 historic site. As of 2014, 45 prehistoric sites have been recorded in Lamoille County, most along rivers or their tributaries. The location of known sites is not surprising, since most archaeology is done at the time of bridge replacement or renovation. The lack of evidence for sites in upland areas should not be taken as proof that no sites exist in those areas, only that no one has looked there.

### **Historic Occupation**

As stated above, most of the towns in the county were chartered in 1781, but the first settlers didn't arrive until 1783. Cambridge was the first town settled. The rivers in the town, Lamoille, Seymour, and Brewster,

offered perfect locations for mills, both grist mills and saw mills, and these were the first commercial establishments in town. Remains of the mills can be seen along the Brewster River, if you know where to look, but no systematic survey of these sites has been undertaken. The same is true in the other towns in the county.

Villages quickly developed at strategic locations along the rivers, most of which still exist. Although the effects of time, weather, and especially fire, have taken a toll on historic structures in the county, most villages contain structures dating to the early to mid-19<sup>th</sup> century. These villages are the core of the county.

Wooded areas in the county often hold remnants of earlier occupation in the form of cellar holes. This is especially true in the upland areas, where Sterling and Mansfield – the lost towns – were located, but cellar holes can be found throughout the county. The presence of lilac bushes in incongruous places is evidence of early occupation as well. Unfortunately, little exploration of these sites has been attempted. There is rich history locked in these sites.

### **Where Do We Go From Here?**

Archaeologically, Lamoille County is almost a blank slate. Although Act 250 requires archaeological testing for all projects using state or federal funds, these projects are almost exclusively related to transportation, skewing the little information we do have towards the river valleys. Flooding, which occurs regularly along all the water courses in the county, erases the remains of seasonal camps that may have existed in or near the floodplain.

To understand the long, rich history of the county it is important to begin to identify and record archaeological sites – both pre-contact and historic. There are many ways to begin the process without engaging a professional archaeologist. The process of excavation is a destructive one, and should only be started after a clear set of questions, which the excavation will attempt to answer, has been formulated. Local historical societies, conservation commissions, schools, and interested citizens can begin the process by:

- Interviewing local farmers to identify and record find spots of prehistoric artifacts
- Locating and cataloguing artifacts in private collections
- Studying historic maps to determine where buildings once existed that are no longer standing
- Interviewing descendants of the earliest settlers who may have memories or stories passed down through the generations

### **Historic Structures**

The village centers contain historic structures which need to be catalogued and preserved. Several Lamoille County towns have designated historic districts on the State and/or National Register of Historic Places. Other villages need to begin this process. Local historical societies could take the lead and bring schools in as a way to learn not only history, but the research methods necessary to complete the inventory. Those villages that are not yet designated village centers may seek that designation so that local businesses will have an incentive to participate in the cataloguing.

In addition to seeking Designated Village Center status, towns may consider the Certified Local Government (CLG) program. This program requires communities to develop and implement local legislation for the

protection of historic properties, makes towns and villages eligible to apply for federal historic preservation grants open only to CLGs. Currently only Stowe and Waterville in Lamoille County are CLGs.

This Plan, and the State of Vermont, has a stated policy of encouraging development in village centers. To make that happen, villages need to be inviting and interesting places for people to live. Preserving the historic character of the villages is important to creating that atmosphere. In addition, seeking and receiving Designated Village Center and Certified Local Government status entices business development to the community which, in turn, makes the village a more inviting and interesting place to live.

### **From the past to the future**

There is much that can and should be done to understand and preserve the rich history of Lamoille County, both above and below ground. What is needed is a catalyst to bring together members of the community who have many different interests. Both historical societies and conservation commissions are interested in preserving the past, albeit in different ways. Planning commissions often steer development towards historic centers. Schools want to teach local history and research methods to their students. The catalyst could be:

- Programs on history co-sponsored by historical societies and conservation commissions to bring together diverse sections of the community and instill an interest in pursuing further study
- Outreach by planning commissions to explain the advantages of the historic center, designated village center, and CLG programs to the community
- Developing or expanding historical curriculum in the schools to spark an interest in local history at the earliest age.

We need to begin to chart our history to be a vibrant county for the future.

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*Mansfield and Stowe were the first chartered communities in Lamoille County in June 1763. In 1848, Mansfield was annexed into the Town of Stowe.*

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## Demographics

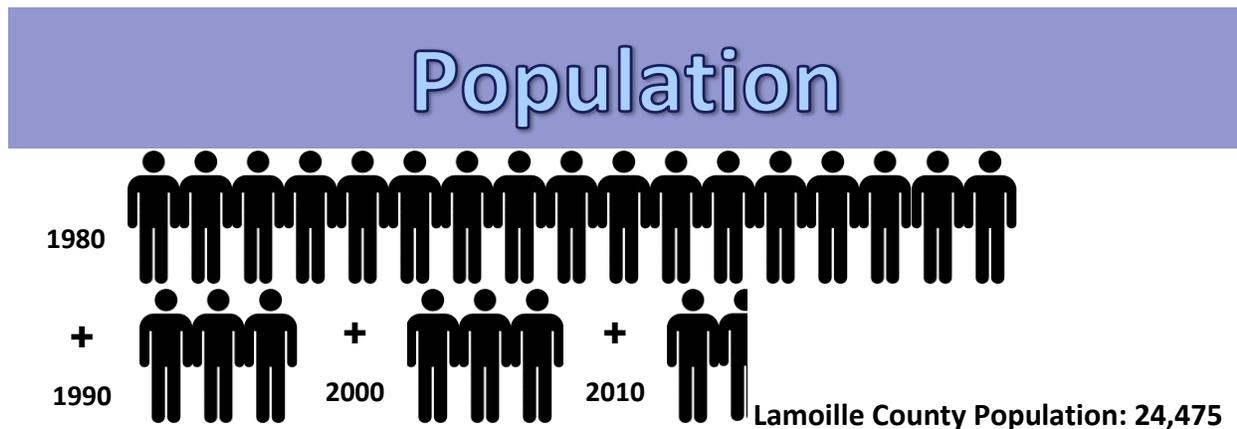
Planning is based on people - how many there are, where we live, and the impacts we cause to one another and to the world around us. Planning connects the way we live to how we use our land and seeks to prevent land use conflicts, protect natural resources, and manage future development while creating harmonious communities where people want to live, work, and visit. Understanding trends in the regional population will help manage future population and development trends.

Since 1960, Vermont has experienced an unprecedented period of growth. Between 1960 and 1970, Vermont's population grew by 14.1% - faster than any period since the 1800's. Lamoille County now has just short of 4 percent of the state's total population.

Throughout the 1990's, Lamoille County's total population rose faster than the state's average, a change of 17.7% as compared to 8.2% for the state. Lamoille County experienced higher percentage changes in all major age cohorts.

### Median vs. Average

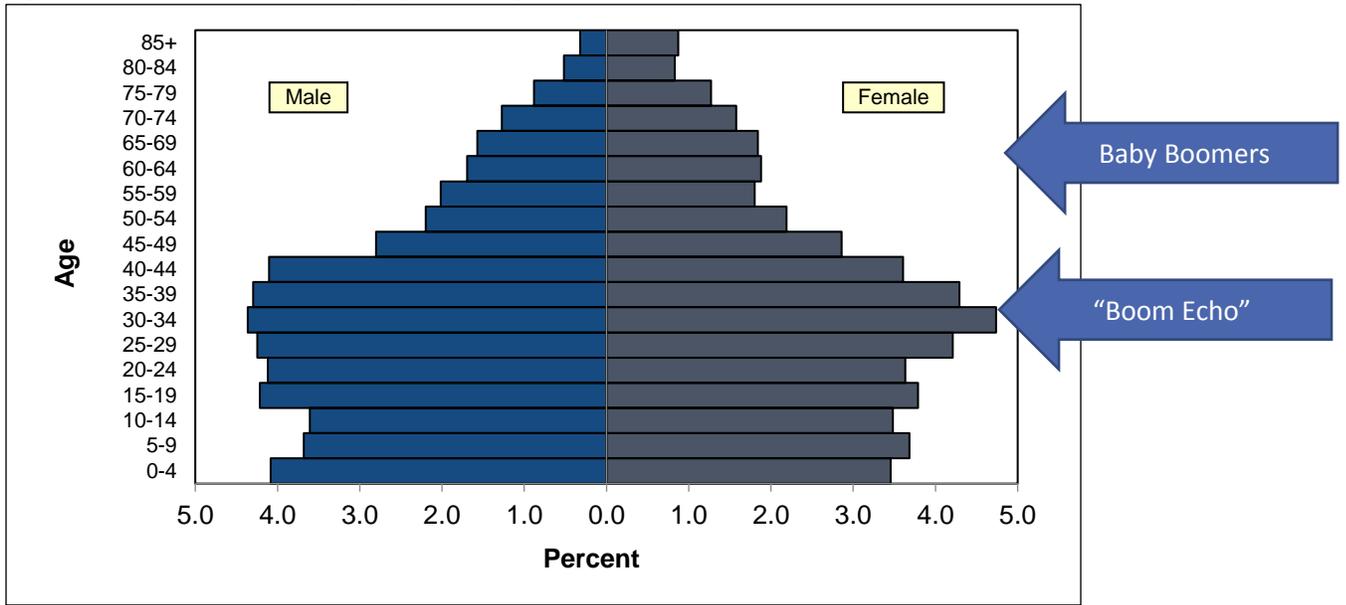
The median refers to the value in the middle. This is the point at which there are as many instances above as there are below. The average is the result of adding all numbers in a set then dividing by the amount of numbers.



Population pyramids show population, age, and gender for a given location. For Lamoille County and Vermont, the large bulges center on the 50-54 age group - 'baby boomers'. The next bulges, the 15-24 age groups, represent the "boom echo" (children raised by the baby boomers). It is likely that this boom echo generation will produce another bulge in time. It is typical to see a higher proportion of females to males in the 65+ age groups; females tend to live longer.

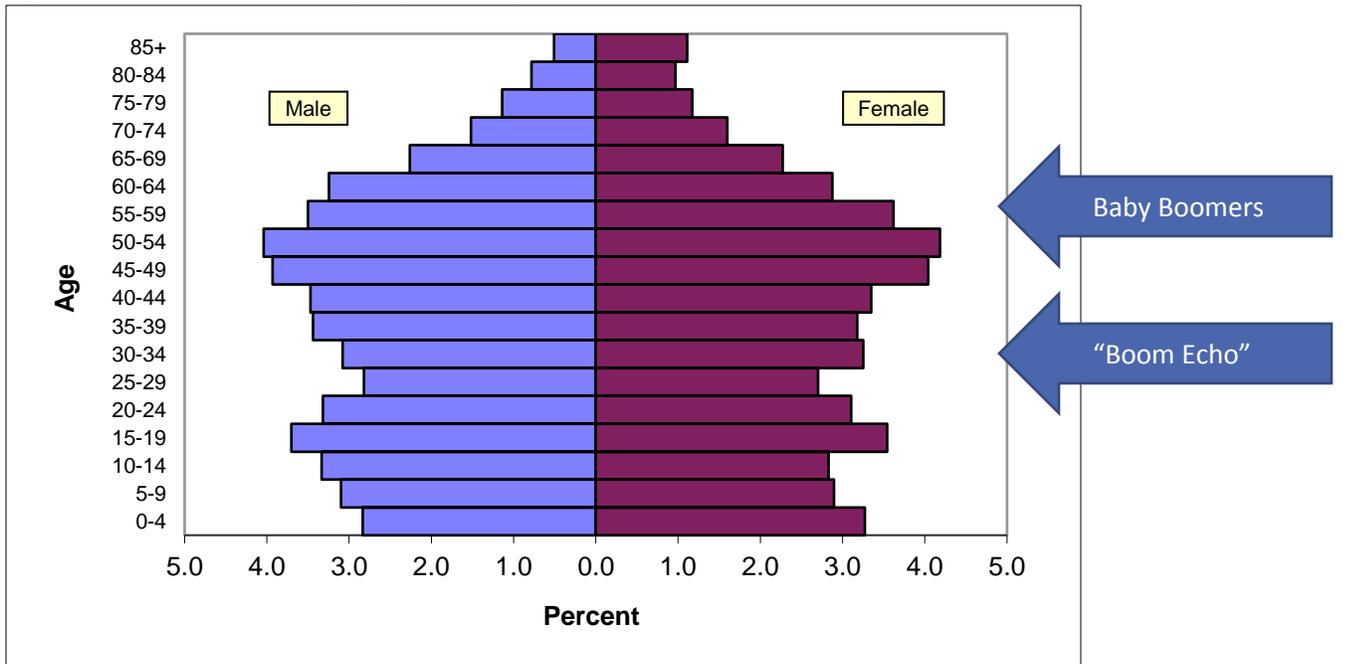
In 1990, there was a higher concentration of younger people aged 20 – 44; today, the population of 15 – 24 year olds has increased. There has been a significant increase in older age groups since 1990, a typical Vermont trend.

**Figure 2-1. 1990 Lamoille County Population Pyramid**



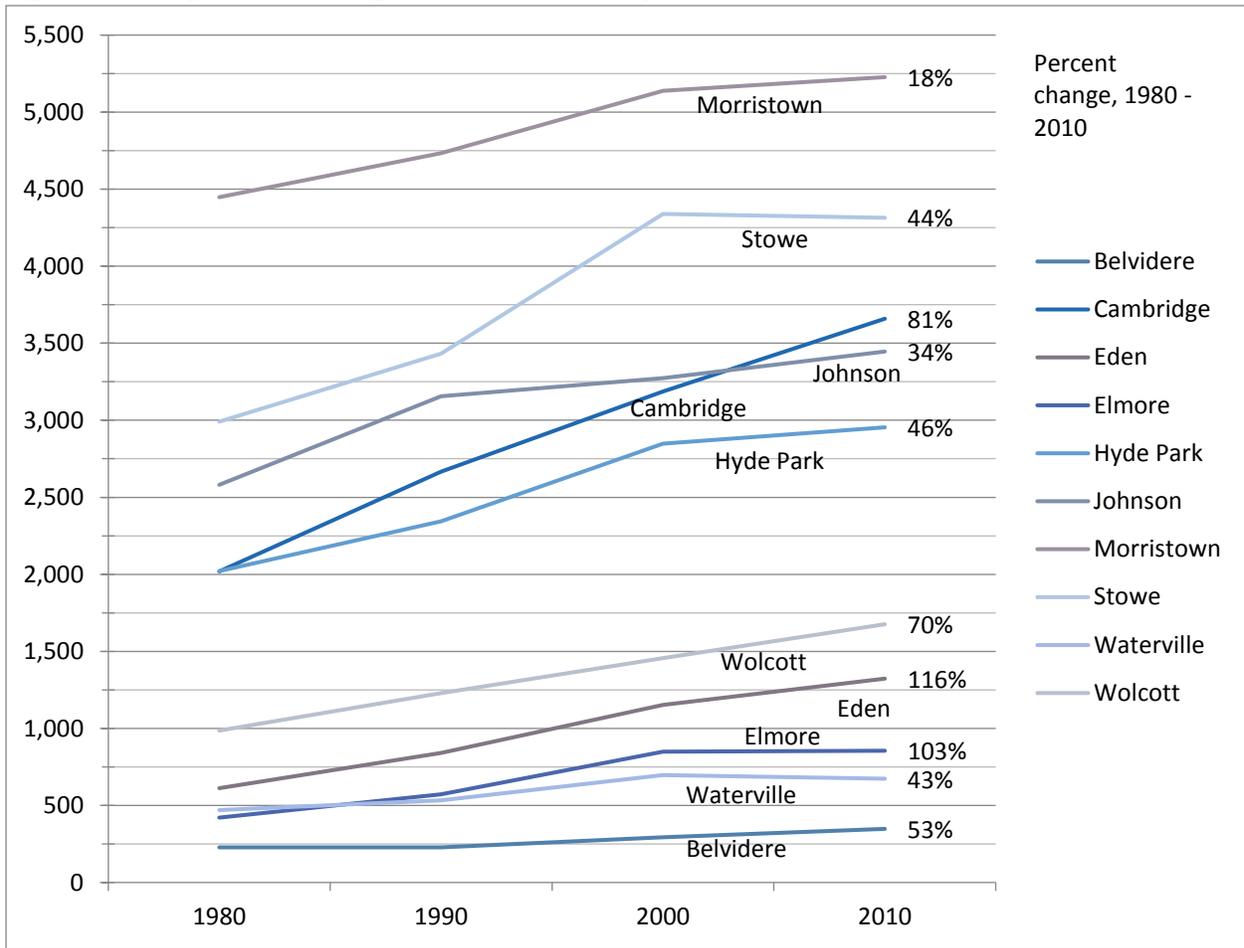
Source: U.S. Census Bureau 1990 Census of Population and Housing

**Figure 2-2. 2010 Lamoille County Population Pyramid**



Source: U.S. Census Bureau 2010 Census of Population and Housing

**Figure 2-3. Population Change in Lamoille County Towns, 1980 – 2010**

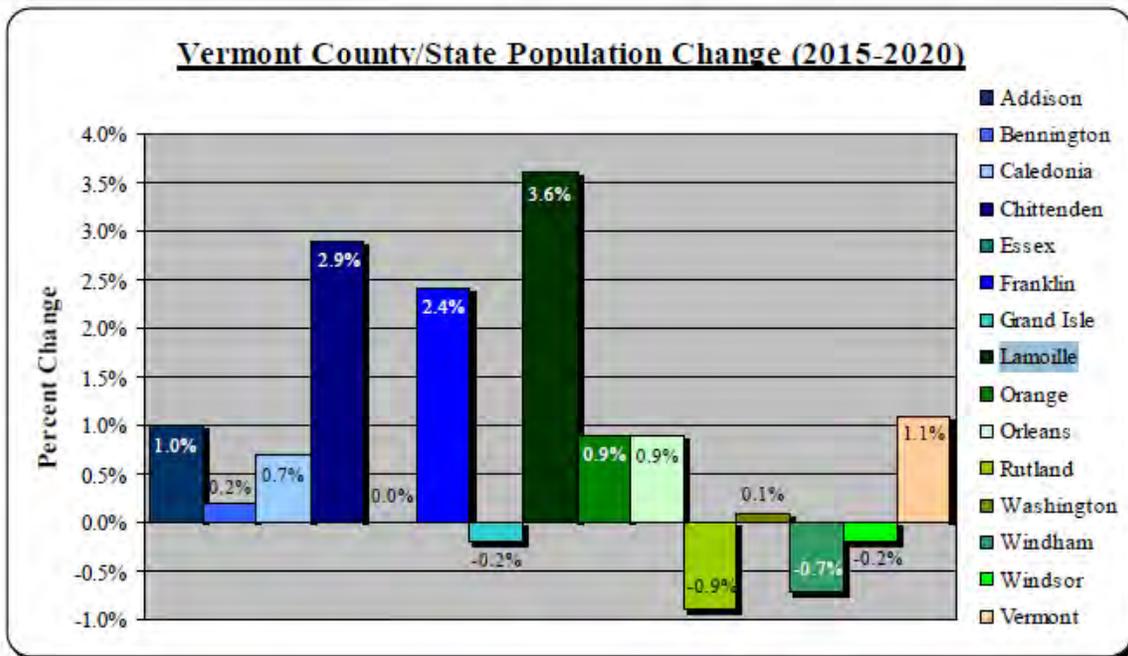
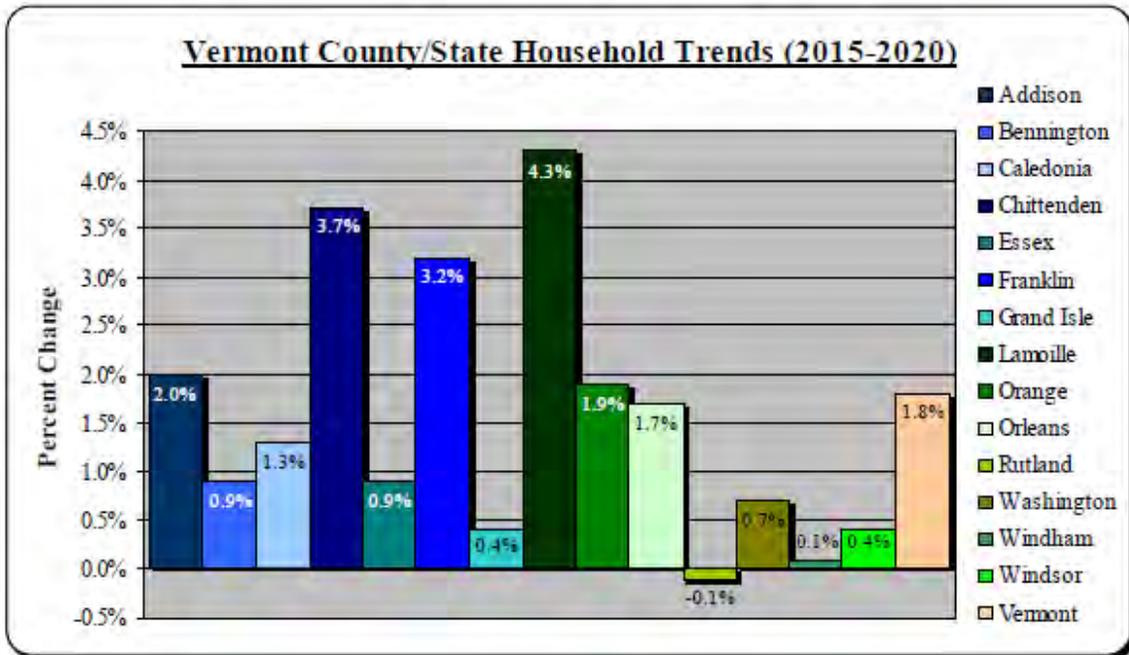


**58%**

**Of 18 – 24 year olds have some college or higher**

**36%**

**Of 25+ year olds have a Bachelor's Degree or higher**

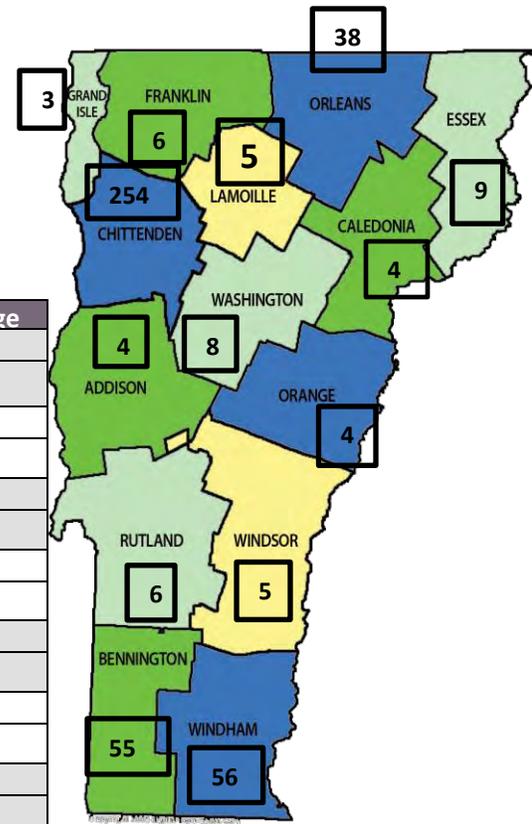


Figures 2-4 Vermont County/ State Household Trends and Vermont County/State Population Change

Lamoille County's population is anticipated to have the greatest percent growth in population and households over the next five years (2015 – 2010), according to the *2015 Vermont Housing Needs Assessment*. Neighboring counties Chittenden and Franklin have the next highest population growths. These growing rates will put additional pressures on housing more people over the next five – ten years.

# Population Density

		2000	2010	% Change
<b>Addison</b> (809.09 Sq Miles)	Population	35,944	36,793	2.36
	Density	44	45	
<b>Bennington</b> (677.93 Sq Miles)	Population	36,994	37,125	.35
	Density	55	55	
<b>Caledonia</b> (655.15 Sq Miles)	Population	29,689	31,213	4.88
	Density	45	48	
<b>Chittenden</b> (616.02 Sq Miles)	Population	146,595	156,56	6.37
	Density	238	254	
<b>Essex</b> (673.43 Sq Miles)	Population	6,459	6,306	-2.37
	Density	10	9	
<b>Franklin</b> (694.08 Sq Miles)	Population	45,417	47,746	5.13
	Density	65	69	
<b>Grand Isle</b> (195.15 Sq Miles)	Population	6,901	6,970	.99
	Density	35	36	
<b>Lamoille</b> (462.53 Sq Miles)	Population	23,239	24,476	5.32
	Density	50	53	
<b>Orange</b> (691.85 Sq Miles)	Population	28,220	28,936	2.54
	Density	41	42	
<b>Orleans</b> (718.31 Sq Miles)	Population	26,283	27,238	3.63
	Density	37	38	
<b>Rutland</b> (944.15 Sq Miles)	Population	63,406	61,645	-2.78
	Density	67	65	
<b>Washington</b> (702.86 Sq Miles)	Population	58,045	59,534	2.57
	Density	83	85	
<b>Windham</b> (797.99 Sq Miles)	Population	44,216	44,513	.67
	Density	55	56	
<b>Windsor</b> (975.66 Sq Miles)	Population	57,418	56,670	-1.30
	Density	59	58	
<b>State of Vermont</b> (9,614.19 Sq Miles)	Population	608,826	625,741	2.78
	Density	63	65	



Population density is the number of people per each square mile in the county

Source: 2000 Census; 2010 Census; ESRI; Urban Decision Group – from 2015 Vermont Housing Needs Assessment

# Economics

**Table 2-6. Employment and Income<sup>1</sup>**

	Annual Average Employment*	Annual Average Wage per employee**	Median Adjusted Per Capita Income+	Effective Homestead Education Tax Rate++	Percent of People Living Below Poverty Line**
Belvidere	11	\$34,319	\$28,826	\$1.43	12.7
Cambridge	1,190	\$26,369	\$34,165	\$1.30	8.8
Eden	87	\$24,202	\$28,257	\$1.48	14.3
Elmore	23	\$18,822	\$40,078	\$1.23	13.8
Hyde Park	691	\$34,202	\$30,855	\$1.28	10.0
Johnson	977	\$35,393	\$22,772	\$1.36	18.2
Morristown	3,578	\$34,569	\$28,361	\$1.09	11.6
Stowe	3,904	\$30,657	\$34,015	\$1.32	12.2
Waterville	43	\$29,333	\$30,755	\$1.46	14.0
Wolcott	161	\$28,743	\$27,218	\$1.29	8.8
Lamoille County	10,664	\$32,047	\$41,237~	NA	12.7
Vermont	293,088	\$39,425	\$32,501	NA	11.1

Sources: \*Vermont Dept. of Labor, number of people employed, \*\* 2007 – 2011 American Community Survey, + Vermont Dept. of Taxes, per employee, ++ Vermont Division of Property Valuation and Review

~Per Capita Income, according to Vermont Dept. of Labor

Families, children, and seniors in poverty<sup>2</sup>

The rate of people living in poverty in Lamoille County is estimated at **12.6%**, with the number of families living in poverty at a rate of **9.6%**. These are groups with housing needs that are difficult to meet.

Poverty rates in villages are higher than towns, with people in poverty between 9% and 26% of the total population.

<sup>2</sup> American Community Survey

## \$53,368

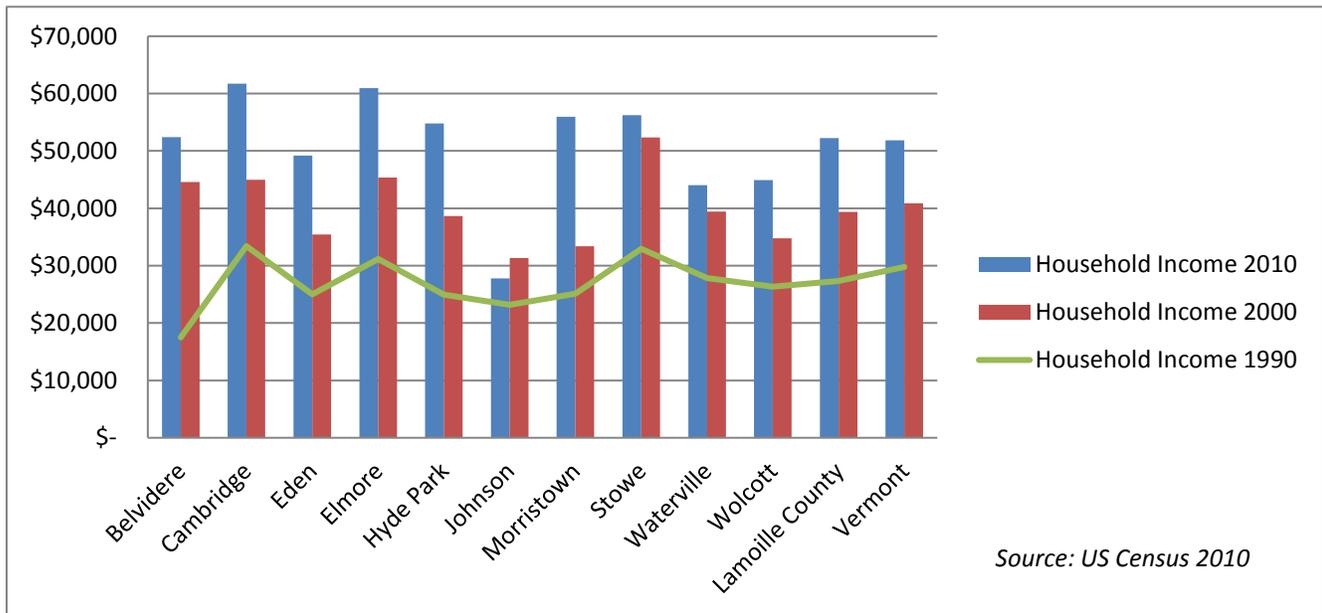
## The median household income in Lamoille County in 2010

<sup>1</sup> Employment includes both public and private employers covered by the unemployment compensation law. The data is gathered from reports submitted by employers each quarter and is aggregated into industries as defined by the North American Industry Classification System (NAICS). The major groups of employers excluded from coverage are most agricultural production firms and the self-employed. This includes the labor force status of the area's residents who are 16 years of age or older. The residents may work, look for work, or be unemployed from firms in areas other than where they reside. The estimates include agricultural workers, unpaid family members and the self-employed.

**Table 2-7. Lamoille County annual wages by industry, 20102**

North American Industrial Classification System Industry	Average Wage (\$)
Total Covered Jobs*	32,047
Private ownership	31,257
Goods Producing	37,475
Natural Resources and Mining	30,255
Construction	38,248
Manufacturing	38,725
Durable Goods	44,686
Non-Durable Goods	18,852
Service Providing	30,221
Trade, Transportation, and Utilities	28,421
Retail trade	24,339
Information	40,720
Financial Activities	41,340
Professional and Business Services	50,244
Education and Health Services	37,562
Health care and social assistance	38,560
Leisure and Hospitality	21,934
Other services, except public admin	27,643
Government (total)	36,388
Federal Government	39,513
State government	38,698
Local government	35,351

**Table 2-8 Median household income 1990-2010, Lamoille County Towns**



2 Source: Vermont Department of Labor, Economic and Labor Market Information

\*Covered jobs include: 1) private for-profit businesses with 1 or more employees, 2) federal, state, and local government, 3) non-profit religious, charitable, or educational firms with 4 or more employees, 4) farms with 10 or more workers, 5) private homes employing domestics, and 6) exempt firms who voluntarily elect coverage.

# Section 3: Where We Live

Housing, Transportation, Energy, and Land Use



## Housing: Strategy

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While Vermont's population has stagnated over the last decade, Lamoille County's population has been growing. But as the number of people in each household decreases, housing costs and home prices continue to rise at a rate unequal to income growth. This means that more housing units may be necessary to house the same number of people and the ability of people to spend money outside of their basic needs may be restricted. The expectation, therefore, is an overwhelming need for additional housing as the County continues to grow. To meet this need, the Regional Plan offers the following Housing objectives:

***Provide for the full housing continuum:*** There is more to the County's housing picture than simple supply. The housing needs of various segments of the population vary greatly. Affordability for young families, renters, and first time homebuyers is a major workforce housing concern. At the same time, an aging population creates future needs for more housing options for senior and disabled residents.

***Ensure a diverse and affordable housing stock:*** With the diversity of communities in Lamoille County, from rural communities without traditional village centers or commercial cores to towns that are the workforce center of the region to communities with heavy seasonal housing stock, the housing needs of each community vary. Further, each community has different water and wastewater availability, development pressures, and priority needs that must be addressed.

***Consider the costs of housing plus transportation:*** As the cost of transportation rises, the costs of housing plus transportation may start to factor into where housing is built or re-developed. Encouraging growth in Center Areas by locating centers of employment, services, and housing more compactly, helps alleviate added transportation costs.

This chapter was based on available U.S. Census and American Community Survey data, municipal plans, the regional plans of other Regional Planning Commissions, the report *Fair Housing and Land Use Regulation in Lamoille County, Vermont* (2007), the *2005 Lamoille County Housing Needs Assessment*, the *2010 Vermont Housing Needs Assessment*, and the *Vermont Housing Needs Assessment Guide* (2003). While this section aims to be comprehensive in addressing the needs of Lamoille County's population and its communities, it is nearly impossible to capture every housing need or scenario. The section aims to address trends found throughout the region and provides suggestions, policies, and recommended action items to guide LCPC's work with ensuring all residents have safe, quality housing they can afford over the next eight years.

## POLICIES & ACTION ITEMS

***Policy:*** *Housing affordability is a regional challenge and whenever possible, regional solutions should be promoted.*

### **Action Items:**

- Assist every municipality to plan for the full spectrum of the "Housing Continuum" to meet present and future population needs, including, but not limited to: entry level housing, manufactured housing parks, transitional housing, accessory apartments, senior housing and assisted living facilities, multi-family housing, single-family housing, and duplexes.
- Along with its member municipalities, conduct a county-wide housing study and needs assessment. This study will address the full "housing continuum" and will include an analysis of housing availability and affordability, including "specialized housing". The study will recommend strategies for increasing availability

and/or affordability where they are lacking within housing types of the continuum.

- Support housing that allows elderly residents to age in their communities, including but not limited to accessory units and elderly housing.
- Identify appropriate locations for specialized housing options. “Specialized housing options” are identified in the Housing Section. Locations are discussed in the Land Use section.
- Maintain historic housing data for comparison to current trends in order to help project future housing needs.
- Work closely with existing housing organizations on the planning, financing, development, and management of affordable housing projects in Lamoille County to ensure all residents have affordable shelter options year round.
- Advocate for state policies and funding for initiatives that increase housing opportunities and affordability.
- Upon request, assist municipalities with non-regulatory language or ordinances that provide creative ways of addressing housing needs. Housing options that could be explored include: community loan funds, co-operative housing, co-housing, reverse mortgages, HomeShare Now, and other techniques aimed at increasing housing opportunities and affordability.

**Policy:** LCPC, together with municipalities and regional housing organizations, should promote and support efforts that allow and encourage clustering for the purpose of providing affordable housing, building multi-family units, providing lots for single family homes, and mixed-use development projects.

**Action Items:**

- Upon request, assist municipalities with individualized housing plans that accommodate the diverse and changing housing needs of each municipality through non-regulatory mechanisms, zoning and subdivision regulations, and other mechanisms. Assistance will include further education and outreach to the public about housing responsibilities, statutes, and needs for sheltering.
- Encourage affordable housing by offering potential incentives to meet a municipality’s stated affordable housing goals, such as reducing permit or hookup fees or allowing single meters to serve multi-unit structures for municipal sewer, water or electrical services.

**Policy:** LCPC encourages municipal efforts to maintain adequate sewer, water, and other facilities and services that accommodate residential growth in Center Areas.

**Action Items:**

- LCPC supports efforts to upgrade sewer, water, and other infrastructure to accommodate residential growth in Center Areas.
- Work with municipalities to improve the quality of the existing housing stock. Efforts may include: providing technical assistance in applications for grants, loans, and tax credits for code improvement; in adoption and enforcement of health and building codes; assisting with lead and asbestos assessment and abatement; and brownfield assessment, remediation, and reuse.

**Policy:** LCPC shall assist municipalities in preparing capital programs and capital budgets to fund improvements to community infrastructure and services needed to support housing development, particularly within Center Areas.

**Action Items:**

- Work with municipalities to designate Growth Centers and Neighborhood Planning Areas.
- LCPC should assist municipalities in pursuing State and Federal funding to assist in the installation and/or upgrade of improved municipal services to service housing developments, particularly within Center Areas.
- The existing housing stock should be preserved and renovated. Adaptive re-use of older and historic buildings is encouraged, especially in Center Areas.

**Policy:** LCPC supports residential development that is compatible with existing community character as defined in municipal plans, historic development patterns, and smart growth land use patterns. An increase in the total number of dwelling units and/or housing density in comparison to neighboring properties shall not in and of itself be considered detrimental to the character of the neighborhood.

**Policy:** Development standards should permit a variety of housing (including single-family, multi-family, accessory, and mobile homes). Municipalities should use alternatives to minimum lot size to regulate use and intensity of development, especially in Center Areas.

**Action Items:**

- Encourage policies, regulations, and projects that support policies outlined in this Land Use Plan, aimed to cluster housing, preserve open space and working landscapes, and involve a variety of regulatory and non-regulatory tools to achieve desired densities and settlement patterns.
- LCPC encourages innovative planning, design, and construction of primary housing that minimizes cost, energy consumption, and environmental impacts of housing.
- To support clustering of housing, developers shall consider use of community water/wastewater systems, wastewater pretreatment, and innovative wastewater treatment.
- To ensure a predictable permitting process, municipalities are encouraged to provide clear standards to assess applications for new housing and subdivisions.
- Conduct trainings throughout the region on land use tools and creative solutions to address housing needs, including, but not limited to form based codes, PUDs, density bonuses, alternatives to large lot zoning, voluntary and compulsory inclusionary zoning and types of subdivisions, and other creative solutions to address housing needs. Trainings will be tailored for Planning Commissions, Development Review Boards, and other municipal decision-makers.

## Housing: Background and Inventory

Municipalities may find unique approaches to addressing housing needs applicable to the community but ultimately, a regional entity may be able to facilitate work between municipalities, service providers, non-profit agencies, and residents of varying needs to address housing needs.

Housing is affected by transportation, location, workforce development and opportunity, and land use trends. Regional organizations that do not work directly with those seeking housing, such as LCPC, can be liaisons between regional groups, agencies, entities, and organizations that do create housing and housing policy. Housing struggles are not limited to any one community in the county. Policies and programs implemented in one community may have consequences in the next. LCPC can facilitate county-wide dialogues in order to help finance and locate housing.

To address housing needs and trends, it is useful to collect and analyze data on demographic changes or to undertake housing needs assessments. A Lamoille County regional housing needs assessment was last conducted in 2007. Since the recession of 2008 – 2010, trends are likely very different given changes in the regional, state, and national economies.

Lamoille County’s demographic trends show a substantial increase in housing starts, likely due to the County’s increasing population. Housing challenges include affordability, adequate stock of housing for diverse populations, quality of housing, transportation costs, land constraints, and availability of employment opportunities. Everyone needs shelter and a regional approach to addressing housing makes everyone responsible for ensuring all people are adequately, appropriately sheltered.

### Housing and Demographic Changes

In the last two decades, new housing starts in many Lamoille County towns have increased substantially, at a rate faster than overall population growth. For comparison, between 1990 and 2010, the number of housing units in the county increased approximately 31.4%, while the population increased by only 24% (Table 3-1). This trend is attributable to several factors, including a declining average household size, which will be discussed in detail later in this chapter.

### Housing Needs and the Housing Continuum

People have different housing needs at different ages. When there is a burst of demand within a specific age group, it leads to inflation within their particular type of housing. Lamoille County must track population and age statistics to ensure each group has an adequate supply of housing to meet their needs. The State of Vermont describes each group and its housing demand in this way (Table 3-2):

Table 3-1 Population change and housing change, 1990-2010

	<b>Population</b>	<b>Housing</b>
	% Change	% Change
<b>Town</b>	1990 - 2010	1990 – 2010
Belvidere	52.63%	25.75%
Cambridge	37.20%	53.80%
Eden	57.50%	52.46%
Elmore	49.21%	34.07%
Hyde Park	26.02%	41.88%
Johnson	9.19%	22.61%
Morristown	10.44%	17.69%
Stowe	25.66%	24.59%
Waterville	26.50%	51.90%
Wolcott	36.37%	38.72%
<b>Lamoille County</b>	<b>24.02%</b>	<b>31.37%</b>

Source: U.S. Census 1990, 2000, 2010

Table 3-2 Housing Continuum by Age Group

Age Group	General Characteristics	Housing Demand
20s	-Lower incomes -High mobility -Small households	Apartments
30s	-Beginning families -Small children -Growing income	1 <sup>st</sup> Time Homebuyer Mobile homes Condos
40s	-Growing families -Growing income	Step up to larger house Additions, home improvements
50s	-Stable housing -Empty nest -Income peak	Live in existing homes Renovate and improve housing
60s	-Nearing retirement	Begin process of “downsizing”
70s	-Retirement -Reduced income -Reduced physical mobility	Smaller homes Condos Retirement developments
80s/90s	-Risk of frailty -More single households than couples	Assisted living At risk of institutional care

Source: Vermont Department of Housing and Community Development, 2005 VT Housing Needs Assessment

Demographic trends (see Section 2) indicate that the proportion of the population who are retirement age and elderly will increase over the next decade. While the middle-aged tends to be the wealthiest sector of the population, many of those in the elderly age range may be single people with limited incomes and the need to locate near services. The increasing trend shifting towards older renters over younger will impact the housing demands. From a supply standpoint, older renters expect higher quality rental units than younger renters or may need to shift from a detached single family home to a more modest living unit. Based on supply information discussed earlier, it appears there has been an increase in the supply of rental housing. These trends will likely continue for the next ten years.

### Household and Family Characteristics

Housing needs differ based on household types. The Census breaks families into three groups<sup>1</sup> :

- married couples,
- female householder with no spouse present, and
- male householder with no spouse present.

In addition to families, the Census breaks households into non-families<sup>2</sup>. The town with the highest percentage of householders living alone is Stowe (33%) followed by Belvidere and Morrystown (29%). Different people desire

1 According to the 2010 US Census and American Community Survey, a household that has at least one member of the household related to the householder by birth, marriage, or adoption is a "Family household." Same-sex couple households are included in the family household's category if there is at least one additional person related to the householder by birth or adoption. Same-sex couple households with no relatives of the householder present are tabulated in nonfamily households. Federal rulings in 2015 have likely changed these definitions. At the time the data was collected, these are the definitions and categories counted.

2 "Nonfamily households" consist of people living alone and households which do not have any members related to the householder.

home-ownership but generally have more difficulty doing so than married couples. This can be due to cost, bank

**Lamoille County, 2010:**  
**63% of the 10,014 households were families**  
**48.3% of households were married families – often living**  
**in home-ownership situations**  
**10% of households were female householders**  
**27% of households live alone**

policies, credit, or other factors.

What is telling about the householder data is similarities between Stowe and Johnson Town. Both Stowe and Johnson have high rates of households composed of non-family members (43%). This could be housemates, same sex couples, or non-married partners, for example. Both Johnson and Stowe have high rates of rental occupancy. However, for Johnson, this is likely due to the high population of students and for Stowe, it is the high population of seasonal residents, many of whom are retirees.

Table 3-3 depicts the trends in the average size of families and all households between 1990 and 2010 for the county and the entire state. The average family and household size across Lamoille County and Vermont appears to be steadily decreasing since 1990. Families and households that are smaller may desire smaller dwellings. However, the numbers presented are averages and many households do experience overcrowding. Overcrowding has become much more of an issue with the high rate of foreclosures and declining economy as families move in together to share costs. Similarly, taking in elderly or lower-income relatives may be unsuitable for smaller houses not equipped to handle more people.

Table 3-3. Average Size of Families and all Households, 1990-2010

Year	Lamoille County		Vermont	
	Household	Family	Household	Family
1990	2.56	3.07	2.57	3.06
2000	2.45	2.94	2.44	2.96
2010	2.37	2.87	2.34	2.85

Sources: 1990 - 2010 Censuses of Population and Housing

### Housing Stock Characteristics

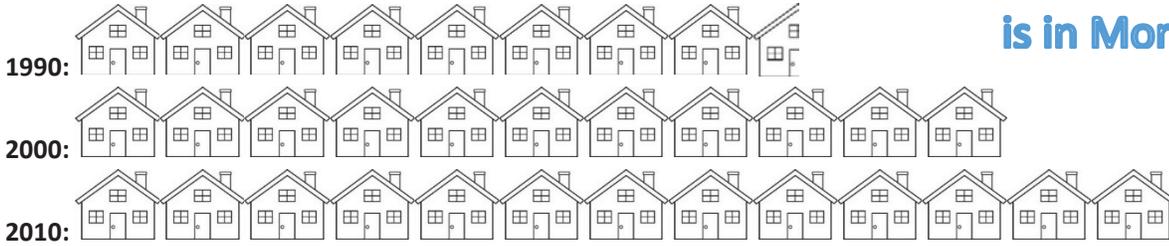
According to the U.S. Census, the majority (68%) of the housing units in Lamoille County in 2011 were single-family homes. The second most common housing unit type in Lamoille County in 2011 was a unit in a building with 3 or more units (13%). This is followed by mobile homes (10.5%) and buildings with 2-units (8.6%).

The housing stock in Lamoille County is primarily owner occupied. The County has stayed at 70 – 71% owner occupancy rate from 1990 to 2010 for all occupied properties. Johnson has the highest percentage of rental

occupancy of all Lamoille County towns, however, the rate of owner occupancy to rental occupancy has the highest rate of change in Cambridge. This is due in large part to the high rental population in Jeffersonville.

**HOUSING UNITS** (1 house = 1,000 units)

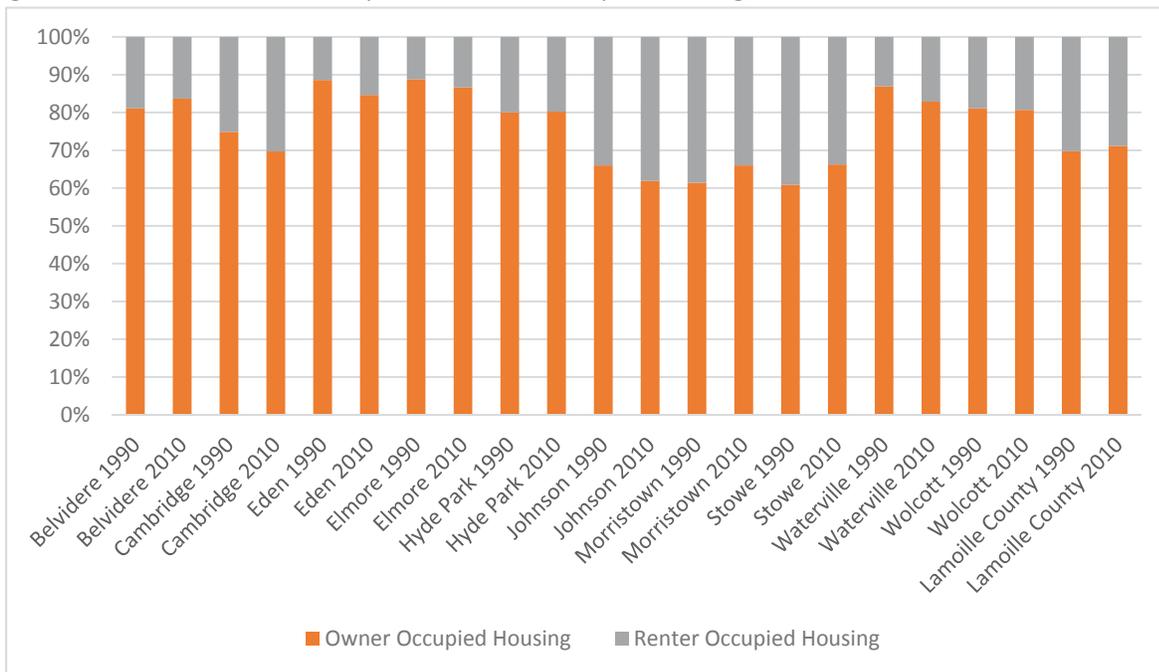
**Half of the County's housing is in Morrystown and**



During the time period 1990 – 2010, Cambridge, Hyde Park, and Waterville increased their housing units by 50%. Morrystown has had the slowest rate of housing unit growth throughout this same time period, increasing its housing stock by 17.7%.

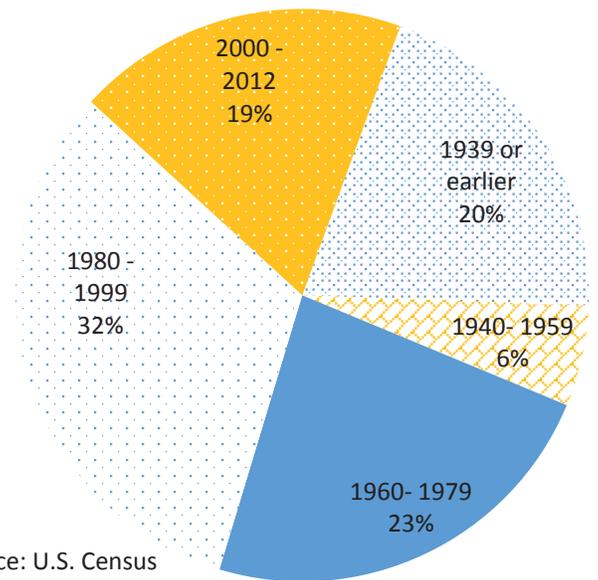
Lamoille County depends on its seasonal population for much of the economic growth. However, a majority (82.7%) of the County's housing stock is year-round housing. Cambridge, Johnson, and Morrystown each have only a small portion (5%) of their housing stock as seasonal. On the other hand, Stowe, Elmore, and Eden each have significant seasonal populations, 39%, 29%, and 26% respectively.

Figure 3-4 Percent of owner occupied and renter occupied housing, 1990 and 2010



One way of measuring housing quality is by the age of housing stock. Much of Vermont’s housing stock is older than the national average. This corresponds to housing quality issues and the potential need for housing rehabilitation as opposed to new housing, which can come with its own set of additional costs. Examples of issues that can arise with an older housing stock include: prevalence of lead paint and asbestos, no fire code, and inefficient energy use. Lamoille has a newer stock than the state average, with 20% built prior to 1939. In fact, Lamoille has one of the lowest percentages in the state for housing built prior to 1939. Almost 19% of the housing stock was built since 2000, which is a high rate relative to other counties and exemplifies the county’s increasing growth rate. It should be noted, however, that 95% of the 84 houses in Cambridge Village were built prior to 1939.

Figure 3-5. Age of Lamoille County Housing Stock



Source: U.S. Census

In 2011, the median year of all structures built for housing units in Lamoille County was 1978. The median year of renter occupied housing is 1974 (40 years old) and for owner occupied housing units it is slightly later, 1980. Lead paint was banned from use in 1978. It is likely that many renters and homeowners are exposed to lead in their housing.

All houses have their challenges but one of the challenges with older homes is their functionality. When houses were built in the 19<sup>th</sup> century, they were larger to accommodate extended families and families that were much larger than they are today. The average size of a family in Lamoille County today is 2.87 people, which is down from 1990 and down dramatically from 7.00 people in 1800. Large Victorian homes have proved useful for a number of adaptive re-uses. Beyond their intended use as a single-family home, these homes have found use as rental apartments for individuals and families, shared housing situations for elderly, assisted living facilities, commercial uses, museums, transitional housing, or mixed-use developments (commercial and residential uses). A recent example of an adaptive re-use housing project utilizing a Victorian home and carriage house in Lamoille County includes Lamoille View, a Lamoille Housing Partnership project which opened in 2013 as a senior housing project with 25 units.

**The Need for Fair and Affordable Housing**

It would be ideal for all residents of Lamoille County to have fair and equal opportunity to secure affordable housing that meets their needs for shelter and accessibility. Unfortunately that is not always the case. Common barriers to housing include low incomes, high housing costs, accessibility and self-care needs due to age and disability, and possible discrimination based on these factors, race and ethnicity, familial status, and more.

Communities with zoning and subdivision bylaws must be careful not to drive up housing costs by requiring large lots or having other requirements that add costs to the final unit. By state law, municipalities must treat mobile homes the same as other types of housing and must allow mobile home parks, multi-family housing, and accessory apartments in their communities. In 2007, LCPC published a report entitled *Fair Housing and Land Use Planning & Regulation in Lamoille County, Vermont*. This report analyzed Lamoille County’s municipal plans and zoning bylaws to assess the degree of compliance with the U.S. Fair Housing Act and propose steps to further the

goal of fair housing. The report noted that all towns and villages with a plan have some language that may be impractical given the community’s lack of regulatory authority and that many communities do have some provisions to increase access to affordable housing.

### Housing Affordability

The Vermont Department of Housing and Community Development (DHCD) housing policy states that housing is considered affordable when the costs (such as rent and utilities, or mortgage and taxes) are no more than 30% of income for a household earning 80% of the county median. As a general rule, the lower the income, the smaller the chance that available housing will be affordable. Factors that affect the affordability of housing are briefly discussed below. (For more detailed analysis, see the Economic Development, Energy, Transportation, and Demographics sections). An affordable monthly housing payment for local families is approximately \$1,334 per month, including taxes and utilities. Accounting for increases in heating fuel prices—which may exceed \$200 per month during winter—there are a limited number of housing options in the region that are, by definition, affordable.

**32% of Lamoille County renters are in unaffordable housing situations**

**\*Vermont Housing Data**

The median household income of a renter in Lamoille County is \$32,147, compared to the median household income of a homeowner, \$63,894. Homeowners spend about 24% of their incomes on housing costs. Most of Lamoille County’s towns and villages are unaffordable for renters, including: Belvidere, Cambridge Village, Eden, Hyde Park, Johnson, Johnson Village, Morrisville, and Stowe.

Municipality	2000 Median Gross Mortgage (\$)	2000 % of Household Income	2010 Median Gross Mortgage (\$)	2010 % of Household Income
Belvidere	756	13.5%	1,536	25.80%
Cambridge	1,028	20.8%	1,733	22.30%
Cambridge Village	950	19.2%	1,779	28.10%
Jeffersonville	1,102	18.9%	1,399	31.40%
Eden	758	17.5%	1,340	21.70%
Elmore	953	21.3%	1,345	21.30%
Hyde Park	830	19.3%	1,286	21.80%
Hyde Park Village	867	21%	1,481	25.20%
Johnson	810	21.3%	1,389	26.80%
Johnson Village	817	19.5%	1,540	31.60%
Morristown	882	21.1%	1,545	23.10%
Morrisville	845	18.2%	1,406	23.00%
Stowe	1,443	23.2%	2,465	29.80%
Waterville	957	23.8%	1,322	24.60%
Wolcott	806	19.3%	1,246	26.60%
<b>Lamoille County Average</b>	<b>977</b>	<b>20.8%</b>	<b>1,444</b>	<b>23.70%</b>
<b>Vermont Average</b>	<b>1,021</b>	<b>20.2%</b>	<b>1,516</b>	<b>23.20%</b>

Source: U.S. Census 2000, American Community Survey 2007 - 2011

Low and middle-income residents do not fare as well. Lower-income earners are likely to have a harder time keeping up with housing costs than higher wage earners. A combination of rising land and home prices, concentration of employment in the low-wage service sector, and increased pressure on the rental market could rapidly push some Lamoille County communities out of the affordable range for low and middle-income residents. While owning a home may be more affordable for some workers, the cost of maintaining that home over time will continue to increase as the cost of living increases faster than wages.

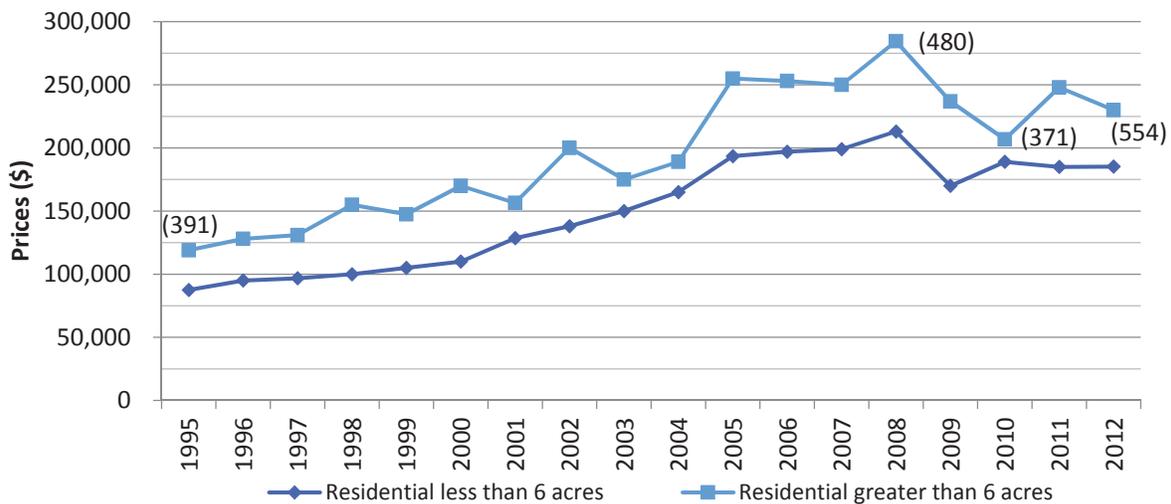
*Cost of purchasing a home*

Using the rough estimate that households can afford a house that is three times their yearly income, a family with an income of \$53,368 (median income in 2010) could afford a home with a sale price of \$160,104. Affordability is determined by sale prices, not by property values; there may be plenty of affordable housing but if none of it is for sale, it doesn't do a buyer any good. The median sale prices for

Lamoille County are in the figure above. These prices were derived from property transfer tax information compiled by the State of Vermont. The number in parentheses indicates the number of sales in selected years Countywide, incomes increased 91% between the 1990 and 2010 Census counts. Table 3-8 attempts to determine

**Median value of housing**  
**Eden: \$100,000 - \$149,999**  
**Stowe: \$300,000+**

Figure 3-7. Median Residential Sale Prices for Lamoille County, 1995 to 2012



Source: Vermont Department of Taxes 1995-2012

whether or not local and regional income sources have been keeping up with increases in home sale prices. Home sale prices are a primary driver of housing costs, and increases in average wages can affect all local households, regardless of how many earners may be present. However this table does not take into account mortgage rates, utility costs, tax rates, and other non-wage income sources, including public subsidies. From 1995 – 2005, home sale prices exceeded wage increases, a trend that reversed with the collapse of the housing market after 2005. Rather than an increase in overall purchasing power, a precipitous decline in housing values ensued. In combination with low interest rates, the housing market decline has made home ownership more affordable in theory.

Despite the slow increase in home prices, the median family could not afford to buy the median priced house in Lamoille County. The State Department of Taxes tracks housing sale prices annually, categorized by parcel size. Median sale prices range from \$185,250 for less than 6 acres to \$230,000 greater than 6 acres. Housing prices on smaller parcels sold for less than their value in 2009 but have since risen, albeit to levels not seen since the early 2000s. For larger residential properties, prices have been variable since 1998, with regular peaks and valleys. The price drop in 2010 has been slower to recover.

Still, housing prices are above affordability for the average Lamoille County worker. The tenuous balance between median sale price and median income could easily swing in either direction given the current condition of the economy and housing market. Also, the needs and preferences of individual households may not be able to be met within this tight window of affordability. When adjusted for 2012 inflation, the cost of a residential house and property in 1995 would be \$130,000- \$177,000 – still less than the current median.

*Rental Housing Costs*

Renters in particular struggle to afford housing in Lamoille County. As demonstrated in Table 3-9, housing affordability exceeds 30% of a household’s income in most Lamoille County towns and villages.

Table 3-8. Increase in Median Home Prices versus Annual Average Wages – Lamoille County

Time Period	Median Home Price Increase	Average Wage Increase
1990-1995	0.00	17%
1995-2000	32.22%	18%
2000-2005	59.66%	27%
2005-2010	0.26%	16%

Sources: 2010, Vermont Dept. of Taxes, Property Transfer Data, as analyzed by Vermont Housing Finance Agency 2010, Vermont Department of Labor, Quarterly Covered Employment and Wages Report.

Table 3-9. Rental housing costs as percent of household income

Municipality	2000 Median Gross Rent (\$)	2000 % of Household Income	2010 Median Gross Rent (\$)	2010 % of Household Income
Belvidere	625	33.8%	988	41.7%
Cambridge	603	24.4%	888	24.9%
Cambridge Village	682	28.1%	782	35.7%
Jeffersonville	503	23.9%	867	29.7%
Eden	566	26.3%	1,305	37.5%
Elmore	738	19.2%	1,167	28.3%
Hyde Park	588	22.4%	790	32.5%
Hyde Park Village	529	24.4%	800	27.0%
Johnson	481	30.3%	758	31.0%
Johnson Village	451	29.6%	719	40.3%
Morristown	493	25.9%	931	28.7%
Morrisville	475	25.6%	841	31.0%
Stowe	714	26.5%	1,318	34.0%
Waterville	513	33.1%	940	25.9%
Wolcott	537	27.7%	758	20.0%
<b>Lamoille County Average</b>	<b>543</b>	<b>26.2%</b>	<b>930</b>	<b>31.8%</b>
<b>Vermont Average</b>	<b>553</b>	<b>26.2%</b>	<b>843</b>	<b>30.9%</b>

Source: 2000 and 2010 U.S. Census

### Housing plus Transportation

The decision about where to live and where to work is based on a number of individual factors. Employment in Chittenden County may pay more but it also costs more to buy a home there. Lamoille County's communities are within driving distance to Burlington but housing costs have historically been much lower. The same can be said for living and working within Lamoille County. Housing values, as opposed to sale prices, are varied throughout Lamoille County towns.

Over 60% of 2012 property transfers in Lamoille County were in Stowe, Morristown, and Cambridge. These three communities are also closest to Burlington and Barre-Montpelier, two major, statewide employment centers. While housing is generally more affordable further from employment centers, longer commutes often result in increased transportation costs (including fuel costs, vehicle repairs, and other related expenses, Table 3-10).

Table 3-10 Costs of Commuting\*

	40-mile round trip commute	15-miles round trip commute
Monthly Costs	\$452	\$169.50
Yearly Costs	\$5424	\$2034

\*Assumes commute is 5 days per week x 2013 IRS rate (\$.565 per mile)

The financial costs of commuting show that an average 40 mile round trip per workday will cost a worker about \$452 a month, or \$5,424 a year (using the Internal Revenue Service's 2013 standard mileage rate) while a worker who has a 15-mile round trip commute will spend significantly less, \$170 a month or just over \$2,000 annually. Commuting also impacts quality of life, traffic, air pollution, and time spent with families or in the community (for more information, see the Transportation Section). Development patterns that locate housing further from jobs and services cost residents time and money, and also reduce the amount of disposable income that residents have to spent at local businesses.

This combination of housing plus transportation costs is at the root of a new affordability index developed by the Center for Neighborhood Technology (CNT). CNT realized that there are more cost burdens associated with housing than just income, or income and commuting costs. Neighborhoods that are efficient also cost less. This means compact neighborhoods with mixed-uses, access to jobs, services, and transit are more efficient. After housing costs, transportation is the second greatest cost to a household. Combined, housing and transportation should be no more than 45% of a household's income.

The CNT website, [www.htaindex.cnt.org](http://www.htaindex.cnt.org), discusses housing and transportation costs in greater detail and features an interactive platform that allows users to gauge their housing plus transportation affordability index. The index includes incomes, household size, and average number of commuters per household. An example from the site is Washington County. Washington County residents spend about 22.85% of their incomes on housing costs. When combined with transportation, they spend over 52% of their incomes on those two costs. This has been deemed unaffordable by the CNT index.

Lamoille County's housing values are \$240,000 and the household income is \$53,368. Using a Washington County example, the average value of a house is \$203,100 and the typical worker earns \$54,227 annually. The idea of housing plus transportation costs can roughly be figured in the following for Lamoille County homeowners:

Table 3-11. Housing + Transportation Affordability in Lamoille County\*

	<b>Cost</b>	<b>% of income</b>
Median Mortgage payments	\$1,512/ month	56.6
Commuting costs	\$5,424 (annually)	16.9
Total	\$23,568	73.5

\*Based on the average annual wage of \$32,047; mortgage payments based on 2010 U.S. Census Bureau (\$18,144 annually)

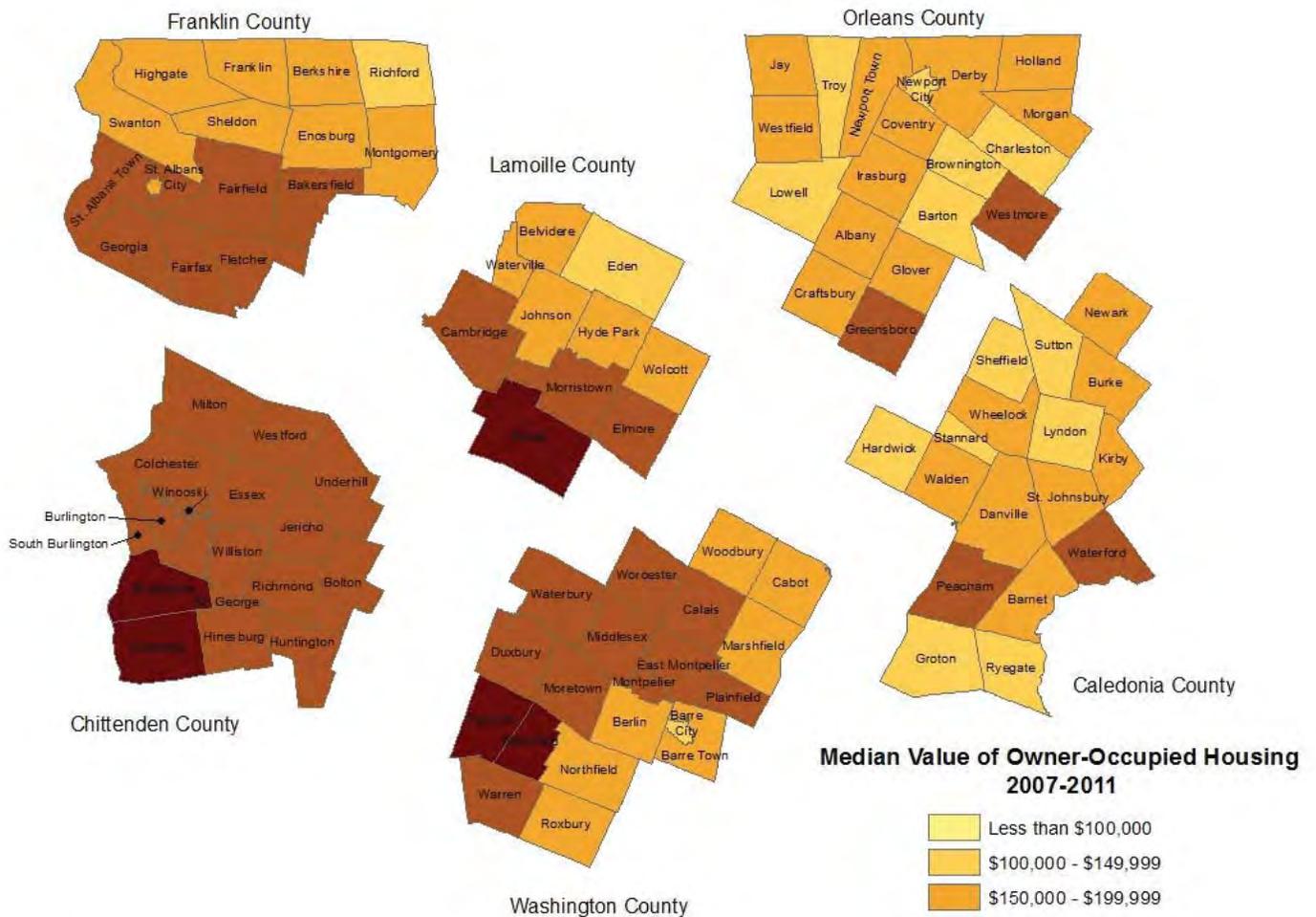
Housing values of towns in adjacent regions provide varied options for potential Lamoille County residents. In the northeastern regions and towns, housing values are lower and more diverse than the western and southern towns which border Lamoille County. Owner-occupied housing values in Lowell and Hardwick are less expensive than Craftsbury, for example. The southern towns of Franklin County, all of Chittenden County’s towns adjacent to Lamoille County, and most of Washington County’s bordering towns have median housing values in the upper end of the spectrum.

Housing values in adjoining regions are an important consideration for communities bordering other counties. As housing costs in Chittenden County continue to increase, development pressure may be put on Cambridge and Jeffersonville. Waterville, Belvidere, and Eden are all currently relatively affordable communities within reasonable commuting distance to the Jay/ Newport area. Major developments proposed in this area may have an impact on housing costs and/or increase development pressures on these Lamoille County communities. Monitoring workforce projects will be important for LCPC as these development proposals unfold to the north.

**Specialized Housing Options**

Within every community are individuals or families with special housing needs. The elderly, individuals, and families with children in poverty are examples of groups with special needs that are found in most communities. The disabled or infirmed may also require special arrangements. A final category of special needs housing is group quarters or institutional care. Living arrangements such as college dormitories, nursing homes, group homes, and homeless shelters fall into this category. If diverse housing options are not available, some residents may be forced to relocate outside of Lamoille County as they age and need additional levels of care.

High housing costs adversely affect young families and the elderly more than the general population. For the elderly who may be living on fixed incomes, the cost of utilities, health care, or other monthly costs can be difficult to maintain. For the elderly, who may live alone or with another person, their homes may be larger than what one or two people need or can maintain. This increases costs of heating and maintenance. The draw for elders to remain in their homes may be economic (an older person is more likely to own his or her home rather than pay a mortgage) or social (comfort of knowing the house, the neighborhood, and the community).



Source: Housing Vermont  
[www.housingdata.org](http://www.housingdata.org)

Young families may require more bedrooms. Ramifications of inadequate bedroom counts may impact, among other factors, wastewater treatment systems in communities without municipal sewer or cause overcrowding. For a 4-bedroom house, it is estimated that a family needs to earn about \$33.58 an hour, or \$69,846 annually. This is well above the county median income.

Listed below are groups with special needs which are found in Lamoille County and an evaluation of how well their needs are being met. Generalizations are made throughout this section based on characteristics and they are not intended to be derogatory in any manner. With each generation, individuals are staying healthier longer and can live independently much later in life. But, in general, taking care of oneself and one's home get significantly more difficult as one gets older especially if someone loses a spouse.

For elderly assisted living facilities, there are four levels based on the amount of care and assistance necessary. The amount of special care required may be more or less depending on the situation. Some individuals need only special construction (such as handicapped accessibility) while others need assisted living arrangements (visiting nurses) while still others may require full institutional care.

This group would need Level IV care.

- Seniors 70-85: Most seniors between 70 and 85 continue to live independently, but many require some assistance especially as they get older. These may be situations where seniors have difficulty driving or require a visiting nurse periodically. This age group may require Level III care.
- Seniors 85 and over: Beyond age 85, seniors increasingly need more intensive care. In the most serious cases, full institutional care is required. There are relatively few individuals in this category but this may be due to the fact that anyone who requires assisted living are forced to move to towns which have these facilities available. These individuals would require Level II or Level I housing. Level I nursing homes are generally located near hospitals where emergency services can be available.
- Mobility and self-care limitations (disabilities). Individuals would require assistance with day-to-day functions such as eating, dressing, and bathing. Depending on the severity of the limitations presented by one's disability, human services, transportation services, or special construction (handicapped accessibility) may be required. Social services are available in Lamoille County although special living situations for those in serious conditions do not exist.
- Families, Children, and Seniors in Poverty: The average rate of poverty in Lamoille County, based on 2010 estimates, is 12%. Poverty affects individuals, families, and the elderly. It is a compound of income, cost of living, and the ability to provide basic needs to survive.
- Homelessness and Transitional Housing: Homelessness is when people are unable to acquire or maintain housing they can afford. Despite the resiliency of Vermonters, homelessness continues to afflict many in Lamoille County.
- Student housing: Contrary to State trends, Lamoille County's percentage of 20 – 24 year olds is increasing and is projected to continue growing. It is unclear to what level that age group is enrolled in post-secondary education but enrollment trends at nearby institutions continue to increase. However, housing a student population requires different expectations than housing for elderly or families, for example. With Johnson State College in Johnson and the Vermont Woodworking School student population housed in Jeffersonville, these two communities face especially different housing challenges related to housing affordability and availability than many other Lamoille County communities.
- Seasonal workers: As an economy which benefits heavily from tourism related industries, Lamoille County has a unique challenge in housing seasonal workers who may only spend 5 – 8 months in Lamoille County. There is no definitive characterization of the type of seasonal worker who may need housing in the region so housing should accommodate a variety of needs on the housing continuum.
- Veterans: Lamoille County has a population of veterans who live here year-round. The housing needs of veterans, individually or a family, are unique to this group. While military benefits are generally available, veterans often need an holistic approach to address their needs, particularly veterans of active duty. The incidence of post-traumatic stress disorder, substance abuse, or mental health illness is high in this group, making stable, affordable, and safe housing an issue of concern for many.

#### *Older and Disabled Residents*

The proportion of Lamoille County households with household members over 62 years of age is growing at a faster rate than for all households (20 percent compared with 18 percent, respectively) (Table 3-12 below). The rate of change for low-income older households (below 80% of median income) is increasing quickly, with more than 1,350 households estimated in 2010, representing a change of 23% between 2000 and 2010. This reflects the general household growth in this popular destination county, the first decade of the “baby boom” population cohort as it begins to affect elder households, and generally longer life expectancies.

Table 3- 12. Estimated Number of Households By Household Income Relative to Estimated Area Median, 2000 - 2010

Percentage of Area Median Household Income	2000	2005	2010	% Change (2000 – 2005)	% Change (2000 – 2010)
<=30%	349	419	457	19.92%	31.02%
31%-50%	381	360	389	-5.31%	2.28%
51%-60%	123	151	186	22.97%	51.88%
61%-80%	240	295	317	22.88%	32.00%
>80%	894	942	1,047	5.42%	17.16%
Total	1,986	2,167	2,397	9.11%	20.69%
Total <=80%	1,092	1,225	1,350	12.12%	23.57%

Source: Gent Communications analysis of data from Census (2000) and Claritas (2005, 2010)

In 2000, more than 575 Lamoille County elderly households had some type of mobility and/or self-care limitation. The problem was pronounced for elderly or extra-elderly (age 75+) owner households. However, non-elderly households experienced even higher levels (39% of owner and 20% of renter households). The total number of households with mobility and/or self-care limitations represents 15 percent of all Lamoille County households.

And, the 2005 Lamoille County Housing Needs Assessment confirmed: Lamoille County has not met the state 40%/60% long-term care goal in which 40% of long-term care services are available within the community. Lamoille County does not have access to assisted living or some forms of unlicensed special needs housing. Elders report difficulty in locating the special needs housing they need and some providers are exploring the feasibility of adding units to existing special needs housing projects.

According to the 2010 Census, there were 962 seniors (65+) living alone in Lamoille County, about 4% of the population. This group is important for social reasons as being retired and living alone in northern Vermont can be hard. In many cases, opportunities to rent apartments in senior housing are desired. The average monthly payment for Supplemental Security Income (SSI)<sup>3</sup> is \$762. There are over 500 individuals in Lamoille County receiving these federal benefits. As already demonstrated previously, this monthly income is not sufficient to provide housing and food, at a minimum.

#### *Homelessness and Transitional Housing*

Homelessness is difficult to measure, particularly in a region like Lamoille County, with limited social services, a scattered population, and proximity to major social service centers like Burlington and Barre. While data is limited, based on the best available information, we know:

- There is 1 domestic violence shelter in Lamoille County
- At any given time, there are approximately 12 families staying in hotels in the county
- There are 45 families in shelters at peak times
- People find places to live such as personal automobiles or tents
- Seasonal work leads to homelessness in off seasons
- Most people who are homeless are employed at some level

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<sup>3</sup> Supplemental Security Income Supplemental Security Income (SSI) is a Federal income supplement program funded by general tax revenues (*not* Social Security taxes) that is designed to help aged, blind, and disabled people who have little to no income. It provides cash to meet basic needs for food, clothing, and shelter.

There are a number of causes for homelessness. It is not often that there is only one factor that causes an individual or family to become homeless but rather it is a culmination. Some factors include:

- Domestic violence or threatening situation
- Lack of affordable housing
- Rental policies are difficult (requiring first/last and security deposit is unaffordable; lack of 2, 3, or 4 bedroom rental units; landlords uneasy to rent to families)
- Undiagnosed mental health issues
- Substance abuse
- Gap between income needed to purchase or rent a home is growing
- Low or stagnant wages are not keeping up with rising costs of heating, housing, or transportation

Point in Time data collection counts the number of individuals and families receiving State assistance at any given point. For all counties except Chittenden, roughly 1000 people were in Emergency Shelters or transitional housing for homelessness, or shelters not adequate for human habitation. This is an increase from 750 the year before, and an increase from 655 the year before that. Statewide, homelessness is a serious issue that continues to grow, even as the economy appears to improve. As of January 30, 2013, the number of individuals seeking assistance in Lamoille County was 13. Of these 13 individuals, only 1 person sought services for one time, meaning those seeking assistance are often seeking assistance on multiple occasions, highlighting a need for continued assistance. Chittenden County, with its high population, has the highest rates of services sought. Lamoille County, Caledonia County, and Franklin County all have similar numbers of individuals seeking shelter.

County	Total Persons	%	Totals Persons –	HUD Homeless*	Chronic Homeless	Precariously Housed	Motel Vouchers	VT Rental Subsidy
Caledonia	107	4.1%	106	61	5	45	40	2
Chittenden	739	28.6%	610	465	97	173	218	55
Franklin	117	4.5%	70	43	10	30	3	39
Lamoille	136	5.3%	108	36	1	75	23	12
Orleans	24	0.9%	21	17	3	4	1	6
Washington	249	9.6%	196	141	25	64	67	19

HUD Homeless includes Chronically Homeless. Precariously Housed includes people doubled-up, couch surfers etc. Unknown/Not Recorded are not shown separately, but are included in Totals. All client counts are unduplicated unless otherwise noted. Statewide Unduplicated counts may not equal the sum of County or AHS District Totals. For example, if a person with the same unique identifier was counted by an agency in Addison County and by an agency in Chittenden County, statewide unduplicated counts will count this person as one, and breakdowns for Addison County and for Chittenden County will each count this person.

As of the writing of this Plan, there are no year-round, 24-hour homeless shelters available in the County. In addition to emergency shelters, transitional housing plays a key role in moving a family or individual from a homeless condition to permanent housing. In addition to shelter, transitional housing offers accompanying services coordinated by support agencies to manage the housing, coordinate with partners, and expand beyond finding a housing unit and into life skills training. The ultimate goal of transitional housing is to help individuals or families become independent and successful in finding permanent housing. There is no definition of a transitional housing unit; it can be a motel, apartment, a unit in a multifamily structure, a room in a house, or a facility built

specifically as transitional housing. Residency generally lasts between six months and two years. Because it is an amorphous issue, it can be difficult to quantify people served by transitional housing. Service providers (those working for non-profits or for State or Federally funded social service programs) have identified a need for more transitional housing spread out around Lamoille County rather than concentrated in one or two buildings in one or two towns.

The State, through the Reach Up program, offers motel vouchers for emergency situations, to families. These vouchers are not handed out freely, but eligibility must be determined by income, resources, living expenses, and number of family members. If temporary assistance is sought, recipients must show they are likely to be self-sufficient in 4 months or less.

Other State assistance programs include the Vermont Rental Subsidy Program, is similar in structure to the Federal Section 8 program. Applicants must be pre-screened by regional Housing Review Teams and meet eligibility requirements. Approved renters pay a portion of rent while the state pays the remaining portion. Apartments selected must be priced below fair market rent and pass an inspection. Federal programs provide housing assistance under the Section-8 Housing Choice Voucher. A family or individual can apply to the Vermont State Housing Authority for rental assistance (called a "voucher") that would enable them to afford a privately-owned apartment of their choice within the Housing Authority's jurisdiction. Affordable housing developments such as Brewster River Housing (Jeffersonville) and Section 8 Housing Vouchers are, in many cases, the housing of last resort for some families before becoming homeless. These housing and support programs are necessary to help families keep a roof over their heads until a more permanent arrangement can be made.

Social service providers, through the Agency of Human Services, Department of Corrections, non-profit organizations, United Way, the Lamoille Family Center, clergy, and other programs, have identified barriers to finding housing for those in desperate need. Lamoille County's dependence on tourism has made it difficult for public places to be open to the public when the need is greatest. Shelters often have limited hours. The availability to find showers, maintain a mailing address or phone number, and to receive assistance during non-business hours are consistent barriers preventing individuals and families from taking steps to improve their situations. Landlord relationships with service providers and potential renters are strained. There is often a misunderstanding and miscommunication between the parties, buoyed by public misperceptions of those receiving State assistance. Further, as state and federal funding is often tenuous and unpredictable, service providers are stretched thin and working to triage clients' needs.

### *Student Housing*

The population of 20 – 24 year olds continues to increase in Lamoille County, a trend not seen in most other regions of Vermont. For people in this age group who are receiving post-secondary education, there are unique housing challenges. The housing continuum identifies this age group as having lower incomes and high mobility, likely living in apartments or rental housing.

Lamoille County is home to Johnson State College, one of five schools in the Vermont State College system. Enrollment has increased steadily since 1985, now educating about 1,800 individuals. JSC's campus includes on-campus dormitories with 550 beds and on-campus apartments for 50 people, including students with families. An increasing proportion of the college's student population is classified as "non-traditional college age". These older students are more likely to seek off campus housing, often in Johnson Village.

Johnson Village contains 662 housing units. Out of the 589 occupied units, 11% are renter occupied. Out of those 662 housing units, 53% are in multi-unit structures. Large village homes have frequently been converted into apartments, which encourages a denser village center but also poses other challenges to public safety and neighboring property values. The high rate of housing conversions often results in absentee landlord situations. Renters spend about \$720 a month on housing costs, which is below the median county average. Despite the lower cost of housing, the majority of renters in Johnson (62%) spend more than 30% of their household incomes on housing, making it unaffordable.

Another educational institution providing student housing in Lamoille County is the Vermont Woodworking School, located in nearby Fairfax. The Woodworking School leases a in Jeffersonville to provide dormitory housing. Students who live off-site may also tend to seek housing in Jeffersonville given its high rate of rental units.

With lower housing costs in Lamoille County than neighboring regions, students who attend schools in Burlington or Montpelier may choose to either live at home with parents residing in Lamoille County, or rent their own apartments and commute to school in other regions. Data has not been collected to verify whether or not this is occurring. Expanding the availability of accessory apartments is one way to accommodate a commuter/student population without overtaxing an already limited rental housing market.

#### *Seasonal Worker Housing*

The regional economy is dependent upon tourism, especially the winter ski industry. This economy can bring unique challenges to municipalities that host major ski resorts and related service-based businesses. In particular, Cambridge and Stowe must consider issues related to housing for seasonal workers. Stowe Mountain Resort, Smugglers' Notch Resort and other companies rely on seasonal employees. These workers generally need inexpensive housing with short-term or no leases. Providing affordable housing for seasonal workers is essential for the success of the tourism industry. The high demand for seasonal housing in Stowe and Jeffersonville has caused the price of rental units to be significantly higher than what can be afforded by those who are employed in these areas. The result is a spillover, which increases rents in neighboring communities as well.

Seasonal worker housing can be constructed and maintained in a manner that has a positive impact on the area's aesthetics and the towns as a whole. A trend in both Stowe and Cambridge suggests old motor lodges are being converted to seasonal worker housing. Poorly kept facilities could degrade the character and health of host towns. These issues could be addressed through zoning regulations by requiring site plan and/or conditional use review for these types of units. Zoning regulations could further identify appropriate locations for such types of housing (for example, along Route 108 in proximity to major resorts). By locating such housing in specific areas or along specific corridors, it becomes more feasible to provide transit and other services that benefit seasonal employees.

#### **Municipalities and Housing**

As residents age, many may wish to remain in their communities, but it will become more difficult to take care of large, rural properties. At the same time, housing costs may be prohibitively expensive for younger families and individuals seeking their first home. Some Lamoille County towns lack the infrastructure to support large senior housing or affordable housing developments while others must balance housing affordability and housing stock with other factors such as parking, infill development, and/or natural resources. There are several strategies a municipality may employ to address housing, some of which are presented below..

### *Planning*

Through plans, municipalities have assessed their housing needs and goals. While each community has its own housing needs, challenges, and opportunities, the following common themes are found among plans:

- Safe, quality housing for all residents, including those with specialized housing needs
- A variety of housing needs should be available, including accessory apartments and manufactured housing
- New housing should be located near existing facilities, infrastructure, and utilities and should not place an undue burden on the capacity of the municipality to provide services
- New housing should be built in a way to lessen the impact on natural and fragile resources, including along elevations unsuitable for development and in flood hazard areas
- Housing should follow the land use policies identified in the municipal plan
- Identify appropriate locations for locating types of housing to accommodate the continuum of housing needs
- Identify needs and set goals for achieving housing affordability and needs
- Set policies to guide municipal housing planning
- Describe possible funding mechanisms to encourage new housing developments, improve safety conditions, or lower costs for residents
- Develop land use policies that may impact where and how housing can be located in the community
- Set the agenda for municipal actions over the next five years
- Provide a statement on affordable / fair housing
- Outline incentives for developers to encourage fair housing

### *Education and Outreach*

- Municipalities can educate property owners of their rights and responsibilities, renters of their rights and responsibilities, and the rights and responsibilities of landlords
- Municipalities can provide updated information on any changes to housing laws or discrimination practices
- Provide public spaces for homeless residents to bathe, rest, or stay warm in the winter

### *Regulation*

- Revise limits on lot sizes / lot requirements
- Allow permitted uses to include multi-family, single-family, manufactured, co-operative, senior housing, and other housing types in all districts where residential housing is appropriate
- Allow accessory apartments at the State minimums or larger, which may affect square footage, number of occupants, bedrooms, etc.
- Allow a variety of building styles, such as encouraging clustering to save costs, burying utilities, sharing driveways, etc.
- Inclusionary zoning for affordable housing units
- Instate flexible regulations, including, where appropriate zero lot-line development, small lots, and easing parking requirements
- Allow mechanisms in regulations to encourage transitional housing or homeless shelters

### *Funding*

Few Lamoille County communities have large enough tax bases to provide local funding for new housing development. However, communities can assist in securing funds for housing that meets their local needs. For example, many senior and affordable housing developments are funded through Community Development Block Grants, which require the municipality to serve as the applicant. In addition, tax credits provided through the Vermont Downtown and Village Center programs can be used to facilitate the adaptive reuse of historic buildings and offset the costs of making code and other improvements to the existing housing stock.

Specifically, for communities with land use regulations, state law requires that zoning bylaws cannot discriminate against certain types of housing, such as mobile homes. Well-planned mobile home parks can provide affordable, entry-level homeownership housing options. The Sterling View mobile home park in Hyde Park is an example of such a park. A developing trend in other regions of the Country are “cottage” neighborhoods, which consist of relatively small (sometimes less than 1,000 sf), owner-occupied dwellings located close together on small lots. These developments often include central buildings with common cooking and recreation facilities.

Another area where zoning can help create affordable housing is through clustered housing. State statute allows clustered housing through a mechanism called a “Planned Unit Development.” This provides communities with another means of regulating density in downtowns and village centers from the traditional use of minimum lot sizes. Clustered housing can decrease costs by minimizing infrastructure investment, such as shorter roads and fewer power lines. Density bonuses for affordable units have also been used in other towns and regions.

### *State Programs*

The State program “Vermont Neighborhoods” is another option to increase the supply of affordable housing. The program offers relief from Act 250 and certain state taxes for projects that contain affordable housing and are located in proximity to state “designated Village Centers and Downtowns”. It also provides a small amount of financial incentives for communities that host new affordable housing. Municipalities may wish to investigate if participation in this program would help to further their communities’ goals.

### *Brownfields*

Brownfields Programs assist property owners and investors in overcoming environmental challenges related to past use. Brownfields projects prioritize sites for assessment. Working with consultants, property owners, prospective developers, and state and federal agencies, projects move from assessment phases to redevelopment phases. The Arthur’s Main Street Block in Morrisville is a brownfield redevelopment using historic buildings for housing and commercial use. The Johnson Village Housing on School Street in Johnson is another example of a brownfield redevelopment project. In both cases, the Lamoille Housing Partnership was the key organization for moving the projects to redevelopment. Brownfields projects are excellent models of adaptive reuse of buildings and land.

### **Housing Resources**

There are many resources available for renters, homeowners, potential homeowners, municipalities, and others interested in housing. The Lamoille Housing Partnership (LHP) is a regional, non-profit organization serving residents of Lamoille County in funding, managing and developing attractive, affordable housing opportunities. LHP develops projects in Lamoille County communities that:

- Are financially feasible
- Meet perceived or real social needs

- Serve community interests

LHP has developed affordable housing projects in several communities (Jeffersonville, Morrisville, and Stowe) and is available to work with town government, businesses and individuals to discuss developing other affordable housing opportunities. They have 300 units in their portfolio, with some projects focusing on Section 8 housing units, units for seniors, or units dedicated to eligible low-income individuals and families. LHP also supports a limited equity homeownership program, in which grants are offered to first time homebuyers meeting income eligibility guidelines. When the homeowner is ready to sell, they receive a portion of the appreciation of the home, while the remainder is passed on to the next homebuyer, allowing the home to remain “perpetually affordable.”

The land use provisions of this plan can help create opportunities for housing developers and service providers, to do their part to encourage fair and affordable housing. These provisions will be discussed in detail in the Land Use section of this plan.

Capstone Community Action helps people achieve economic sufficiency with dignity through individual and family development. Since 1965, Capstone has worked with low-income families, those who are impoverished, government agencies, and other non-profits to provide services and programs for low to moderate income Vermonters. Capstone provides outreach, and works to empower individuals to take control of their economic futures. Capstone also organizes to identify common problems, establish goals, and take action to address social and community issues.

**More information**

More housing information is found in the Appendix, which includes: a detailed list of service providers able to assist with affordable housing, homelessness, transitional housing, emergency housing, housing for veterans, or housing for those with substance abuse, mental illnesses, or developmental disabilities, as well as Options and Opportunities to address housing needs.

## Transportation: Strategy

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An effective transportation network provides safe, efficient, accessible and environmentally sound transportation options that connect residents and workers to their jobs, schools, recreation, shopping, and other community activities. The following strategies must be taken into consideration in order to achieve an efficient transportation system:

**Address Safety Issues:** Priority should be given to transportation projects or programs that address identified safety issues.

**Maintain and Manage Existing Infrastructure:** The existing transportation system is vital for moving people and goods within the region. Given the extreme cost of transportation investments, maintaining the existing infrastructure should be given priority.

**Enhance Mobility by Providing Transportation Alternatives:** In order to provide meaningful transportation choices to children, seniors, residents, visitors, and businesses, creative effort must be focused on alternatives to single occupancy auto travel whenever feasible. Such alternatives should incorporate healthy community design and be enhanced by a land use pattern where the everyday needs of residents can be satisfied within concentrated, mixed use developments served by a network of bicycle and pedestrian routes and connected by public transportation.

**Maintain the Lamoille County Aesthetic, Environment, and Quality of Life:** Transportation investments should be consistent with the overall character of the region. This should be reflected in all projects from bridge designs and highway facilities, to transit bus size, sidewalks and bike-paths.

**Integrate Land Use Planning and Transportation Planning:** There is a direct relationship between land development and the transportation system. The existing transportation system is a major influence on land use decisions. In many instances, this has resulted in the fragmentation of the region's scenic, agricultural, natural, and social resources. For example, effective access management enables municipalities and the State to maximize the capacity of the existing transportation network. By considering the transportation aspect of land development, we are more likely to be successful in making the best use of our limited land resources and preserving regional character.

**Support Regional and Local Economic Vitality:** The transportation infrastructure of Lamoille County is an integral component of the regional and local economy. Larger projects such as the Morrisville Alternate Truck Route, the Morrisville-Stowe State Airport, and the Lamoille Valley Rail Trail promise great opportunity for the regional economy.

## POLICIES & ACTION ITEMS

**Policy:** *Ensure the region's transportation infrastructure is resilient.*

### Action Items:

- Engage Vermont Agency of Transportation (VTrans) early in the project development process to ensure that local concerns are addressed.
- Work with municipalities to identify vulnerable transportation infrastructure and facilities; identify recommendations to increase resiliency.
- Work with municipalities to identify "flood resiliency" improvements to the transportation network, especially as they relate to Center Areas, such as but not limited to constructing bridges and culverts to accommodate a 50-year flood event.

- Advocate for increased funding for maintenance of existing roads and bridges.
- Roads and bridges should be built to locally defined specifications.

**Policy:** *Improve safety on Lamoille County roads.*

**Action Items:**

- Encourage municipalities to develop transportation infrastructure inventories and capital budgets in an effort to effectively manage municipal highway infrastructure and prioritize improvement projects.
- Utilize data such as traffic volumes, highway sufficiency and bridge sufficiency ratings, and high crash location data to assist in the regional project prioritization process.
- Encourage and assist in the implementation of low-cost safety improvements such as signing, pavement markings, and educational campaigns as short-term or interim solutions to identified highway safety issues.
- Ensure the transportation network is designed to safely accommodate all users, including pedestrians and bicyclists, particularly in Center Areas.
- Encourage and assist in the implementation of traffic calming measures at appropriate locations throughout the region.
- Continue to support the implementation of projects that improve conditions for the truck freight industry.

**Policy:** *Foster efficient and convenient public transit service that addresses local and regional needs.*

**Action Items:**

- Continue to support and assist local transit providers in obtaining needed funding.
- Continue to actively represent Lamoille County on the CCTA and RCT Boards of Directors.
- Assist regional transit providers in identifying areas where services should be expanded.
- Advocate for increased overall public awareness of the Elderly & Disabled Persons transportation program and the future needs of the program.
- Conduct periodic needs assessment to determine whether the region's various public transit services are meeting the needs of Lamoille County.
- Investigate the feasibility of new services and actively seek funding for them.
- Continue to support the Jeffersonville Commuter Service and work with partners to secure adequate parking facilities for commuters.
- Continue to support public transit service within Morristown and between Morristown and Stowe.
- Work to establish regular transit service between Johnson and Jeffersonville and between Morristown and Johnson.
- Work to extend the schedule of the existing Mountain Road Shuttle in Stowe to the summer months, as proposed in the CCTA Transit Development Plan.
- Work with regional partners to establish public transportation service between Lamoille County and Burlington International Airport.
- Work with regional partners to extend public transit service to Johnson State College.
- Coordinate with local transit providers to ensure connectivity between transit providers.

**Policy:** *Improve the connectivity of the bicycle and pedestrian network in Lamoille County and ensure regional bicycle and pedestrian needs are met.*

**Action Items:**

- Promote the removal of roadway hazards to bicycle travel during routine maintenance.
- Encourage the integration of bicycles with other transportation modes through techniques such as bicycle racks on transit vehicles, bike parking, improvement of shoulders, and construction of multi-use paths.
- When reviewing projects, recommend that shoulder widths follow the VT State Design Standards and Bicycle Facility Planning and Design Manual, or the most recent State Standards.
- Work with municipalities, VTrans, and other stakeholders to develop a Bicycle and Pedestrian Master Plan for Lamoille County. As part of this process, revisit and update the 1997 “Regional Bicycle Routes” map.
- Road shoulders are a necessity in rural communities for biking and pedestrian travel. LCPC will routinely update its road shoulder inventory and encourage expanded shoulders for paving projects.
- Upon request, work with municipalities to identify areas where bicycle parking or storage facilities should be established. When feasible, coordinate the location of bicycle parking/storage with existing or planned public transit service.
- Identify roadways where bicycle improvements are needed in order to link employment and population centers.
- In conjunction with municipalities, support creation of bicycle lanes, especially in Center Areas.
- Assist municipalities in planning for the improvement of existing and future sidewalk network, as well as pedestrian accommodations including benches, lighting, and information kiosks.
- Work with municipalities to design intersections and public walkways to meet ADA requirements for curb ramps, accessible traffic signals, and crosswalk enhancements.
- Assist towns and interested organizations in performing community walkability audits to identify pedestrian barriers and needs.
- Continue to work with municipalities to inventory sidewalks; identify missing links.
- Coordinate with VTrans to ensure that pedestrian accommodations are included in intersection improvement projects and roundabouts.
- Pedestrian needs shall be included in state highway projects, especially in and near Center Areas.
- Advocate for continued and increased funding for programs providing resources for bicycle and pedestrian programs.
- Encourage municipalities to require consideration of bicycle and pedestrian transportation in development plans through local ordinances.
- Encourage municipalities to apply Complete Street principles, appropriate to the setting, to provide safe access and circulation for pedestrians, bicyclists, transit riders, and motorists.
- Encourage schools to promote educational programs that support walking and bicycling and its health benefits.
- Work with municipalities and schools to map safe walking and bicycling routes.

**Action Items:**

- Continue to actively participate in the implementation of the Lamoille Valley Rail Trail (LVRT) and promote its economic benefits.
- Pursue municipal connections to the LVRT, as well as other direct pathway connections between municipalities.

- Support the planning, design, and implementation of the extension of the Stowe Recreation Path to Stowe Mountain Resort and other destinations.
- Continue to work with the towns of Stowe and Morristown to investigate opportunities to connect the towns with a multi-use path.
- Continue to support community organizations and non-profits seeking to implement recreational trail connectivity, trail mapping, multi-use trails, bike racks, etc., by providing grant writing and technical assistance.
- Study and assess impacts of trails over time on transportation patterns, property values, crime, and other quality of life factors.

**Policy:** *Support regional efforts to make air travel a safe, attractive, efficient, and competitive mode of shipping and transportation.*

**Action Items:**

- Support expansion of the Morrisville-Stowe Airport and the implementation of the Morrisville-Stowe Airport Master Plan.
- Support efforts to improve the viability of cargo and freight transportation from the Airport, including establishment of a Foreign Trade Zone in Lamoille County.
- Support the development of appropriate, cargo related uses and facilities at and in the vicinity of the Morrisville-Stowe Airport.
- Promote the various activities offered at the Morrisville-Stowe Airport.
- Enhance public awareness of the benefits of having a regional airport.
- Encourage the use of airport facilities to enhance economic development.

**Policy:** *Back statewide upgrades to rail infrastructure for freight and passenger service.*

**Action Items:**

- Support continued Amtrak services through Waterbury, Essex Junction, and St. Albans as a benefit to the Lamoille County region. Support expansion of this service to Burlington.
- Support reestablishment of passenger rail service to Montreal.
- Encourage efforts to upgrade existing rail infrastructure.
- Encourage continued efforts to maintain and improve a functional statewide freight and passenger rail system.

**Policy:** *Support regional multi-modal opportunities.*

**Action Items:**

- Assist municipalities in identifying needed Park and Ride improvements.
- Educate regional businesses about Transportation Demand Management (TDM) strategies.
- Work cooperatively with VTrans and regional transit providers to make Park and Ride locations as multi-modal as possible.
- Encourage non-motorized travel, public transit, carpooling, telecommuting, and alternative fuel vehicles.
- Develop a comprehensive regional TDM plan and work with regional partners to implement the plan.

- Work to install electrical vehicle charging stations in each of the region’s Designated Downtowns and Village Centers and at park and ride locations.
- Study successful TDM programs and identify portions suited for Lamoille County.
- Work with regional partners to coordinate, promote, and implement rideshare and transit programs.
- Continue to participate in regional activities that promote alternative transportation.
- Participate in the design phase of State highway projects to address multi-modal connectivity with roundabouts and other traffic calming devices. Roundabouts shall include pedestrian crossings and improve bicycle mobility.

**Policy:** *Ensure transportation projects are compatible with regional land use planning efforts.*

**Action Items:**

- Continue to coordinate with appropriate agencies and municipalities to ensure that land use and transportation decisions are linked so that land uses are supported by the appropriate types, levels and timing of transportation improvements.
- Coordinate with municipalities on land use and transportation projects to address local transportation needs, including regional access management issues.
- Assist municipalities in establishing land use patterns that encourage alternative modes of transportation and multi-modal connections.
- Work with municipalities to establish a variety of transportation options as part of the development review process.
- Continue to participate in regional and state transportation planning efforts to ensure Lamoille County's transportation needs are addressed in regional and state plans.

**Policy:** *Ensure roadway improvement projects enhance scenic and environmental resources while maintaining safety and mobility and suit the character of Lamoille County.*

**Action Items:**

- Evaluate regional transportation corridors and determine whether or not they need corridor management plans.
- Continue to work with VTrans and municipal road and highway departments, to design, construct, and maintain roadways in a manner which preserves the character of the region.
- Develop design guidelines to be utilized when planning road improvement projects on designated scenic highways and byways.
- Continue to work with the Green Mountain Byway Steering Committee and the Smugglers Notch Partnership to implement recommended projects; including updating the management plans.
- Work with interested communities to extend the Green Mountain Byway north to Morrisville, and potentially to Hyde Park and Eden.
- Monitor the progress of implementation of corridor plans and re-evaluate recommended projects.
- Update the Rt. 100 Corridor Plan and Access Management Plan, including the northern section through Eden. Address access management, bicycle/pedestrian mobility, wildlife connectivity, and scenic resources.
- Preserve the region’s character by encouraging the use of context sensitive design standards on state highway projects.
- Inventory the scenic resources along Lamoille County roads.
- Support the development of a Rt. 15 Access Management Plan and a Rt. 12 Corridor Plan.

# Transportation: Background and Inventory

## Highway System

In Lamoille County, as in many rural areas, the highway system provides much of the region’s transportation needs. The highway system, including roads and bridges, has also been the focus of the majority of transportation improvements within the region.

The region’s highway system serves many purposes. It is the primary freight network for the county but also often serves as the village “Main Street”. The combination of these uses can sometimes create safety issues and pedestrian and vehicular conflicts. These issues must be addressed to continue to provide a safe and functioning transportation network.

Table 3-13. Total Highway Mileage in Lamoille County, 2012

Highway Classification	Description	Miles
Class 1	The state is responsible for the surface management of these facilities, otherwise they are town maintained. These are extensions of state highways and carry state highway route numbers.	4.4
Class 2	Selected based on their through connections between towns and typically have more traffic than Class 3 roads. These roads are generally of regional significance.	95.1
Class 3	All traveled town highways other than Class 1 or 2; must be passable under normal conditions all seasons of the year by a standards manufactured passenger car. Provide local access to town and are often interconnected with other local network roads.	381.6
Class 4	All other town highways; need not be kept open year-round by the town, but bridges and culverts are to be maintained.	89.4
Legal Trail	Public rights-of-way which are not highways are not a required responsibility of the town for any construction, maintenance, repair, or safety.	15.9
State Highway	Highways exclusively maintained by the state.	119.7
	Total Class 1-4 Highways	570.5
	All Highways	706.1

Source: Vermont Agency of Transportation, 2012 Highway Mileage Report, February 2012

## Road Classification

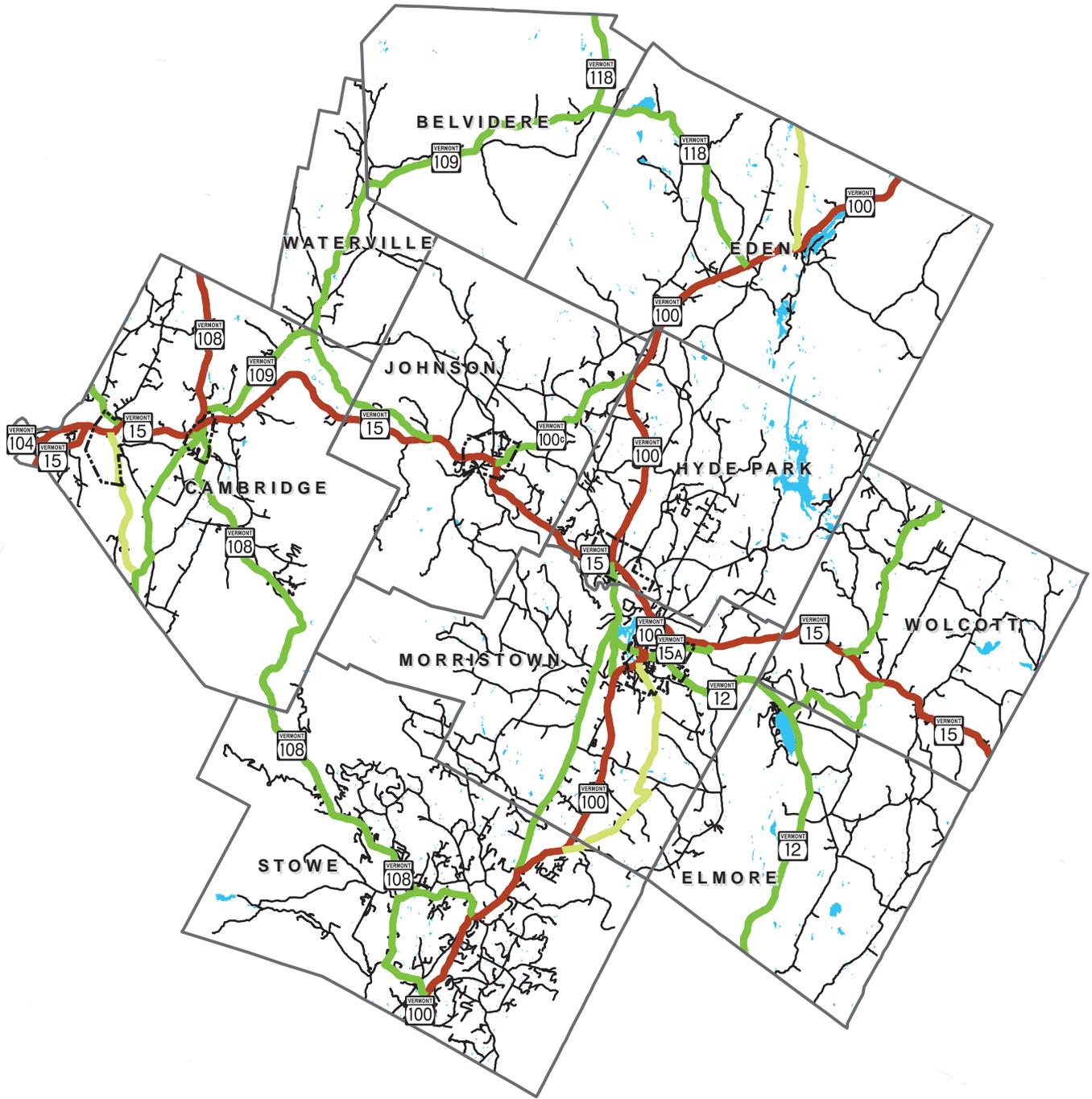
Highway systems are characterized and classified by various means to serve many purposes. Roads can be classified in two ways, at the local level by *Town Highway Classification* or by *Functional Classification* at the state and federal levels (see map on next page).

### *Town Highway Classification*

All town highways in Vermont are classified as Class 1, 2, 3, or 4 and decline from 1 to 4 in order of significance. Table 3-13 shows the composition of all town and state highway mileage in Lamoille County.

# Highway Functional Classification

## Lamoille County



Non-classified Road

**Functional Class**

-  Rural Minor Arterial
-  Rural Major Collector
-  Rural Minor Collector

**Data Sources:**

Political Boundaries: VCGI, 1991.  
 Roads: 1:5000 E-911 Road Data, 2014.  
 Surface Water: VCGI for VHD-USGS, 2001.  
 Functional Classification: VTrans, 2010.

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A majority of the highway network in Lamoille County is Class 3. Maintenance of existing highways is often the largest item in a municipal budget. For this reason, it is important for municipalities to plan for, monitor, and manage their highways as effectively as possible. Road surface management, bridge and culvert inventories, and capital budget planning are all tools to help municipalities manage their highway networks. The Agency of Transportation (VTrans) also offers a variety of road and bridge grant programs to assist funding municipal highway projects. *The Handbook for Local Officials*, published by VTrans, is an excellent resource and provides an overview of grant programs. This publication known as the “orange book” is available through VTrans and online.

*Functional Classification*

Functional classification is the process by which all streets and highways are identified based on how efficiently they serve the overall channelization of traffic within a network. Rural highways are categorized by function into principle arterials, minor arterials, major and minor collectors, and local roads. All roads serve dual functions of providing mobility and access. Arterials are primarily for moving vehicles from one place to another. They may still provide access to some adjacent lands, but accesses should be kept to a minimum in order to maintain a high level of mobility service. Local roads are primarily oriented toward providing access to adjacent land; while they do serve to provide some degree of mobility, they are not generally designed to process the volume and speed of traffic on a principle arterial. Keeping functional classifications in mind when considering access permitting issues and land development can help maintain an efficient highway system and avoid safety and congestion issues. Functional classification can also be used when deciding where investment priorities to be are made.

Both state and federal governments use the functional classification system. The map below shows the functional classification of the regional highway network. For the purposes of this plan, the state highways and town-highway major-collectors are referred to as the “regional” highway system.

Table 3-14. Functional classification of the regional highway system

Functional Classification	Purpose	Description
Arterial	Maximize speed and volume of vehicles, few access points	Roads designed primarily to carry through traffic or large volumes of traffic for long distances. Characterized by controlled access, channelized intersections, and restricted parking. These roads function to distribute traffic to and from collector streets serving all land uses.
Collector	Moderate speed and mobility	Intended to collect and channel traffic from lesser traveled roads in the arterial system and provide access to adjoining parcels. Major collectors generally serve traffic between towns and communities, and minor collectors operate within a town.
Local Road	Lower speeds and volume, many access points	Provide access to adjoining land and generally have little to no through traffic. These can be considered “neighborhood” type streets and have a higher share of access points or driveways.

**Vehicle Miles Traveled**

Lamoille County’s highway network carries approximately 261 million vehicle miles traveled (VMT) annually. The annual average daily traffic volume or “AADT” is a measure of the total annual volume of vehicle traffic on a

particular highway. This information is useful in tracking growth pressures, travel patterns, and other trends related to regional development. The map on page 74 provides an overview of the region’s AADT.

**Highway Sufficiency**

The Agency of Transportation rates state highways and town highway major collectors for their adequacy in terms of structural condition, safety, and service. A section of road that meets all minimum design standards and is completely adequate in all other respects, rates a 100. The score decreases based on actual deficiencies in each of these areas. Sufficiency ratings are useful in identifying road sections which may have various types of deficiencies. Table 3-15 provides an overview of sufficiency ratings for the region’s highway network. To determine a highway sufficiency number contact VTrans.

Table 3-15. Lamoille County Highway Sufficiency

		Lamoille County		Vermont	
Sufficiency Rating	Category	Mileage	% Total	Mileage	% Total
0-39	Bad	10.7	6.0	177.0	6.7
40-59	Poor	46.8	26.3	889.0	33.8
60-79	Fair	103.2	58.1	930.0	35.4
80-100	Good	17.0	9.6	633.0	24.1
Total		177.72	100	2629	100

Source: Vermont Agency of Transportation, 2008 Highway Sufficiency Rating Report

**Bridge Classification**

Bridges are classified according to their length and whether they are owned and maintained by the state or a municipality. Bridges longer than 20’ in length are classified as “long” structures, while those between 6’-20’ in length are considered short. Structures shorter than six feet are classified as culverts. Lamoille County’s highway system includes 122 bridges.

**Bridge Sufficiency**

VTrans inspects all state-highway bridges and town highway bridges 20’ in length or longer. The Federal Highway Administration calculates bridge sufficiency ratings based upon the inspection sheets completed by VTrans. These ratings, known as the Federal Sufficiency Rating (FSR) are based on:

- Structural Adequacy
- Serviceability and Functional Obsolescence
- Essential to Public Use
- Special Reductions (catchall for factors such as detour length and so forth)

The FSR provides a uniform means of comparing bridge conditions among multiple structures. It is important to note that a low FSR does not necessarily indicate that a bridge is in danger of physical failure. Bridges with a FSR of 0-50 are eligible for federal reconstruction funds while bridges with a FSR of 50-80 are



eligible for federal rehabilitation funds. Bridges listed as structurally deficient and/or having restrictions should be considered first when prioritizing bridge projects. Prioritization should also consider the bridge’s relevance to the overall regional highway system. The map on page 75 indicates the region’s FSR for bridges.

**Movement of People**

Lamoille County residents rely heavily upon the automobile as their primary means of transportation. Given the nature of development in the region, this reliance on the automobile has formed a trend toward the separation of employment areas, commercial services, and housing opportunities. This separation has resulted in greater auto-dependency.

Table 3-16. Travel Time to Work 1990-2010

	1990		2000		2010	
Travel time to work	Number	Percent	Number	Percent	Number	Percent
Workers not working at home	8,762	100	11,306	100	11,693	100
Less than 5 minutes	1,108	12.6	807	7.1	752	6.4
5 to 9 minutes	1,568	17.9	1,539	13.6	1,765	15.1
10 to 14 minutes	1,318	15	1,584	14	1,470	12.6
15 to 19 minutes	1,199	13.7	1,569	13.9	1,546	13.2
20 to 29 minutes	1,133	12.9	1,579	14	1,829	15.6
30 to 44 minutes	1,238	14.1	1,940	17.2	1,998	17.1
45 or more minutes	1,198	13.7	2,288	20.2	2,333	20
Mean travel time (minutes)	19.5	(X)	25.7	(X)	24.4	(X)

Source: 1990, 2000 U.S. Census CTPP, 2006-2010 American Community Survey

*Access to Highway System*

Although majority of Lamoille County residents have access to one or more vehicles, there continues to be many auto-less households that rely on public transportation as the primary means of transportation. These residents must also be considered in the development of our future transportation system.

*Commuting Travel*

Based on 2010 census data, 75% of Lamoille County residents commute alone to work by automobile. The American Community Survey indicates that Lamoille County residents are also commuting a greater length of time to work. Although in more developed areas this is often attributed to congestion, in rural regions it is primarily the increasing distance between home and places of employment. Table 3-16 shows that from 1990 to 2010 the average travel-time-to-work in Lamoille County has increased from 19.5 minutes to 24.4 minutes.

**Freight Transportation**

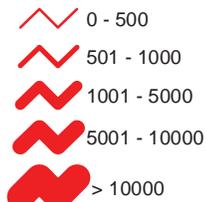
The primary source of freight transportation in Lamoille County is the regional highway system. The Vermont Statewide Freight Plan (Revised August 2013) concluded that the majority of all freight in Vermont is transported by truck. This puts a tremendous strain on the highway network in terms of needed maintenance and also adds to perceived congestion. Truck traffic counts conducted by VTrans provide information regarding the region’s highway network and those being used for moving freight. Truck traffic counts have identified VT Route 100 and VT Route 15 as the primary freight and truck routes throughout the region.

# 2012 Average Annual Daily Traffic

## Lamoille County



### Average Annual Daily Traffic



- State Highway
- Class 2 Town Highway
- Class 3 Town Highway

### Data Sources:

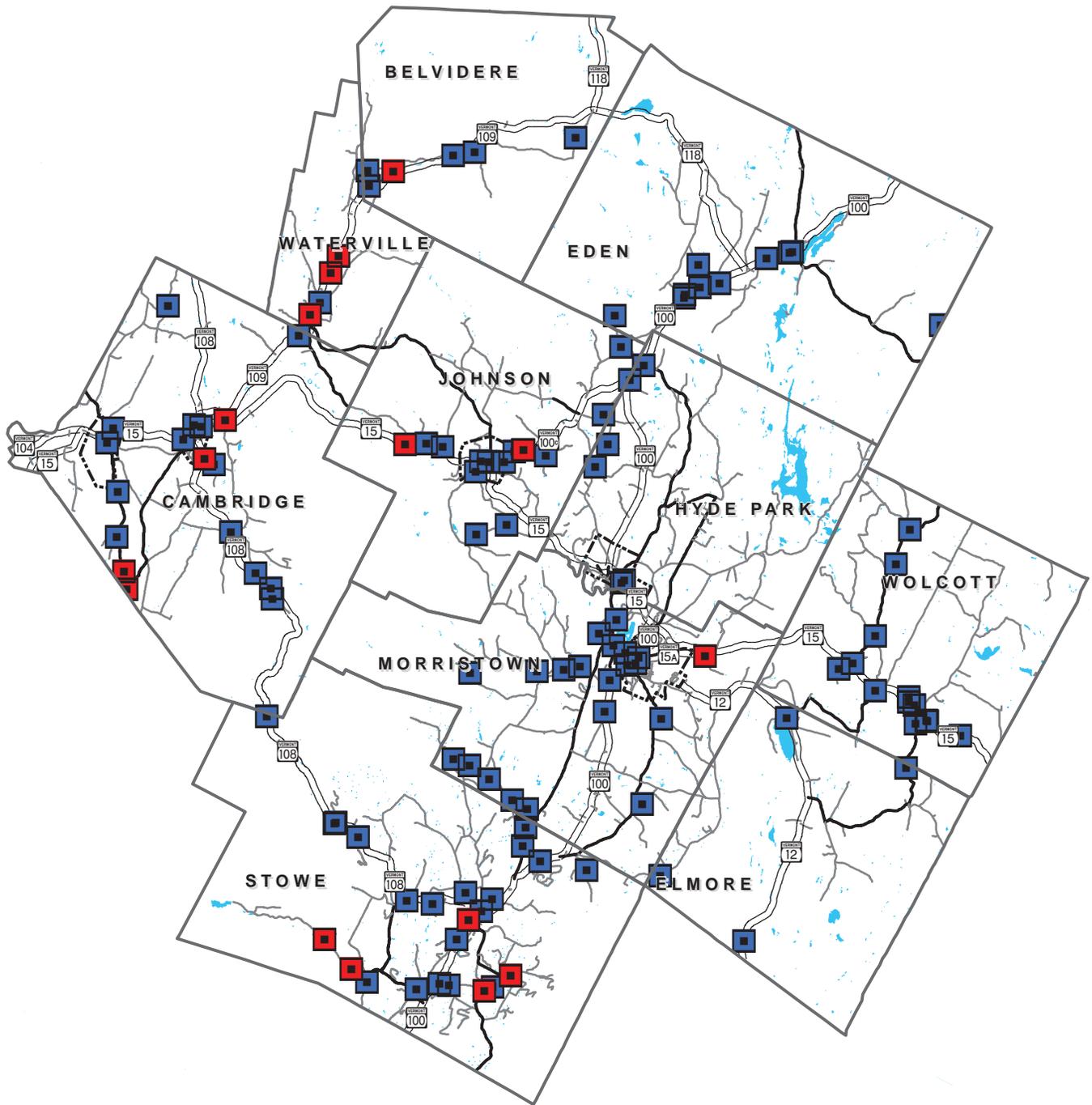
Political Boundaries: VCGI, 1991.  
 Roads: 1:5000 E-911 Road Data, 2014.  
 Surface Water: VCGI for VHD-USGS, 2001.  
 AADT: VTrans, 2012.



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# Bridge Federal Sufficiency Ratings

## Lamoille County



### Bridge Federal Sufficiency Rating

- < 50%
- > 50%
- State Highway
- Class 2 Town Highway
- Class 3 Town Highway

### Data Sources:

Political Boundaries: VCGI, 1991.  
 Roads: 1:5000 E-911 Road Data, 2014.  
 Surface Water: VCGI for VHD-USGS, 2001.  
 Bridge Federal Sufficiency Ratings: VTrans, 2015.

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### **Local Transportation System Planning**

The condition and safety of the highway network is an area of great concern at the town level. To address these concerns, LCPC works closely with regional towns to provide resources that will enable maintenance tracking of current roads, culvert and bridge conditions, along with needed improvements. In an effort to maintain the region's highway network, LCPC encourages towns to adopt minimum design standards for town highways. Adopting design standards can help reduce future maintenance costs, provide eligibility for grant programs, and sets a standard for private roads that connect into the municipal highway network. Typical road standards address design features such as ditching and culvert requirements, right-of-way, roadway crown, travel lane width, and so forth. A road policy outlines processes such as the acceptance of a private road into the town highway system, driveway and access standards, and the procedure for laying out, reclassifying, or discontinuing a highway. Adopting design standards or a local road policy can help prolong the life of existing infrastructure, as well as save on future costs. Assistance with these programs is available through LCPC and the VTrans District Administrator's office.

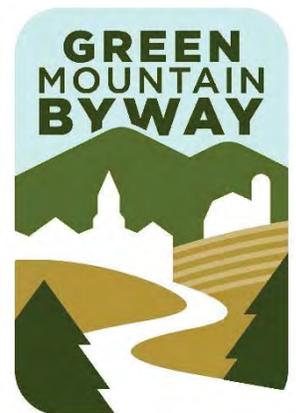
### **Transportation Resources** *(see map, page 77)*

#### **Vermont Byways Program**

Lamoille County is home to the Green Mountain Byway, as well as the Smugglers' Notch Scenic Highway. Both byways are tailored to preserve scenic road corridors and significant landscapes. According to the Vermont Scenery Preservation Council, a byway is defined as "a highway or other public road that may be associated with other transportation resources that have special scenic, historic, recreational, cultural, archeological and/or natural qualities, and that has been formally designated by the Vermont Transportation Board."

#### *Green Mountain Byway*

The Green Mountain Byway stretches from Stowe to Waterbury along VT Route 100. This section of highway was designated in 2009 for its scenic, historic, cultural and economic importance to the region. Intrinsic resources found all along the byway include historic structures and landmarks, scenic views, recreational facilities, local businesses and other popular tourism attractions. The Green Mountain Byway Corridor Management Plan (2008) identifies the importance of this section of highway and ideas for preserving its valuable assets for future generations and all users to enjoy.

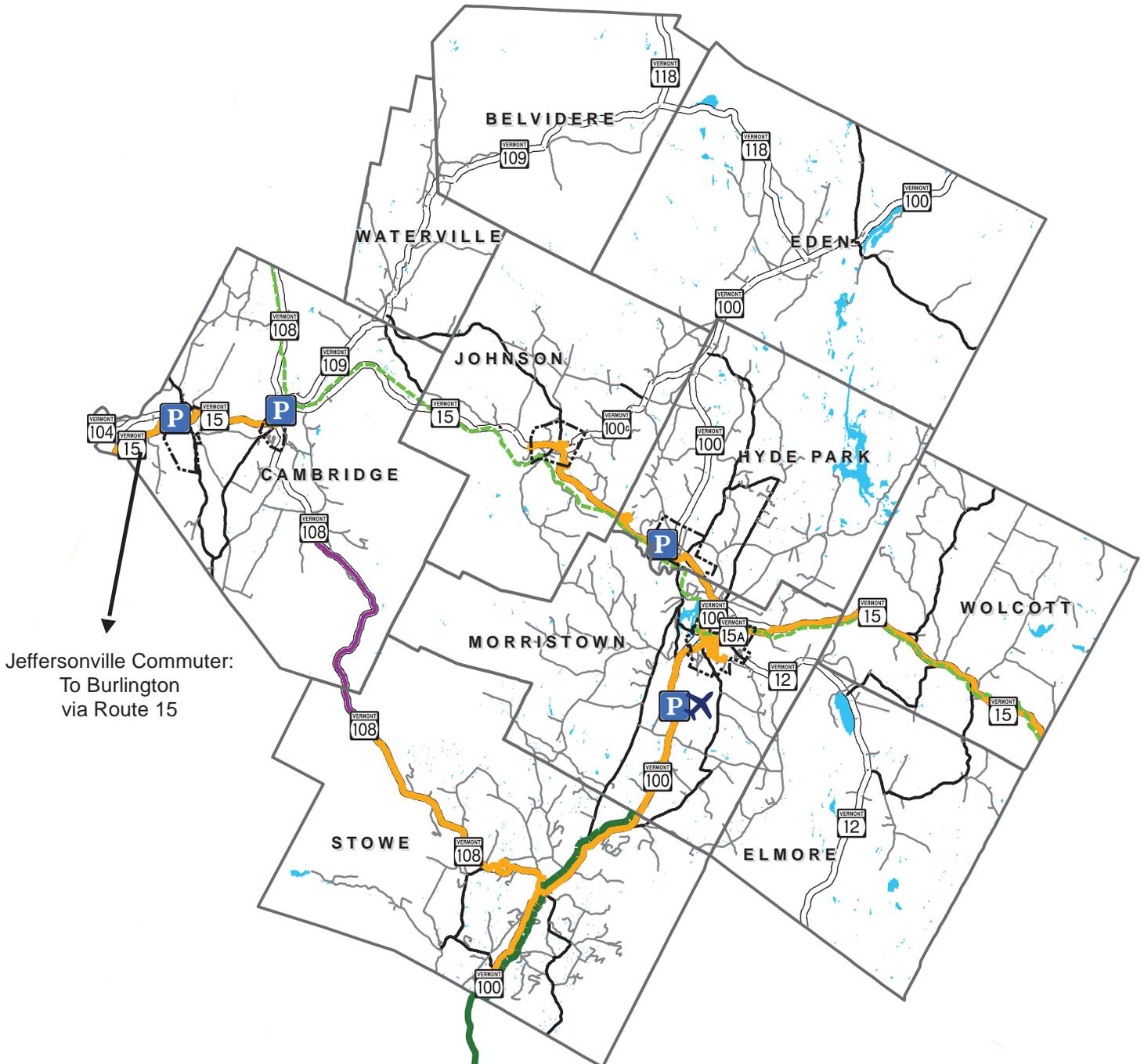


#### *Smugglers' Notch Scenic Highway*

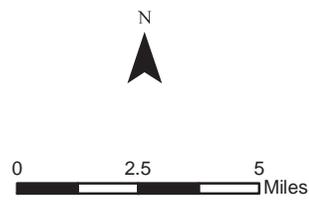
The Smugglers' Notch Scenic Highway is a 3.7 mile portion of VT Route 108, beginning in Stowe and ending in Cambridge. Scenic highways are designated for their representation of valuable natural resources including ecologically sensitive habitats, recreation areas, and productive scenic working landscapes. The Smugglers' Notch Scenic Highway is best known for its intriguing cliff formations, scenic vistas, variety of hiking trails and narrow, winding roadway. Smugglers' Notch, listed on the Vermont Fragile Areas Registry, is home to a variety of rare species such as the Peregrine Falcons. This scenic highway is managed in a manner that protects the ecological, geological, and recreation assets of the area. Proposed projects along the highway should conform to the *Smugglers' Notch Scenic Highway Corridor Management Plan* (1995). Efforts should be made to update the plan and re-evaluate the project recommendations.

# Transportation Resources

## Lamoille County



Jeffersonville Commuter:  
To Burlington  
via Route 15



- Airport
- Park and Ride Facilities
- Green Mountain Byway
- Smugglers Notch Scenic Highway
- Lamoille Valley Rail Trail
- Transit Routes
- State Highway
- Class 1 & 2 Town Highway
- Class 3 Town Highway
- Unknown Class

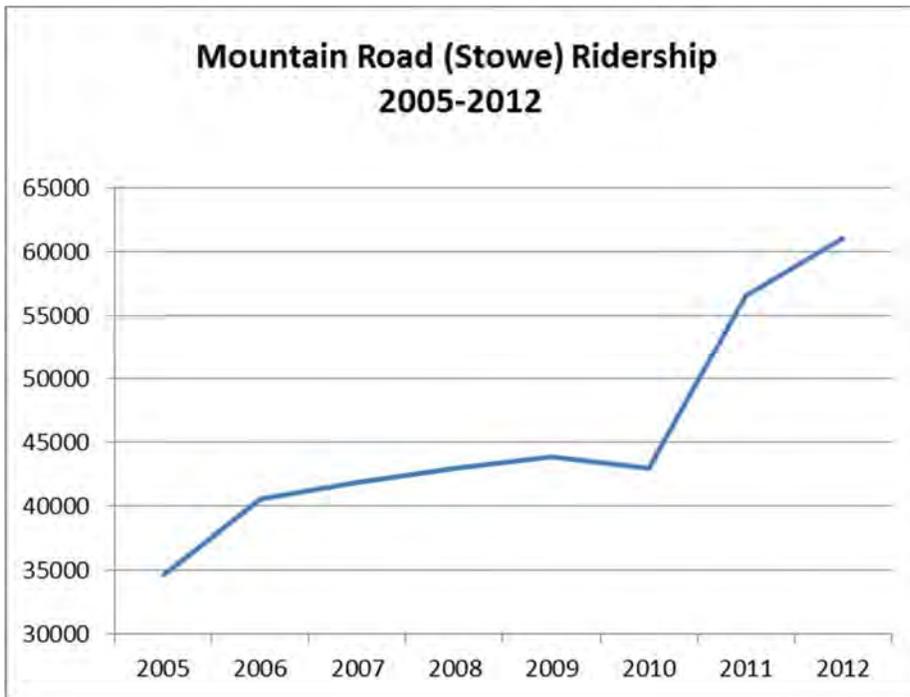
Data Sources:  
 Political Boundaries: VCGI, 1991.  
 Roads: 1:5000 E-911 Road Data, 2014.  
 Surface Water: VCGI for VHD-USGS, 2001.  
 Airport, Park and Ride Facilities, Transit Routes, Green Mountain Byway, Smugglers Notch Scenic Highway: LCPC, 2011.  
 Lamoille Valley Rail Trail: VAST, 2010.

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**Public Transportation**

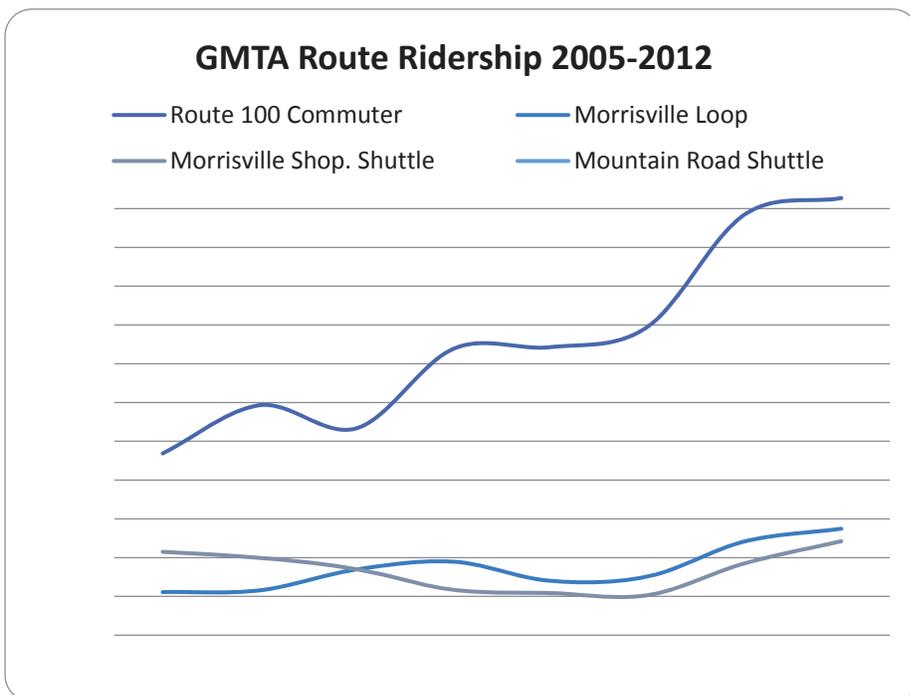
Throughout Lamoille County and the state, public transportation provides basic mobility service to all ages of Vermonters. Vermont has made great strides in public transportation in recent years. Many regions are now benefiting from fixed-route transit services that have never before been offered. Demand-response transportation, serving our more dispersed population and rural areas, is very successful thanks to a large network of volunteer drivers and well-organized transit operators utilizing the latest management tools.

The public transit system in Lamoille County consists primarily of two providers: the Green Mountain Transit Agency (GMTA) and Rural Community Transportation (RCT). The transit system is comprised of both traditional “fixed route” services, operated by GMTA, as well as a “demand response” network operated by RCT. GMTA and



RCT have implemented many of the recommendations from previous “short range transit plans” and both providers updated their Transit Development Plans in 2012. These plans provide a 10-year program for service and operations.

Though the region has seen many improvements in public transit, there are still many challenges. The relatively dispersed population of Vermont, the rugged terrain, and the seasonal variation pose challenges to the establishment, maintenance, and upkeep of viable transit operations.



**Existing Transit Services**

The Green Mountain Transit Agency (GMTA), managed by Chittenden County Transit Authority (CCTA), operates the majority of the traditional fixed route and deviated fixed route transit routes. Traditional fixed routes operate on a set schedule, along a pre-

determined route, and do not deviate from that route, and as best as possible, from the timetable associated with the pre-determined bus-stop locations. Deviated fixed routes follow a fixed route and timetable, but upon 24 hours' notice, travel off route for passenger pick-up or drop-off.

Rural Community Transportation, Inc. (RCT) is a private, non-profit organization created through a grant from the Federal Urban Mass Transportation Administration (UMTA) to coordinate Medicaid transportation services. RCT uses all modes of transportation including buses, cars, taxis, vans, and volunteer drivers. RCT offers demand response services as well as a shopping shuttle, Medicaid transportation, Reach Up transportation, and services for the elderly and disabled. RCT's service area includes Essex, Caledonia, Orleans, and Lamoille counties. RCT's main office is located in St. Johnsbury with branch offices in Newport and Morrisville. See Table 3-13.

Several fixed route services are provided throughout Lamoille County- the Rt. 100 Commuter, Morrisville Loop, Mountain Road Shuttle, the Morrisville Shopping Shuttle, Ridge Runner Shopping Shuttle, and the Johnson Shopper. For routes and schedule information please contact GMTA or RCT.

Lamoille County's latest public transit addition is the Rt. 15 Jeffersonville Commuter Bus offered by CCTA. The Jeffersonville Commuter, which began in October 2013, provides weekday service along the Rt. 15 corridor, serving Jeffersonville, Cambridge, Underhill, Jericho, and Essex Town as it heads into Winooski and Burlington. The route offers two morning round trips and two afternoon/evening trips, arriving and departing from downtown Burlington.

The Jeffersonville Commuter route was included in CCTA's Transit Development Plan as a needed service along a major commuting corridor into Chittenden County. The route was selected as a project by the Circ Alternatives Task Force to improve transportation options and is operated with federal Congestion Mitigation Air Quality funds (80%) and State operating funds (20%).

Table 3-17. RCT demand response rides 2007 – 2012

Town	TRIPS						2012
	2012	2011	2010	2009	2008	2007	Diff.
Belvidere	396	262	176	24	51	212	134
Cambridge	2,158	2,146	2,623	3,365	3,273	2,573	12
Eden	2,099	2,204	1,077	1,333	2,385	1,884	-105
Elmore	335	282	324	741	504	638	53
Hyde park	4,412	4,200	3,383	5,270	6,226	7,661	212
Johnson	4,390	3,353	3,284	4,137	5,403	5,792	1,037
Morristown	6,726	6,223	7,070	8,545	8,929	8,962	503
Stowe	3,434	2,611	3,597	3,994	3,301	3,345	823
Waterville	121	49	381	625	545	867	72
Wolcott	773	746	1,280	1,846	1,785	1,250	27
Totals	26,856	24,087	25,205	31,889	34,410	35,191	2,768

**Demand Response**

Demand Response or "on-demand service" is primarily oriented towards serving regional seniors and persons with a disability. Demand Response services provide flexible routing and scheduling according to the passenger needs. These services are most often used in rural areas or in areas where there is low passenger demand.

Demand-response transportation services are available for Medicaid-eligible residents of Lamoille County through RCT (Lamoille County's designated Medicaid transportation provider). Dedicated volunteer and professional drivers deliver several hundred rides to medical services each year. To serve the need of the region effectively, RCT has developed a program of trip combination that combines riders that are reimbursable through

various funding sources. This trip coordination increases efficiency and reduces costs, since the cost to operate a vehicle is approximately the same regardless of whether one person or multiple people occupy the vehicle.

### **Elderly & Disabled Persons Transportation Program**

The Elderly & Disabled Persons Transportation Program, formerly known as “5310”, provides funding for transportation of persons age 60 or over, and/or persons with disabilities as defined by the American’s with Disabilities Act. The E & D program is intended to serve a wider range of transportation needs, including shopping, meal-site transports, and social trips. Various human service agencies in Lamoille County, including Vocational Rehabilitation, Council on Aging, Meals on Wheels, Lamoille County Mental Health, and Out and About Adult Day Center, assist their clients in accessing these funds. Service is provided throughout Lamoille County and in some instances extends outside the county.

Since RCT is the provider for both Lamoille and the neighboring northeastern Vermont counties, there is some overlap in services. Residents of Hardwick, for example, are transported into Morrisville to Out & About Adult Day Center since this is the closest service. Eligible trip purposes include kidney dialysis, medical trips not covered by the Medicaid program, trips to senior meal sites, shopping and personal trips, vocational transportation, and social and recreational trips. However, the level of funding devoted to this program is simply not sufficient to cover all needs. In many circumstances, the most immediate needs, such as life-sustaining medical trips, are the priority over other types of non-medical trips.

### **Other Human Service Transportation Programs**

Throughout Vermont there are a number of other transportation programs that have specialized services. For an overview of providers and associated human service transportation programs, please see the 2008 Vermont Human Service Transportation Coordination Plan.

### **Bicycle & Pedestrian Network**

In the past fifty years the vast majority of transportation projects have been primarily aimed toward improving the mobility and safety of automobile travel. In many cases, this has been without consideration for pedestrians and bicyclists. More recently, the growing popularity of bicycling, running, walking, and general concern for health, has increased demand for appropriate bicycle and pedestrian facilities.

### **Current Use of System**

Current Census data (2010) for Lamoille County indicates that 715 commuters, or approximately 6% of commuters walk or bicycle to work. This figure has increased from approximately 676 commuters in 1990. Over the past 20 years, the number of people traveling by bicycle or foot in Lamoille County has increased by 5.8%. Most often bicycle or pedestrian trips are made in village centers or in areas of compact development with adequate travel space for pedestrian and cyclists.

### **Feasibility of Pedestrian and Bicycle Travel**

Most bicycle travel in Lamoille County takes place on the region’s highway network. A common concern is that road shoulders are often too narrow to safely accommodate shared use. The provision of adequate shoulders for bicycling along highways is an important step in encouraging bicycling as a viable form of transportation. As a general rule, bicycling is considered a feasible transportation option for trips of less than five miles. College towns, such as Johnson, often see a great deal of bicycle users, as there is a concentration of residents who do not own cars and must rely on other modes of transportation. Bicycle use is also common among school-age

children, where bicycles provide important mobility to get to school, as well as social and recreational activities. Safe, pleasant and convenient facilities (bike lanes and trails) and amenities (bike racks and bike lockers) should be provided to encourage bicycle travel.

The decision to walk rather than drive is highly dependent on distance, the condition of the pedestrian environment, and weather. Studies have indicated that pedestrians have general walking threshold of roughly a quarter-mile, or approximately 5 minutes for regular trips, and a 1-mile radius or approximately 20 minutes for a commute trip. Majority of regional pedestrian trips tend to be concentrated in compact village centers where the distance to destination points is likely shorter. The *Vermont Pedestrian and Bicycle Facility Planning and Design Manual* should be consulted when making decisions regarding designs for pedestrian facilities. Improvements to street and highway design in both village centers and on rural roads will assist in increasing pedestrian safety and providing more comfortable walking environments.

### Existing Bicycle Facilities

In 1997, the Lamoille County Transportation Advisory Committee designated official regional bicycle routes. Routes designated as preferred regional bicycle transportation routes were limited to state routes and class 2 and 3 town highways; these routes align with the system of rural arterial and collector roads (see the map below). These designated routes were chosen as the most direct connections between local development centers that provide the services cyclists need such as food, water, shelter, and



technical support. In 2000, LCPC inventoried road shoulder conditions along these regional bicycle routes to get a baseline of existing conditions. Although often used by cyclists, the shoulder facilities along most of the designated routes are deficient for bicycle and pedestrian uses according to the *VT State Design Standards*. These standards suggest minimum widths based on factors such as the amount of traffic, the posted speed limit and other variables. Note that VTrans is currently in the process of updating these standards.

To ensure that improvements occur, LCPC's road shoulder inventory should be routinely updated with a windshield survey of shoulder conditions. This will assist municipalities and the region in identifying opportunities to improve shoulders for bicycling. The road shoulders that are in need of improvement should be coordinated with other transportation projects, particularly paving projects that can address shoulder deficiencies for bicyclists.

# Regional Bicycle Routes

## Lamoille County



-  Lamoille Valley Rail Trail
-  Stowe Recreation Path
-  Bicycle Route
-  State Highway
-  Class 2 Town Highway
-  Class 3 Town Highway

### Data Sources:

Political Boundaries: VCGI, 1991.  
 Roads: 1:5000 E-911 Road Data, 2014.  
 Surface Water: VCGI for VHD-USGS, 2001.  
 AADT: VTrans, 2012.  
 Bicycle Routes: LCPC, 2005.  
 Stowe Recreation Path: Town of Stowe, 2010.

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Map: Regional Bicycle Routes

## **Existing Pedestrian Facilities**

Walking is most commonly used for short trips and is part of nearly all transportation trips. Walking can also form the beginning and end of public transit trips. Given the short distances people are likely to walk, walking is primarily a local-level means of transportation. Facility improvements should initially focus on villages, town-centers, neighborhoods and compact developments.

### *Walking in Village Centers*

The historic land development patterns of village centers provide a foundation for a pedestrian-oriented environment. Lamoille County is home to numerous historic village centers such as Hyde Park, Cambridge, Jeffersonville, Johnson, and Morrisville. Both designated village centers and downtown areas throughout Lamoille County tend to be characterized by compact mixed-use development; these activity centers are the most suited areas for walking and making connections to multiple destinations.

Several municipalities have made vast improvements to their pedestrian environment by planning and constructing extensive sidewalk networks in the village centers and outward extensions. In Stowe, sidewalks have been extended along the Route 108 corridor from the village, and sidewalks are planned for the Lower village commercial areas along Route 100 and along Route 108 from Cape Cod Road to Cottage Club Road. Morrisville has made continued improvements to sidewalks in the village center and has connections to People Academy, as well as the commercial district north of town. Morristown is currently planning a sidewalk extension along Route 100 from A Street in the village to the Bishop Marshall School. The village of Hyde Park has been implementing a village enhancement plan with the aim of constructing connections from Main Street to adjacent residential areas on both ends of the village. Finally, Johnson has recently completed a streetscape improvement project along Main Street that included traffic calming measures. Johnson has also built connections from the village center west along Route 15 to connect the Town Offices and residential development. These expansions to the pedestrian network encourage non-motorized connections between the village centers and nearby destinations.

### *Walking in Rural Areas*

In many smaller villages and rural areas, widened road shoulders or a separated path may in some cases be the most appropriate pedestrian facility. Village centers that lack sidewalk facilities include Belvidere, Cambridge Village, Eden Mills, Elmore, Waterville and Wolcott. In the case of Cambridge Village, Route 15 is difficult for pedestrians to cross, particularly during commuting hours. This area was recommended for a village enhancement design as part of the VT15 Corridor Management Plan. Such an effort would address deficiencies by identifying locations for crosswalks, sidewalks, appropriate signage, and other modifications that would enhance the overall experience in the village for pedestrians.

Many of these village centers also serve as summer recreation destinations such as Eden Mills and Elmore. With Lake Eden situated near the core of Eden Mills, this village center generates a fair amount of pedestrian activity and could benefit from having a safe pedestrian connection from the lake. With the State Park located near the village center, Elmore also serves as an area with notable pedestrian activity to nearby businesses, as well as connections to the school. Much of this activity is concentrated along the lake front off of Route 12. Improving pedestrian connections between the Lake Elmore School, Elmore Store and Elmore State Park is desired by the community.

Waterville Center and Belvidere both lack safe pedestrian connections to the school from the village center. These towns have less compact village centers making such connections a challenge, as schools are located half a mile or more from the village core. In some rural areas, which lack pedestrian improvements, local town highways with low-traffic and low-speeds can sometimes serve as pedestrian routes for walking. In the case of Wolcott, the village is comprised of several large and small commercial businesses and residential development along Route 15. Both the high traffic along the state highway and the open accesses to the adjacent businesses create a safety concern for pedestrians utilizing the shoulder. Wolcott has procured studies of on-road facilities and shared-use path opportunities to link the village area to the school and the Lamoille Valley Rail Trail.

### **Recreation and Transportation**

The connection between recreation and transportation is often overlooked. The Stowe Recreation Path plays an important transportation role in Stowe providing an alternative non-motorized transportation facility for much of the length of the Mountain Road (VT108). Similarly, the Lamoille Valley Rail Trail (LVRT) will be a regional transportation facility connecting many of the towns and villages throughout the region and beyond. These facilities, while perhaps perceived as primarily recreational facilities, should also receive attention for their role and importance as transportation corridors. Towns not directly served by the LVRT will most likely wish to develop safe connections to the trail. Some will choose to gain access to the LVRT via highway connections, but others may wish to develop off-highway connections, contributing to a region-wide trail network.

The railbanking of the Lamoille Valley Rail Corridor provides an opportunity for the development of a multi-use path the length and quality of which is unprecedented in Vermont. This 96-mile state-owned right-of-way parallels Vermont Route 15 and the Lamoille River for much of length of the county. Providing an off-highway link between many villages along the way, the trail is poised to become a destination facility for walkers, bicycle tourists, and other recreation purposes, but also presents a real transportation alternative to VT Route 15. The economic benefits of the trail are potentially very high as well, with much opportunity for service industry along the way including food, lodging, and technical support for the various users of the trail.

The Stowe Recreation Path, constructed in the 1980s, parallels VT Route 108 from the historic village of Stowe and extends 5.3 miles toward Stowe Mountain Resort. This paved pathway serves locals and visitors alike and accommodates a variety of modes including walkers, bicyclists, roller-bladers, and families with strollers. Although the path is contained within the town of Stowe, it provides a transportation alternative to VT108 for users traveling to and from work, as well as access for the year-round tourism population. Spurs off the path to access other municipal facilities such as the recreation fields and the high school, have been studied over the years and should be implemented as funding is identified. In addition, an extension to the Stowe Mountain Resort should also be examined.

LCPC and municipalities have been working to make additional connections and build upon these two resources. LCPC, in collaboration with towns of Morristown and Stowe, is studying the potential shared-use connection between the Stowe Recreation Path and the LVRT; this pathway would provide a safe alternative to traveling along the Route 100 corridor for pedestrians and cyclists and serve to connect the transportation networks between these communities.

Additionally, communities throughout the region recognize the importance of existing local connectors and their ability to provide a safe travel link to village centers, as well as regional pathways and bicycle routes. Local connectors across the region serve in the form of extended sidewalks, local roadways and recreational pathways.

In some cases these links serve as connectors for regional bike tours such as Gold Brook Road, Stowe Hollow Road, and the River Walk Path in Stowe. See the Regional Trails map on page 83 for more trails.

### **Planning for Facilities**

VTrans developed and adopted the *Vermont Bicycle and Pedestrian Facility Planning and Design Manual* in 2002. This manual provides extensive background and guidance on the specifications of bicycle and pedestrian planning and facility design. This manual, or the most recent Vermont Standard, should be consulted whenever planning for, or designing, bicycle and pedestrian facilities in addition to the *Vermont State Design Standards*.

In addition to these guidance and standards, the principle of incorporating all transportation users into the existing road network was backed by “Complete Streets” legislation. The Complete Streets Law (Act 34) which went into effect July 1, 2011, requires both the state and municipalities in Vermont to consider the needs of all users (e.g. bicyclists, pedestrians, transit users) in all transportation plans and projects. This new policy mandates that all new and renovated paved roads consider the needs of motorists, bicyclists and pedestrians of all ages and abilities. Examples of design elements encouraged through the Complete Streets program include:

- Adding and maintaining sidewalks that are connected to public services
- Improving lighting, signage and pavement markings
- Installing curb ramps and sidewalk seating.

LCPC annually coordinates with municipalities to inventory Complete Street projects and identify how towns are incorporating the new requirement into their local project planning process. In some rural areas, communities should be allowed to use improved widened shoulders in lieu of sidewalk facilities to meet the “Complete Street” mandate.

### **Air Transportation**

Aviation provides an important function in the region’s transportation system. Convenient access to passenger and freight air service is vital to many businesses in Lamoille County and is important to the tourist economy and business sectors. A functional airport is a tremendous asset and an integral component of an intermodal transportation system.

### **Regional Airport Facilities and Services**

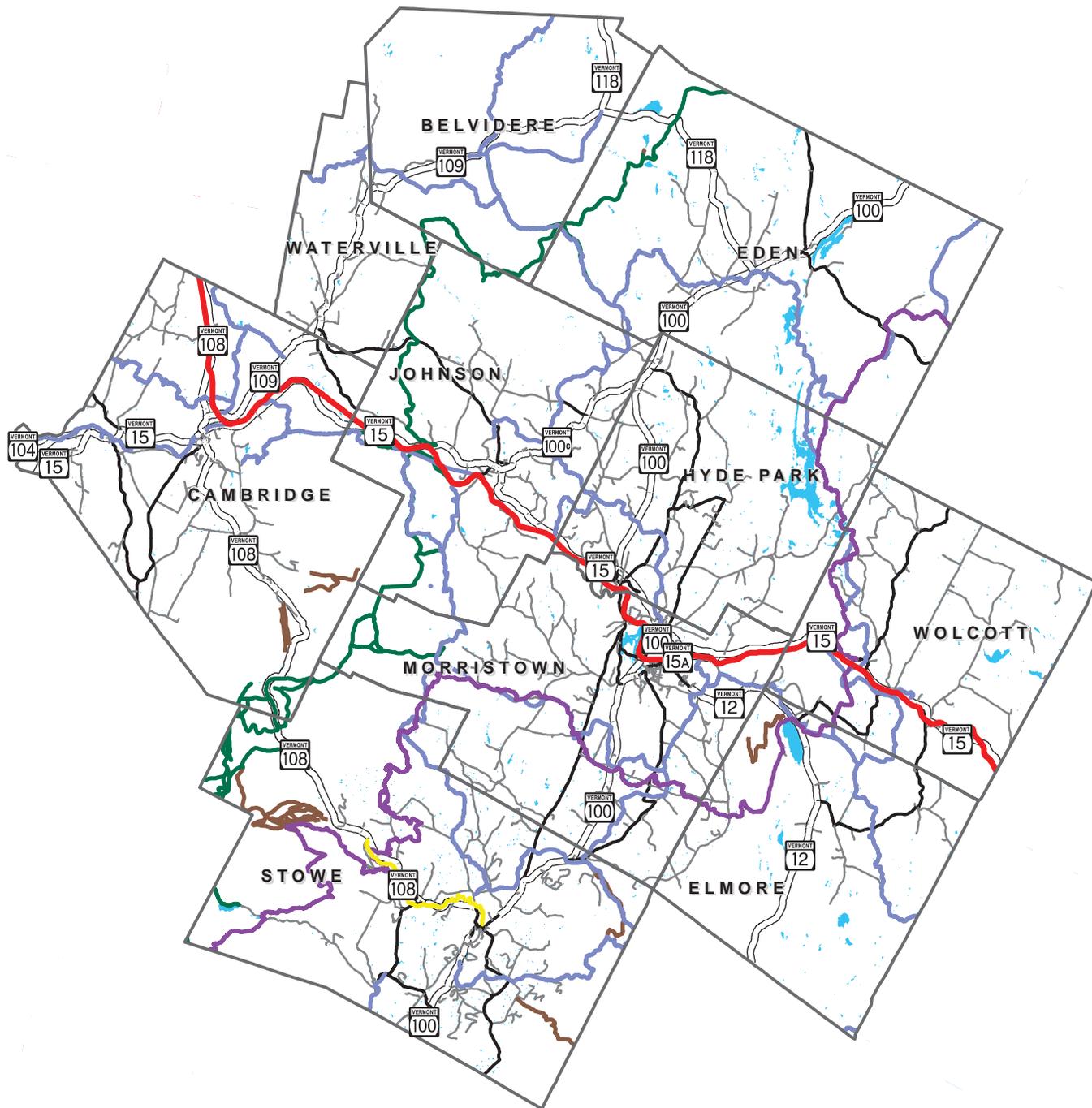
Lamoille County is home to the Morrisville-Stowe State Airport (MSA), located in Morrystown on VT100, north of Stowe and south of the Village of Morrisville. Owned by the State of Vermont, VTrans manages the administration of the airport, and contracts with a private fixed-base operator that handles daily operations of the facility. The MSA is classified as a Regional Service airport with a focus of connecting the local and regional economy to the state and national markets. This general aviation airport services charter and air taxi service for business class travelers and tourists, similar to many of the other small State-owned aviation airports scattered around Vermont. The airport hosts charter activity from local businesses including Burton Snowboard Company, various foodservice and restaurant owners in the Morrisville and Stowe area, as well as business executives from the New York and Boston areas. MSA also contracts with the Stowe Soaring Company to host glider rides. This operation is very popular with tourists during the summer and fall-foliage seasons.

#### *Morrisville-Stowe Airport Master Plan*

VTrans completed the most recent Master Plan update for Morrisville-Stowe Airport in January 2005. Many of the improvements are oriented toward meeting FAA safety requirements for operation of the current fleet-mix of

# Regional Trails

## Lamoille County



### Data Sources:

Political Boundaries: VCGI, 1991.  
 Roads: 1:5000 E-911 Road Data, 2014.  
 Surface Water: VCGI for VHD-USGS, 2001.  
 Regional Trails: ANR 1993, VAST 2011,  
 Catamount Trail Association 2003.

Created 7/29/15 by LCPC. Map is for planning purposes only, not for regulatory interpretation.

- Lamoille Valley Rail Trail
- Stowe Recreation Path
- Catamount Trail
- VAST Trail
- Long Trail System
- State Forest Trail
- State Highway
- Class 1 & 2 Town Highway
- Class 3 Town Highway
- Unknown Class

aircraft. The planned improvements will address current deficiencies, allowing safe and efficient operations for the existing fleet of small aircraft. MSA is not eligible for subsidization of commercial air passenger service under current federal regulations due to the close proximity to Burlington International Airport. Therefore, MSA will likely continue to operate in its present function; serving private aviation, charter service, and air taxi service.

There are a variety environmental and development constraints limiting the ability to expand MSA and operational service. The airport's close proximity to Elmore Mountain and the adjacent Ryder Brook, prevent MSA from extending the runway beyond 4,200 feet. Additional limitations to expansion include the lack of developable state-owned land, limited taxiway availability, minimal terminal space, and limited aircraft storage space. These limitations make it unlikely that the function of the airport will change much in the future. Future improvements listed in the airport's Master Plan and the VTrans 2012 Status Report, include adding a parallel taxiway to the southern portion of the runway, replacing taxiway lighting, extending the runway by 300 feet, expanding terminal space, and constructing new additional hanger space for air craft storage. With the exception of the terminal and hanger space expansions, these improvements are underway and will aid MSA in increasing the availability of current private and charter service.

#### *Public Safety and Health Functions*

The Morrisville-Stowe Airport also serves as a base for specialized trainings. MSA assists Vermont State Police by providing volunteer pilots to aid in local law enforcement and serving as training grounds for annual drug patrols. MSA is also utilized by the Air National Guard to host flight trainings, helicopter practice, and search and rescue operations. In addition to hosting flight trainings, the Morrisville-Stowe Airport supports local aviation activities by providing air craft parking and storage, a jet fueling station and rent-a-car service. Additional health and safety trainings hosted at MSA include rabies control programs sponsored by the USDA and the Canadian government. Local pilots also volunteer on occasion for medical emergency transports.

#### *Regional Economic Impacts of MSA*

Situated in between Morrisville and Stowe, MSA is a vital contributor to attracting visitors and increasing business revenue in these two municipalities. According to the 2010 *VTrans Morristown-Stowe Airport Business Plan*, in 2003 the MSA was estimated to have a direct and induced economic impact of \$11,982,500 in terms of business sales and public expenditures. If the proposed improvements in the Business Plan are to be implemented, which includes a runway extension, new 1500-foot hangar space, and additional staffing, the economic benefit is estimated to rise to \$15,245,700. For more information on the economic impacts of the Morrisville-Stowe Airport consult the 2010 MSA Business Plan.

#### *Airport Service Outside Lamoille County*

While MSA serves as a vital regional connector for Lamoille County visitors and part-time residents, the airport does not provide commercial service. Currently, Burlington International Airport and the Rutland State Airport are the only airports in Vermont that provide scheduled commercial air service; larger airports in Massachusetts, New Hampshire, New York, and Canada provide additional commercial service. Clearly, Morrisville-Stowe State Airport serves a different level of activity than Logan International or Trudeau in Montreal. Still, all of these airports provide services that benefit Lamoille County. Many resort hotels in the region provide shuttle transportation to the Burlington International Airport.

### **Rail Transportation**

The State of Vermont was the first state in the nation to own a railroad when it purchased the abandoned Rutland railroad in 1962. A pioneer in the rail industry, Vermont now owns approximately half of the 600 active miles of rail in the state. Rail activity has, however, declined in Vermont even with these efforts to preserve a functional rail system.

Since 1992, rail transport, of both passengers and freight, has steadily declined as much of the nation transitions to a service-based economy. Although rail is a cost-efficient transportation option, many factors have created less than favorable conditions for rail industry success. Highly unequal subsidizing of highways over rail infrastructure, complex ownership and operating structures of railroad companies, and a continually restructuring of the general economy have all contributed to the railroad industry’s difficult existence.

### **Freight Transport**

In recent years, freight transportation in Vermont has been transitioning from rail to truck. Freight rail transport is most competitive for long-distance hauls of bulky, lower-value commodities such as coal, grain, paper, wood and minerals. The transport of products such as agricultural, building and earth resource materials, including petroleum products, as well as retail items, comprise the majority of Vermont rail freight. Although railroad transportation is generally less expensive for high-bulk commodities, railroads have less flexibility for delivery schedule and locations, making truck transportation more appealing to many industries. Truck transportation is generally more cost effective for higher value items, due in part to higher inventory costs that are saved by more timely truck freight schedules.

### **Passenger Rail**

Vermont passenger rail service has also suffered a decline in recent years. The Amtrak “Montrealer” has been replaced with the shorter run “Vermont” and the Ethan Allen Express still operates on the western side of the state. Although passenger rail service has been declining in Vermont, the State contributes annual operating funds to Amtrak in order to retain the existing passenger service. Maintaining and developing a functional rail system is challenging at all levels of government. There is great potential for rail to relieve pressures of congestion and wear on our highways, and passenger rail provides mobility to many people with limited long distance travel options. Although Lamoille County has no active rail lines, it serves the region’s interests to support continued Amtrak service through Waterbury, Essex Junction, and St. Albans, as well as to support Vermont’s general efforts to maintain a functional rail system.

### **Lamoille Valley Railroad**

The Lamoille Valley Railroad, formerly known as St. Johnsbury and Lake Champlain Railroad, served as a vital east-west transportation corridor from 1877 till its closing in 1994. Despite efforts to upgrade the railroad in the late 1970s, this line faced difficulty continuing due to various



circumstances including the rerouting of the New England Railroad, and the loss of local freight industries, such as the asbestos mines in Lowell and the talc plant in Johnson.

In 2000, the Vermont Agency of Transportation requested proposals for the use of the corridor. The process resulted in the recommendation that the State railbank the corridor through the Federal Surface Transportation Board, and pursue the development of a multi-use trail with Vermont Association of Snow Travelers (VAST). By the fall of 2002, VTrans had begun the railbanking process which requires Federal Surface Transportation Board (STB) ruling in Washington, D.C. After a lengthy process, the railbanking became official in January 2005. VTrans and VAST have signed a lease and VAST is working on developing the Lamoille Valley Rail Trail (LVRT) into a four season recreational trail.

### **Multi-Modal Connectivity**

Creating a connected transportation system that supports cars, bicycles, pedestrians, rail service, and public transit is a primary strategy for developing a comprehensive and efficient transportation network. Transportation Demand Management, or TDM, is a general term for strategies that increase transportation system efficiency by encouraging reduced auto trips, increasing travel options, providing incentives to modify travel behavior, or by simply reducing the need to travel by promoting compact mixed-use developments. TDM strategies most often focus on identifying alternatives to single occupant vehicles during commuting hours.

Perhaps the most attractive characteristic of these strategies is that they are significantly less expensive and controversial than large highway construction projects. TDM provides an opportunity to address many of our highway management issues while continuing to improve facilities and services. To improve the efficiency of the region's overall transportation system, all future transportation projects and TDM strategies should consider three main factors reliability, convenience and connectivity to other transportation modes.

### **Transportation Demand Management**

There are many strategies that allow us to preserve the capacity of our existing highway network, increase mobility, conserve energy, and reduce transportation-related emissions, while still allowing us to go about our daily lives without too much difficulty. Traditional TDM strategies include carpooling, vanpooling, transit use, walking, and bicycling. More recent TDM measures that have been well received by the commuting public include flexible scheduling, compressed work week, and telecommuting. Advances in communications technology make these strategies possible; however these strategies do rely on the flexibility of employers and the ability and willingness of employees to alter their typical daily schedules.

#### *Ridesharing*

Ridesharing programs encourage drivers to share rides with those traveling the same commuting patterns. Vermont has an excellent rideshare program that is organized, maintained, and promoted by *Go Vermont* in collaboration with Vermont public transit providers. Currently, *Go Vermont* offers an online carpool matching service known as Zimride, allowing commuters to make easy and safe connections with other professionals commuting to the same general location. This program assists in reducing the number of single occupancy vehicles on the road, thereby reducing traffic congestion, wear and tear on the roads, cutting individual fuel costs up to 50%, and reducing carbon emissions. Based on current registered Zimride commuters, if all members were matched and took advantage of carpooling, 304,271 pounds of carbon dioxide emissions would be eliminated each year.

### *Employer Based Programs*

Employers can offer a variety of opportunities to encourage ride sharing and alternative means of transportation. Examples include providing preferred parking spaces to carpoolers, installing bike racks for cyclists or offering prize-based incentive programs recognizing employees' efforts to carpool, bicycle or walk. Larger employers may also wish to stagger shifts to reduce congestion of the roadways during typical peak-hour traffic times.

Promoting employer-based programs that encourage the use of alternative transportation modes can yield a variety of benefits including a reduction in travel costs, reduced wear and tear on personal vehicles, increased physical health, reduced healthcare costs, and increased productivity by reducing commute-related stress.

Employer sponsored telecommuting programs also have noted environmental and employee benefits.

### **Park and Rides**

Vermont has seen significant success with the establishment of park and ride lots. Typically placed at the junction of major State Highways or Interstate exits, Park and Ride lots provide a facility for travelers and commuters to leave their vehicle and connect to public transit or carpool for the remainder of their trip. VTrans and public transit providers operating throughout Vermont have made great efforts over recent years to coordinate fixed route transit services with these lots to encourage and facilitate their use.

Lamoille County currently has three formal Park & Ride lots; one co-located in the parking lot of the Morrisville-Stowe Airport on VT100, one located at the Hyde Park Municipal Offices along Route 15, and one west of Cambridge Village on VT15. There are also a number of informal park and rides such as the Elmore Town Store parking lot and a dirt pull-off along VT 15 in Jeffersonville. These lots, while not formally recognized as Park & Ride facilities by VTrans do provide parking space to rideshare. VTrans offers a Municipal Park-and-Ride Grant Program that provides funding for upgrades and improvements to new and existing park and ride facilities.

### **Transportation Connections to Adjacent Regions**

Services provided through the region's existing transportation network, including public transit, park and ride lots, and recreation trails, allow for both commuters and leisure travelers to make connections not only within Lamoille County, but also to adjacent regions. Public transit connections can be made to Montpelier and Burlington through the Route 100 Commuter operated by GMTA. Residents and commuters can connect from the Route 100 Commuter to the Montpelier Link Express or Waterbury Commuter bus routes. Park and ride lots located along Route 15 in Cambridge and Hyde Park also allow Lamoille County residents to make more viable and cost savings connections to adjacent counties including Chittenden, Franklin and Caledonia County.

Additionally, extended shared-use recreation paths such as the Lamoille Valley Rail Trail will allow travelers to make easy connections to adjacent communities such as Hardwick in Caledonia County.

### **Transportation-Land Use Connection**

Traffic volumes and transportation mode choices are influenced by the location, density, and mixture of land uses. Dispersed low density development patterns rely almost solely on the automobile as the primary mode of transportation. As housing, employment centers, shopping and service opportunities become further separated, roads become more congested and the region's landscape loses its revered rural aesthetic.

By encouraging concentrated, mixed-use development within existing developed centers or within designated growth areas, commute trips can be shortened, and other modes of transportation can be promoted.

Municipalities can implement this strategy through infrastructure investments as well as zoning and subdivision ordinances. Promoting this type of development will minimize the need for highway network expansion while

facilitating trips made by walking, bicycle, and public transit. An important component of this strategy is ensuring that all public buildings and facilities - post offices, schools, public meeting facilities, recreational fields, etc. are located within walking distance of village/commercial centers. Another aspect of this strategy is the concept of mixed-use development. Mixed-use developments offer opportunities to live, work, shop, and recreate close together and encourage bicycle and pedestrian transportation.

Within Lamoille County, the VT Route 15 and VT Route 100 corridors provide vital access to employment and housing opportunities. By promoting access management strategies, the look and function of the rural areas along these corridors can be preserved while still allowing well-planned development.

### Access Management

Access management is a strategy for managing physical connections and development along roadways by regulating the frequency or location of access points along road corridors. Frequent curb cuts and driveways decrease the efficiency of streets by creating additional turn movements and increasing congestion. Access points also increase the risk of crashes among vehicles and lead to bottlenecks and added congestion, reducing roadway capacity and overall mobility. Safety and capacity concerns can be mitigated by implementing effective access management strategies. Strategies include limiting the number of access points along regional roadway corridors or acquisition of development rights to limit unsafe access points.

By incorporating access management regulations into local zoning or subdivision ordinance, towns can maintain the capacity and ability to process traffic while preserving roadway level of service. Safety is also increased with access management strategies by reducing the number of potential conflict points between vehicles and non-vehicular traffic.

### Traffic Calming and Streetscaping

Many of Lamoille County's villages have developed around state highways. These highways play the dual role of providing access and mobility. The complicating factor in many of these villages is that the state highway often also serves as "Main Street". Traffic calming has proven a popular mechanism to balance the needs of the villages with that of the state highway. Traffic calming features are visual and physical cues to reduce speed, be cautious, and alert drivers to change their behavior. These features such as village gateway signs, street markings, curb-extensions, and other physical features also serve as refuge for bicyclists and pedestrians. VTrans has developed a *Traffic Calming Planning and Approval Process* and standard drawings of traffic calming features considered acceptable for use on state highways in village areas. VTrans should consider including traffic calming elements as a component of major roadway projects on the State highway system, especially in village and downtown areas.



The roundabout in Jeffersonville (and those in Hyde Park and Morrisville) lacks pedestrian fixtures, such as a marked crosswalk or sidewalk.

### Healthy Community Design

There are several aspects of healthy community design that directly relate to transportation planning. The basic principles consider the integration of commercial and residential developments and the location of destinations such as schools and employment centers. Both of these factors can strongly influence the way people tend to

travel to access destinations. Policies that support healthy community design include compact development, interconnected streets, and a network of connected sidewalks and bicycle routes. Towns are encouraged to incorporate healthy community design principles into their municipal plans, promote alternatives to automobile travel, as well as increasing physical activity by providing access to parks and bicycle and pedestrians facilities.

### **Corridor Planning**

Corridors serve as vital connectors to statewide highways, intra-regional corridors and local roadways. Understanding the existing functions and characteristics of each corridor can help guide prioritization and design of future transportation improvement projects. Improvements to primary corridors should consider both community concerns and the most efficient way to move goods and people throughout the region.

Lamoille County's primary corridors include Vermont Routes 100, 15 and 12. While each route has its own unique land use patterns, a large portion of primary corridors situated within the region are characterized by scenic rural landscapes, historic village centers, and small clusters of commercial development at the fringe of villages. As communities along these connector routes continue to grow, transportation investments and improvement projects should consider all modes of transportation, especially biking and walking. Existing pedestrian and bicycle facilities along state routes are unable to safely accommodate pedestrian and cyclists. Towns in the region are encouraged to design future transportation and land use projects in a manner that will meet the needs of all users, while preserving scenic and intrinsic resources, especially along designated byways and scenic highways.

### **VT Route 100 - Stowe to Morristown**

The VT Route 100 Corridor begins in Waterbury and intersects with Route 15 in Morristown. This corridor passes through two of Lamoille County's largest employment centers; Stowe and Morristown/Morrisville. These two towns alone account for approximately 40% (9,541) of the County's total population. The overall pattern of development along the corridor is characterized by historic villages connected by a scenic two-lane rural highway. Rural portions of the highway are dominated by large parcels of farm, forestland, and single family homes. Transitional areas along the periphery of village centers are commonly characterized by a mix of commercial uses, while the historic centers of Stowe and Morrisville are dominated by mixed-use development.

According to the Vermont Route 100 Access Management Plan, traffic delays along the corridor are most concentrated in downtown Stowe near Route 108, in the Village of Morrisville, and Cady's Falls Rd in Morristown. VTrans traffic count data indicates overall traffic along the corridor is dominated by passenger vehicles accounting for 68-71% of vehicles traveling from Stowe to Morristown. Medium trucks/vans account for the second most common (25-28%) vehicle type traveling the corridor. Meanwhile, heavy truck and tractor trailers with more than 2 axles only account for approximately 1-3% of vehicles traveling this section of the VT Route 100 corridor.

The 2004 Vermont Route 100 Access Management Plan identified multiple transportation improvements to address current access and safety issues along the corridor. Recommended improvement projects include the following:

- The construction of the Route 100 Alternative Truck Route in Morrisville (currently under construction);
- Applying the standards of the *2003 Vermont Pedestrian and Bicycle Facility Planning and Design Manual* when designing new road projects;

- A mix of proposed turn lanes, traffic signals, roundabouts, bike/pedestrian facilities, and defined driveway access improvements (See Figures E1-3 in the Access Management Plan).

### **VT Route 100 - Hyde Park to Eden**

The northern portion of the Vermont Route 100 Corridor begins in Hyde Park and extends to the Eden/ Lowell townline. This corridor passes through two municipalities, Hyde Park and Eden. This section of VT 100 is comprised of vast farmland, single family homes, and pockets of mixed-used development situated in North Hyde Park, Eden center and Eden Mills. Near Eden Mills, the corridor passes by more recreation-oriented development centered around Lake Eden.

Although North Hyde Park and Eden are not major employment centers, they are increasingly serving both commercial and residential land uses. As a result of increased development in the Northeast Kingdom, both truck and overall traffic volume have increased along the VT 100 Corridor. According to 2010 VTtrans traffic count data, medium sized trucks and vans account for approximately 28 -32% of vehicles traveling this segment of VT 100, while heavy trucks and trailers ranged from 1.5-8% of vehicles.

As both truck traffic and commercial and residential development continues to sprout up along Route 100, accommodating multiple transportation modes becomes increasingly difficult. In many areas along VT 100 in North Hyde Park and Eden, road shoulders are narrow and unsafe for pedestrians and cyclists. To improve bicycle and pedestrian facilities and reduce vehicle conflicts the following improvements are recommended:

- Widen road shoulders along Route 100 in Hyde Park and Eden;
- Improve and define driveway access near commercial developments;
- Where possible, widen road width to incorporate a truck passing lane.

### **VT Route 15 - Cambridge to Wolcott**

VT Route 15 Corridor begins at the Essex/Jericho townline and extends east to Hardwick in Caledonia County. This corridor passes through a total of nine municipalities, five of which are located in Lamoille County; Cambridge, Johnson, Hyde Park, Morristown and Wolcott. Cambridge's close proximity to Chittenden County has made it one of the fastest growing towns in Vermont. Overall, the Route 15 Corridor is dominated by rural, scenic, agricultural sections of highway passing through several historic village centers (Cambridge, Johnson and Wolcott) and commercial clusters. In Lamoille County, commercial areas along Route 15 are commonly located on the fringe of historic village centers including, Morrisville, Jeffersonville, and Hyde Park.

As VT Route 15 continues to serve development and population growth in both Lamoille and its suburban counterpart Chittenden County; traffic volumes will continue to increase along the corridor. According to 2010 VTtrans classification traffic counts, this two-lane corridor is dominated by passenger cars (ranging from 65-69% of vehicles traveling the corridor at selected count sites). Medium weight truck traffic volumes were recorded slightly higher west of 15A, accounting for 31% of vehicles counted. Heavy weight truck traffic ranged from 2-5% of traffic flow along Route 15 within Lamoille County.

Currently, with the exception of certain village areas such as Main Street in Johnson, a large part of the corridor lacks proper bike and pedestrian facilities. Road shoulder widths tend to be narrow along the corridor, providing inadequate access and unsafe routes for pedestrians and cyclists. To reduce traffic congestion and increase bicycle, pedestrian and motorists safety, the *2004 Vermont Route 15 Corridor Management Plan* identified the following transportation improvements:

- Where possible, create truck traffic passing lanes to increase mobility;
- Widen road shoulders to increase motorists and bike/ pedestrian safety;
- Make use of turn-outs where widening the road shoulder is not possible to allow slower traffic to pull off the road;
- Improve bicycle and pedestrian facilities in village centers including installing sidewalks, bike racks and implementing traffic calming measures such as streetscape vegetation;
- Improve access management in Jeffersonville and Morristown by sharing driveways, parking and directing traffic to off-street parking rather than along Route 15;
- Locate new Park and Ride facilities in village centers;
- Promote ridesharing along Route 15 to reduce traffic demand.

### **VT Route 12 – Elmore to Washington County**

The Route 12 Corridor begins in Morrisville along Upper Main Street and ends in Montpelier. Within Lamoille County, the corridor passes through both Morristown and Elmore. This two-lane corridor is becoming an increasingly more popular travel route for both commuters and visitors traveling to Montpelier. Aside from Morrisville and Elmore center, the Route 12 Corridor passes through predominantly rural areas dominated by recreation, farm and forestland.

As Route 12 serves as a scenic commuting route from Morrisville to Montpelier, the corridor, like others in Lamoille County, is dominated by passenger vehicle travel. According to VTrans 2010 traffic count data, passenger vehicles accounted for approximately 68% of cars traveling Route 12 from Morristown to Elmore. Similar to other primary corridors in the region, Route 12 has experienced an increase in truck traffic. Medium weight trucks and vans accounted for approximately 30% of vehicles traveling the corridor within the County. Meanwhile, heavy truck and tractor trailer traffic tends to be lower along Route 12 than on VT Routes 15 and 100.

VT Route 12 serves as the gateway to popular recreation destinations including Elmore State Park and Lake Elmore. Future road improvement projects must consider the safety of all users along the corridor. Similar to portions of VT Routes 100 and 15, Route 12 lacks adequate bicycle and pedestrian facilities. With the exception of a few areas such as Elmore center, road shoulder widths tend to be narrow along the corridor, placing non-motorist users at a higher risk of conflicts with automobiles. To improve safety along VT Route 12 the following projects are recommended:

- To accommodate cyclists and pedestrians, widen road shoulders along VT Route 12 in Morristown and Elmore where sidewalks are not present;
- Study the feasibility of installing sidewalks in Elmore Center to provide safe pedestrian access for users traveling from the Elmore Town Store to Elmore State Park.

### **Regional Transportation Projects**

The Lamoille County Transportation Advisory Committee (TAC) prioritizes regional transportation infrastructure projects annually. When prioritizing infrastructure projects, TAC reviews information such as functional classification, annual average daily traffic volume, and safety issues associated with each project. This information provides a general framework to review each project within its respective project category, such as town highway bridges, roadway, safety improvements, paving, and park and rides.

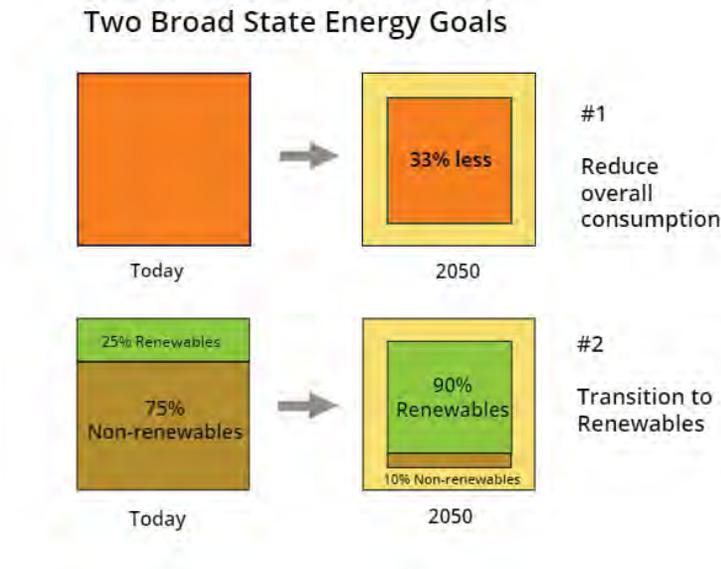
The TAC also considers the following when prioritizing regional projects:

- The impact of the project on congestion and mobility conditions in the region;
- The availability, accessibility and usability of alternative routes;
- The functional importance of a highway or bridge as a link in the local, regional or state economy;
- The functional importance of the facility in the social and cultural life of the surrounding communities;
- Conformance to the local and regional plans;
- Local support for the project; and
- Other factors (community character, quality of life, etc).

The prioritization list for regional transportation projects is updated annually. The most recent prioritization list is available at the LCPC office.

# Energy: Strategy

Lamoille County’s Energy Plan is guided by two broad state energy goals. These goals - set for year 2050 - are to decrease the overall energy consumption in Vermont by 33% and transition the state’s energy use from 75% non-renewable to 90% renewable. Meeting these energy goals will set the state on a path to meet its greenhouse gas emission reduction targets.



## POLICIES & ACTION ITEMS

**Policy:** Encourage efficient use of energy and energy conservation.

**Actions:**

- Work with planning commissions to incorporate energy efficiency and conservation measures into municipal plans and zoning bylaws.
- Seek funding to support LCPC’s capacity to work with property owners, municipalities, local energy committees, electric utilities, and institutions (e.g. schools) on energy efficiency, education and outreach initiatives. With the capacity expanded, promote programs and facilitate efforts to:
  - Weatherize home, businesses and institutions.
  - Educate about residential and commercial building codes, net zero energy construction.
  - Implement district heating, and combined heat and power opportunities.
  - Install air source and geothermal heat pumps.
  - Install efficient wood and biomass heating systems for new construction, as replacements for fossil fuel furnaces and backup heat systems for heat pumps.
  - Conduct building walk-throughs for owners of rental housing.

- Promote the Thermal Efficiency Statewide Clearing House website and the resources featured at the website to Lamoille County residents, businesses and institutions.
- Discuss with Green Mountain Technology Center the potential for developing educational programs related to energy efficiency improvements, and training programs that encourage fuel dealers to become energy service providers. Additionally, support other K-12, higher education and vocational education initiatives to bring energy ideas and solutions to the classroom.
- Support efforts to utilize local forest resources in the manufacturing of thermal biomass fuels. Work with municipalities and economic development partners to determine the feasibility of locating a biomass fuel production facility in Lamoille County. Identify appropriate locations and funding mechanisms in support of the biomass production facility.
- Research feasibility of locating a biogas production facility that processes biodegradables to generate energy.

**Policy:** Support development of renewable energy generation through the use of solar, wind, hydro, biomass and geothermal resources. All energy projects must adhere to a high environmental standard that includes avoiding or mitigating negative impacts to the natural resources listed in this plan and the plans of the host municipality.

**Policy:** Utility scale wind generation is not supported. This plan defines utility scale wind generation as facilities with total generation capacity of 1 MW or more.

**Policy:** Encourage locating energy generation facilities at the preferred locations, areas where there is electric demand, and at locations where the land has already been built and impacted. Preferred and potentially suitable areas are listed in section 5 “Siting of Renewable Energy Facilities” and shown on energy maps. LCPC will work with municipalities to identify additional preferred areas for energy generations.

**Policy:** Energy projects must consider impacts to municipalities other than the host municipality, including but not limited to impacts to local roads in other communities, the ability of other communities to provide services, and the impacts of off-site mitigation, as outlined in the Substantial Regional Impact thresholds found in this plan.

**Actions:**

- Provide assistance to municipalities with developing energy plans that align with state goals for an increased, Vermont-based, renewable energy generation.
- In order to enable increases in energy generation:
  - Electricity transmission systems in Lamoille County must be improved. The LCPC will work to understand impacts of increased regional energy generation on utilities and their customers, and incorporate this understanding into regional and municipal energy planning processes.
  - Technologies must be available that allow integration of intermittent renewable energy sources with energy sources available 24/7. To that end, energy storage is

essential to making a higher proportion of renewable resources a viable energy supply portfolio. The LCPC supports initiatives that will result in expanding the use of energy storage systems for renewables and making the acquisition of the storage systems affordable.

**Policy:** Foster efficient and convenient public transit service that addresses local and regional needs (Policy cross-referenced in Transportation Strategy section; p. 62)

**Policy:** Improve the connectivity of the bicycle and pedestrian network in Lamoille County and ensure regional bicycle and pedestrian needs are met (Policy cross-referenced in Transportation Strategy section; p. 63)

**Policy:** Support regional multi-modal opportunities (Policy cross-referenced in Transportation Strategy section; p. 64)

**Policy:** Ensure transportation projects are compatible with regional land use planning goals (Policy cross-referenced in Transportation Strategy section; p. 65)

**Actions:**

Actions that highlight connections between transportation and energy are listed in the Transportation Strategy section of the Regional Plan; pp. 61-65

**Policy:** Infrastructure investments, transportation improvements, and location of public buildings should reinforce the objectives of the Regional Plan. Future development should be directed to areas served by water and wastewater and other public infrastructure. (Policy cross-referenced in Land use Strategy section; p. 141)

**Policy:** Land use and development should reflect site specific environmental limitations. The density and intensity of development should conform to the limitations of the land and available public services. Higher densities and more intensive uses should be located in Center and Enterprise Areas, while lower densities and less intensive uses should be located in Rural and Working Land Areas (Policy cross-referenced in Land Use Strategy section; p. 142)

**Policy:** Encourage future growth within Center and Enterprise Areas while discouraging strip development along transportation corridors. (Policy cross-referenced in Land Use Strategy section; p. 142)

**Actions:**

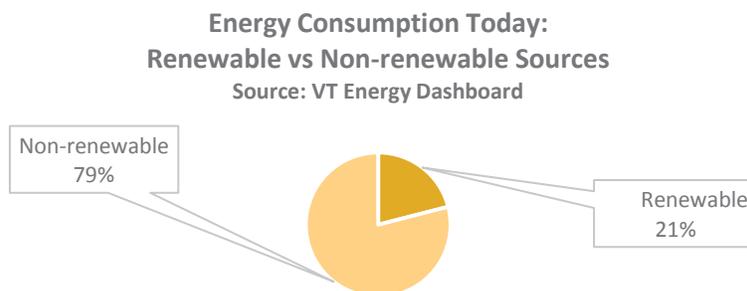
Actions that highlight connection between land use and energy are listed in the Land Use Strategy section of the Regional Plan; pp. 141-144

# Energy: Background and Inventory

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## 1. INTRODUCTION

Energy used in Vermont is obtained from a variety of sources and is used to provide electricity, heat and cool buildings, and transport people and products. Today, residents and businesses in Lamoille County meet their energy needs by utilizing 21% of renewable resources such as wood, sun or wind, and 79% of non-renewable, predominantly petroleum based products such as gasoline or heating oil. \*4



In 2011, Vermont established a laudable goal to significantly increase the proportion of renewable sources of energy we use. This goal is to meet Vermont's total energy needs by using 90% of renewables by 2050 (90x50). Lamoille County Enhanced Energy Plan is guided by the 90x50 goal and the goal forms a basis for energy projections, strategies and actions contained in this Plan. The biggest opportunities to reach 90% by 2050 include energy efficient buildings, switching to renewably powered heating, transportation and electricity, and reducing vehicle miles travelled. Among the actions that can significantly advance our progress toward 90x50 are:

1. Widespread and extensive weatherization of the region's older housing stock.
2. A strong move toward wood heating (firewood and pellets for single homes; wood chip or pellet based central district heating systems for larger residential, commercial and industrial complexes).
3. Greater reliance on electricity heating systems such as heat pumps.
4. Greater reliance on electricity in transportation, namely an increased use of electric vehicles for personal transportation.
5. An increased emphasis on compact development patterns with most development occurring in mixed use centers.
6. Availability of employment opportunities close to workers' place of residence.
7. Effective addressing of interregional transportation issues.
8. Continuation of conservation and efficiency programs.
9. Advancement in developing biofuel technology.

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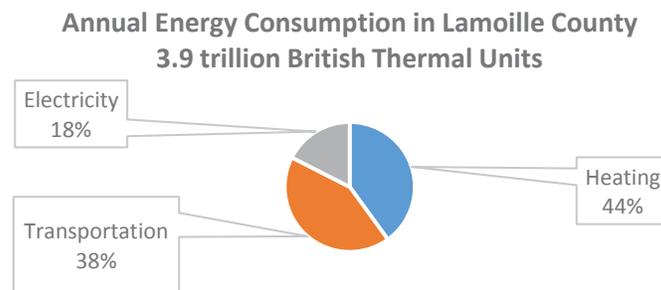
\*4 <http://www.vtenergydashboard.org>

## 2. ENERGY PROFILE TODAY

### Current Energy Usage and Energy Spending in Lamoille County

To adequately understand what strategies the region needs to implement to achieve state energy goals, it is important to understand more about the region's current energy use. Using federal, state, and regional data, the LCPC has estimated regional energy consumption for space heating, transportation and electric uses. There are various ways to measure energy use. Electricity use can be measured in kilowatt hours, transportation fuel use can be expressed in gallons of gas, and heating fuel use can be tracked by tons of wood pellets, gallons of propane; depending on what kind of fuel use is measured. A common measure that can be calculated for any type of energy fuel use is a British Thermal Unit (BTU) \*5. While British Thermal Units (BTUs) may be harder to conceptualize in terms of the volume of energy fuel used, they allow for usage comparisons across all energy sectors; i.e. electricity, transportation and heating.

Based on the LCPC's estimates, the regional currently uses approximately 3.9 trillion BTUs to meet energy demands of its residents and businesses. Energy required for space heating represents 44% (1.73 trillion BTUs) of the annual consumption. Demand for transportation fuels equates to 38% (1.46 trillion BTUs) and electricity usage is 18% (0.7 trillion BTUs) of the total annual use. (Note: Work completed by the Vermont Energy Investment Corporation for this project, which is discussed in Section 4, does not provide a direct comparison to this calculation due to a different methodology used to estimate energy consumption.)



Annual expenditures on heating, transportation and electric energy in Lamoille County are estimated at \$101 million in 2016. \*6 It is important to note that in 2016 fossil fuel prices in the United States were the lowest since 2004. Over time the prices fluctuated significantly. For example, as compared to 2012, when residential fuel oil cost was \$4.00 per gallon and propane cost \$3.6 per gallon, the 2016 prices were \$1.85 and \$3.2 respectively. Gasoline cost \$3.62 per gallon in 2012 and \$2.17 in 2016. When the prices of fossil fuel products rise again, those increases will affect both homes and businesses.

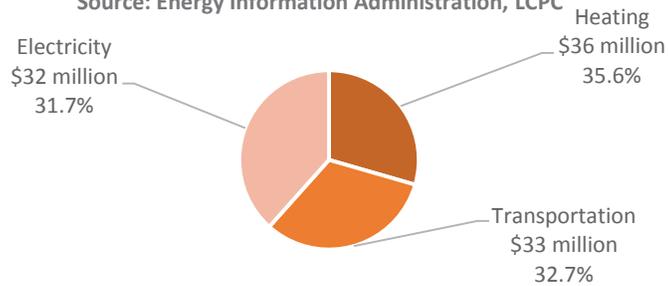
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\*5 The British thermal unit (Btu or BTU) is a traditional unit of heat; it is defined as the amount of heat required to raise the temperature of one *pound* of water by one degree Fahrenheit. It is part of the British *Imperial* system of units.

\*6 Prices used to calculate energy expenditures are based on 2016 US Energy Information Administration data.

### Annual Energy Expenditures in Lamoille County 2016 Estimates

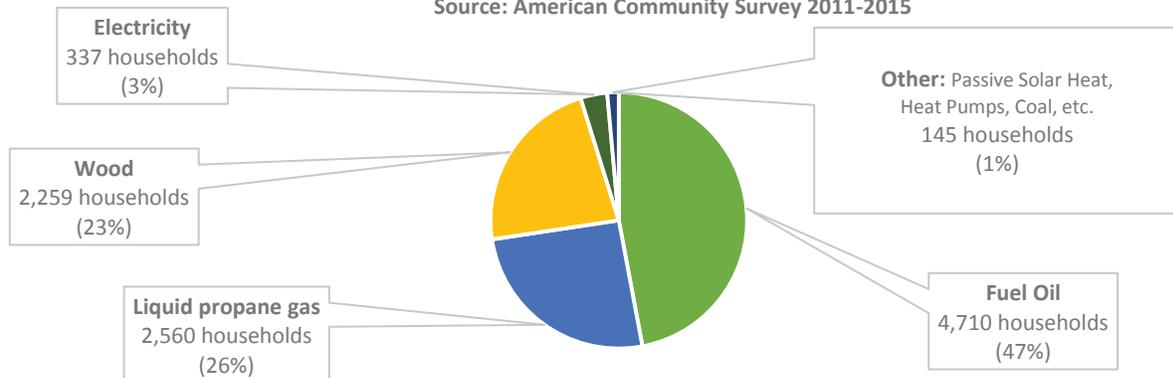
Source: Energy Information Administration, LCPC



### Energy Use by Sector: Space Heating Residential Heating

#### Heating Fuels Used by Lamoille County Households

Source: American Community Survey 2011-2015



Lamoille County residences use about 70% of thermal energy consumed in the region. Homes are heated primarily with fuel oil and propane (73% of households). Firewood and, to a lesser extent, wood pellets are used in 23% of homes.

Types of heating fuels used vary among communities in the region. Towns with more densely developed population centers have a higher proportion of households heated with oil and propane. More rural communities, on the other hand, have a significant number of homes that use wood as a primary heating fuel. Differences in household ownership also appear to be related to fuel use and energy efficiency of housing stock. In general, owner-occupied housing units are more likely than renter-occupied units to be heated with oil or wood, while a relatively large number of rented units are heated using propane or electricity. Moreover, many rental housing units are located in buildings with relatively poor energy performance, often large older houses that have been divided into multifamily units. The table below provides a detailed breakdown of heating fuel use patterns in owner-occupied and rental housing units.

#### Heating fuels used by Lamoille County Households: Focus on Owner-Occupied and Renter Households

Heating Fuel Type	Owner Households	Renter Households
Fuel Oil & Kerosene	47%	44%
Liquid Propane Gas	23%	34%
Wood	27%	10%
Electricity	1%	10%
Other (passive solar, heat pumps, coal etc.)	2%	2%

Source: American Community Survey

The age of the housing stock in a community is particularly important in determining how much fuel a typical home uses. Many housing units in Lamoille County are more than 50 years old, and often poorly insulated and not well air-sealed. Weatherization of older housing structures has proven to be very effective in reducing heating fuels consumption as well as home energy bills as, on average, weatherization reduces heating fuel consumption by 20-30 percent.

#### **Commercial and Industrial Heating**

Businesses and institutions in Lamoille County use about 30% of space heating energy consumed in the region. Overall, there are 1,087 commercial, industrial and institutional establishments in Lamoille County and similar to residences, these establishments heat spaces primarily with oil and propane (83% of establishments), and to a lesser degree, wood (16% establishments). Use of wood heat is most evident in schools. Currently, two schools in Lamoille County have wood chip heat (Johnson Elementary and Lamoille Union Middle and High Schools) and another two are heated with wood pellets (Peoples Academy and Stowe High School). As with the case of residential structures, the size, location, and nature of the use will determine the most effective strategies for reducing energy demand and determining an appropriate alternative heating fuel.

#### *Modern Wood Heating Systems and Heat Pumps*

In Lamoille County, woody biomass is abundant and represents an opportunity to generate renewable energy from the region's natural resource base, while supporting the local forest economy. The installation of modern, wood-fired heating systems provide an efficient, viable way of delivering heat to Lamoille County homes and businesses. Future efforts to produce biomass for widespread consumption within the county must be coordinated with local forest management plans to ensure the continued sustainable harvest of the region's forests.

Beyond biomass, both air source heat pumps and geothermal ground source heat pumps are promising sources of renewable thermal heating. Air source heat pumps use electricity to transfer thermal energy from the outside air into a home. Air source heat pumps have the potential to meet most of a home's thermal demands but in extreme weather may require, supplemental sources of heat may be needed. Ground source heat pumps take thermal heating energy from the ground. Ground source heat pumps are extremely efficient systems for heating a building and will operate in all the extremes of Vermont's weather.

### Energy Use by Sector: Transportation

As a predominantly rural county at the edge of the Burlington and Montpelier job centers, residents of Lamoille County depend on the automobile for everyday transportation needs. Lamoille County residents commute an average of 26 minutes to work in each direction. Eighty-seven percent of Lamoille County residents commute to work by automobile, with nearly 77 percent of commuters driving alone. For residents of smaller towns and remote areas of the county, trips to County shopping centers or schools can also be in excess of one hour, roundtrip. Annually, the County’s personal vehicles travel an estimated total of 281 million miles per year. (Note: This number supersedes the annual vehicle miles travelled number in the Transportation Plan)

Table 2: Light Duty Vehicle Energy Usage in Lamoille County

<b>18,718 vehicles in Lamoille region</b>
15,000 miles on average traveled annually per vehicle
<b>281 million miles traveled in Lamoille region per year</b>
684 gallons of gasoline used annually per vehicle
<b>12.8 million gallons of gas consumed annually in Lamoille County</b>

Source: American Community Survey, VTrans

The use of electricity as a transportation fuel is increasing in Vermont, however, the hybrid and electric vehicle market in Lamoille County is still nascent at best. As of January 2017, approximately 100 plug in hybrid and electric vehicles were registered in the region which is about 0.5% of all registered vehicles. The number of electric vehicle charging stations is on the rise. In Lamoille County, there are now ten public charging stations in Stowe, two stations in Johnson, and one station each in Hyde Park, and Morrisville.

### Energy Use by Sector: Electricity

Historically, electricity used by Vermont residents and businesses has been produced by large generators, predominantly located beyond Vermont borders. Hydro Quebec and the Seabrook nuclear facility in New Hampshire are a couple of examples. Electricity produced by these plants was then transmitted to Vermont customers via a robust network of transmission lines, distribution lines and transformers.

In recent years, Vermont has seen a rise of in-state energy generation and the state’s vision is for this trend to continue. Reliance on out-of-state energy generation will remain essential for meeting Vermont’s demand for electricity but the vision is that it will increasingly be supplemented by Vermont-based generation plants utilizing renewable sources.

Integrating the in-state production into the overall electrical system, will radically change the physical requirements of the electric grid as well as the ways electricity is being bought by Vermont’s retail utilities and sold to end customers. Adaptations related to the electric grid will include a need to incorporate into the grid multiple generating sources producing highly intermittent amounts of electricity (the sun does not shine and the wind does not blow 24/7). Grid changes will affect Vermont’s transmission system (operated by the Vermont Electric Power Company) and will filter down to the distribution system level (owned and operated by retail utilities), and require capital investments in power line upgrades, automated switching and substation equipment, and even entrance services and transformers serving

individual homes and businesses. Additionally, effective and larger scale storage of electricity from intermittent sources of renewable energy will also be critical to the reliability of the electric grid.

### **Electric Utilities Serving Lamoille County**

The amount of electricity used by households and businesses expanded rapidly for many decades but began to plateau in the early 2000s and in recent years has remained fairly consistent. In Lamoille County, nine electric utilities deliver electricity to home and businesses in the region. To meet their electric demand, in 2016, Efficiency Vermont reports that Lamoille homes consumed about 114 million Kilowatt hours of electricity and the businesses in the region consumed 91 million Kilowatt hours of electricity. In the future, the demand is anticipated to go up- largely due to projected increases in the use of electricity for residential heating and passenger vehicle transportation.

#### *Utilities serving Lamoille County that also have headquarters located in the County:*

- The Village of Hyde Park Electric Department (HPE) provides service to approximately 1,350 meters in Hyde Park Village, North Hyde Park Village, a section of northwest Johnson, and east of Davis Hill. In 2016, HPE energized its wholly owned 1 MW solar generating facility providing about 13% of HPE electricity requirements. Village of Morrisville Water & Light Department: With a service area covering most of Morristown and portions of Hyde Park, Stowe, Elmore and Wolcott, Morrisville Water & Light provides electricity to approximately 4,000 customers. Morrisville Water and Light operates three hydro-electric dams with the electrical capacity of 7 MW.
- Stowe Electric Department: Providing electricity to more than 90% of Stowe's residents and businesses, the Stowe Electric Department serves more than 3,900 customers. Stowe Electric Department owns and operates a solar farm with the electrical capacity of 1 MW.
- Village of Johnson Water & Light Department: With a service area slightly larger than the Village limits, including Johnson State College, Johnson Water & Light provides electricity to more than 900 electric customers.
- Vermont Electric Cooperative (VEC), a member-owned co-operative headquartered in Johnson, with 34,000 customers located across 71 towns in northern Vermont.

#### *Other utilities serving Lamoille County:*

- Hardwick Electric Department
- Village of Enosburg Falls Electric Department
- Green Mountain Power

### *Electric Efficiency*

In 2016, electric and thermal efficiency measures installed by Efficiency Vermont in Lamoille County resulted in energy cost savings of \$363,000 to homes and \$467,000 to businesses. During 2016, Efficiency Vermont worked on 494 residential projects and 439 commercial & industrial projects in Lamoille County. Efficiency Vermont defines a "project" as a collection of one or more energy efficient measures that have been implemented at a customer's physical location. Examples of energy efficiency measures include lighting or refrigeration efficiencies, weatherization, or switching to a more efficient hot water or space heat systems.

The energy transformation provisions of Act 56, passed by the Vermont Legislature in 2015, tasks electric utilities with implementing programs to help their customers transition from fossil fuels to more efficient sources of energy. As an example, in 2017, Vermont Electric Cooperative offers all customers who install a cold-climate heat pump a one-time \$150 bill credit in addition to the Efficiency Vermont incentive which reduces the cost of installation. VEC also offers a \$250 bill credit for the purchase of new or used electric vehicle or a plug in hybrid purchased in 2017. In 2018, municipal electric utilities represented by the Vermont Public Power Supply Association can choose to participate in VPPSA's electric vehicle pilot program. The customer incentive for purchasing an electric vehicle will be \$800 and the customer incentive for purchasing a plug-in hybrid electric vehicle will be \$400. Low-income customers will receive an additional \$200 towards the purchase.

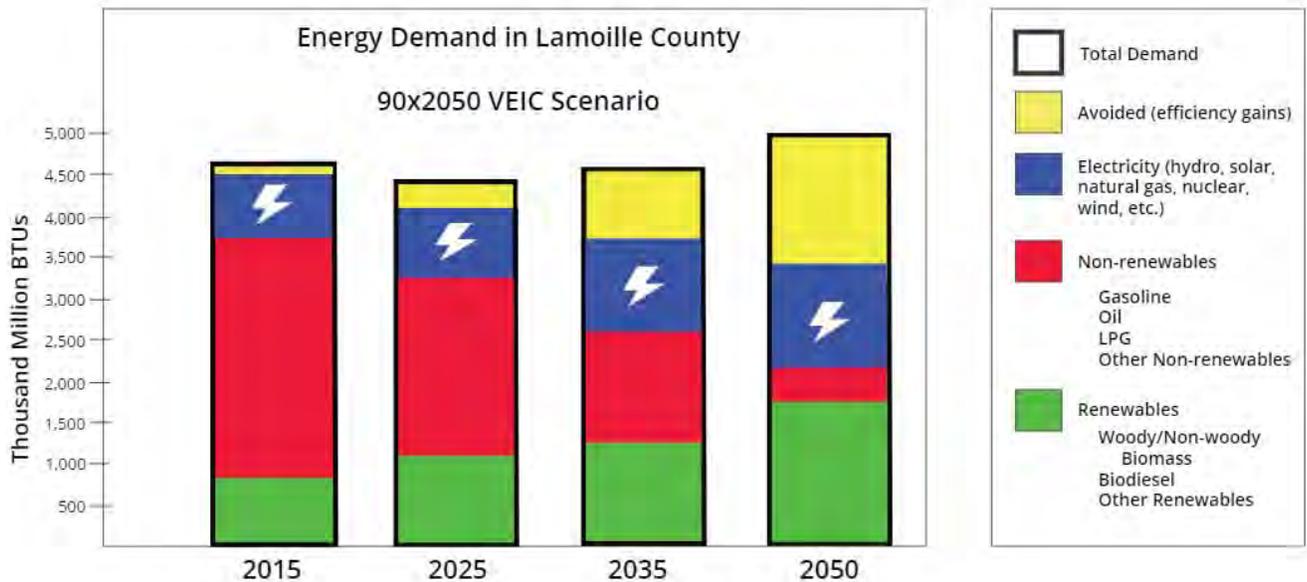
### **3. FUTURE ENERGY USE**

The State of Vermont has a bold goal to meet 90% of its energy needs through increased efficiency and renewable sources by 2050. To model pathways towards the goal, the State, in partnership with Vermont Energy Investment Corporation (VEIC), utilized the Long-Range Energy Alternatives Planning model (LEAP) developed by Stockholm Environment Institute that projects future energy demand in the state and its regions. The outcome, shown below, projects future energy demand for Lamoille County and represents one possible scenario by which the Lamoille County can contribute to achieving the state energy goals. The scenario relies on increased efficiency, conservation and electrification as ways for decreasing overall amount of energy used. Because of the LEAP model complexity, it is difficult to explain comprehensively. What follows is a simplified explanation of energy usage trends envisioned by LEAP. Appendix A presents a full model for the region as well as a more thorough explanation of the model assumptions and methodology.

The figure on the next page shows the transition in the amount of energy obtained from renewable and non-renewable fuel sources. Among the most notable trends are;

- The model results show that, despite a growing population and economy, energy use will decline by nearly 35 percent because of increased efficiency and conservation.
- Electricity use will increase with the intensified use of heat pumps as primary heating sources and the use of electric vehicles. Because those choices are powered by electricity, and electricity is three to four times more efficient compared to fossil fuels, overall energy use will decrease.
- Overtime, the model projects a near complete elimination of our two principal transportation fuels, gasoline and diesel, as well as oil, currently the major fuel used for space heating in many parts of the state.

The use of wood as a fuel is expected to increase dramatically due to its expanded use for space heating as wood pellets displace oil, propane and natural gas in small residential buildings and as efficient biomass district heating systems become more widespread.



**LEAP Projections:**

To demonstrate the magnitude of changes that would need to take place to align Lamoille County’s energy profile with the state energy goals, LEAP offers very specific targets to serve as a guidepost for Lamoille County’s transitions in energy use and energy generation. Policies and actions listed at the front of the energy plan show steps that can be completed by the LCPC to help attain the projected targets. Many other policies and implementation steps could help the region attain its energy goals but these strategies cannot be achieved by the LCPC and require the action of the state agencies, municipalities, public utilities and private individuals.

*Summary of LEAP Targets:*

**Target: Use of renewables**

Energy Sector/Year	2015	2025	2035	2050
Heating	25%	33%	43%	73%
Transportation	7%	20%	38%	86%
Electricity	27%	54%	74%	94%

**Target: Households heated with wood**

Households/Year	2015	2025	2035	2050
Number of households	2259	4193	4832	6757
Percentage of households	22%	41%	47%	66%

**Target: Households heated with electric heat pumps**

Households/Year	2015	2025	2035	2050
Number of households	51	296	775	1,545
Percentage of households	0%	3%	7%	14%

**Target: Commercial establishments heated with wood**

Households/Year	2015	2025	2035	2050
Number of establishments	74	106	144	217
Percentage of establishments	9%	12%	17%	25%

**Target: Households weatherized**

Households/Year	2015	2025	2035	2050
Number of households	543	2,429	5,771	12,901
Percentage of households	5%	21%	49%	100%

**Target: Commercial establishments weatherized**

Businesses and Institutions/Year	2015	2025	2035	2050
Percentage	7%	16%	31%	61%

**Target: Households equipped with efficient appliances**

Residences/Year	2015	2025	2035	2050
# of residences with efficient appliances		3,419	6,667	11,795
% of residences with efficient appliances		30%	57%	91%

**Target: Passenger electric vehicle use**

Vehicles/Year	2016	2025	2035	2050
Number of electric vehicles	100	1,368	4,575	11,801
Percentage of vehicles	0.5%	11%	39%	89%

**Target: Passenger biodiesel vehicle use**

Vehicles/Year	2015	2025	2035	2050
Number of biodiesel vehicles	38	192	346	667
Percentage of vehicles	0%	1.5%	2.9%	5%

**Target: Renewable electrical output from facilities located in Lamoille County**

Year	2016	2025	2035	2050
Total Electrical Output (megawatt hours)	30,100	82,000	140,000	198,000

### **Challenges to meet LEAP targets**

Lamoille County faces several challenges in achieving the LEAP targets. Despite the challenges involved, the LCPC believes that any and all progress toward the goals of this plan is important.

#### *Grid limitations*

Increased distributed generation will impact the function of the electrical grid. The Vermont electrical grid was developed to have a one-way flow of electricity. As with the rest of the United States, Vermont has historically depended on a small number of centralized power plants—the vast majority of which are now located outside of the state. With growth in distributed generation, the way in which electricity is generated has changed. In some parts of the region, the grid is not fully capable of allowing the placement of all scales of renewable energy generation facilities in every community. If the region and state are going to become more reliant on distributed solar generation, or even become a net exporter of renewable energy, Vermont public utilities and Vermont Electric Power Company (VELCO) will need to increase the pace of system-wide upgrades. This may be a difficult task to complete without directly impacting ratepayers and the cost of electricity in the state and the region.

#### *Rate of Progress in Weatherization and Electric Vehicle Adoption*

The state short-term weatherization goal for Lamoille County is to weatherize 3,200 homes by 2020. The actual rate of weatherization appears to be much slower. Based on the records provided by Efficiency Vermont and Capstone Community Action, between 2008 and 2016 these two organizations completed 362 projects which is only about 11% of the 2020 goal. Additional weatherization have likely been completed by property owners themselves. This suggests that while weatherization efforts in Lamoille County are underway, at the current rate of progress, the attainment of weatherization goals set by the State is likely out of reach. LCPC is also concerned about the ambitious target identified as 89% electric vehicles by 2050 provided that today only half a percent of passenger vehicles in the County are estimated as electric.

#### *Up-front cost of energy efficiency improvements and fuel switching*

Despite the demonstrated long- term savings benefits, the capital needed to significantly reduce energy consumption and switch to renewable fuels can be a significant barrier to implementation. This holds true both for thermal efficiency improvements and replacement of petroleum based vehicles by electric ones.

#### *Reliance on cord wood and biomass*

The LEAP model depends very heavily on cord wood use as a single-family home heating source (and for commercial and industrial heating too). Although wood is a renewable resource that is currently available in the region, its use in the region should be monitored as this plan evolves to ensure that it continues to be harvested in a sustainable manner. As noted in the Working Lands Section of this Plan, due to past “high grading,” much of the timber in Lamoille County’s forests is not of high enough quality for lumber. Removing lower quality timber for cordwood, wood chips, and wood pellets in order to provide growing room for healthier trees can be part of a sustainable forestry management plan, and is necessary in some cases to restore overall health. The continued reliance on cord wood for heating and its impacts on greenhouse gas emissions and air quality in the region should be monitored.

### *Lack of outreach and enforcement of Residential and Commercial Building Energy Standards*

Although Efficiency Vermont has provided some outreach to local contractors and the general public regarding the requirements of RBES and CBES, there is still a lack of knowledge about the programs. The state also lacks the ability to enforce the codes and the system Vermont uses to track adherence to the standards is a challenge. Currently, energy efficiency is self-certified by the building contractor, with a requirement that a completed certificate be submitted to the municipality where the building is being constructed. However, many communities are unaware of this requirement and have no way to track the submission of certificates. Towns with local code officials may enforce energy efficiency codes and towns with Certificate of Occupancy (COO) requirements must receive an Energy Code certificate before issuing the COO. Nearly a half of Lamoille County communities (7) have zoning bylaws, but only one requires a COO.

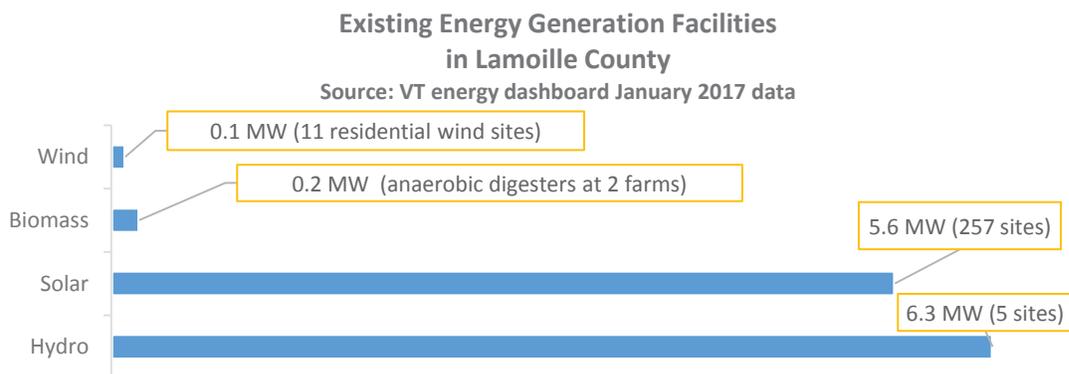
## 4. CURRENT AND FUTURE RENEWABLE ENERGY GENERATION IN LAMOILLE COUNTY

### Current Renewable Energy Generation in Lamoille County

Most of today's renewable energy production in Lamoille County comes from hydro and solar facilities. At the close of 2016, Lamoille County was a home to approximately 275 energy generation sites. Together, these sites have a combined energy production capacity of 12.2 megawatts (MW) and an estimated electric output of 30,000 megawatt hours (MWh). Community Energy Dashboard at [www.vtenergydashboard.org](http://www.vtenergydashboard.org) maps and regularly updates the list of energy generators of all sizes in the region and all its towns. Energy maps in this plan show generators with capacity larger than 15 KW.

### Existing Hydro Generation: 5 sites

Hydroelectric energy generation is one of the lowest-cost, steady power producers available to Lamoille County. There are currently five hydroelectric facilities in operation in the region, which account for 6.3 MW of existing capacity. Morrisville Water & Light owns three facilities, located in Hyde Park and Morrisville, with a combined generation capacity of 5.2 MW. Hardwick Electric Department owns a hydro plant located in Wolcott with 1 MW capacity. Stowe hosts a smaller privately owned hydro facility with capacity of 0.1 MW. Many of these hydroelectric facilities are currently engaged in the Federal Energy Regulatory Commission relicensing process. The hydroelectric generation capacity may be reduced as a result of this relicensing process. If this occurs, additional sources of renewable energy generation will need to be identified.



### **Existing Solar Generation: 257 sites**

As of January 2017, Lamoille County has approximately 5.6 MW of installed solar photovoltaic generation capacity. The largest solar arrays currently operating are two 1 MW solar projects independently owned by the Village of Hyde Park Electric Department and the Stowe Electric Department.

### **Existing Biomass Generation: 2 sites**

Electricity can also be generated from other renewable resources, including woody biomass (especially as a combined heat and power project), and bio-digesters that use organic waste to produce methane that can be burned to generate power. Vermont Energy Dashboard shows that there are two bio-digesters in Lamoille County located at Joneslan Farm in Hyde Park and Keewaydin Farm in Stowe, however, conversations with the Vermont Department of Agriculture revealed that the digesters are no longer operational.

### **Existing Wind Generation: 11 sites**

The power of wind to generate electricity has to date been harnessed by eleven Lamoille County residences. Residential-scale wind turbines installed at these homes have the combined generation capacity of 69 KW. There is currently no commercial or utility scale generation facility in the region, although the town of Lowell just north of Lamoille County hosts one of the largest wind installations in the State with 21 turbines and the generation capacity of 63 MW.

### **Future Renewable Energy Generation in Lamoille County**

In order to adequately contribute to the goal of 90% renewable by 2050, the LEAP model forecasts that Lamoille County will need to add new renewable facilities capable of producing 168,000 MWh of renewably generated electricity, the amount approximately five and half times greater than the current production.

To illustrate the impact of the added production on land use, Lamoille County Planning Commission estimated that if the region's energy production target was to be met solely by ground-mounted solar installations, the region would need to set aside about 1,035 acres toward this pursuit.

Energy Planning Standards developed by the Department of Public Service require that regional planning commissions divide the projected regional production among municipalities. Table 3 below provides this information for both the region and its municipalities. In computing the projected production, LCPC took into consideration municipal population shares and the amount of electricity already produced in the municipalities. (Note: Using today's solar panel installation technology, the LCPC estimated about 8 acres of land per 1 MW of solar generation).

There are individual sites in Lamoille County that have the potential to meet generation targets of more than one municipality. As an example, the former asbestos mine in Eden discussed below could accommodate solar arrays capable of generating enough electricity to meet combined generation goals for Eden, Belvidere and Waterville.

Table 3. Projected renewable energy generation in Lamoille County municipalities

Town	2050 output projections (MWh)	Existing output 31/1/2017 (MWh)	New Output Needed (MWh)	New capacity needed for ground mounted solar deployment (MW)	Land needed (acres)
Belvidere	1,982	31	1,951	1.5	12
Cambridge	29,737	1,488	28,250	21.7	174
Eden	11,895	170	11,724	9	72
Elmore	9,912	190	9,722	7.5	60
Hyde Park	23,790	8,684	15,106	11.6	93
Johnson	27,755	717	27,037	20.8	166
Morristown	41,632	12,406	29,226	22.5	180
Stowe	35,685	2,657	33,027	25.4	203
Waterville	5,947	131	5,816	4.5	36
Wolcott	11,895	3,610	8,285	6.4	51
County total	198,249	30,085	168,163	129.4	1035

Source: VT Department of Public Service, VT Energy Dashboard

*Can Lamoille County Meet the 90x50 Energy Generation Goal?*

Lamoille County has opportunities to generate energy from various sources including solar, wind, hydro, biomass or geothermal reserves. Two resources that appear to have the potential to most substantially contribute to meeting the 90x50 energy generation goal of 168,000 MWh are the sun and the wind. Hydro, biomass and even geothermal sources may be feasible for a production of modest amounts of electricity but would probably be insufficient to produce the output required to keep the region on track to meet the 90x50 energy generation goal.

Using the Department of Public Service methodology, which takes into account the presence of the renewable generation resource (sun or wind) and environmental constraints of the land, the LCPC calculated Lamoille County’s energy generation potential from lands potentially suitable for sun and wind generation.

\*7. Table 4 below presents these calculations for the region and its municipalities.

*Electric Grid Limitations*

The resource potential and environmental attributes of the land are not the only factors in the consideration of whether a site is viable for the deployment of a particular technology. The capacity of the electric grid to transmit the newly generated electricity is also key and currently poses a serious challenge for meeting the 90x50 energy generation goal for Lamoille County, particularly within the grid in the northern tier of the state known as Sheffield Highgate Export Interface (SHEI). In Lamoille County, SHEI encompasses towns of Belvidere, Eden, Johnson, Cambridge and parts of Hyde Park, Morristown and Stowe.

\*7 [http://publicservice.vermont.gov/sites/dps/files/documents/Pubs\\_Plans\\_Reports/Act\\_174/Regional%20Guidance\\_Final.pdf](http://publicservice.vermont.gov/sites/dps/files/documents/Pubs_Plans_Reports/Act_174/Regional%20Guidance_Final.pdf)

Currently, existing renewable energy generation plants within SHEI, such as Lowell Wind and Sheffield Wind, produce more electricity that can be consumed within the SHEI region. Given the lack of usage within SHEI, a solution would be to export the electricity to areas with greater electric demand. However, current physical limitations of the grid do not allow for adequate export of power, and exporting the power becomes an issue to the point that existing wind turbines are being forced to curtail energy production in order not to overload the grid. According to electric utilities, any additional energy generation facilities will further overwhelm the distribution grid, cause further curtailing of the existing generation and drive up costs. In Section 248 proceedings conducted by Public Utility Commission, both Vermont Electric Cooperative and Green Mountain Power have been opposing adding larger than rooftop scale arrays due to physical constraints of the electric transmission system.

Table 4. Renewable Energy Potential in Lamoille County

Town	Ground mounted solar: Potential capacity (MW)	Ground mounted solar: Potential output (MWh)	Wind: Potential capacity (MW)	Wind: Potential output (MWh)	Total: Potential Capacity (MW)	Total: Potential Output (MWh)
Belvidere	410	503,284	2,017	6,183,356	2,427	6,686,639
Cambridge	765	938,043	1194	3,661,571	1959	4,599,613
Eden	1,490	1,827,336	1291	3,958,206	2,781	5,785,542
Elmore	546	669,461	369	1,130,588	915	1,800,049
Hyde Park	1,232	1,510,312	73	224,585	1305	1,734,896
Johnson	880	1,079,692	590	1,808,940	1,470	2,888,632
Morristown	1,040	1,275,916	101	310,433	1,142	1,586,348
Stowe	1,091	1,337,543	610	1,870,260	1,701	3,207,803
Waterville	313	383,710	428	1,311,482	741	1,695,191
Wolcott	962	1,179,184	64	196,991	1,026	1,376,174
County total	8,728	10,704,173	6,737	20,656,409	15,796	31,376,581

### **Solar Generation Potential**

Due to the nature of our topography and land cover, solar is a viable source of renewable energy generation in Lamoille County. The initial mapping analysis, graphically displayed on the Solar Resource Map, identified lands in Lamoille County that are potentially suitable for solar power generation. These potentially suitable lands comprise 69,825 acres of land. Of this number, 9,342 acres (13%) are lands with prime solar potential and 60,483 acres (87%) are lands with secondary solar potential.

The suitability potential was determined on the basis of two factors: presence of sufficient sunlight and environmental characteristics of the land. As a result, the Solar Resource Map shows “prime” solar areas defined as lands with sufficient resource (sun) and no environmental constraints, and “secondary” solar areas, defined as areas with sufficient sun and environmental characteristics that may pose an obstacle to the development of renewable energy facilities. Areas with insufficient solar radiation or areas that have environmental constraints that will make these areas likely unsuitable for the development of renewable

energy generation facilities have been removed from the map and are not shown in any way. (Note: Environmental constraint categories associated with “secondary” and “likely unsuitable” lands are listed in Section 5 of the energy plan under headings *Areas Potentially Suitable for Renewable Energy Development* and *Areas Likely Unsuitable for Renewable Energy Development*).

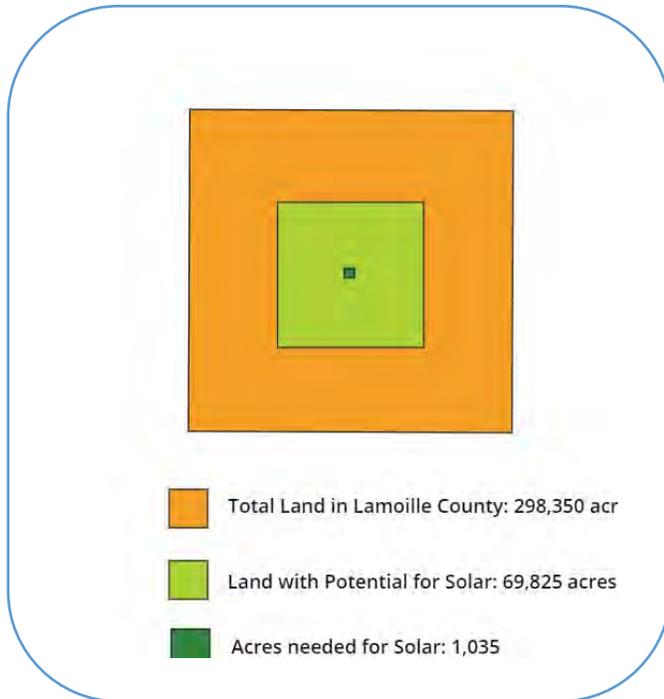
The solar potential diagram shows that if the region’s target for renewable energy output was to be met solely by ground-mounted solar installations, the region would need to set aside about 1,035 acres (0.4% of total land area) toward this pursuit. This plan supports solar generation facilities of all sizes.

What about Rooftop Solar?

Roof-top solar (or solar facilities on existing structures) can supplement ground-mounted (or land based) solar installations but in order to generate enough power to meet the 90x50 goal for electric generation, roof mounted solar cannot fully replace the ground mounted installations. Lamoille County Planning Commission estimated that the region has the potential to generate around 16,000 MWh of electricity from rooftop solar arrays- nearly 10% of the region’s 2050 renewable energy output target.

Solar at former Asbestos Mine in Eden?

In 2011, the Environmental Protection Agency, in collaboration with the U.S. Department of Energy commissioned a solar generation feasibility study for the closed asbestos mine site straddling the town line between Eden and Lowell. The study, completed in 2013, determined that up to 150 acres could be configured to accommodate solar photovoltaic arrays. The former mine site has several locations in Eden and Lowell with potential for installing large solar arrays, including a 2.2 megawatt (MW) array on the waste-rock area, a 4.6 MW array in the entry and building areas, and/or a 11.6 MW array on south facing slopes of the Eden and Lowell piles. This plan designates the former asbestos mine as a preferred location for a solar generation facility.



Rooftop Solar Potential Estimate

**RESIDENTIAL STRUCTURES**

Structures: 2785 (25% of existing)  
 Average Array Size: 4 Kw  
 Estimated Output: 1,448 MWh

**SMALL COMMERCIAL (<40,000 sq. ft.)**

Structures: 298 (25% of existing)  
 Average Array Size: 20 Kw  
 Estimated Output: 7,774 MWh

**LARGE COMMERCIAL (>40,000 sq. ft.)**

Structures: 25 (50% of existing)  
 Average Array Size: 200 Kw  
 Estimated Output: 6,500 MWh

Total Estimated Output from Rooftop Installations = 16,000 MWh of electricity

## **Wind Generation Potential**

Lamoille County, due to its geography, has areas with wind speeds sufficiently strong to enable wind energy generation. The Wind Resource Map shows areas with potential to accommodate commercial and utility-scale wind generation facilities. In total, the potentially suitable wind areas comprise 26,949 acres of land of which 271 acres (1%) are lands with prime wind potential and 26,678 acres (99%) are lands with secondary wind potential.

The suitability potential was determined on the basis of two broad factors: presence of sufficient wind speed, digitally modeled at 50 and 70 meter hub height, and environmental characteristics of the land. As a result, the Wind Resource Map, shows “prime” wind areas defined as lands with sufficient wind speed and no environmental constraints, and “secondary” wind areas, defined as areas with sufficient wind speed and certain environmental characteristics that may pose an obstacle to the development of renewable energy facilities. Areas with insufficient wind speeds or environmental constraints that will likely make these areas unsuitable for the development of renewable energy generation facilities are not shown on the map. (Note: Environmental constraint categories associated with “secondary” and “likely unsuitable” lands are listed in Section 5 of the energy plan under headings *Areas Potentially Suitable for Renewable Energy Development* and *Areas Likely Unsuitable for Renewable Energy Development*).

The Regional Plan supports the development of residential as well as commercial wind generation facilities provided environmental impacts are mitigated and site-specific concerns are addressed. Utility scale wind generation is deemed an intensive land use incompatible with land use policies of the Regional Plan and is therefore not supported. This plan defines utility scale wind generation facilities as facilities with total generation capacity of 1 MW or more.

### *Is Utility-Scale Wind Generation Appropriate for Lamoille County?*

Lamoille County Regional Plan is guided by three overall objectives which include protection of the region’s natural systems and valuable agricultural and silvicultural resources, and protection of working landscapes. (p. 134). Areas shown on the wind resource maps as having utility-scale wind

generation potential are located in the Working Lands – Forest Area. Numerous diverse land uses in this area, such as active forest management, conservation, wildlife management or aesthetic preservation, rely on large, unfragmented blocks of forest land therefore, maintaining unfragmented forest blocks is an important objective of this area. The Regional Plan calls to reduce the rate of fragmentation of agricultural and forest lands and to maintain and improve wildlife connectivity (p. 140). New development should minimize forest fragmentation or disruption of productive use for timber management. Wind turbines by their very nature are difficult to cluster because of the spatial needs of turbine blades and must extend above the tree line,

### Wind Generation by Facility Size

#### *Residential:*

A wind turbine serving a single residence with maximum generation capacity of up to 10 KW.

#### *Commercial:*

A wind turbine system serving a business, located on business premises and having a maximum generation capacity of up to 1 MW.

#### *Utility-scale:*

A wind turbine system with total generation capacity of 1 megawatt or more. For reference, Lowell Wind is a large utility-scale project. It has 21 towers with 3 MW generation capacity each. Each tower is 83 meters (273 feet) tall. From the ground to the blade tip is 135 meters (443 feet).

which puts their placement in this area in conflict with the objective of maintaining unfragmented forests. New roads should be very limited in forest areas and should be constructed with consideration of impacts on productive forest stands, wildlife connectivity, erosion and runoff, and aesthetic resources (p. 137). Land Use development should reflect site specific environmental limitations, the density and intensity of development should conform to the limitations of the land and available public services. Higher densities and more intensive uses should be located in Center and Enterprise Areas, while lower densities and less intensive uses should be located in Rural and Working Lands Areas. Land development should take into account the capability of the land as it relates to topography and soil limitations, areas of steep slopes, and poorly drained or unstable soils. In areas where fragile characteristics have been identified, development should be discouraged unless it is shown that these assets will not be unduly altered or harmed. (p. 142).

The Regional Plan also discourages major development along Lamoille County's regionally prominent ridgelines (p. 183) all of which are located in the Forest Area and include Worcester Range and Mt. Elmore, Woodbury Range, Mt. Mansfield and Sterling Ranges, Butternut Mountain and Belvidere Mountain. In addition to their environmental values, the ridgelines provide the visual backdrop for which the County is known. They are cherished for their aesthetic beauty and the regional economy thrives on recreation dollars derived, in large part, from the scenic beauty of the region. There is a strong perception in Lamoille County municipalities that wind turbines placed on the ridgelines will negatively impact the aesthetics and the economy of the region.

During the development of the energy plan, towns of Belvidere, Eden and Waterville identified the following specific ridgelines and peaks as unsuitable for utility scale wind development: Laraway Mountain, Cold Hollow Mountain Range, Mount Norris, Bean Mountain, Bowen Mountain and Hadley Mountain.

Sound level impacts of proposed wind generation facilities are evaluated by the Public Utility Commission on the basis of state standards which impose daytime and nighttime decibel limits on wind turbines. Currently, these standards limit turbines' sound to 39 decibels at night and 42 during the day. This Plan accommodates health concerns over sound impacts of large wind turbines by replicating a policy approach adopted by the Bennington Regional Planning Commission and incorporating into the Wind Resource Map a 1-km buffer from residential structures.

To compensate for the challenge of utility wind siting, the LCPC acknowledges that greater amounts of other forms of renewable energy sources most likely solar and biomass will be needed to meet state energy goals.

If a municipality through its local planning process identifies a preferred location for a utility-scale wind facility within their boundaries, LCPC may consider amending its plan to account for this local preference. Coordination and consensus will be a critical component of any process to amend the regional plan in this regard. Additionally, LCPC shall only consider such an amendment if the location, or locations, identified by the municipality are not in the areas categorized by this regional plan as "likely unsuitable" and mitigate impact to environmental constraints in areas identified as "potentially suitable".

### **Hydro Generation Potential**

Vermont has an abundance of the two principal components for generating local hydroelectric power - hills and water. In spite of these natural attributes and an existing potential to develop power at over 300 existing

dams, only a handful of hydroelectric sites have been restored or constructed in Vermont since 1987. Because of the potential impact on aquatic resources, hydroelectric power is the only renewable energy source required to gain approval from numerous state and federal agencies which makes the permitting process very complex and costly. \*8 In Lamoille County, the Town of Waterville commissioned a study to determine the feasibility of a micro-hydro facility on Kelley River in 2008. To this day, the Town has not been able to secure all permits needed to construct the facility.

At this writing, hydroelectric generation represents about one half of renewable energy generation in Lamoille County. This plan recommends to preserve the viability of existing hydroelectric generation as loss of this dispatchable renewable energy source will need to be replaced by solar, which increases the grid challenge significantly. This plan also supports redevelopment and development of small, environmentally sound hydroelectric sites as well as to harness hydroelectric energy.

The Hydroelectric Resources map shows hydroelectric potential based on a 2007 study conducted by Community Hydro. The map fifteen dams in Lamoille County that could be converted into hydroelectric facilities. Two dams appear to have the generation potential of more than 50 kW each while the remaining dams have estimated generation potential of less than 50 kW each. The map also shows current sources of hydro generation.

#### **Woody and Non-Woody Biomass Generation Potential**

Electricity can also be generated from other renewable resources, including organic waste (such as manure, brewery waste or food scraps) or woody biomass.

Organic waste is processed in bio-digesters. The digesters produce methane gas that fuels an engine to produce electricity. The LCPC is interested to study the potential for methane production, including the possibility of utilizing waste from several operations, (farm and non-farm) at one bio-digester. Such digester could generate electricity by processing food scraps gathered by the solid waste district, manure from local farms or brewery waste from local breweries to generate electricity.

Another possibility is to generate electricity by burning wood at combined heat and power facilities. Given the amount and quality of timber in the County, wood-fired combined heat and power (CHP) systems are of particular interest to our region. These systems produce electricity both for on-site consumption and sale back to the grid, while piping excess heat to help meet the thermal needs of the facility. At the community-scale, centralized CHP systems can supply heat to households and businesses within a limited radius, in what is commonly known as “district heating” system.

To provide an attractive return on investment to any prospective developer, CHPs must be sited in proximity to a facility or group of buildings capable of utilizing a large, year-round heat supply. Ideal sites include hospitals, hotels, apartment complexes, and industrial sites. With funding from the Vermont Clean Energy Development fund, LCPC has produced maps that identify potentially viable CHP sites which include Copley Hospital in Morrisville, Johnson State College, Fisher Bridge Industrial Park, North Hyde Park industrial park

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\*8 The Undeveloped Hydroelectric Potential of Vermont, <http://www.communityhydro.biz/>  
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and the industrial park under consideration in Johnson at the Jewett property. Additionally, Smugglers' Notch Resort has assessed their property as a feasible CHP site.

## **5. SITING OF RENEWABLE ENERGY GENERATION FACILITIES**

The development of new renewable energy generation facilities in Lamoille County is a key component of Vermont's energy future. However, in order to protect our environment and critical resources while encouraging renewable energy development, Lamoille County Planning Commission developed an inventory of areas preferred and potentially suitable for renewable energy generation.

The inventory is supported by energy maps. The maps, and the corresponding data, can be used to inform energy planning efforts by the region and its municipalities. They may also be used for conceptual planning or initial site identification by those interested in developing renewable energy infrastructure. They should not, however, take the place of site-specific investigation for a proposed facility, and should therefore not be thought of as "siting maps." The step-by-step analysis used to develop these maps may be conducted specifically for any site where renewable energy development has been proposed, and in that sense, these maps provide a model for the process that should be undertaken when evaluating the siting of a renewable energy development.

### **Areas Preferred for Renewable Energy Development**

Areas preferred for renewable energy development are the areas identified as "preferred" in Act 174 unless these areas are identified as unsuitable by municipal plan of the municipality in which the development is proposed. State-defined preferred areas include:

- Parking lots
- Brownfield Sites
- Landfills
- Rooftop installations
- Gravel pits
- Specific locations designated in a duly adopted municipal plan or identified by a municipal legislative body.

At this writing, several municipalities identified specific locations preferred for energy generation. These locations are shown on the Regional Considerations Map.

- Wolcott's Town Plan proposes the following specific preferred locations: Former landfill (for ground mounted solar); Fisher Bridge Industrial Park (for combined heat and power generation facility); Wolcott Elementary School and municipal offices (for rooftop solar).
- Hyde Park's Town Plan identifies the following specific preferred locations: Existing gravel pits (for ground mounted solar); North Hyde Park Industrial Park (for a combined heat and power generation facility); Hyde Park Elementary School, Lamoille Union Middle and High School and municipal buildings (for rooftop solar); Transfer Station (for ground mounted solar).
- Eden's Town Plan identifies the former asbestos mine as a desirable location (for ground mounted solar).

- Jeffersonville Village Trustees identified the Wastewater Treatment Facility as a preferred location for solar.

### **Areas Potentially Suitable for Renewable Energy Development**

The Solar and Wind Resource Map show areas with energy generation potential as based on presence of the resource (sun or wind) and environmental attributes of the resource areas. Areas identified on the maps as “secondary” have environmental constraints that may pose a barrier to the development of renewable generation. “Prime” areas are lands with no environmental constraints.

State-defined areas with secondary solar and wind potential possess one or several of the following environmental constraints:

- Federal Emergency Management Agency Special Flood Hazard Areas
- Prime Agricultural Soils\*
- Act 250 Agricultural Soil Mitigation areas
- Protected Lands (State Fee Lands and Private Conservation Lands)
- Deer Wintering
- Hydric Soils
- Vermont Conservation Design Highest Priority Forest Blocks

\*Due to the significant overlap between areas with solar energy generation potential and prime agricultural soils, and the need to compensate for the challenge of utility wind siting with greater amounts of other forms of renewable energy, it is anticipated that some solar development will occur on prime agricultural soils. Such development should be in keeping with the Agricultural Soils Mitigation Policies for each Planning Area outlined in the Future Land Use Section of this Plan. Consistent with the policies for other forms of commercial and industrial development, prime agricultural soils are not considered a constraint within Center and Enterprise Areas. In other areas, solar energy development may occur on prime agricultural soils when measures are taken to retain the long term agricultural viability. Such measures may include, but are not limited to, mounting panels on driven posts without concrete or floating ballasts rather concrete or paved pads to avoid long-term impact to soils; designing the facility to allow certain agricultural practices to occur within and underneath the solar arrays (such as animal grazing, bee yards, or growing crops); placing solar facilities on fields with limited viability for commercial agriculture due to size, topography, access, and similar limitations; incorporating soil building cover crops, pollinator plantings, or other grassland habitat conservation features into the areas between panels; and/or other mitigation measures appropriate for the specific site.

### **Areas Likely Unsuitable for Renewable Energy Development**

Areas likely unsuitable for renewable energy development include areas with insufficient resource potential (sun or wind) and areas with environmental constraints that signal likely, though not absolute unsuitability for development based on statewide regulations. The solar and wind resource maps, refer to these areas as “solar likely unsuitable” or “wind likely unsuitable”.

State defined environmental constraints that make particular areas likely unsuitable for energy generation include:

- Federal Emergency Management Agency identified floodways
- River Corridor Areas as identified by the Vermont Department of Environmental Conservation
- Class 1 and 2 Wetlands as noted in Vermont State Wetlands Inventory or advisory layers
- Vernal Pools (confirmed and unconfirmed)
- State-significant Natural Communities and Rare, Threatened, and Endangered Species
- Wilderness Areas, including National Wilderness Areas

### **Regional Environmental Constraints**

In addition to the state defined environmental constraints listed above, this plan identifies several regional constraints. The regional constraints are: Additional High Priority Forest Blocks, and Zone 1, 2 and 3 public water drinking sources Source Protection Areas.

Zone 1 Source Protection Areas, defined as a 200-foot radius around the public water source, represent an environmental constraint that signals likely, though not absolute unsuitability for renewable energy development. As such these areas shall be treated as areas likely unsuitable for renewable energy development.

Additional High Priority Forest Blocks and Zones 2 and 3 Source protection areas represent environmental constraints that may pose a barrier to the development of renewable generation. As such, these areas shall be treated as areas potentially suitable areas for renewable energy development.

The regional constraints are shown on the Regional Considerations Map. The regional constraints were not incorporated into the acreage estimates for prime and secondary solar and wind potential.

# Lamoille County Renewable Energy Potential: Hydroelectric

This map illustrates potential for energy development but not necessarily suitability

<b>Hydroelectric Facilities</b>	<b>Energy Infrastructure</b>
Operational Facilities	Substations
<b>Potential sites</b>	3 Phase Power Lines
< 50kW Capacity	Transmission Lines
> 50kW Capacity	3 Phase power line data for areas served by Morrisville Water and Light was not available.

**Hydroelectric Likely Unsuitable**  
Areas with low hydroelectric potential or environmental constraints have been removed and are not shown in any way on this map.

Streams	State Highway
Waterbodies	Class 2 Road
Town Boundary	Class 3 Road
	Class 4 Road
	Private Road
	Legal Trail

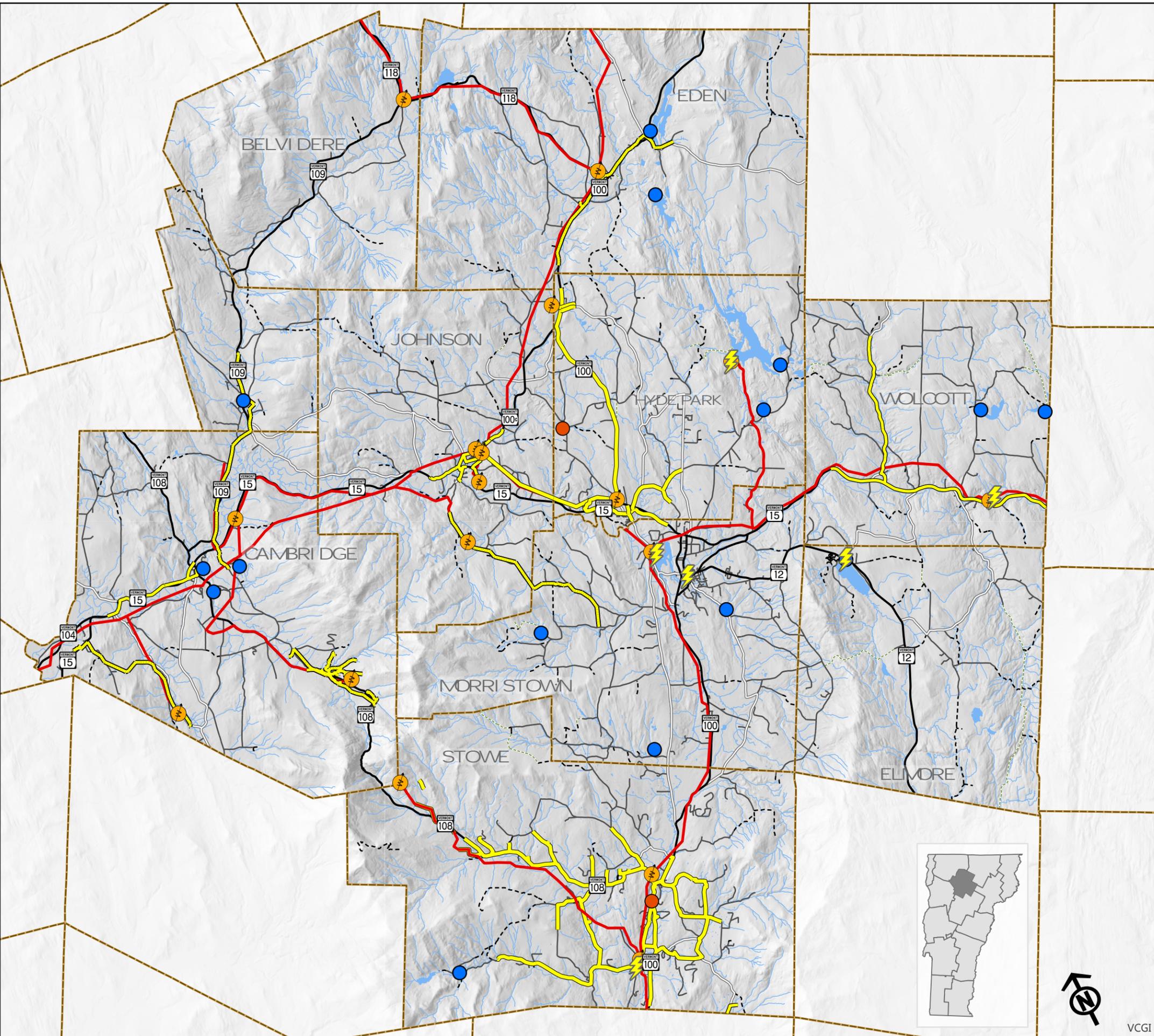
**Methodology**  
This map shows areas of resource potential for renewable energy generation from hydroelectric, i.e. dams that could be converted into hydroelectric facilities as well as active hydroelectric sites. Existing hydroelectric dam information was extracted from the Vermont Dam Inventory, while potential hydroelectric sites were derived from a study conducted by Community Hydro 2007. Based on estimates conducted within the report, this map categorizes dams based on their potential hydroelectric generation capacity, and the downstream hazard risk that would be involved in hydroelectric production at each site.

**Data Sources:**  
 POTENTIAL HYDROELECTRIC SITES: VCGI, 2017  
 SUBSTATIONS: VCGI, 2017  
 3 PHASE POWER LINES: Data from town utilities and Green Mountain Power  
 POLITICAL BOUNDARIES: 1:24000 USGS Quadrangles, VCGI, 1991.  
 ROADS: 1:5000 VTrans Road Data, 2017.  
 SURFACE WATER: On-screen digitized from 1:5000 digital orthophotos using USGS 7 1/2 quadrangles and 1:20000 color infrared aerial photography as additional source material, VCGI for VHD-USGS, 2001.  
 Map created by LOPC, 2017

Data has not been field verified and is subject to change. Use for planning purposes only.

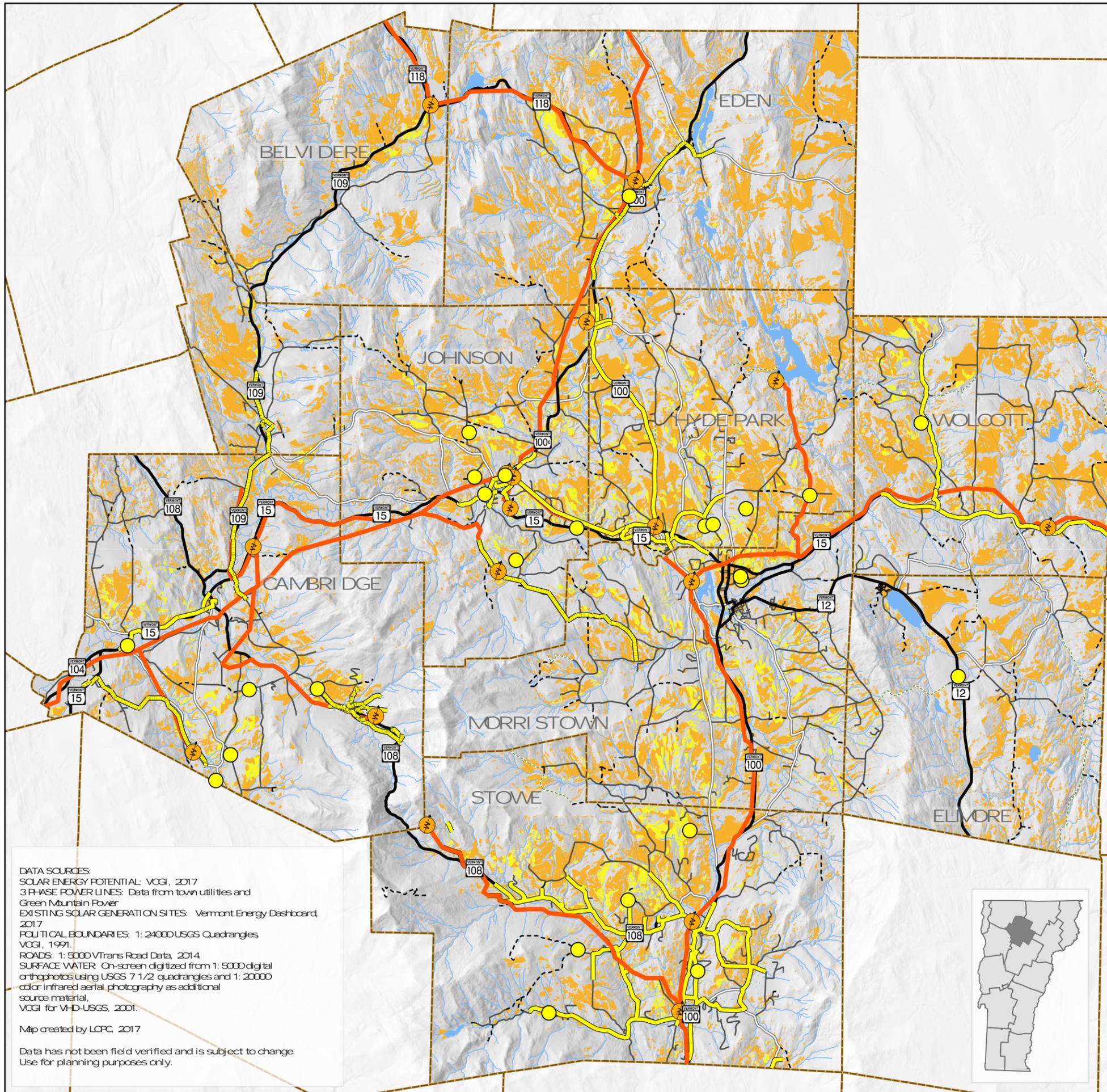


VCGI



# Lamoille County Renewable Energy Potential: Solar

This map illustrates potential for energy development but not necessarily suitability



<b>Solar Energy Potential</b>	<b>Energy Infrastructure</b>
Secondary Solar	Substations
Prime Solar	3 Phase Power Lines
<b>Existing Solar Energy Generation Sites</b>	Transmission Lines
Solar Energy Generation Sites	3 Phase power line data for areas served by Morrisville Water and Light was not available.
Solar generation sites with >15kw capacity are shown. Sites of all sizes are mapped at <a href="http://www.vtenergydashboard.org/">http://www.vtenergydashboard.org/</a>	

Streams	State Highway
Waterbodies	Class 2 Road
Town Boundary	Class 3 Road
	Class 4 Road
	Private Road
	Legal Trail

### Methodology

This map shows areas of resource potential for renewable energy generation from solar, i.e. locations where renewable energy generation would likely be most feasible according to the natural conditions of an area. This map also considers various other conditions, such as ecological zones, that may impact the feasibility of renewable energy development. These conditions are referred to as constraints.

### Prime Solar

Areas with high solar potential and no environmental constraints

### Secondary Solar

Areas with high solar potential and environmental constraints that may pose an obstacle to development. These areas are shown on the map and include the following constraints:

- Agricultural soils (local, prime and statewide classifications)
- FEMA special flood hazard areas
- Protected lands
- Act 250 agricultural soil mitigation areas
- Deer wintering yards
- Highest priority forest blocks
- Hydric soils

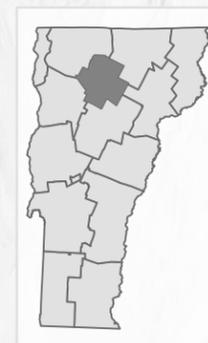
Areas where solar energy is likely unsuitable  
Areas with low solar potential or environmental constraints likely to prohibit development. These areas have been removed and are not shown in any way on this map. Environmental constraints are:

- FEMA floodways
- River corridors
- Federal wilderness areas
- Natural Communities and Rare, Threatened and Endangered Species
- Vernal pools
- Wetlands class 1 and 2

**DATA SOURCES:**  
 SOLAR ENERGY POTENTIAL: VCGI, 2017  
 3-PHASE POWER LINES: Data from town utilities and Green Mountain Power  
 EXISTING SOLAR GENERATION SITES: Vermont Energy Dashboard, 2017  
 POLITICAL BOUNDARIES: 1:24000 USGS Quadrangles, VCGI, 1991.  
 ROADS: 1:5000 VTrans Road Data, 2014  
 SURFACE WATER: On-screen digitized from 1:5000 digital orthophotos using USGS 7 1/2 quadrangles and 1:20000 color infrared aerial photography as additional source material, VCGI for VHD-USGS, 2001.

Map created by LCPC, 2017

Data has not been field verified and is subject to change. Use for planning purposes only.



# Lamoille County Renewable Energy Potential: WIND

This map illustrates potential for energy development but not necessarily suitability

**Wind Energy Potential**

Prime Wind
  Secondary Wind

Wind potential at 50 and 70 meter hub heights has been mapped  
Wind generation with smaller hub heights may be possible at lower elevations

**Energy Infrastructure**

Substations
  Transmission Lines

3 Phase Power Lines  
 3 Phase power line data for areas served by Morrisville Water and Light was not available.

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Elevation above 1500 feet
  State Highway

1 km Residential Buffer
  Class 2 Road

Streams
  Class 3 Road

Waterbodies
  Class 4 Road

Town Boundary
  Private Road

Legal Trail

## Methodology

This map shows areas of resource potential for renewable energy generation from wind, i.e. locations where renewable energy generation would likely be most feasible according to the natural conditions of an area. This map also considers various other conditions, such as ecological zones, that may impact the feasibility of renewable energy development. These conditions are referred to as constraints.

### Prime wind

Areas with high wind potential and no environmental constraints

### Secondary wind

Areas with high wind potential and environmental constraints that may pose an obstacle to development. These areas are shown on the map and include the following constraints:

- Agricultural soils (local, prime and statewide classifications),
- FEMA special flood hazard areas, Protected lands
- Act 250 agricultural soil mitigation areas, Hydric soils,
- Deer wintering yards, Highest priority forest blocks

### Areas where wind energy is likely unsuitable

Areas with low wind potential or environmental constraints likely to prohibit development. These areas have been removed and are not shown in any way on this map. Environmental constraints are:

- FEMA floodways, River Corridors, Federal Wilderness Areas,
- Natural Community Areas, Vernal Pools,
- Areas with Rare, Threatened and Endangered Species,
- and Class 1 and 2 Wetlands

### Regionally Significant Ridgelines

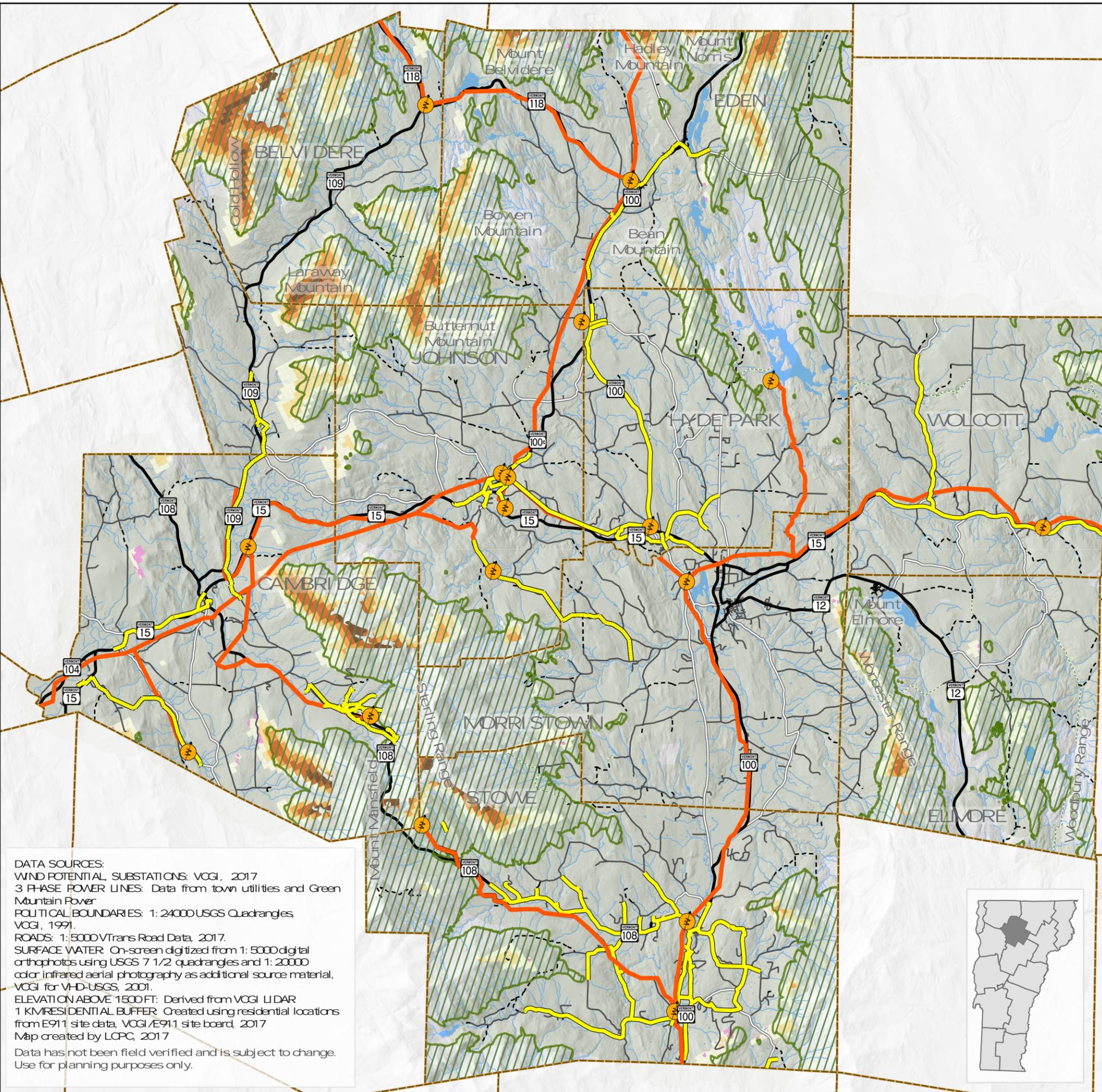
Regionally Significant Ridgelines as listed in Regional Plan. They include:

- Belvidere Mountain, Butternut Mountain, Mount Elmore,
- The Mount Mansfield Range, The Sterling Range,
- The Woodbury Range and The Worcester Range

### Municipal Ridgelines Unsuitable for Energy Development

Towns of Eden, Belvidere and Waterbury identified specific ridgelines or peaks as unsuitable for utility-scale wind development:

- Cold Hollow Mountain Range, Laraway Mountain, Bean Mountain,
- Bowen Mountain, Hadley Mountain and Mount Norris



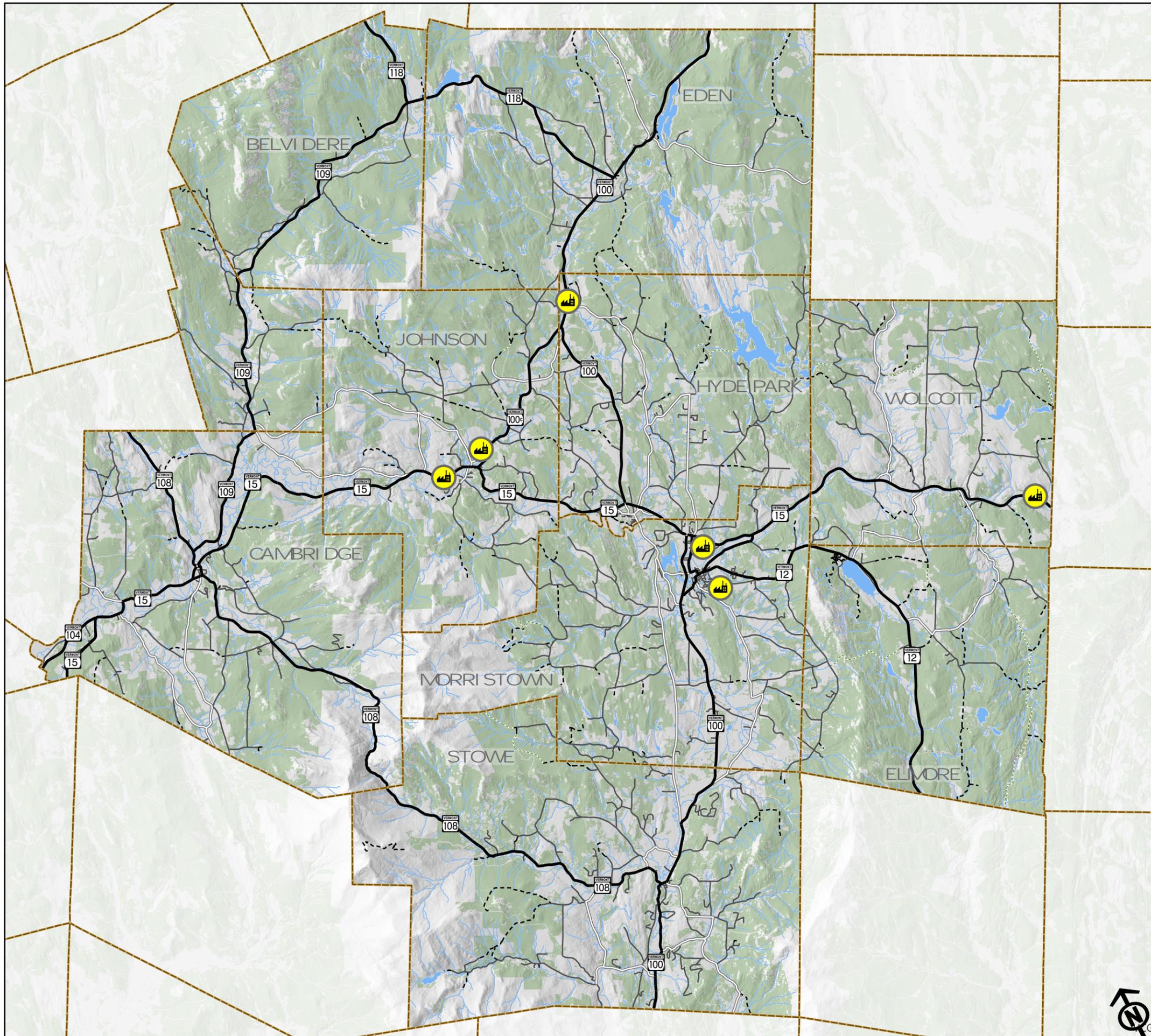
VCGI



**DATA SOURCES:**  
 WIND POTENTIAL, SUBSTATIONS: VCGI, 2017  
 3 PHASE POWER LINES: Data from town utilities and Green Mountain Power  
 POLITICAL BOUNDARIES: 1: 24000 USGS Quadrangles, VCGI, 1991.  
 ROADS: 1: 5000V Trans Road Data, 2017.  
 SURFACE WATER: On-screen digitized from 1: 5000 digital orthophotos using USGS 7 1/2 quadrangles and 1: 20000 color infrared aerial photography as additional source material, VCGI for VHD-USGS, 2001.  
 ELEVATION ABOVE 1500 FT: Derived from VCGI LIDAR  
 1 KM RESIDENTIAL BUFFER: Created using residential locations from E911 site data, VCGI/E911 site board, 2017  
 Map created by LCPC, 2017  
 Data has not been field verified and is subject to change. Use for planning purposes only.

# Forest Area with Biomass Potential Lamoille County, VT

This map illustrates potential for energy development but not necessarily suitability



- Forest Area with Biomass Potential
- Streams
- Waterbody
- Town Boundary
- Potential Sites: Combined Heat and Power
- State Highway
- Class 2 Road
- Class 3 Road
- Class 4 Road
- Private Road
- Legal Trail

This map shows areas of potential for woody biomass harvest and potential locations for combined heat and power facilities fed by woody biomass. The map also illustrates conditions that may limit the feasibility of extensive harvesting of wood for energy use. These conditions are referred to as constraints. Physical features that make extensive harvesting infeasible include: FEMA floodways, River Corridors, Class 1 and 2 Wetlands, Vernal Pools, State-significant Natural Communities, Rare, Threatened, and Endangered Species, and Wilderness Areas.

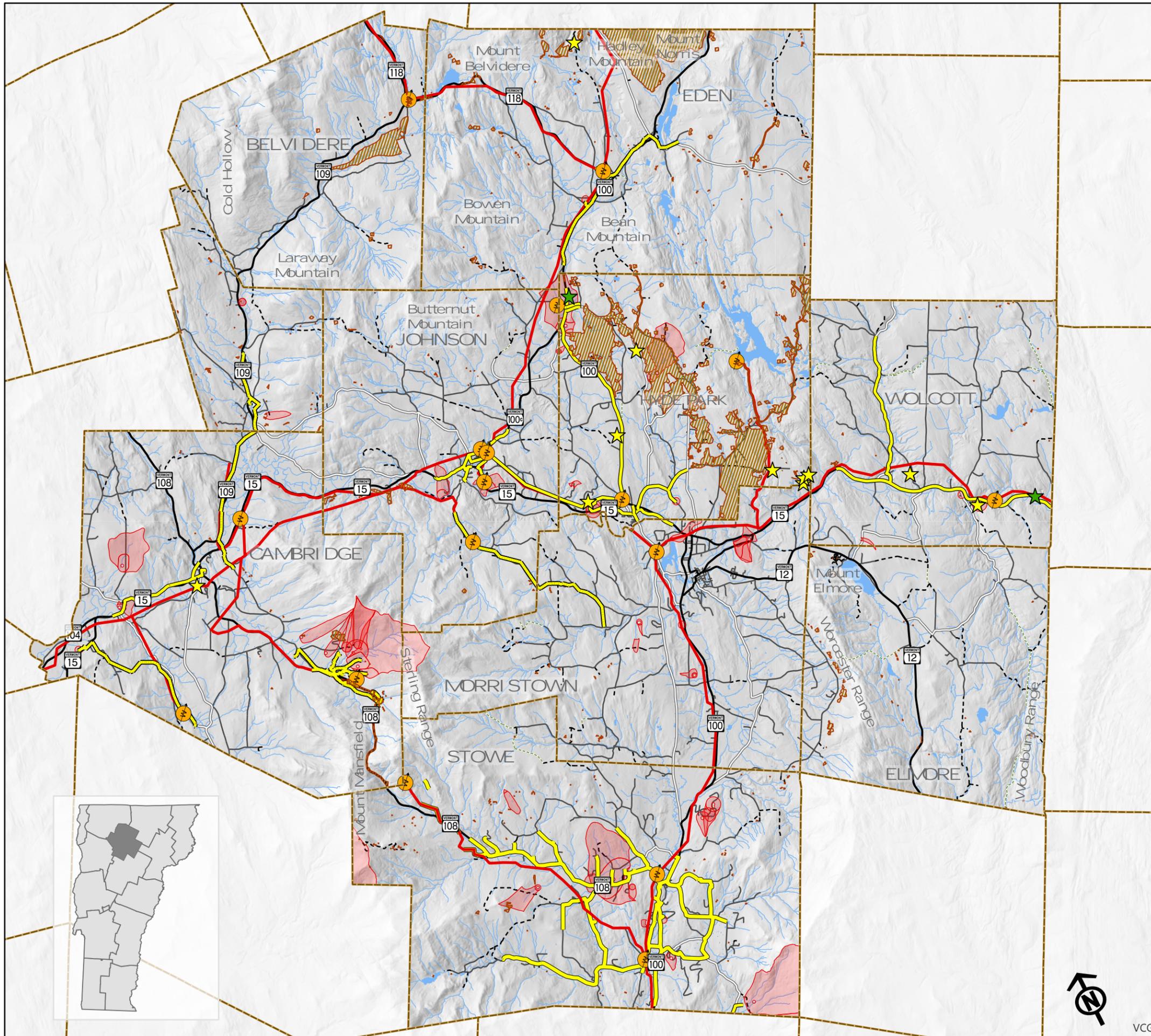
**Data has not been field verified and is subject to change. Use for planning purposes only.**

DATA SOURCES:  
 VT POTENTIAL WOODY BIOMASS AREA: VCGI, 2017  
 POTENTIAL SITES: COMBINED HEAT AND POWER: LCPC study, 2010  
 POLITICAL BOUNDARIES: 1: 24000 USGS Quadrangles VCGI, 1991.  
 ROADS: 1: 5000 VTrans Road Data, 2014.  
 SURFACE WATER: On-screen digitized from 1: 5000 digital orthophotos using USGS 7 1/2 quadrangles and 1: 20000 color infrared aerial photography as additional source material, VCGI for VHD-USGS, 2001.

Map created by LCPC, 2017



# Lamoille County Renewable Energy Potential: Regional Considerations



Sites identified by Municipalities as preferred for certain types of energy generation

- ★ Combined heat and power generation
- ★ Solar

Other Regional Considerations

- Ground Water Source Protection Areas: Zones 1, 2 and 3
- Additional High Priority Forest Blocks

Energy Infrastructure

- Substations
- 3 Phase Power Lines
- Transmission Lines

3 Phase power line data for areas served by Morrisville Water and Light was not available.

- Streams
- Waterbodies
- Town Boundary
- State Highway
- Class 2 Road
- Class 3 Road
- Class 4 Road
- Private Road
- Legal Trail

DATA SOURCES:  
 GROUNDWATER SOURCE PROTECTION AREAS: VCGI, 2017  
 ADDITIONAL HIGH PRIORITY FOREST BLOCKS: Working Forest Lands not within in High Priority Interior Forest Blocks, VCGI, 2017  
 SUBSTATIONS: VCGI, 2017  
 3 PHASE POWER LINES: Data from town utilities and Green Mountain Power  
 POLITICAL BOUNDARIES: 1: 24000 USGS Quadrangles, VCGI, 1991.  
 ROADS: 1: 5000 VTrans Road Data, 2017.  
 SURFACE WATER: On-screen digitized from 1: 5000 digital orthophotos using USGS 7 1/2 quadrangles and 1: 20000 color infrared aerial photography as additional source material, VCGI for VHD-USGS, 2001.  
 ELEVATION ABOVE 1500FT: Derived from VCGI LIDAR  
 1 KM RESIDENTIAL BUFFER: Created using residential locations from E911 site data, VCGI/E911 site board, 2017  
 Map created by LCPC, 2017

Data has not been field verified and is subject to change. Use for planning purposes only.



VCGI



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## Telecommunications: Strategy

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Today's society makes access to a variety of communications mechanisms an absolute necessity. Lamoille County is covered by basic telecommunications infrastructure with significant gaps. Village areas often have cable television, broadband internet, and DSL phone coverage but coverage to the rural parts of the County is severely limited. Visitors, businesses, residents, job seekers, emergency responders, and utility workers rely on cellular phone coverage, high speed internet, and other forms of technology for day-to-day functions and services. Cellular coverage has improved since 2006 but is still limited in many locations due to terrain and service provider propriety. As integral as mobile devices and connectivity are to the future, this plan recognizes the limitations to universal coverage by federal regulation, Vermont's dispersed population, and incomes. These are not insurmountable. To better position Lamoille County to attract visitors, retain residents, and build businesses, LCPC's objectives for Telecommunications are:

***Complete cellular and mobile phone coverage for all of Lamoille County.*** Today, 30% of Vermont adults live in a wireless household. The traditional landline is fading from memory in favor of multi-functional mobile devices. Four national carriers provide services in Vermont. Lamoille County's mountainous geography and dispersed population has made it difficult for universal coverage along state highways and local or private roads. For emergency services, business, and tourism to thrive here, phone service must be available to all reaches. However, it must be recognized that infrastructure and federal regulation prevent the collapse of the telephone network. As technology changes, LCPC should follow the availability of this service.

***Complete Wi-Fi or broadband coverage, or future compatible Internet technology, for all of Lamoille County.*** While many Center Areas of communities currently receive fast Internet connection and coverage, much of Lamoille County is underserved by affordable high-speed Internet. The state, nation, and world are moving towards a more technologically connected society, from how we are entertained to filling out job applications to conducting business, choosing healthcare, and paying taxes online. For Lamoille County to remain competitive and attractive, it must offer outstanding technological capabilities for all parts of the County.

***Adopt a 10-year plan for Lamoille County telecommunications towers and coverage.*** Understanding that technology is advancing faster than this plan, LCPC should adopt a future plan for telecommunications, including tower siting, co-location potential, unserved areas, and a need assessment based on providers' future plans. Rather than wait for towers to proliferate across the hills, valleys, and open spaces of the county, or for the economy to lag, LCPC should be strategic in where infrastructure is needed and what factors are needed to facilitate co-location.

This plan recognizes that technology is evolving at a rapid pace; therefore, technology may outpace recommendations before this plan expires. LCPC will need to plan for these infrastructure components and whatever components are developed in the future, based on advice from experts familiar with the latest in information technology.

### **POLICIES & ACTION ITEMS**

***Policy:*** All Lamoille County residents should have access to the benefits provided by expanded broadband coverage to bridge the "Digital Divide" between those with access and those without.

**Action Items:**

- Ensure children from rural areas and/or low income families are provided with the same digital opportunities as children from urban areas and/or more affluent families.
- Promote the development of affordable pricing structures to facilitate broadband adoption by elderly and low income residents.
- Encourage community service partnerships in which individuals with technology experience share their skills with others (for example, facilitating formal or informal connections between high school or college students to share technology skills with seniors) to ensure all populations have a working knowledge of new technologies.
- Working in coordination with regional partners, provide targeted outreach to people who are hesitant to embrace technology or have questions about its use, regardless of demographics and / or income level.
- Through collaboration with multi-sector service providers, develop a public outreach campaign on the benefits of technology specifically geared towards “late adopters”. Identify individuals in various communities to serve as ambassadors / advocates for technology.

**Policy:** *Broadband internet, and other forms of internet access, should be used to strengthen and grow Lamoille County’s economy.*

**Action Items:**

- Promote the County’s diverse assets, including its recreation and natural resource base, on the web, which may take the form of cooperative ventures between public and private parties.
- Encourage Lamoille County based businesses to increase their internet presence, such as assisting with the implementation of an online Lamoille County Directory, akin to the Lamoille County Phone Book.
- Promote the development of telecommuting, home-based businesses, and remote offices.
- Evaluate the feasibility and safety of establishing “Tele-centers” or centralized points of communications in Lamoille County.
- Actively promote Lamoille County to large firms located in urban areas of the Northeast and Canada as a desirable place to locate a remote office.
- Work with workforce development agencies and human service providers to provide training in essential digital skills among the County’s workforce. Ensure that efforts by various agencies are coordinated to minimize duplication of services.
- Assist municipalities with the creation of new or expanding existing Wi-Fi hotspots for residents and visitors.

**Policy:** *LCPC encourages efforts that assess and coordinate educational and employment needs for ensuring a highly skilled workforce that will meet the needs of local businesses and emerging technologies.*

**Action Items:**

- Work with schools, advanced education institutions, LEDC, and other economic development agencies to identify workforce training needs to prepare youth for employment in fields requiring use of technology, including computer literacy, internet, information technology, and telecommunications.

**Policy:** *LCPC recognizes the potential benefits that broadband provides county residents and businesses, and will work to empower residents to take full advantage of these benefits.*

**Action Items:**

- Promote widespread understanding that broadband offers more than entertainment. Engage County residents to understand ways in which broadband can be used as a creative rather than consumptive tool.
- Utilize the potential financial benefits of broadband for businesses, non-profit organizations, government agencies, and individuals.
- Provide and promote trainings tailored to the specific needs of individual sectors. All sectors are under intense pressure to fulfill their “core” functions. In order to be successful, technology training should be incorporated into existing programs.
- Support computer and internet literacy training opportunities for adults in the region at libraries, colleges, technical centers, and other areas with public computers. Coordinate training efforts by different organizations and sectors to ensure efficient use of financial resources and personnel. Develop model best practices and curriculum for information literacy and disseminate to the appropriate organizations.

**Policy:** *This Plan recognizes that Broadband reinforces, strengthens, and builds community ties and is used as a tool to actively bring communities together rather than passively move them apart. Broadband should be used as a tool to revitalize Lamoille County’s rural villages and downtowns in order to reclaim historic roles as centers of commercial and civic life, and to function as incubators for new, high tech businesses.*

**Action Items:**

- Encourage utilization of e-government tools to engage residents and improve the efficiency of government programs and services while continuing to use traditional means of communications to ensure that residents without broadband access are not disenfranchised or denied access to government records or services.
- Assist community anchors, such as libraries, schools, and community centers, to evolve their technological offerings to ensure the vitality of these institutions in the “Digital Age”, while preparing youth for a more technologically advanced society.
- Broadcast government hearings, public meetings, and other important public gatherings online. Develop mechanisms for residents who cannot physically attend meetings to participate remotely. Provide local governments and other public entities, upon request, with technical assistance on best practices for developing and maintaining a municipal website, including issues such as ADA accessibility.
- Equip existing community anchors with the equipment, tools, and training necessary to serve as technology and communication hubs. When feasible, provide public access to these facilities.
- Implement tools and provide resources for public, high speed internet access in villages and downtowns. Such tools include, but are not limited to, development of public access Wi-Fi zones, establishment of tele-centers, or development of publicly accessible “internet cafes.”
- Support the use of social media and online networking tools to increase community connections among residents, visitors, and local businesses.

**Policy:** *This Plan recognizes that although much of Lamoille County is rural and dispersed, communications should be accessible to all residents, through cellular or mobile phone service, internet capability, and traditional means such as newspapers and broadcast television.*

**Action Items:**

- Support older, traditional media transition to new forms of media.
- Cellular service should be available along all state highways in the County.
- Print media and broadcast television are encouraged as communication tools to reach a wide audience, particularly those transitioning to online, digital media.
- Support investment in telecommunication infrastructure in village centers, towns, and remote areas of the county.

**Policy:** Telecommunication towers should co-locate antennas to avoid tower proliferation, where possible.

**Action Items:**

- New and proposed replacement telecommunications facilities must be compatible with existing land uses.
- LCPC, municipal representatives, regional resources, and developers should work together to plan for the enhancement and expansion of telecommunication infrastructure. As technology advances, adjust plans for telecommunication improvements accordingly.
- Review all proposed telecommunications projects to ensure compatibility with the policies contained within this Regional Plan.

# Telecommunications: Background and Inventory

Telecommunications are becoming increasingly more important in day-to-day functions for communication, business, education, and community relationships. Because of the growing need for and use of expanded telecommunications in Lamoille County, this section is added to draw needed attention to these facilities. This section consists of the following areas:

- Point Telecommunication Facilities (phone lines, cable lines, broadband, etc.)
- Mobile Telecommunication Facilities
- Newspapers
- Economic Development
- Flood Resiliency

## Point Telecommunication Facilities

Point telecommunication facilities (or point to point networks) are those that are designed to provide telecommunication services to a fixed point (your home or business). Currently, most Vermonters could potentially have up to three point facilities in their home- cable/satellite (for television), telephone lines, and wireless internet connection (if separate from telephone and television on a WISP network for instance). As

mentioned above these point systems are consolidating such that it is now possible to have a single point telecommunication facility handling multiple roles- a cable line, internet, and phone (voice over internet protocol) simultaneously.

### Common Definitions

•**Broadband:** A direct, high speed (200Kbps defined by the Federal Communications Commission in 2014) connection to the internet through phone, cable, satellite, or a wireless network.

•**Internet Service Provider (ISP):** A company that provides users with access to the Internet, usually for a fee. The most common ways to connect to an ISP are by using a phone line (dial-up) or broadband connection (cable, DSL, or satellite).

•**Wireless Internet Service Provider (WISP):** An Internet service provider with a network based on wireless networking. Technology may include commonplace Wi-Fi wireless mesh networking, or proprietary equipment.

•**Digital Subscriber Line (DSL):** A family of technologies that extends the ability of copper telephone lines to carry high-speed data telecommunications over short and medium distances.

•**Wireless Fidelity (Wi-Fi):** A brand name for an industry standard used for providing Local Area Networks (LANs) over license free wireless spectrum.

### Phone lines

FairPoint is the incumbent telephone company for the region, including: Jeffersonville central office code, Johnson central office code, Morrisville central office code, and Stowe central office code. Small portions of Hardwick's and Craftsbury's central office codes also cover some small portions in Wolcott and Eden.

FairPoint is regulated by the Public Service Board through an Alternative Regulation Plan which runs for five year increments before being renewed.

Phone lines can also provide internet service over "dial up" or broadband speeds via DSL. DSL is limited to locations with certain types of phone lines and having distances within 3 miles from an office or, with newer technology, five miles or further depending on technology. DSL is available in most, but not all, communities in Lamoille County. A recent Back Roads Broadband Grant was awarded to extended DSL services to all areas of Cambridge and Waterville.

By contrast, there is little to no DSL service available in Belvidere and Elmore. Download speeds are generally slower than cable broadband (approximately 3-7 Mbps) and service is distance sensitive, meaning speeds are slower at more remote locations. Residential DSL service can

be purchased starting at \$20 per month.

Available virtually anywhere there is telephone infrastructure, dial-up internet is widely used in rural areas of Vermont. Unfortunately, download speeds are insufficient (maximum of 56Kbps) for streaming media and large file downloads. While dial-up is undesirable for most businesses, it may not be possible or viable for casual internet users looking for a low-cost alternative to broadband, with prices starting at \$10 per month.

#### *Broadcast Television*

Television is transmitted through two means: analog or digital. Each has a different set of parameters that enable broadcasting. "Broadcasting" is the transmission of information through a signal. Most digital transmissions require a compatibility system, replacing the traditional antennas that previously accessed signals through the airwaves. Cable companies are franchised by municipalities. Towns and villages can request changes to the franchise agreement when they expire. Changes could include adding public access channels or expanding service to new areas. Most municipalities have access to cable lines. Without access to a cable line, it is difficult for many televisions to receive a signal.

#### *Wireless ISP*

In rural locations Wireless ISP broadband (WISP) is being marketed to homes and businesses because it is cheaper than the cost of running cable or other high speed lines. In these situations each subscriber to the system would have a static antenna that would link to other antennas to provide the wireless network. The fixed antenna makes the system a point-system. This type of system is currently available in many places throughout Lamoille County but not in Belvidere, much of Eden, Elmore, Jeffersonville, and other remote parts of the region.

#### *Broadband coverage*

Some communities are broadband rich areas with respect to point communications. Some Lamoille County residents and businesses may have multiple options to receive broadband internet service while others, such as Wolcott, have none. Cable broadband is available in portions of Hyde Park, Johnson, Morristown, and Stowe. Cable broadband provides customers with the fastest download speeds and is generally regarded as the standard for "high speed" internet access in more developed areas. Cable broadband is generally available for about \$45 a month.

FairPoint Communications has completed installation of Carrier Ethernet Service equipment at some locations (such as Jeffersonville). The installation allows data communications to be delivered across the internet to local businesses at speeds of 1 Mbps to 1 Gbps with products such as E-LAN (Ethernet Local Area Network), E-Line (Ethernet Point-to-Point) and E-DIA (Ethernet Dedicated Internet Access). The availability of Carrier Ethernet represents an opportunity to increase local business communication avenues and diversify the local employment base. It is important to note that many satellite or data plans have limits on how much data can be downloaded, uploaded, and used in a certain time period.

#### *Satellite Internet*

A higher speed alternative to dial-up service, satellite internet is generally more expensive (upwards of \$85 per month) and slower than both DSL and cable broadband, with service also subject to interruption during rain storms. However, because satellite coverage is nearly ubiquitous, it remains an attractive option in rural and outlying areas of the state but it has a drawback in price and data transmission.

## **Mobile Telecommunication Facilities**

As of the drafting of this plan, mobile communications are still divided into two categories- cellular and Personal Communications Service (PCS). A new emerging semi-mobile facility is that of Local Area Networks (more commonly known as “Wi-Fi” hotspots) but has limited application in terms of the distance range of wireless users. While telecommunications and broadband technology in Lamoille County have improved in recent years, there are still significant “drop zones” on several highway corridors, including Route 15 in Cambridge, Johnson, and Wolcott, Route 12 in Elmore, Route 108 in Cambridge and Waterville, Route 109 in Belvidere, Route 118 in Eden, and Route 100 in Eden (see the map at the end of the chapter).

### *Cellular phone service*

Cellular service is defined as a subset of personal wireless service (PWS) employing modulation based on a spectrum of megahertz, which changes quickly with technological advances. Cellular’s advantage is the greater range for communication but it uses a narrower bandwidth (carries less data). Currently, cellular coverage in Lamoille County is provided by two main service providers, Verizon and AT&T.

### *Personal Communications Service*

Personal Communications Service (PCS) are a subset of Personal Wireless Services generally employing digital modulation at higher (up to 2GHz) frequencies. PCS uses a wider bandwidth so it can carry a greater amount of information but at the expense of coverage.

### *Wi-Fi Hotspots*

Providing Wireless Internet (or “Wi-Fi”) hotspots was a primary goal of the 2004 Vermont Telecommunications Plan. “Wi-Fi” hotspots are places where a computer or mobile phone user can access the internet wirelessly (sometimes for a fee and sometimes free). In the same way that PCS carries more information at the expense of coverage compared to cellular, Wi-Fi carries more information than PCS but with a significant loss of coverage. While Wi-Fi can carry voice (in the form of voice over internet protocol) it is generally used to send information. The State Telecommunications Plan set an ambitious goal of having 100% Wi-Fi coverage in downtowns and resorts by 2010 so that residents and visitors can access the internet and email while on vacation or on the road; 2014 updates to that Plan call for increasing the upload and download speeds statewide. Work is still underway to accomplish this goal.

Some municipalities have invested in or worked to provide Wi-Fi zones in village areas, including Cambridge, Jeffersonville, Johnson, and Morrisville. The development of public access Wi-Fi districts in core areas holds great potential for attracting new residents and businesses. A public Wi-Fi district could also help to attract visitors and tourists to villages as they would be able to access the internet while on the road.

### *Radio and Emergency Service Communications*

Emergency service communications operate in the UHF bandwidth (460MHz) and VHF bandwidths (150 MHz) depending on the system. Other wireless communications may exist in these bandwidths including pager services (VHF) and other businesses with dispatch systems like buses and delivery companies. HAM radio operates with repeaters in these ranges as well as at High-Frequency (HF) bands.

One important consideration to any discussion of mobile telecommunication facilities is that of towers. In the past, towers for radio and television were hundreds of feet tall (thousands of feet tall in the west and mid-west of the US). Today towers rarely exceed 120 feet except for radio towers. Cellular companies have resorted to placing

antennas on farm silos, barns, church steeples, flag poles, or anything sufficiently off the ground. The cost of taller structures does not generally provide a large improvement in coverage.

### **Newspapers**

Lamoille County residents have access to the following local newspapers: the *News & Citizen*, *The Transcript*, *The Mountain Gazette*, *The Hardwick Gazette*, and the *Stowe Reporter*. The *News & Citizen* and *Transcript* are published in Morrisville and issued to Lamoille County towns and villages every Tuesday and Thursday. *The Transcript* is provided to all postal patrons free of charge. LCPC and member municipalities often utilize these papers to warn the public regarding official notices and public hearings. *The Stowe Reporter* reports on happenings in the region although highlights primarily events and news within the town of Stowe. *The Mountain Gazette* reports primarily on the towns of Cambridge, Westford, Underhill, and Jericho. While focused primarily on the Hardwick region, the *Hardwick Gazette* offers significant weekly coverage of Wolcott. The closest paper with a daily circulation, upon request, is the *Burlington Free Press*. The *Free Press* provides limited coverage to events in Lamoille County. Residents also have access to several other news publications, including *Seven Days* and the *Mountain Ear*.

### **Communications and Economic Development**

High-speed internet is a vital tool for home-based businesses, telecommuters, the cottage software and web development industries, the creative economy, high value-added professions or technical services careers, and even manufacturers, who increasingly rely on broadband for product specifications and advertising. Further, access to high-speed internet is pivotal to informational and transactional resources commonplace in any business in the 21<sup>st</sup> century. Access to reliable, affordable Internet service providers could be an important piece for growing the economic base and the sense of community camaraderie throughout Lamoille County communities. Social media can be a powerful tool for connecting individuals to one another. If initiatives to bring high-speed internet access are successful, they could represent an economic boon to towns and villages. The lack of broadband availability in many Lamoille County communities represents a divide between municipalities and the full capacity of the Internet to support access to information, e-commerce, and educational resources.

Roughly 12% of Lamoille County residents are employed in high value-added professional, scientific, and technical services careers. This sector includes architects, engineers, graphic designers, lawyers, veterinarians, and accountants, to name a few. This sector is highly concentrated in Stowe and Morrisville but is not exclusive to those communities. Numerous small businesses are included in this sector, about 120, employing close to 400 people countywide.

For those working in the “creative economy” (see Section 5), access to high-speed internet is essential. With the advent of online marketplaces and accessibility of personal websites, those in the creative economy, or artisans looking to supplement their primary income, rely on high-speed internet to conduct business.

#### *Macro-Economic Trend: Technological innovation is advancing rapidly.*

Technological innovation is making the labor force more productive and changing the way goods and services are transacted, allowing both the work force labor and investment dollars to make more with less. Encouraging continued growth in productivity (including new investment and a focus on work force preparedness) is key to the regional economy’s ability to compete. This will challenge the companies in the region to continuously improve the ability to apply knowledge and technology to the production process better than its competitors.

*Example: Universal access to broadband internet is critical for new and established businesses. Internet access will increase online sales transactions, allow workers to telecommute, and increase marketability of products produced in Lamoille County. Efforts to improve workforce development and skill development are taking root in the school system by training students to use computers and computer programs, exposure to computers, tablets, videos, and other media, and strengthening courses in the sciences.*

### **Communications and Flood Resiliency**

Maintaining effective communications is essential during all phases of a disaster. In the height of a disaster, be it a major flood, fire, or medical emergency, response personnel require access to communications technology to coordinate the response. It is important to ensure that radio and telecommunications equipment used by emergency personnel is not located in an area where it is vulnerable to flooding. For this reason, telecommunications equipment serving public buildings and/or emergency response facilities should be elevated out of base flood elevations.

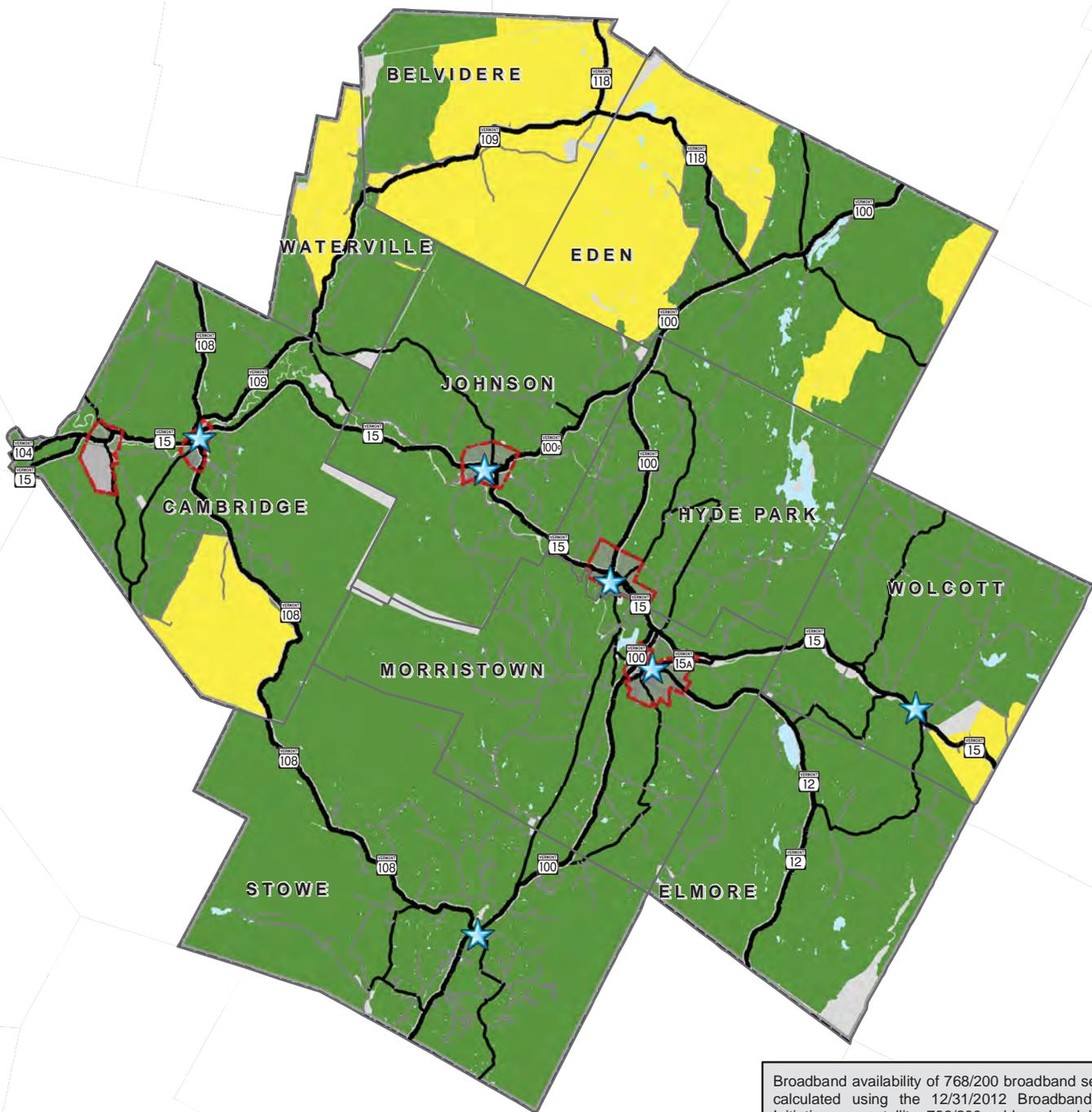
Flooding can also threaten telecommunications infrastructure itself. Utility poles located in hazard areas may be susceptible to both erosion and inundation hazards. For example, several utility poles located near the Brewster River in Jeffersonville are in jeopardy due to erosion. Loss of this infrastructure could compound the effects of a flooding disaster.

Telecommunications infrastructure can also assist a community in preparing for a flood. For example, river gauges provide advanced warning, allowing responders to mobilize and residents to secure themselves or evacuate. Emergency responders across the county are working to develop simple advanced warning systems to notify residents of impending flooding via email or text message. Utilizing the State of Vermont's VTAlert system, anyone can sign-up to receive real-time alerts of impending emergencies via landline, cellular phone, text message, email, and pager. The system allows users to sign-up for notices about localized hazardous weather events, statewide hazardous weather events, or select from a menu of specific events (e.g. frost advisory, hot weather temperature warning, flash flooding watches and warnings, etc.). VTAlert can be used at the state level, regionally, locally, or through locally defined communities, such as emergency responders or all residents living on Main Street. The system is free and trainings are provided by the Division of Emergency Management and Homeland Security.

*For further information on broadband in Lamoille County, please see the 2012 Broadband Technology Project, available online at: [www.lpcvt.org](http://www.lpcvt.org)*

# Broadband Coverage

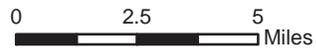
## Lamoille County



Broadband availability of 768/200 broadband service was calculated using the 12/31/2012 Broadband Mapping Initiative non-satellite 768/200 address-level broadband availability dataset and forward looking datasets provided by service providers.

768/200 broadband service indicates a download speed of at least 0.768 Mbps and an upload speed of at least 0.2 Mbps.

This dataset represents broadband availability as of December 31, 2012.



-  Public Libraries with Broadband
-  Village Boundary
- Broadband Coverage**
-  No Buildings to Serve
-  100% Served
-  Projects in Progress
-  Partially Served

Data Sources:  
 Political Boundaries: VCGI, 1991.  
 Roads: 1:5000 E-911 Road Data, 2014.  
 Public Libraries with Broadband: VCGI, 2013, Database developed by Stone Environmental.  
 Broadband: VCGI, 2013, Database developed by Stone Environmental.

Created 7/30/15 by LCPC. Map is for planning purposes only, not for regulatory interpretation.

## Land Use: Strategy

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Land use provides the framework upon which many decisions related to growth, development, and conservation is built. Land use is shaped by many factors, including natural constraints such as soils and topography, economic forces, and decisions related to transportation and infrastructure. Existing land uses in Lamoille County are the result of historic settlement patterns. The policies in this section are derived from a comprehensive review of the land use policies of Lamoille County's fifteen municipalities and the State planning goals defined by the Vermont Legislature. The intent of this Regional Plan is to support and supplement, rather than supersede, goals and policies regarding land use development at the local level while ensuring that decisions in one municipality are cognizant and address impacts on other municipalities and regional resources and infrastructure. The Regional Plan is guided by the following three overall objectives:

***To guide growth into Center and Enterprise Areas:*** Centers may include new and existing settlements and range in size from small settlements such as Garfield in Hyde Park to the region's largest urban area of Morrisville. Centers can be as small as a country store, a post office, school or church, and a cluster of homes. Centers may also include the base lodge areas of resorts and appropriately located enterprise areas. Growth is most likely where there is adequate infrastructure to support it. Infrastructure upgrades and modernization will be critical to achieving this objective.

***To encourage compact development and protect the working landscapes:*** In recognition of the infrastructure limitations of many Centers, as well as the personal desires of many Lamoille County residents, it is likely that development will continue in rural areas of the County. Development in rural areas should be managed for efficient use of land: clustering to protect open space and the working landscape; shared facilities such as sewer, water, and roads; and avoidance of areas not suitable for development.

***To protect the region's natural systems and valuable agricultural and silvicultural resources:*** As discussed elsewhere in this Plan, Lamoille County's natural environment and diverse agricultural and silvicultural resources are among the assets that distinguish the region from other areas of the country and neighboring regions of Vermont. Protection of these resources will likely take a variety of forms – from stewardship by private landowners, to purchase of easements by conservation organizations, to fee simple ownership by municipal or State entities. In light of limited public resources, public conservation funds and mitigation efforts should be targeted toward those areas that best support the goals of local and regional plans.

## Regional Plan Future Land Use Map and Planning Areas

State Statute directs Regional Plans to include a "land use element, which shall consist of a map and statement of present and prospective land uses" (24 V.S.A. § 4348). The Future Land Use Map (page 145) identifies Planning Areas that will be used to guide land use and development in Lamoille County over the next eight year regional planning cycle. In keeping with the spirit of local control upon which this Plan is based, these Planning Areas are derived from municipal plans. The Future Land Use Map is intended to complement local plans and is not intended, nor should it be used, to supplant any local planning effort. The Planning Areas focus on the overall pattern and form of development rather than on specific densities or use categories, which are more properly defined at the local level. Since transportation infrastructure and investments can play a major role in shaping land use patterns, each Planning Area also contains a discussion of transportation related issues.

The Future Land Use Map also provides guidance to the District Environmental Commission relative to agricultural soils mitigation. When a development subject to Act 250 impacts agricultural soils, mitigation of these

soils is required. In general, Act 250 is structured to prefer “on-site” mitigation – that is, modifying the site design of the project so that the soils are not impacted (See VSA §6093(a)(2)). However, the District Commission may authorize “off-site” mitigation if “that action is deemed consistent with the agricultural elements of local and regional plans” (See 10 VSA § 6093(a)(3)(b)). Each Planning Area defines appropriate circumstances under which “off-site” mitigation may be approved by the District Commission. A map of agricultural soils is on page 146.

*For a discussion of methodology used in developing the Future Land Use Map, please see Appendix B.*

### **Center Areas**

**General Description:** This area consists of Lamoille County’s traditional village and downtown centers as well as areas identified as nodes for compact and/or mixed use development in local plans. This area includes, but is not limited to, State “Designated Downtowns and Village Centers”. In general, these areas contain the highest densities and greatest diversity of uses found in the County. While local plans may designate zoning districts with varying permitted uses (residential, commercial, etc.), the overall pattern of development within Center Areas is one of mixed uses. All areas within the Center Area shall be considered an “existing settlement” for the purpose of Act 250 review. In recognition of the significant difference in density and diversity of uses enabled by municipal sewage and water infrastructure, this area is divided into the following four distinct Planning Areas on the Future Land Use Map:

- Centers with Wastewater and Water Infrastructure
- Centers with Water but without Wastewater Infrastructure
- Centers with Wastewater but without Water Infrastructure (as of 2015, there are no such Centers in Region)
- Centers without Wastewater or Water Infrastructure

*Note: The Centers with Wastewater and Water and Centers with Water may include some areas in proximity to municipal sewage or water service that are not currently connected to the system.*

**Transportation:** The transportation network within the Center Area should be designed to serve diverse user groups. Formal sidewalks, bike lanes, and bike paths are strongly encouraged in Centers with Wastewater and Water Infrastructure and should be required for any development within a Center with Wastewater and Water that requires Act 250 review. In the more rural setting found in most other Centers, expanded/wide shoulders, trail networks, and off road paths may also be used to accommodate pedestrians and cyclists. Such facilities should be recognized as “existing facilities” by the VT Agency of Transportation and should be maintained, improved, and expanded upon in State highway projects. Transit connections within and between Centers is also highly desired. Center Areas should receive priority for new transit service and other multimodal transportation improvements. Park-and-ride facilities are strongly encouraged at the periphery of Center Areas.

**Agricultural Soils Mitigation:** In recognition of the Regional Plan’s primary objective “to guide growth into compact settlements,” mitigation of agricultural soils shall not be required in Center Areas, regardless of the physical properties of the soil, unless specifically warranted based on policies found in local plans. In Center Areas, LCPC shall advise the District Commission that on-site mitigation is not consistent with the land use objectives of this Plan. If the District Commission determines that mitigation is needed, off-site mitigation should be allowed at the minimum ratio required by statute. LCPC may participate in any Act 250 proceedings related to this issue, provided off-site mitigation is also compatible with the policies of the municipal plan of the host community and/or the findings and conditions of any municipal land use permit.

## Enterprise Areas

**General Description:** The Enterprise Area contains areas designated for special uses that generate significant amounts of activity, such as industrial parks, airport facilities, ski resorts, etc. in municipal plans. While not directly connected to a Center or “existing settlement,” these areas provide much of the Region’s current and potential employment opportunities and are vital to the economic development of the County.

**Transportation:** Given that these areas are likely to rely on heavy freight and/or generate a significant amount of customer/employee traffic, use of shared access and internal circulation roads is highly encouraged. Locally appropriate internal pedestrian connections are also encouraged. Connection to transit and other multimodal service is encouraged to ensure that Lamoille County residents without access to an automobile are able to benefit from the services and employment opportunities found in these areas.

**Agricultural Soils Mitigation:** In recognition of the need for “shovel ready” industrial land in Lamoille County, off-site mitigation should be allowed for any development that is primarily industrial in nature or will provide infrastructure needed to support industrial development (such as warehouse, distribution, and port facilities). Such mitigation should follow the minimum ratio required by statute.

## Rural and Working Lands Area

**General Description:** The Rural and Working Lands Area is made up of those areas designated in local plans primarily for lower density development, agriculture, and forestry. This area covers a large portion of Lamoille County’s land area and includes agricultural land and forest land interspersed with clusters and nodes of development. Use of development tools such as conservation subdivision, Planned Unit Developments (PUDs), and Transfers of Development Rights (TDRs) is strongly encouraged in this area.

New development should be located to minimize disruptions to productive use of land currently in agricultural production. Development should be located along existing features such as farm and woods-roads, along field’s edges, or on the least productive fields. New residential subdivisions may be required to include covenants and deed language acknowledging that the development is located in an area with active agriculture and forestry operations and prohibiting future homeowners from bringing nuisance suits against existing operations and future agriculture and forestry operations that follow applicable state regulations.

**Transportation:** This area contains several of the major transportation corridors through Lamoille County. Some communities allow diverse, non-residential uses along these corridors. State Planning Statute discourages “strip development,” and the Act 250 District Commission is enabled to deny projects deemed to be “strip development” under the newly reformed criteria 9(L). State Statute defines “strip development” as *“linear commercial development along a public highway that includes three or more of the following characteristics: broad road frontage, predominance of single-story buildings, limited reliance on shared highway access, lack of connection to any existing settlement except by highway, limited accessibility for pedestrians, and lack of coordination with surrounding land uses in terms of design, signs, lighting, and parking.”*

To avoid a project being designated as “strip development” by the District Commission, municipalities may pursue several options, including access management policies that encourage or require use of shared access and parking, development of access management plans under 24 VSA § 4432(1), capital planning for bicycle/pedestrian improvements and local park-and-rides, site plan review that includes specific standards for

signs, lighting, parking etc., context sensitive design, design review or form based codes, and/or limiting non-residential uses along corridors in rural areas.

The Rural and Working Lands Area also contains several important wildlife roadway crossings. These include the Willow Crossing Area on Route 15 near the Cambridge/Johnson town line, Route 118 in Eden and Belvidere, Route 12 in Elmore, the area of Route 100 north of North Hyde Park Village at the Eden Town Line, and the Shutesville Hill area on Route 100 near the Stowe/Waterbury town line. Transportation improvements in these areas should be designed to allow for wildlife permeability. This can be accomplished by providing oversized culverts, reducing speed limits, providing occasional breaks in guardrails, and other similar methods. Development in and adjacent to these areas should include site design techniques to maintain connectivity between wildlife habitats.

In agricultural areas, new roads should be constructed along fields' edges or use linear features such as hedgerows to avoid fragmenting agricultural fields. Development should also be configured to allow for continued access to working lands by agricultural and forestry equipment.

**Agricultural Soils Mitigation:** This area should be targeted for investments in programs aimed at assisting agriculture and forestry. Actively farmed agricultural land should be targeted for protection associated with off-site mitigation from other sites within Lamoille County. Given the large portion of Lamoille County in this area, off-site mitigation may be appropriate in some circumstances. Off-site mitigation may be allowed when one or more of the following criteria are met:

The development is located within one-and-a-half (1.5) road miles of a Center Area associated with a State Designated Downtown; or within one road mile of another Center or Enterprise Area; and/or connected to a Center Area or Enterprise Area by pedestrian or bicycle infrastructure, including but not limited to, an on-road bike lane or shoulders that are officially for biking (4' wide) or marked as a bike lane meeting VTrans standards, sidewalk, greenway or trail system, or formal bike/multiuse path; or

- The development is a "conservation subdivision" in which at least 50% of the total area is reserved as open space; or
- Off-site mitigation is necessary to facilitate development of farmworker housing, value-added enterprises, agricultural/forestry education facilities, or other uses that support the working lands economy; or
- Off-site mitigation elsewhere in Lamoille County better contributes to the creation of usable, unfragmented blocks of working lands; or
- The Vermont Agency of Agriculture has determined that off-site mitigation is appropriate or that mitigation is not needed.

In addition, regardless of the criteria outlined above, in recognition of the need for workforce housing in Lamoille County, off-site mitigation at the minimum ratios required by statute should also be allowed for any residential or mixed use development in which the majority of dwelling units will be affordable to households with annual incomes up to 120% of the host community's median income.

### **Working Lands – Forest Area**

**General Description:** This area contains Lamoille County's largest blocks of unfragmented forests. As noted in the Working Lands Chapter of this Plan, there are numerous, diverse uses of Lamoille County's forests, including

but not limited to active forest management, conservation, wildlife management, recreation, and/or aesthetic preservation. The specific use of any forest should be left to the property owner and/or land manager. However, what unites almost all these uses is that they all rely on large, unfragmented blocks of forest land. Therefore, maintaining unfragmented blocks of forest land is an important objective of this area.

When new development occurs in this area, it should be located to minimize forest fragmentation and/or disruption of productive use for timber management. Development should be located along existing features such as woods-roads or in the least productive forest stands. Development should also be configured to allow for continued access to working lands by forestry equipment. New residential subdivisions may be required to include covenants and deed language acknowledging that the development is located in an area with active forestry operations and prohibiting future homeowners from bringing nuisance suits against existing operations and future forestry operations that follow applicable state regulations.

**Transportation:** Transportation infrastructure can fragment working lands just as much as development. New roads should be very limited in forest areas and should be constructed with consideration of impacts on productive forest stands, wildlife connectivity, erosion and runoff, and aesthetic resources.

**Agricultural Soils Mitigation:** This area should be targeted for protection associated with off-site mitigation from other sites within Lamoille County. If agricultural soils mitigation is required, it should be on-site, unless off-site mitigation is supported by the Vermont Agency of Agriculture. Off-site mitigation should also be allowed when necessary to facilitate value-added enterprises, agricultural/forestry education facilities, or other uses that support the working lands economy. This area should also be targeted for investments in programs aimed at assisting agriculture and forestry.

### **Floodplain/Working Land Area**

**General Description:** This area includes land located outside of Center Areas and within the FEMA mapped 100-year floodplain. Much of this area is used for agriculture due to favorable, alluvial soils and large flat fields which are absent in the more mountainous terrain in other areas of Lamoille County. Provided State Accepted Agricultural Practices (AAPs) are followed, agriculture is an appropriate use of these floodplain areas. Best Management Practices, such as establishing vegetated buffers along stream banks, are strongly encouraged. Some areas have reverted to wetlands or floodplain forests. This vegetation can greatly improve floodwater attenuation and may capture sediment and debris during large flood events, helping to mitigate downstream flood damage and debris jams.

Development in this area must be carefully designed to minimize risks to life and property, and to ensure that floodwaters are not displaced onto upstream or downstream properties. When new structures are constructed, they should be elevated at least two feet above base flood elevation. Use of compensatory storage or structural piers is highly encouraged to accomplish this elevation.

**Transportation:** Construction of new roads should be extremely limited in this area. When new roads are constructed, they must be designed to ensure that floodwaters are not displaced onto abutting or downstream properties.

Some elements of the existing transportation network may contribute to upstream and downstream flood damage. Undersized bridges and culverts may cause downstream erosion that destabilizes stream beds and

banks and may even change the path of the stream. Berms used to elevate roads may disconnect a river from its floodplain and push floodwaters onto other properties. Redesign and retrofitting existing elements of the county transportation network to reduce flood hazards is highly encouraged. This may include increasing bridge and culvert spans, installing bypass culverts or low water crossings in berms, and development of flood benches to reconnect rivers to their floodplain.

**Agricultural Soils Mitigation:** This area should be targeted for conservation associated with off-site mitigation from other sites within Lamoille County. When land in this area is conserved through off-site mitigation, the mitigation agreement should contain provisions for maintaining or establishing a vegetated buffer along the stream bank.

Off-site mitigation should be allowed when necessary for hazard mitigation and/or floodplain restoration. This area should also be targeted for investments in programs aimed at assisting agriculture and forestry.

### **Conserved Lands Overlay**

**General Description:** There are two overlay areas on the Future Land Use Map. Overlays create special use areas placed over existing land use areas that identify unique provisions in addition to those of the underlying area. The overlay protects a specific resource or guides development within special areas. The objectives of each underlying Planning Area should be followed for both conserved lands overlay areas.

The overlays on the Future Land Use Map are for State Forest Land and Other Conserved Land. Conserved lands often have limited uses because of the characteristics being conserved. Development is usually limited or restricted. Much of the Conserved State Forest Land in Mt. Mansfield State Forest is leased by ski resorts and subject to Act 250 review. Since these areas have already been conserved, they are not targeted for future agricultural soils mitigation. However, future conservation easements are encouraged to connect to existing conserved lands to: reduce forest and agricultural fragmentation; provide large blocks of land that better support wildlife connectivity; protect rare, important, and irreplaceable natural and fragile areas; and protect scenic and historic features and resources. Use of recreation on some conserved lands is appropriate and should be encouraged when possible.

**Transportation:** Transportation infrastructure can fragment working lands just as much as development. New roads should be extremely limited. Roads and trails should be constructed with consideration of impacts on productive forest stands, agricultural operations, wildlife connectivity, erosion and runoff, and aesthetic resources.

### **Shoreland Area Overlay**

**General Description:** Overlays create special use areas placed over existing land use areas that identify unique provisions in addition to those of the underlying area. The overlay protects a specific resource or guides development within special areas. The objectives of each underlying Planning Area should be followed for both conserved lands overlay areas.

The overlay on the Future Land Use Map for the Shoreland Area follows the jurisdiction of the Vermont Shoreland Protection Act (Chapter 49A of Title 10 §1441 *et seq.*) administered by the Agency of Natural Resources Department of Environmental Conservation. The Act establishes a state regulation for guiding development within the protected shoreland area 250 feet from the mean water level of all lakes greater than 10

acres in size. The intent of the Act is to prevent degradation of water quality in lakes, preserve habitat and natural stability of shorelines, and maintain the economic benefits of lakes and their shorelands. Municipalities may be delegated to administer this Act locally.

### Future Land Use Goals

In order to measure the effectiveness of local and regional planning efforts in establishing the development patterns outlined in the Future Land Use Map, LCPC establishes the goals listed for the next regional planning cycle. NOTE that the purpose of these goals is to measure the progress toward attaining the objectives of this Plan. **The goals listed below are not intended to be mandates for any municipality, and they shall not be used as the basis for denial, or recommendation of a denial, of any development proposal, including projects with a substantial regional impact.**

- Locate at least fifty percent (50%) of new residential dwelling units in Center Areas defined on the Future Land Use Map.
- Locate at least fifty percent (50%) of new or renovated commercial floor area in Center or Enterprise Areas.
- Increase the county-wide supply of workforce housing.
- Reduce the rate of fragmentation of agricultural and forest lands in the Rural and Working Lands Areas.
- Increase the number of public road miles in Center Areas served by appropriate pedestrian infrastructure. In rural settings, this may include expanded/wide shoulders, trail networks, and off-road paths.
- Maintain and improve wildlife connectivity, as measured through the following:
  - Increase the percentage of conserved or protected land within identified wildlife corridors
  - Increase the percentage of culverts within identified wildlife corridors utilizing aquatic organism passage (AOP) design features.

As noted above, these goals are intended solely for the purpose of measuring progress toward the objectives of this Plan, and **shall have no regulatory effect**. If, upon evaluation, a goal is not met, it could signify:

- **A need to reevaluate State, regional, or local policies that may inhibit achieving the goal.** For example, if less than 50% of new residential dwelling units are located in Center Areas, this could signify a need to revise State wastewater rules to allow more extensive alternative wastewater treatment technology and/or management structures, as outlined in the “Land Use and Infrastructure Limitations” discussion below.
- **A need to reprioritize funding to meet the Goal.** For example, if less than 50% of new and renovated commercial floor area is located in Center or Enterprise Areas, this could signify a need to prioritize funding for wastewater, water supply, transportation, and telecommunications infrastructure serving these areas.
- **A need to reexamine the goals.** For example, if Centers are inhibited by flood hazards or already developed to build-out capacity, such that new development cannot occur, this could signify a need to identify safer areas for new Center or Enterprise Areas.

## POLICIES & ACTION ITEMS

*Policy: Infrastructure investments, transportation improvements, and location of public buildings should reinforce the objectives of the Regional Plan. Future development should be directed to areas served by water and wastewater and other public infrastructure.*

### Action Items:

- Coordinate and educate municipalities to plan for controlled and guided growth, through use of locally appropriate tools such as municipal plans, infrastructure inventories and assessments, capital budgeting, public grants and loans, and innovative financing structures.
- Development and maintenance of modern infrastructure systems, including multi-modal roads, water supplies, wastewater systems, and diverse energy sources, with priority given to infrastructure that supports development and redevelopment of Center and Enterprise Areas.
- Support expansion of telecommunication and broadband networks to serve all areas of Lamoille County.
- Infrastructure upgrades and extensions serving Center Areas should receive the highest priority for public funding. Efforts to extend water and sewer lines beyond Center Areas and/or outside established sewer service areas should be reviewed with consideration for the long-term growth and developmental impacts associated with expanded service areas as well as planning tools and bylaws in place to prevent strip development or undue adverse impacts on natural resources. Appropriate planning tools, such as zoning or subdivision bylaws containing provisions to prevent strip development, should be in place prior to undertaking sewer or water line expansion beyond Center Areas or immediately adjacent Enterprise Areas.
- LCPC may support inter-municipal sewer line extensions that connect Center Areas in one municipality to wastewater treatment facilities with excess capacity in another, provided such extensions are supported by the legislative bodies of all impacted municipalities, and measures are in place to minimize strip development between the Centers.
- LCPC will not support the relocation of community “anchors” which may include, but not be limited to, the following: municipal offices, schools, post offices, churches, general stores, etc., outside of Center Areas.
- New and expanded State, County, and Federal offices and other facilities (excluding maintenance facilities, garages and similar uses) shall be located in Center Areas.
- LCPC supports exploration and development of innovative wastewater treatment options, including, but not limited to, development of decentralized wastewater systems.
- As an alternative to wastewater infrastructure, LCPC supports municipal efforts to develop community wastewater management districts serving Center Areas and/or to develop low-interest loan programs for septic repair and upgrades.
- LCPC supports revisions to the State Environmental Protection Rules to encourage greater use of “Innovative/Alternative Systems and Products” and waterless waste treatment options.
- LCPC will work with the VT Agency of Natural Resources for allocation reform to ensure that the reserved capacities of its member municipalities’ sewer plants are more closely aligned with the actual operating capacity.
- LCPC will work with the VT Agency of Natural Resources, interested municipalities, and other Regional Planning Commissions to make State Wastewater Revolving Loan Funds available to capital projects within locally defined wastewater management districts.

- The VT Agency of Transportation must consider land use impacts of transportation projects, as outlined in the discussion of the Future Land Use Map.

**Policy:** *Land use and development should reflect site specific environmental limitations. The density and intensity of development should conform to the limitations of the land and available public services. Higher densities and more intensive uses should be located in Center and Enterprise Areas, while lower densities and less intensive uses should be located in Rural and Working Land Areas.*

**Action Items:**

- Land development planning should take into account the capability of the land as it relates to topography and soil limitations, areas of steep slopes, and poorly drained or unstable soils. These areas should remain in resource or recreational use or at most accommodate low densities.
- In areas where fragile characteristics have been identified, development should be discouraged unless it can be shown that these assets will not be unduly altered or harmed. These areas may include, but are not limited to, high elevations, steep slopes, wetlands, floodplains, threatened and endangered species, or wildlife habitat, such as deeryards, bear masts, and core forest habitat.
- New development outside of Center Areas should be discouraged from areas prone to significant flooding unless adequate measures to reduce flood damage have been made, as outlined in the Watersheds and Flood Resiliency Chapters. Flood prone areas that also contain agricultural soils should receive high priority for protection associated with off-site mitigation from other sites within Lamoille County.
- New on-site and municipal sewage treatment facilities should be sited outside of the FEMA- delineated 100-year floodplains, to the greatest extent feasible, to mitigate the environmental impacts of flooding. If wastewater sewage treatment facilities must be located in the 100-year floodplain, they should be elevated or floodproofed to at least two feet above the base flood elevation.
- Encourage municipalities to adopt Wellhead Protection Areas (WHPAs) and Source Protection Plans (SPPs) to preserve the quality of local water supplies.

**Policy:** *Encourage future growth within Center and Enterprise Areas while discouraging strip development along transportation corridors.*

**Action Items:**

- Development related to the recreation and travel industry should be encouraged in both Center and Enterprise Areas. Recreational development must give consideration to off-site impacts to host and neighboring communities such as transportation and the availability of affordable housing for employees.
- Especially in Center Areas, encourage a mixture of housing opportunities to meet the needs of diverse County residents.
- To discourage strip development and maximize efficient use of the existing capacity of the regional transportation network, LCPC will work with municipalities to explore and implement measures such as access management policies that encourage or require use of shared access and parking, development of access management plans under 24 VSA § 4432(1), capital planning for bicycle/pedestrian improvements and local park-and-rides, site plan review that includes specific standards for signs, lighting, parking etc., context sensitive design, design review of form based codes, and/or limiting non-residential uses along corridors in rural areas.
- In determining whether or not a development constitutes “strip development,” the District Commission must consider the following:

- The unique topography of Lamoille County which is characterized by narrow valleys bounded by rivers and steep mountain slopes and which has resulted in a traditional development pattern of town and village centers that are linear in nature; and
- The need to foster development that supports the working landscape, such as sawmills, stock yards, feed stores, agricultural processing plants, and equipment repair/supply that are more appropriate to locate in Rural and Working Lands Areas; and
- The diverse, alternative means of providing pedestrian access and non-motorized connectivity in rural settings, including trail systems, expanded shoulders, and multimodal paths, such as the Lamoille Valley Rail Trail and the Stowe Recreation Path.
  - Connect Enterprise and Center Areas to the regional public transportation network.
- Support redevelopment and reuse of existing vacant or underutilized structures and industrial and brownfield sites whenever possible.
- Work with municipalities to develop bylaws that reduce the appearance of “strip development” along state highways, facilitate infill and redevelopment in areas of existing strip development rather than extension of strip development, and minimize pressures for additional strip development in adjacent municipalities.
- LCPC should encourage minor revisions to Vermont Neighborhood Development Area (NDA) program rules to make the designation more effective in rural areas. Such revisions include:
  - Allowing NDAs to be created in areas served by either public water OR public wastewater (as opposed to both, which is current practice).
  - Allowing NDAs in areas where the municipality or private developer is implementing creation of a community wastewater system or a wastewater management district.
  - Allowing NDAs in communities without zoning provided the community has adopted subdivision bylaws that require developers to meet all of the density and design standards of the program.

**Policy:** *In addition to impacts and benefits to the host municipality, development must consider impacts on other municipalities and regional resources and infrastructure.*

**Action Items:**

- In the development of local plans and bylaws, municipalities are encouraged to incorporate issues and concerns common to neighboring communities in the region.
- Work with municipalities and adjacent regions to better coordinate land use planning efforts.
- Future growth should not significantly impair the public recreational opportunities of waters, open lands, or woodlands or destroy or threaten areas of significant historical, educational, cultural, endangered, scientific, agricultural, silvicultural, architectural, or archaeological value.
- Future development must not place an undue burden on the ability to provide public and community services, such as schools, roads, water, sewer, emergency access, etc. Where such services are impacted, including services that are provided by entities other than the host municipality, the developer should be required to provide financial or other mitigation.
- LCPC will provide information and assistance to proposed projects and developers on issues that are of local, regional, interregional, and statewide concern.

**Policy:** *A diverse array of tools should be utilized to maintain the County’s working landscape.*

**Action Items:**

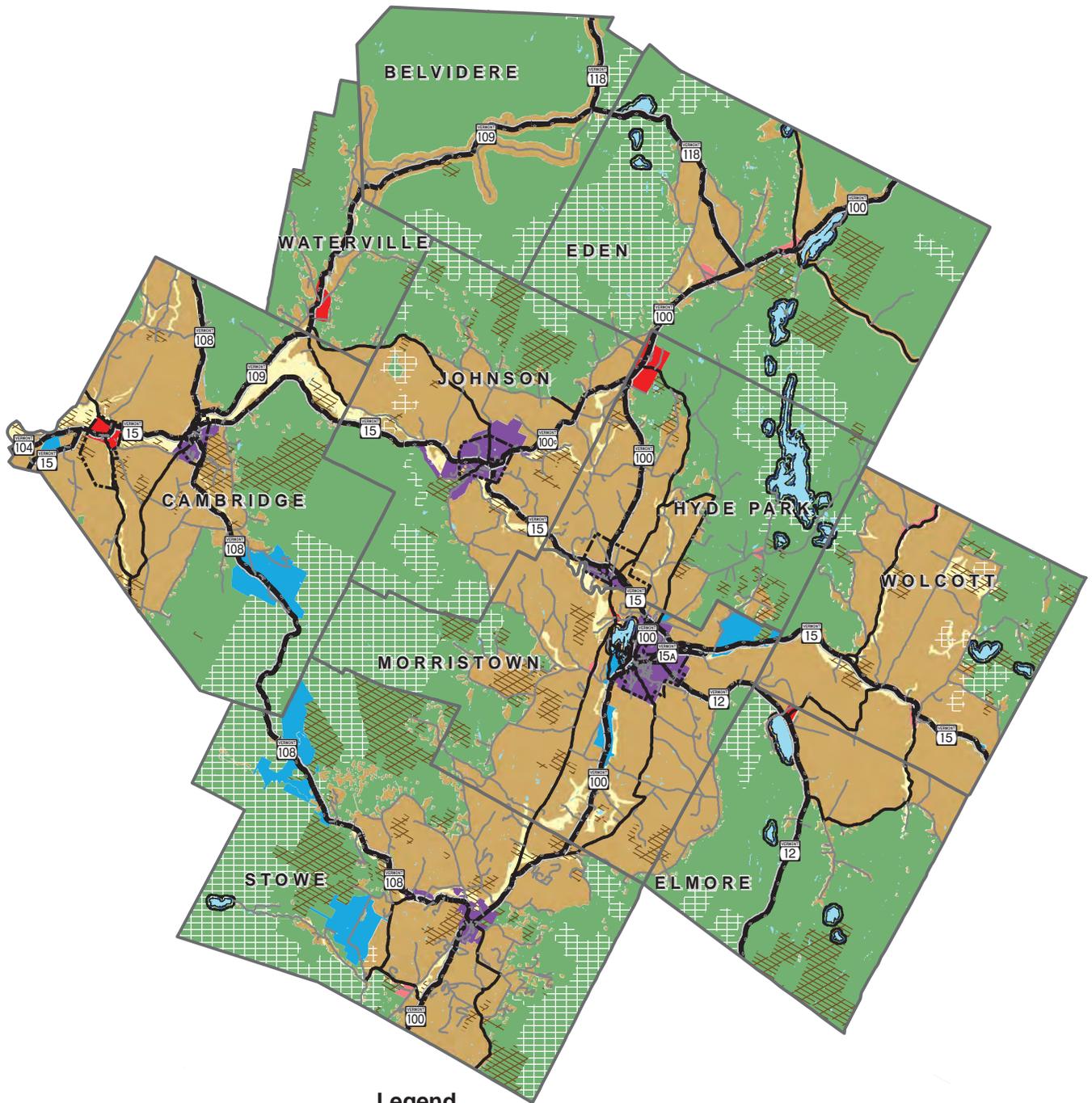
- Encourage and promote the implementation of a range of conservation concepts in planning; i.e., the transfer and/or purchase of development rights, land trusts, conservation easements, covenants, land use tax incentives, and clustering to allow for the retention of open space whether it is scenic vistas, agricultural lands, wildlife management areas, public lands, etc.
- Encourage the use of transfer of development rights, purchase of development rights, and similar planning tools to:
  - Encourage higher density development in Growth Areas
  - Protect agricultural and forest resources in Rural and Working Land Areas
- To reduce development pressures on Rural and Working Lands, encourage development in Center and Enterprise Areas. In Center and Enterprise Areas, LCPC may provide comments through the Act 250 process regarding appropriate circumstances for off-site mitigation, as outlined in the Future Land Use Map, regardless of whether the project meets the definition of a substantial regional impact.
- Target the Working Lands Area for protection associated with off-site mitigation from other sites within Lamoille County. In order to ensure that off-site mitigation best meets the needs of local communities, off-site mitigation payments may be made to local Land Trusts with proven records of land conservation and ongoing stewardship.
- In Rural and Working Lands Areas, protect the viability of agriculture and forest lands by supporting development designed to mitigate the impacts from parcel fragmentation and to provide continued accessibility to resource lands. When development of agricultural and forest lands occurs, development should be clustered in such a way so as not to negatively impact the continued viability of any remaining or adjacent agricultural operations. Consideration should also be given to the loss of open space and recreational resources when developing agricultural and forest lands.

**Policy:** *Increase the amount of “shovel ready” land for industrial development served by sufficient infrastructure. Such land should primarily be located in Enterprise Areas or within Center Areas as appropriate based on local planning goals.*

**Action Items:**

- Inventory and map existing industrial areas to assess regional capacity for expansion.
- Identify infrastructure limitations to support industrial development in Enterprise Areas and Center Areas. Assist municipalities in pursuing funding and financing to address these limitations, provided such investments support the three primary land use objectives described in this section.
- Work with owners and operators of existing intensive uses, such as gravel pits and other earth extraction industries, to determine if future industrial uses may be incorporated in long term remediation of the site.
- Within zoning districts designated primarily for industrial development, municipalities are encouraged to consider allowing some industrial uses as permitted uses rather than conditional uses. In such areas, municipalities should also consider measuring performance standards such as noise from the boundary of the industrial district rather than property lines within the district.

# Future Land Use Lamoille County



## Legend

-  Center with Water and Wastewater Infrastructure
-  Center with Water Infrastructure
-  Center without Water or Wastewater Infrastructure
-  Enterprise
-  Rural and Working Land
-  Working Lands - Floodplain
-  Working Lands - Forest
-  State Forest
-  Other Conserved Lands
-  Shoreland



## Data Sources:

Political Boundaries: VCGI, 1991.  
 Roads: 1:5000 E-911 Road Data, 2014.  
 Future Land Use: Digitized by LCPC, 2015. For more details on methodology, see Land Use chapter of 2015 Lamoille County Regional Plan.

Created 8/03/15 by LCPC. Map is for planning purposes only, not for regulatory interpretation.

# Agricultural Soils

## Lamoille County



- Prime Ag Soils
- Statewide Soils

### Data Sources:

Political Boundaries: VCGI, 1991.  
 Roads: 1:5000 E-911 Road Data, 2014.  
 Surface Water: VCGI for VHD-USGS, 2001.  
 Soils: USDA-NRCS soil maps, VCGI, 2007.

Created 7/30/15 by LCPC. Map is for planning purposes only, not for regulatory interpretation.

## Land Use: Background and Inventory

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Lamoille County's existing land use patterns are heavily shaped by the region's underlying topography and geography, as well as its transportation network and historic decisions related to infrastructure investments. The County is bounded to the west by the Green Mountains, including Mount Mansfield, Vermont's highest peak, and to the east by the Worcester Range. The County is then bisected by the Lamoille River and its tributaries. This topography of narrow river valleys bounded by steep mountain slopes has resulted in a settlement pattern that differs greatly from those found in the gentler landscapes of the Champlain and Connecticut River Valleys.

The transportation network has also had a profound impact on land use in Lamoille County. Route 15 (east - west) and Route 100 (north - south) are the primary transportation corridors through the region. Lamoille County is the only region in northern Vermont that does not contain an interstate highway (I-89 in Chittenden County and Northwest Vermont Regions and I-91 in the NVDA region). The region was also once served by the now defunct Lamoille Valley Railroad.

By necessity, most existing settlements in Lamoille County developed along transportation networks such as roads and railways. While linear in nature, most of the settlements constructed in the 1800s and early 1900s were compact in nature. Most regional and local anchors, such as schools, municipal offices, general stores, places of worship, and Courthouses, are still found in these settlements. Lands surrounding these settlements were, and continue to be, utilized for agriculture, forestry, and earth resource based enterprises.

Many of these settlements were created before modern plumbing technology. In some areas, Village governments appeared to foster development of local wastewater and water infrastructure – which are essential to tightly knit, mixed use development patterns. In the mid 1900's, better understanding of clean water needs resulted in development of public wastewater systems in Jeffersonville, Johnson Village, Morrisville, Hyde Park Village, and Stowe. Many of these systems have excess capacity, creating opportunities for infill within Center Areas, but also present potential cost challenges to existing customers who must carry the cost of this unused capacity.

With the advent of the automobile, new auto oriented development has occurred on the periphery of many existing settlements. In addition, the allure of a rural lifestyle and the draw of housing that is markedly more affordable than many surrounding regions have led to low density housing development scattered through rural areas of the County. Growth in rural areas places additional demands on local transportation networks and emergency response services and can also result in fragmentation of working lands and natural resources. These trends are discussed in greater depth in the Housing and Working Lands Chapters.

While Lamoille County's challenging topography and isolation from major transportation networks have created challenges for development, they have also provided opportunities for the travel and tourism industry. Two of Vermont's largest ski resorts, Stowe Mountain Resort and Smugglers' Notch Resort, are located on the western end of the County. Both resorts have major base lodge areas and have contributed to development of ancillary travel and tourism development along Route 108. Smaller recreation destinations are also found scattered throughout the region's rural landscape.

## Land Use and Infrastructure Limitations

For economic growth and development to reach its full potential in Lamoille County, infrastructure needs must be met. This includes adequate water systems, sewage capacity and sewer systems, the availability of three-phase power, the availability of affordable energy, access to roads and bridges, and broadband internet capabilities. This infrastructure not only sparks development but also enhances Lamoille County's attractiveness to current and future residents by allowing residents to expand their employment opportunities through telecommuting or home-based businesses. Further discussion of road infrastructure improvements can be found in the Transportation Chapter, energy and electricity can be found in the Energy Chapter, and broadband capability can be found in the Telecommunications Chapter.

Development can only occur where there is adequate infrastructure to support it. Infrastructure considerations include the location of parking, power, wastewater treatment systems, and water supply. The Future Land Use Map categorizes Center Areas based on the availability of wastewater and water infrastructure. For this section, Working Lands means agricultural and forest land.

### **Parking**

While sometimes thought of as a private responsibility, parking is an important component of infrastructure. Parking can be a highly land consumptive land use, but is one that is essential for economic development. Land beneath a parking lot cannot be used for new structures, cannot host an on-site wastewater system, and does not pay fees for water or wastewater. Concentrating parking in central areas such as shared lots (public or private) and on-street parking can provide for the parking needs of businesses in Center Areas while freeing up land for other forms of development. In more urban areas, this may allow new or expanded buildings. In Centers without wastewater, offsite parking arrangements may provide more room for onsite septic systems on land that would otherwise be needed for parking lots.

### **Wastewater Treatment Systems**

During the 1960s, Vermont began an aggressive campaign to clean up the state's lakes, rivers and streams. At the time, a major source of pollution was untreated sewage, which was commonly discharged directly into many bodies of water. Throughout the 1970s and 80s, Lamoille County municipalities invested heavily in wastewater treatment systems. These primary treatment facilities removed much of the toxic nature of the effluent and significantly improved water quality in local rivers.

As communities in Lamoille County plan for the future, wastewater treatment facilities will continue to play a key role in encouraging compact development and attracting many types of industrial uses. As technology has evolved, municipalities now have an array of options when installing new systems, or upgrading and maintaining existing systems. This flexibility allows communities to tailor systems to meet their budgetary and land use needs. Today, water quality standards are stricter and include provisions for quantity of nutrient loading- specifically nitrogen, phosphorous, and ammonia. Improved wastewater plants in Stowe and Johnson are examples of some of the more advanced systems available to communities. In addition, it is possible that the US Environmental Protection Agency will mandate additional phosphorous removal as part of the Lake Champlain Total Maximum Daily Load (TMDL) cleanup plan. Such a mandate would likely require many systems, including those meeting and exceeding existing Federal water quality standards, to undertake expensive upgrades. Many wastewater treatment facility operators have indicated that more cost effective alternatives for reducing phosphorous loading in Lake Champlain exist, such as better managing stormwater and non-point source pollution

Presently, there are five municipally-owned treatment plants and one large, private sewage system in Lamoille County:

- *Hyde Park Wastewater Treatment System:* A Village system constructed in 1970, equipped with two septic tanks (combined capacity of 55,000 gpd) and a pair of leach fields. Based on recently revised sewage allocations, the system has additional capacity to accommodate commercial customers.
- *Jeffersonville Wastewater Treatment Plant:* An aerated lagoon system constructed in 1989, with a 77,000 gallon per day (gpd) capacity. The plant is operated by the Jeffersonville Village Trustees and any property within the Village may apply to connect. About 50-60% of the system's capacity is currently unused; meaning, if making a conservative estimate, about 35,000 gpd is available for future development. This represents a significant opportunity for new development within the Village and Service Area. The Village Trustees have identified the need for a new aeration system, and are also investigating ways to reduce the facility's energy consumption.
- *Johnson Wastewater Treatment Plant:* A sequential batch reactor facility installed in 1996, serving Village and Town residents within a designated service boundary. Connecting to the system is required of all new development within 100 feet of an existing sewer line. System capacity is estimated at 270,000 gpd and is sufficient to accommodate projected growth within, and adjacent to, the service boundary. The Village has been able to replace older sewer mains as part of other projects at relatively low cost. The Town and Village entered into an inter-municipal agreement to extend sewer service onto specific mapped areas of the Town.
- *Morrisville Wastewater Treatment Plant:* Constructed in 2009, the new Morrisville Wastewater Treatment Plant increased operating capacity by nearly 30% over the previous system, to an estimated 425,000 gpd. The Village has room to accommodate any reasonable 20-year growth projection and is actively looking to expand its line capacity and number of connections.
- *Stowe Wastewater Treatment Plant:* A sequential batch reactor system installed in 1980 and later upgraded in 2003, the plant is equipped to process up to 1 million gpd. The plant is operating at approximately 30% capacity; however, a vast majority of the remaining system capacity is committed to Stowe Mountain Resort for future expansion. As a result, the plant has only 5% reserve capacity remaining.
- *Smugglers' Notch Resort Wastewater Treatment Plant:* A privately-owned aerated lagoon system installed in 1985, with a capacity of 160,000 gpd. The plant consists of four lagoons and additional bio-enhanced treatment (a "living machine technology"), with the effluent disposed of by spray irrigation.

Note that in some Centers, wastewater and water capacity is available, but has not been extended to serve the full Center. Land use patterns can play a role in maximizing use of existing capacity and reduce costs. Allowing higher densities and mixed uses allows more customers to connect to the distribution system and may reduce the per customer costs of water and sewer line extensions within these Centers. Infill, including redevelopment of existing structures and construction of new structures, is highly encouraged in Centers served by water and wastewater.

Households and businesses in Lamoille County not serviced by a municipal sewer treatment facility must have an on-site septic system or connect to another private system, with design and performance regulated by the Vermont Department of Health.

As demonstrated by the Future Land Use Map, many Centers in rural communities are not served by municipal wastewater systems. With no municipal sewer service, the potential for denser, mixed use development is greatly limited. Despite the limitations created by lack of wastewater, there is still potential for some small-scale businesses in these Center Areas. Certain commercial uses, such as offices and retail stores, require significantly

less wastewater capacity than residential uses, making commercial use of existing structures on small village lots a viable option (see Table 3-23 below).

Table 3-23. Wastewater Capacity for Residential and Non-Residential Use

Business Type	Use equivalent 1-bedroom	Use equivalent 3-bedroom
Office	9 employees	28 employees
Day Care Facility (no meals)	2 care providers, 7 children	4 care providers, 24 children
Day Care Facility (1 meal)	1 care provider, 6 children	3 care providers, 18 children
Doctor’s Office	2 staff, 7 patients	4 staff, 28 patients
Retail store	9 employees	28 employees
Restaurant, Tavern, or café	4 seats	12 seats

Source: Vermont Environmental Protection Rules

As a result, property owners could conceivably develop new, small businesses in existing buildings and lots within wastewater constrained Center Areas. Nonetheless, the table also demonstrates the limits of this option. For example, it would be difficult to develop even a moderately sized café without additional wastewater capacity.

There are a variety of tools available to municipalities to overcome these limitations, including;

- Developing “decentralized” wastewater treatment systems.** A decentralized system refers to a wastewater treatment system that relies on a mixture of community septic (similar to the system utilized by Hyde Park Village) and on-site wastewater systems. The Town of Wolcott has been actively investigating creating a “decentralized” wastewater treatment system to serve the Village Area. The Town has conducted several studies which has identified potential sites that could support a system serving the existing Village and providing some capacity for future development. Similar systems may also be feasible in other rural Villages. Due to the small population and limited grand list of many rural communities, it is likely that outside funding would be necessary to construct any such system
- Structure land use bylaws to maximize use of existing capacity:** As demonstrated in the table above, a small office, store, or even a mixed use building with commercial space and a single bedroom apartment requires less wastewater capacity than a three bedroom single family home. Allowing and encouraging certain types of mixed use development, especially if it involves renovation of existing structures, may reduce demands on existing on-site wastewater treatment systems.
- Develop Wastewater Management Districts:** Wastewater management districts are an alternative to developing a municipal sewage system. While not widely utilized in New England, municipalities in other areas of the country have organized Wastewater Management Districts in which the municipality ensures proper maintenance of existing on-site wastewater systems. These districts may be funded through special tax assessments or user fees (similar to fees paid by sewer system customers). Since lack of regular maintenance is a major contributor to failing septic systems, such districts can extend the life of existing systems, help to preserve wastewater treatment capacity, and prevent groundwater contamination caused by failing systems. Some wastewater management districts offer low interest loans for replacing wastewater systems.
- Facilitate agreements between private property owners:** State on-site sewage regulations require setbacks from property lines for leach fields and other system components unless an easement is granted by the adjacent property owner. Given the small size of many Village lots, this represents a major barrier to

enlarging existing on-site systems or creating new ones. In some cases, soils may be available to create a small system serving 2-3 structures. Municipalities may be able to facilitate agreements between willing property owners to either grant easements or construct shared wastewater systems. The municipality's oversight may provide some assurance that the responsibilities and rights of both parties are maintained. A similar alternative could include constructing septic systems serving municipal buildings with additional capacity to allow for future shared use agreements with other properties in the district.

- **Explore alternative treatment options:** State EPRs allow for "innovative" and "alternative" wastewater treatment options. Such systems range from "pre-treatment" such as recirculating sand filters to composting toilets and greywater recycling. These systems may function on less favorable soils and/or less space than traditional leach fields and mound systems. Given that these systems are not necessarily used with great frequency, residents may not be aware that they are available. Municipalities may consider having information such as the list of approved innovative systems and relevant contact information available at municipal offices.

### **Water Supply**

Access to a potable water source is needed for residential living, agriculture, commerce, and industry. At the municipal level, water supplies are critical to fighting fires and protecting public health. Presently, there are six municipal water systems and four co-operative systems that service Lamoille County residents. Households that do not connect to a municipal system maintain a private well or are connected to a private distribution system, such as that of a mobile home park or residential subdivision. Any system with at least 15 connections, or which services 25 or more individuals for at least 60 days per year, is officially classified as a "public water system" and subject to regulation by the Vermont Department of Health.

Public water systems were first put into place primarily for two reasons. The first is to bring clean water from rural springs to the urbanized areas to protect public health from water borne diseases. By requiring proper sanitation and providing clean water, epidemics from water related sicknesses have been all but eliminated. The second reason to develop public water systems was for firefighting. Many systems in Lamoille County were developed following major fires or in an effort to protect against one.

### **Municipal Water Systems**

Municipal water systems are owned and operated by the municipalities they serve. With the exception of Department of Health permitting for water quality, pumping rates and schedules for drilled wells, their operations are directed by the local legislative body or designated board. This includes facility maintenance and replacement, allocation of capacity, and service area expansion. Municipal water systems are:

- *Village of Cambridge Water System (WISD #5149):* Installed in 1974-75, the Village of Cambridge system serves approximately 120 connections and has a storage capacity of 100,000 gallons. It services the incorporated Village of Cambridge, with system management contracted to a private consultant. Water for the Cambridge system is supplied from both a primary and back-up well, sited on Village-owned property. The Village recently purchased a forested property covering the well shield of the back-up well. While this public ownership creates a partial wellhead protection area (WHPA), there are no existing land use regulations to protect the full well shield. The Village also owns legal rights two springs on private land in South Cambridge. The Village has no plans of extending service beyond the Village boundaries and carefully reviews all new connections, due to capacity limitations.
- *Village of Hyde Park Water System (WISD #5154):* Installed circa 1900, the Hyde Park system serves 200 connections, with a storage capacity of nearly 270,000 gallons. Operated by the Hyde Park Water & Light Department, service is provided within the Village limits and to a small number of properties along the supply

line from Fitch Hill Reservoir. New connections are left to the discretion of the Village Trustees. The WHPA is protected by local zoning bylaws, limiting the character and density of development within the entire watershed. The system is adequate to serve current and future residential needs. However, additional reserve capacity and pressure may be needed to support fire suppression systems required in larger commercial development.

- *Village of Jeffersonville Water System (WISD #5150)*: Originally installed in 1910 and later upgraded in 1984, the Jeffersonville system serves an estimated 200 connections, with a storage capacity of 700,000 gallons. Service is available to any property within the Village boundaries; water for the system is supplied by two local springs. While both WHPAs are identified in the Jeffersonville Municipal Plan, neither is protected by zoning or land acquisition. The Village is currently working to upgrade the size of the water mains in the Village core to allow additional pressure.
- *Village of Johnson Water System (WISD #5156)*: First installed in 1895, with major upgrades completed in 2006, the Johnson Village Water System serves 330 connections, with a storage capacity of approximately 530,000 gallons. Operated by the Johnson Water & Light Department, service is available to residents within the Village limits and new connections are permitted by the Village Trustees on a case-by-case basis. The Village owns two wells—the French Hill Surface supply and Nadeau well. In 2003-04, the Village acquired property where a new water supply well was drilled and tested. The WHPA for the new well is owned by the Village and state, and is therefore protected.
- *Village of Morrisville Water System (WISD #5160)*: Installed during the late-1800s, the Village of Morrisville Water System is the largest in Lamoille County, serving 1,200 connections, with a storage capacity of more than 2 million gallons. Operated by the Morrisville Water & Light Department, the system serves residents of the Village and portions of town along Vermont Routes 100, 15, and 12. The water service area can be expanded at the discretion of the Village Trustees. The Village owns three wells, although only Well #3 is used as a primary source. Each well is protected by local zoning and through the purchase of properties within the WHPA. The Water & Light Department has significant capacity for expansion and is open to opportunities to supply new connections. In 2007 a bond vote authorized the construction of a high service water storage facility (i.e. a replacement reservoir) adjacent to the current 500,000 gallon reservoir. According to the Morristown Municipal Plan, the most important considerations for the Village water system are to protect the water sources, identify and correct system losses, ensure proper water pressure, and upgrade the aging distribution system (several areas are 80-95 years old).
- *Stowe Village Water System (WISD #5163, 5164)*: Installed during the late-1800s and upgraded in 1997, the system serves more than 500 connections with an estimated storage capacity of 1.7 million gallons. Operated by the Town of Stowe Water Department, the system serves the unincorporated Stowe Village and properties along Mountain Road (Vermont Route 108) up to Stowe Mountain Resort. Stowe does not have a fixed water service area; anyone within proximity of a water main may apply to hook onto the system. Water is supplied by two wells—Edson Hill #2 and the Village Green Well. Each has an approved Source Protection Plan.
- *Smuggler's Notch Water System (WSID5151)*: The Smugglers' Notch Management Company owns and operates a public community water system serving Smugglers' Notch Resort. The village section of Smugglers' Notch was developed in the 1960's and has been expanding since that time. Smugglers' Notch Management Company approximates that two thirds of the domestic water currently used by the Smugglers' Notch village comes from 8 drilled wells, with the balance coming from a surface source within lands owned by the State of Vermont. This surface water source also provides water for snowmaking purposes and fire protection. The Smuggler's Notch Water System Well Head Protection Area is located in the Town of Cambridge.

## **Fire Districts**

Municipal fire districts are created by a municipality's legislative body, upon the application of 20 or more residents, to provide for a variety of fire protection needs, including the construction and maintenance of water works (20 V.S.A §171). By Vermont Statute, municipal fire districts are operated by a Prudential Committee, elected by vote of the district members. In Lamoille County, there are nine incorporated municipal fire districts with license to operate public water systems, including:

- *Hyde Park Fire District #1* (WISD #5153): Established in 1958, with an estimated 12,000 gallon storage capacity, this system services the unincorporated village of North Hyde Park and the North Hyde Park Industrial Park. Capacity is sufficient to accommodate the build-out of the remaining eight lots within the industrial park.
- *Stowe Fire Districts #2* (WISD #5168): Formed in 1987 as a merger between two privately owned water systems, Fire District #2 serves Gold Brook Circle, Wood Road, and portions of Dewey Hill and Gold Brook Road. The system has limited expansion capacity.
- *Stowe Fire District #4* (WISD #5523): Formed in 1993 to serve the needs of the Glen Brook area of Mansfield View properties. The system was previously unreliable, but underwent major upgrades in 2008, including the installation of new waterlines and the addition of a back-up generator. Like Fire District #2, Fire District #4 also has limited capacity for expansion.

In addition, other smaller fire districts within Lamoille County include Stowe Fire District #1 (inactive), and Stowe Fire District #3 (operated by the Stowe Water Department), Morrisville Fire District #1, and Waterville Fire District #1. In the future, it is possible that one or more private water systems within the county could apply to become municipal fire districts.

### **Cooperative Systems**

Water cooperatives are private, non-profit organizations created to administer a public water system. There are three such systems in Lamoille County:

- *Cadys Falls Water Cooperative* (WSID #5159): Serving 19 connections in the Cadys Falls area of Morristown, the system was installed in 1947 and has a storage capacity of 3,500 gallons. The Town of Morristown and Village of Morrisville are jointly planning the construction of a waterline connecting Cadys Falls to the Village of Morrisville Water system. Funding for said waterline was approved on the 2015 Morristown Town Meeting ballot.
- *Elmore Water Cooperative* (WSID #5152): Installed in 1950 and later upgraded in 1985, the system has a 4,300 gallon storage capacity and services approximately 20 connections in the Lake Elmore village area. In 2011, the Town of Elmore passed a bond vote to upgrade Elmore Water Cooperative and incorporate it as a municipal system. In the coming years, the town anticipates developing regulations and establishing a water district, which may extend beyond the current cooperative boundaries.
- *Morristown Corners Water Cooperative* (WSID #5158): Serving more than 50 connections in the Morristown Corners neighborhood, the system was built during the 1940s and has a storage capacity of nearly 35,000 gallons.

### **Smart Growth vs. Strip Development**

Many of Vermont's land use objectives and regulations are intended to discourage "strip development" while encouraging "smart growth". Strip development is a highly land consumptive development pattern in which single use structures, usually for commercial uses, line a highway. Strip development has the potential to negatively impact natural resources and fragment natural resources. Due to the reliance on single occupancy automobiles and

### Vermont's smart growth principles:

1. Maintains the historic development pattern of compact village and urban centers separated by rural countryside.
2. Develops compact mixed-use centers at a scale appropriate for the community and the region.
3. Enables choice in transportation.
4. Protects the State's important environmental, natural, and historic features, including natural areas, water quality, scenic resources, and historic sites/ districts.
5. Strengthens agricultural and forest industries; minimizes conflicts of development with these industries.
6. Balances growth with the availability of economic and efficient public utilities / services.
7. Supports a diversity of viable businesses in downtowns and villages.
8. Provides for housing that meets the needs of a diversity of social and income groups in each community.
9. Reflects a settlement pattern that, at full build-out, is not characterized by:
  - a. Land consumptive, scattered development outside compact urban and village centers;
  - b. Development that limits transportation options, especially for pedestrians;
  - c. Fragmentation of farm and forestland;
  - d. Development not serviced by municipal infrastructure or requiring extension of municipal infrastructure across undeveloped lands outside compact centers;
  - e. Linear development along well-traveled roads and highways that lacks depth.

individual access points, strip development can also burden the regional transportation network by creating unnecessary turning movements that could be avoided if accesses were better managed and consolidated and other modes of transportation were utilized.

To date, Lamoille County has managed to avoid the most negative aspects of strip development. While the North End of Morrisville is an auto-oriented area, the municipality and private developers have created a grid network of streets and installed pedestrian infrastructure which may allow infill to occur over time. Several municipalities have created planning areas along State highways that direct new development into "nodes" rather than strips along the highway or require shared access for new developments and subdivisions.

Smart Growth stands in contrast to "strip development". While strip development refers to low density, disconnected development scattered along a roadway and accessible only by automobile, Smart Growth envisions centers, nodes, and clusters of development accessible by pedestrians and cyclists as well as cars. These centers may include a mix of uses, allowing someone to easily walk from home to work and then to services. Where strip development is "long," smart growth is "deep."

Lamoille County's topography of narrow river valleys surrounded by steep mountain slopes, coupled with the lack of infrastructure in many centers, creates inherent limitations to the denser, deeper development patterns that typify smart growth. As a result, many of the existing settlements in Lamoille County are linear in nature.

*Vermont Statute defines "strip development" as:*

***linear commercial development along a public highway that includes three or more of the following characteristics: broad road frontage, predominance of single-story buildings, limited reliance on shared highway access, lack of connection to any existing settlement except by highway, limited accessibility for pedestrians, and lack of coordination with surrounding land uses in terms of design, signs, lighting, and parking***  
*(10 V.S.A. § 6001(36))*

State policy makers must recognize that the dense, multi-block pattern seen in regions with gentler topography may not be achievable in much of Lamoille County. Even so, there are some steps municipalities can take to implement "smart growth principles" (box at left) even in rural settings with multiple limitations, including:

- Reducing or eliminating frontage requirements and setbacks to allow more densely built development.

- Allowing multiple uses within a single structure without requiring additional land area.
- Using alternatives to minimum lot size to regulate the intensity of development, such as lot coverage and floor to area ratio.
- As locally appropriate, allowing multiple principal uses per lot to replicate the traditional “running ell” and “carriage house” development pattern found in many villages.
- Reducing and eliminating parking requirements, and allow alternative arrangements such as shared peak parking and offsite parking. Where feasible, construct common or municipal lots or on-street parking.

### **Brownfields Redevelopment**

Brownfield contamination sites are scattered throughout Lamoille County. The use of chemical compounds used at, stored onsite, or transferred to sites may lead to contamination. This includes old gas stations, foundries, or dry cleaners and other industrial sites often found in historic villages and downtowns or along the rail bed of the former Lamoille Valley Railroad.

Brownfields contamination can substantially hamper redevelopment of these areas. Developers and businesses avoid these sites due to potential liability. Left unaddressed, brownfields sites are often underutilized and may fall into disrepair. As this occurs, they can devalue an entire Main Street or neighborhood.

LCPC has been an active participant in the Environmental Protection Agency's (EPA) Brownfields Program since 2005. The program provides Federal funding for assessing and remediating brownfields. Property owners who are not responsible parties to contamination and undertake prescribed remediation receive protection from liability.

Once remediated and redeveloped, brownfields have the potential to become valuable to the surrounding community. Redeveloped properties not only generate tax revenues, jobs, and stimulate economic growth, but they also turn blighted sites into places that are both productive and aesthetically pleasing or attractive. Examples of successful brownfields redevelopments include:

- **Arthur’s Department Store** – Located on Main Street in Morrisville, Arthur’s served as the anchor of the region’s largest downtown for decades. Past use as a dry cleaner left many private investors leery of the site. Occupying three attached buildings, demolition of Arthur’s would have greatly disrupted the fabric of downtown. After a successful assessment, LCPC was able to assist the property owner in leveraging funds for remediation and redevelopment. In 2014, the buildings were rehabbed to include 19 new units of housing. Local businesses are now opening in the building’s street level storefronts.
- **Johnson Community Housing** – Located in one of the Region’s most economically depressed communities, a former electric utility site has been successfully remediated and redeveloped as a mix of family and senior housing. The site is located within walking distance of the Village Center and the local Elementary School.
- **Former Railroad Engine House/ MSI** – This former railroad facility in Morrisville has been remediated and converted into MSI, one of the Region’s fastest growing manufacturing firms. MSI is also incorporating the Engine House into a major expansion of its manufacturing facility.

Assessment, remediation, and redevelopment projects currently underway include a former lumber mill in Jeffersonville, a rail yard in Wolcott, multiple sites that will be utilized as trailheads for the Lamoille Valley Rail Trail, the Gristmill/Creamery in Morrisville, and a former foundry in Morrisville.

## Village and Downtown Designations

Vermont's land use policies, as well as the goals of this Regional Plan, are generally oriented toward directing new growth and development toward compact village and urban centers. In order to revitalize Vermont's traditional villages and downtowns and to encourage new development close to these areas, the State of Vermont has developed several "designated center" programs, including Village Center Designation, Downtown Designation, Neighborhood Development Area Designation, and Growth Center Designation. These designations are granted by the Vermont Downtown Board at the request of the municipal legislative body. The requirements and benefits vary between the various designation programs. A summary of these programs and associated benefits is provided below.

### Village Center Designation

As of the drafting of this Plan, there were seven Designated Village Centers in Lamoille County, including Cambridge Village, Jeffersonville, Johnson Village, Hyde Park Village, Stowe Village, Waterville Village, and Wolcott Village. Municipal plans also identify several potential areas for Village Center Designation. State statute defines a "Village Center" as:

*The core of a traditional settlement, typically comprised of a cohesive mix of residential, civic, religious, commercial, and mixed use buildings, arranged along a main street and intersecting streets that are within walking distance for residents who live within and surrounding the core. Industrial uses may be found within or immediately adjacent to these centers. Village centers are typically smaller in scale than downtowns and are characterized by a development pattern that is consistent with smart growth principles.*

Benefits of Village Center Designation include:

- state and federal tax credits toward the rehabilitation of historic buildings,
- tax credits for façade improvements,
- tax credits for code improvements, including electric and plumbing, sprinkler system, and access improvements such as lifts and elevators; and
- priority consideration for a variety of grant programs, including Municipal Planning Grants, Community Development Block Grants, Transportation Alternatives Grants, as well as other state and federal funds.

These tax credits have the potential to offset some of the additional costs of working with historic structures as well as overcome some of the challenges posed by infrastructure limitations in many rural village settings.

### Downtown Designation

Downtown Designation is similar to Village Center Designation, but requires more robust planning and implementation efforts at the local level. In order to receive Downtown Designation, a municipality must:

- Demonstrate a commitment to protect and enhance the historic character of the downtown through provisions in local bylaws.
- Provide a community reinvestment agreement that has been executed by the authorized representatives of the municipal government, business and property owners within the district, and community groups with an articulated purpose of supporting downtown interests.
- Maintain an up to date capital budget and program that includes funds to improve or preserve public infrastructure within the district, including facilities for public transit, parking, pedestrian amenities, lighting, and public space.

- Identify a source of funding and resources necessary to fulfill the community reinvestment agreement, including commitments from the legislative body of the municipality.
- Organize a downtown organization that will collaborate with municipal departments, local businesses, and local nonprofit organizations for the social and physical benefit of the downtown.
- Provide evidence that any private or municipal sewage system and private or public water supply serving the proposed downtown district is in compliance with State regulations and has sufficient reserve capacity to serve future needs of the designated area.

As a result of these more stringent requirements, Designated Downtowns are eligible for a wider array of benefits than Designated Village Centers. These benefits include:

- All the tax credits and grant incentives available to Village Centers
- Access to the Vermont Downtown Transportation Fund, which provides loans, loan guarantees, or grants up to \$100,000 for capital transportation and related capital improvement projects (grants may not exceed 50% of a project's cost.)
- Traffic calming options, including authority to post speed limits of less than 25 mph to help calm traffic and make the downtown a more pedestrian-friendly environment.
- Expanded signage options, such as the ability to erect and post informational signs to help guide visitors to downtown and to significant historical, educational, recreational or cultural landmarks.
- The ability to create special assessment districts (also known as special benefits district or business improvement districts) to raise funds for both operating costs and capital expenses to support specific projects in downtown.
- Streamlined Act250 review for developments within the Designated Downtown
- Eligibility for "Sales Tax Reallocation," meaning that sales taxes collected as a result of private development in a Downtown are returned to the municipality to support related infrastructure improvements.
- Eligibility for other, periodic funding opportunities, such as grants to install electric vehicle charging stations.

Downtown Morrisville is currently the only Designated Downtown in Lamoille County. Other areas may be eligible for municipalities willing to commit to the program's planning and implementation requirements.

### **Neighborhood Development Area Designation (NDA)**

The Neighborhood Development Area Designation encourages municipalities and/or developers to plan for new and infill housing in the area within walking distance of a designated downtown or village center. Areas eligible for designation must be within a quarter mile of a Village Center or a half mile of a Designated Downtown. Local land use bylaws must also allow for residential densities of at least four (4) dwelling units per acre.

Benefits of Neighborhood Designation are primarily related to state taxes and permitting processes. These benefits include:

- Higher thresholds of Act250 review for "mixed income" developments. (meaning Act250 review is not needed for some developments that would require it elsewhere)
- Reduced Act250 application fees and ANR wastewater permit fees
- Exemption from the land gains tax.

There are currently no Designated Neighborhood Development Areas within Lamoille County. As noted in the Housing Section, Lamoille County has experienced steady housing growth and increasingly provides workforce

housing for households priced out of the market in adjacent regions. The benefits provided for Neighborhood Development Areas could create an incentive for private developers to redirect new housing from rural areas of the County to areas within, or in closer proximity to, Centers.

Unfortunately, current interpretation of enabling statute inhibits many Lamoille County communities from benefiting from this program. As one of the fastest growing regions in Vermont, in terms of both population and new housing units, LCPC recognizes the potential benefit of Neighborhood Development Areas directing development to more appropriate areas AND encouraging municipalities to strengthen subdivision bylaws and address infrastructure limitations. To achieve these benefits, LCPC encourages minor revisions to program rules to make it more effective in rural areas, which are discussed in greater detail in the Land Use Strategy Section.

### **Growth Center Designation**

State statute defines a Growth Center as an area of land that (A) is within or adjoining a downtown, village center, or new town center designated under this chapter; and (B) has clearly defined boundaries that can accommodate a majority of commercial, residential, and industrial growth anticipated by the municipality or municipalities over a 20-year period. A growth center must support and reinforce any existing Designated Downtown or Village Center located in the municipality or adjacent municipality by accommodating concentrated residential neighborhoods and a mix and scale of commercial, civic, and industrial uses that are consistent with the anticipated demand for those uses within the municipality and region.

To be eligible for Growth Center Designation, a municipality must have undertaken extensive planning, including local bylaws with provisions related to density, design, and form of development in the growth center; a capital plan that includes existing and planned wastewater treatment, water, stormwater, and transportation infrastructure, public spaces; existing and planned infrastructure adequate to meet the municipality's 20-year growth needs; policies on the extension of water and wastewater lines that include a defined service area and allocation plan to support the growth center; transportation standards and policies for street connectivity and aiming to create a comprehensive, integrated, connected network for all modes; and bylaws and other programs to minimize impacts on agricultural lands, forests, wildlife habitat, and other important natural resources located outside the proposed growth center.

Benefits of Growth Center Designation include:

- Ability to utilize the state portion of the property tax bill for Tax Increment Financing for infrastructure and improvements
- Vermont Economic Development Authority (VEDA) incentives
- Priority consideration for Agency of Natural Resources funding of new, expanded, upgraded, or refurbished wastewater management facilities, technical and financial assistance for brownfields remediation, Community Development Block Grants, transportation alternative grants, State housing renovation and affordable housing construction assistance programs
- Access to the Vermont Downtown Transportation Fund
- Reduced mitigation requirements for impacts to agricultural soils
- Streamlined Act250 review for developments within the Designated Growth Center

There are currently no Designated Growth Centers within Lamoille County.

## **Industrial Uses and Enterprise Areas**

Lamoille County is fortunate to be home to a vibrant manufacturing section. The region's industrial base is composed largely of locally held businesses. Industrial firms still form an important employment sector for the region, usually at above average wage levels for the County. Some light manufacturing uses may be located in Center Areas without conflict. However, some industrial uses produce off-site impacts, such as noise and heavy truck traffic that are best mitigated if located in areas specifically designated for industrial growth. Such areas in Lamoille County include:

- The proposed Trombley Hill Industrial Park in Morristown
- The Airport Enterprise Area in Morristown
- Portions of the North End/Uptown in Morristown
- The Jewett parcel in Johnson
- The North Hyde Park Industrial Park
- The Fischer Bridge Industrial Park in Wolcott
- The Cambridge Enterprise Park

Unfortunately, many of these areas lack at least one piece of critical infrastructure, are limited by topography, or are owned by property owners who do not currently wish to sell or develop their property. Lack of direct access to an interstate also creates a barrier for industrial development. As a result, the Lamoille Economic Development Corporation has identified the lack of “shovel ready” land for industrial uses as a major impediment to realizing the region’s full economic development potential.

LCPC can assist in overcoming this obstacle by providing assistance in planning for infrastructure needs, such as upgrades to water, wastewater, transportation, and transmission infrastructure. LCPC can also work with municipalities to develop land use regulations that are supportive of industrial development in appropriate areas. Examples include allowing light industrial activities within Enterprise Areas as permitted rather than conditional uses, reducing the potential for future land use conflicts within Enterprise Areas by new, non-industrial uses such as residential, retail, and office/service type uses, and revising performance standards related to noise and other impacts to reflect an industrial rather than residential context.

## **Consumer Durables Manufacturing**

Consumer Durables Manufacturing manufactures products to be sold to the final consumers or to final consumer dealers. These are “heavy” goods that have a life span of three or more years. Examples include cars, furniture, household goods, or toys. This sector is strong in Lamoille County. Major employers in this sector include:

- For over 30 years, Hearthstone has manufactured stoves (gas, pellet, and wood) in Morrisville.
- Started in North Troy, Vermont, in 1960, House of Troy moved to Hyde Park in the mid-1980s when new owners took over the business. House of Troy continues to make classic lighting as part of the Framburg & Co. line of lighting. The business employs 50-99 people.
- Vermont Precision Woodworks was started in the early 1900’s. Its business has expanded over the years to include wood products for musical instruments and furniture, including beds, bunk beds for dorms and residences, and children’s furniture. Lumber is sourced locally. Vermont Precision Woodworks employs about 50 people.
- Manufacturing Solutions Inc., located in Morristown, is an example of a company that underwent a successful assessment and adaptive use of a former brownfields site. MSI is now a major, growing employer, and is expanding to properties in other Lamoille County communities.

### **Recreation Equipment**

While recreation plays a significant role in Lamoille County's economy, and indeed the State of Vermont's economy, few firms specialize in manufacturing recreation equipment. Concept2, based in Morrisville, is a major regional firm in this industry. The company was started by two brothers out of the back of a bread truck and now employs over 50 people. Concept2 is one of the largest manufacturers of oars and rowing machines in the country.

Since 2006, two of the large firms specializing in recreational equipment have moved production out of state. Tubbs Snowshoes was based in Wallingford, Vermont, in 1958 and moved to Stowe in 1987. Production increased and Tubbs was so successful it needed to expand and moved business to China. Production in Stowe ceased in 2005, leaving 30-40 employees without jobs. Diamondback made custom fly fishing rods in Morrisville. The company was sold, production wavered, and in 2007 the plant closed.

### **Consumer Non-Durables Manufacturing**

Non-durable goods are typically goods that are immediately consumed (food and drink) in one use or have a lifespan of less than three years. Examples of the type of manufacturing in this category include food and beverage, textiles and apparel, petroleum products, and chemical products. Textiles are described in more detail below.

Examples of successful companies in this sector include Vermont Peanut Butter Company, whose move to Morrisville in 2012 helped strengthen the industrial cluster in the North End. Alcoholic beverage producers continue to thrive in Lamoille County. Smugglers' Notch Distillery in Jeffersonville and Green Mountain Distillers in Stowe and Morristown have both made successful forays into the alcoholic beverage market. Trapp Family Lager in Stowe is currently undergoing an expansion of its brewery while Rock Art Brewery in Morristown recently expanded to accommodate increased production capacity and better visitor visibility. Another brewery, Lost Nation Brewing, has been recently established in Morristown. Finally, maple producer Butternut Mountain Farm, with a retail store in Johnson and manufacturing operations in Morristown, has been operating for 35 years. It recently completed an expansion of the Morrisville warehouse and packaging facilities. Many of these companies practice socially responsible business practices, providing living wages for employees, using recycled packaging, and, in the case of Butternut Mountain, using renewable energy such as solar power.

### **Specialized Textile Products and Services**

This category is defined as firms specializing in the manufacture of specialized textile products, either apparel or other products, and providing specialized services to textile producers. Regional firms in this category include Turtle Fur, Inc., Vermont Fleece Company, and Johnson Woolen Mills. Johnson Woolen Mills has been in production since 1908. Their signature "Made in the USA" clothing products are sold nationally and internationally. The company is still family-owned and employs about 50 people. Turtle Fur Group moved into the Morrisville Industrial Park and the Vermont Fleece Company is located in the Hyde Park Industrial Park. The Turtle Fur Group includes four separate brands, with the earliest started in 1966, and now manufactures hats, neck warmers, socks, gloves, and clavas, among its products. In 1971 it expanded to include Vermont Originals, which sells hand-knit wool hats. Together, the Turtle Fur Group and the Vermont Fleece Company employ roughly 100 people.

### **Natural Resource Based Manufacturing**

Natural resource based manufacturing, once the pre-eminent industry in Lamoille County, is used in this context to classify wood product manufacturing. This category includes lumber, plywood, wood flooring, assembling wood products, and transforming and making wood products. Today, fewer than four sawmills remain in Lamoille County. Sawmills are dispersed throughout the County, with sawmills in Hyde Park, Johnson, Morristown, and Wolcott.

Numerous businesses in this category, both large and small, produce wood products such as furniture, sheds, cabinetry, toys, and other woodenware. There are roughly 20 producers of these products in at least eight Lamoille County towns. Many of these producers are secondary job activities or of such small scale that they are not captured in employment data. What can be determined is that large-scale wood manufacturing has decreased in employment 74% from 2000 to 2010. Innovations in the natural resource based manufacturing category include small-scale or “backyard” sawmills that perform similar work on a very different scale.

## **Land Use Tools**

Communities have a wide variety of tools available to assist them in achieving their land use goals. Local communities are best positioned to select the tools that will be most effective in achieving their objectives. These tools are divided into “Regulatory” and “Non-Regulatory” Options.

### **Regulatory Tools**

There are two primary types of local land use regulations. **Zoning** regulates the uses of land and the dimensions, construction, repair, and removal of structures; establishes dimensions of land, areas, yards, and distances between structures; and sets densities of population and intensity of use. **Subdivision regulations** apply to the creation of new lots and establish standards related to size, shape, location, and density of lots. Subdivision regulations also outline rules related to how roads, utilities, and other infrastructure serving a new development are laid out and constructed. In short, zoning regulates what someone can build or how they can use their property, while subdivision regulations control the division of that property into two or more lots. It becomes important then to determine which tool is correct to accomplish a goal. For some districts, such as the flood hazard district, the regulation of the use of the lot is most critical to achieving the goal. In other districts, such as a rural district, subdivision regulations are more important. As a general rule, zoning is more important to achieving goals in dense or urban areas while subdivision regulations are more important to accomplishing goals in rural or less dense areas. Some communities have combined their zoning and subdivision regulations into a **Unified Bylaw**. Unified bylaws can reduce the potential for contradictory standards or duplicative review.

Simply having regulations does not ensure that a community will achieve its goals or that development will reflect the desires of the community. It is also important that the regulatory tools be properly selected for the local setting and the objectives of the community. Some examples of provisions communities can consider including in their land use regulations include:

### **Alternatives to Large Lot Zoning**

Many communities rely on “Large Lot Zoning” to control densities in rural areas. Large lot zoning refers to the practice of requiring multi-acre lots for each residential structure. While large lot zoning can effectively reduce the overall density within a rural area, it may also result in unnecessary fragmentation as each new home site must be accompanied by large amounts of land. Large lot zoning may also require the construction of extensive new road networks to serve new developments, resulting in additional fragmentation of working lands and natural resources.

Fortunately, there are alternatives to large lot zoning which can maintain low overall densities while reducing forest fragmentation. One commonly used technique is the **“Planned Unit Development” or PUD**. PUDs allow a landowner or developer to “cluster” development in one area of a parcel while leaving the remainder of the parcel undeveloped. The undeveloped land is often subject to development restrictions, such as an easement, and may be owned by a homeowners association, an individual, a land trust, or a municipality.

One potential drawback of PUD's is that they are often most applicable when a sizeable number of lots are developed at the same time and require some degree of master planning on the part of the applicant. Much of the development in rural areas of Lamoille County occurs in an incremental process in which a landowner may only subdivide a single parcel at a time. In some cases, the benefits of PUD's may be achieved with a more simplified subdivision process. One option is to allow **"density averaging"** over an entire parcel.

Also called **"fixed area zoning,"** density averaging allows a landowner to create new building lots smaller than the district minimum lot size, provided that the total number of new lots does not exceed the number that would usually be allowed within the zoning district. The example below provides an illustration of "density averaging:"

*A parcel contains 100 acres. The parcel is located in a zoning district with a 10 acre minimum lot size. The owner could create a total of ten lots. Applying fixed area zoning, the owner can create nine one acre building lots over a period of several years, while maintaining ownership of the remaining 91 acres. The remaining 91 acres can continue to be managed as a private forest or sold to another party, but may not be subdivided into additional building lots.*

### **Density Bonuses**

Vermont Statute allows municipalities to offer "density bonuses" through their PUD provisions. Density bonuses are usually offered to forward an objective of the municipal plan, such as providing affordable housing, conserving an important natural resource, or providing public access to a trail network. Density bonuses are most effective when the regulations provide clear guidance and standards regarding when a bonus may be awarded.

### **Transfers of Density**

Another regulatory tool authorized by statute is a zoning tool called **"Transfer of Development Rights" (TDR)**. Under a TDR, a municipality could identify a critical resource area as a "sending zone." The allowable density for a parcel in that zone can be "sent" to a different parcel located in a "receiving" zone where the Town desires more dense development.

*Using the hypothetical 100 acre parcel, in a zoning district with a ten acre minimum lot size, the rights to develop ten units of housing on that parcel could be transferred to a parcel in a different area; perhaps in a village center where the availability of infrastructure allows for greater density. A ten acre receiving parcel in a district allowing two units per acre (20 units total) could be developed with 30 units if the development rights were transferred.*

TDRs have had limited success in rural communities, largely due to the lack of large enough receiving zones with the infrastructure needed to accommodate higher density development. This would likely be a challenge in Lamoille County's more rural communities. However, communities with sewer and water infrastructure in their downtowns and Village Centers may find TDRs to be a useful tool for conserving forest land while allowing property owners to realize an economic benefit from the development value of their land.

Recognizing the limited applicability of TDRs, some communities have developed a **Hybrid TDR/PUD approach**. In this hybrid scheme, the development rights from one parcel can be transferred to another parcel, also in a low-density rural location. The result is one parcel with a "cluster" of development and another, non-contiguous parcel that remains undeveloped, basically containing the open space portion of the two-parcel PUD. This tool allows rural communities to focus development in areas where it is most suited (for example, where soils can support greater onsite septic capacity) while preserving undeveloped tracts of forest land. Wolcott's Land Use Regulations

allow for density transfers through its PUD provisions, while Stowe's Zoning Regulations contain a traditional TDR approach.

Both traditional TDRs and hybrid TDR/PUDs require the administrative capacity to document and track transfers of development rights. In order to ensure documentation, it may be wise to record such transfers as notes on the actual Mylar recorded in the Town Land Records.

### **Overlay Districts**

An overlay district refers to a zoning district that is tied to a specific feature. Overlay districts may follow a natural feature such as a stream, deeryard, or wetland; a topographical feature such as all lands above a certain elevation; or infrastructure such as a highway corridor or planned sewer line extension. An overlay adds provisions in addition to the standards of the underlying zoning district. Stowe and Hyde Park have utilized overlay districts to protect viewsheds by requiring developers to take measures such as maintaining forested backdrops on hillsides. Some communities have also established overlays to prevent contamination in the public water supply wellhead protection areas. While not currently used in Lamoille County, some communities in more densely developed areas of the State have developed "access management overlays" that require additional consideration of shared access points on important regional transportation routes.

### **Alternative Techniques to Manage Density and Intensity of Development in Center Areas**

Traditional zoning regulations rely primarily on minimum lot size and setbacks to control density. These are often not the most effective tools in a Village setting and can encourage, or even inadvertently require, new development to take the form of "strip development". Alternative approaches for managing density include **lot coverage** – which sets a maximum percentage of the lot that the building footprint and other impervious surfaces may cover. A similar approach is **floor to area ratio (FAR)** which expresses the relationship between the amount of useable floor area permitted in a building (or buildings) and the area of the lot on which the building stands. Lot coverage is more common in Village settings, in which buildings are generally less than three stories tall, while FAR is more effective in downtowns with multistory buildings.

### **"Character of the Neighborhood" Standards**

Many municipal plans express the importance of maintaining the traditional "character" of Village and downtown areas. However, traditional zoning regulations are usually vague on how to address this and leave much discretion to local review boards. This can create uncertainty and unpredictability in the permitting process. **Form Based Code** is a relatively new concept in planning that considers development based primarily on "form" (the basic appearance of the building and the way in which it is laid out) and provides more flexibility regarding use. Many form based codes include provisions for administrative review of minor developments. Form based codes may also contain standards related to new public and semi-public infrastructure such as roads, sidewalks, and streetscape amenities.

**Design Review** is another tool that can be used to maintain the traditional "character of the neighborhood." Design review is often administered through an overlay district and usually consists of very prescriptive standards related to the architectural design of new buildings. Unlike form based code, design review may also dictate issues such as colors and building materials. Design review usually requires developments to be reviewed by an additional board such as a Design Review Board or a Historic Preservation Commission.

## **Non-Regulatory Tools**

### **Infrastructure Investments and Capital Planning**

In some cases, municipalities may have greater impacts on development patterns through their infrastructure investments than through their land use regulations. Coordinating infrastructure investments with local planning goals is critical to meeting a community's long term objectives. For example, zoning land within an existing area primarily for low density development may result in widely spaced development that does not make efficient use of a system's capacity.

Many major infrastructure investments require a significant amount of capital – often more than a municipality can fund in a single year. By adopting a **Capital Plan and Budget** municipalities may make annual contributions to reserve funds for major investments, thus spreading the cost over multiple fiscal years.

### **Tax Stabilization Agreements**

Municipalities have the authority to enter into tax stabilization agreements with landowners for the municipal portion of property taxes. Most municipalities use this authority to stabilize taxes on working lands such as farms to better reflect the “use” rather than the development value of land. The Town of Hyde Park has established a tax stabilization program to encourage businesses to locate in its three locally defined growth areas (Hyde Park Village, North Hyde Park, and Garfield). Under this program, upon approval of the Selectboard, a portion of the taxes on a portion of the increased property value will be reduced for a defined period of time.

### **Conservation Commissions, Energy Committees, and other Advisory Groups**

Communities have the ability to organize local citizens into official town bodies such as Conservation Commissions and Energy Committees. The goals, activities, and agendas of these groups may vary from community to community. Many Conservation Commissions organize educational programs related to natural resources, assist in management of municipal properties such as Town Forests, and maintain local trail networks. Conservation Commissions can also be empowered to provide input on municipal planning decisions. Energy Committees can be established to educate residents about issues such as energy efficiency, assist in development of local energy resources, or conduct energy audits of public buildings and facilities. The roles of these groups is invaluable, as education is often more effective at achieving goals than regulation.

### **Public Buildings**

Municipalities can have a profound impact on development patterns based on where they locate public buildings. When community anchors such as municipal offices, schools, and post offices are located in centers, they contribute to the vitality of the village or downtown. Conversely, when these anchors are located in rural areas or corridors typified by “strip development,” they move activity and customer base outside of the center. For this reason, whenever possible, community anchors should be located in Center Areas.

### **Public Land and Land Conservation**

Purchase of public land or conservation easements is often the most effective means of conserving a specific natural resource. Lamoille County contains several large State Forests. The Vermont Land Trust has been active in conserving land throughout the County. The Stowe Land Trust and Northern Rivers Land Trust (whose service area includes Wolcott) have also conserved land in their respective areas.

Several municipalities have also established “Town Forests”. The size and management objectives of Town Forests vary greatly across communities, ranging from the 300 acre Morristown Municipal Forest which is actively managed for timber, wildlife, and recreation, to Moss Woods, a six acre forested parcel in the heart of Hyde Park Village, owned and managed by the Village Trustees for “its preservation as an irreplaceable natural area.”

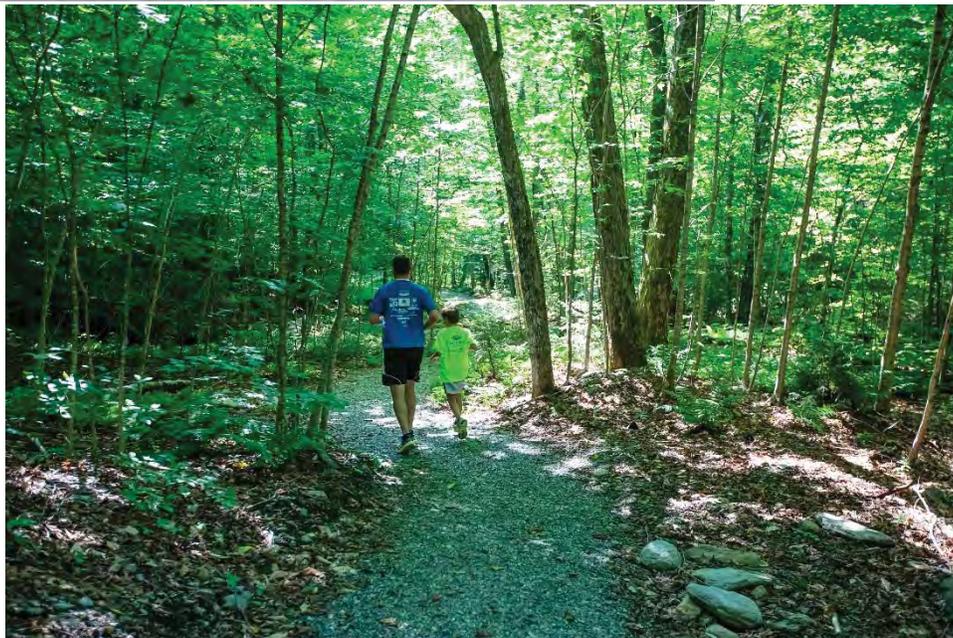
**State Designation Programs**

By pursuing State Designations (discussed above), municipalities can harness a variety of incentives to encourage development and redeployment in their traditional centers. Some communities have dedicated staff available to assist property owners in completing the applications required for tax credits. The Union Bank has also been an important partner in purchasing tax credits from individual property owners who do not have the tax liability to qualify for a tax credit.

## Section 4: Our Sense of Place

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### Recreation, Working Lands, Water Resources, and Flood Resilience



## Recreation: Strategy

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Recreation plays a central role in shaping the character and economy of Lamoille County. To residents, recreation is more than a hobby, it is a passion, the backbone of the economy, the way of life, and a primary reason many people choose to live in Lamoille County. To visitors, it is a way to explore the region and test the abilities of the body. To some, recreation is the key to improving the health and welfare of the population. The following key strategies must be recognized to balance these interests as recreation continues to evolve and shape Lamoille County:

***Ensure Lamoille County integrates recreation into the daily functions of the built environment.*** Nationally, Vermont has one of the lowest obesity rates in the United States, due in large part to a culture that encourages and values recreation. Incorporating recreation into daily life, such as providing sidewalks, footpaths, inter-municipal trails, and bike lanes as major travel corridors, is important to keeping Lamoille County healthy. With abundant access to recreation, the health and well-being of Vermont's population, including Lamoille County, will continue to ensure Vermont stays rated as one of the healthiest states in the country.

***Lamoille County's recreation network requires public landowners, private landowners, and user groups to thrive.*** Some towns have invested local resources to create Town Forests, build recreation paths, or provide parking for trailhead access. User groups need to work together to build a coordinated regional approach to recreation and marketing of resources. Recreation is a powerful way to connect communities to one another, such as the multi-town Lamoille Valley Rail Trail or two-town Stowe- Morrystown Path, and most require joint partnerships.

***Private property owners are the primary stewards of the County's recreational opportunities.*** Private property must be respected, and education is a more effective tool for encouraging sound stewardship of the environment than regulation. As new residents move to the region, it will be important to educate these residents about the Lamoille County land ethic and the importance of traditional activities, such as hunting and fishing, and working with recreation groups to minimize conflicts over use of land. At the same time, new residents must also be educated on respectful use and appropriate etiquette for using private land for recreation.

***Recreation is pivotal to Lamoille County's economy.*** The ski industry brings thousands of visitors to Lamoille County each year and employs a significant portion of the workforce. Wildlife based activities such as hunting, fishing, boating, and camping are an important component of the Region's culture and economy. Sound management of the working landscape can enhance and protect these resources while maintaining a diversity of year-round recreation ensures the County's economy can adapt to changing recreation trends and a warmer climate pattern.

***The working landscape provides diverse outdoor recreational opportunities,*** which also contribute to the regional economy. Recreation includes traditional activities such as hunting and fishing, as well as newer activities such as mountain biking, back country skiing, and dog sledding. With sound land management and cooperative planning, diverse recreational opportunities can coexist with each other and with agriculture and forestry operations while preserving these resources into the future.

Much of the recreation that is available in the region is the direct result of the geographic landscape—hiking, skiing, hunting, and snowmobiling on open spaces and in parks; fishing, boating, and swimming in the many lakes and rivers. The recreational opportunities in the region are available to and appreciated by residents and visitors of the region alike.

This section is focused on the link between recreation and the use of land, economic development, transportation and natural resources, and looks at the provision and use of the region's recreational resources. The provision of recreation throughout the region varies depending on the size of the town. Larger towns in the region depend on a combination of town owned and private recreation facilities. These towns often have populations concentrated in their village centers, but serve nearby rural residents as well.

Partnerships between village "hubs" and surrounding rural towns help make facilities and programs available to more of the county's residents and visitors. Public recreational facilities are available at schoolyards as well as public parks and recreational areas. Trail systems are made possible through partnerships with private landowners. Private recreational opportunities such as guide services, equestrian stables, golf courses, ski resorts, and other activities are found throughout the region.

Because recreation is such an integral part of life for Lamoille County, many sections of the Regional Plan include a connection to recreation. More recreation information can be found in the Transportation, Working Landscape, and Land Use Chapters of the Plan. A map of recreation resources is at the end of this section.

## **POLICIES & ACTION ITEMS**

***Policy:*** Support and strongly encourage creating and maintaining recreational facilities and opportunities for all community users – with special attention to the needs of handicapped, youth, elders, those with low incomes, and people from a variety of ethnic groups who may not be current users.

### **Action Items:**

- Ensure coordinated efforts between LCPC, partner agencies, and member municipalities in planning for and managing outdoor recreational facilities and opportunities.
- Assist municipalities and interest groups in upgrading and expanding existing community recreational facilities, especially those located at schools and community parks.
- Assist in identifying new recreational opportunities on preserved, conserved, or otherwise protected lands.
- Work with local communities to conserve outdoor space and natural areas for outdoor recreation in or near areas of population concentrations.
- Support recreational infrastructure projects that are designed for multiple types of users.
- Increase the number of trails and other outdoor recreational facilities meeting ADA standards.

***Policy:*** Encourage new residential and mixed-use developments to include sidewalks/ walking and biking paths or trails, outdoor open space, recreational facilities, and community gardens.

### **Action Items:**

- Work with municipalities, developers, and state and regional partners to incorporate outdoor recreational facilities and amenities into future plans, including sidewalks and connections to existing recreational facilities or trails.
- Work with municipalities, developers, and state and regional partners to ensure continued public access to noncommercial outdoor recreational opportunities, such as lakes and hiking trails, and identify, provide, and protect these opportunities wherever appropriate.

**Policy:** Support efforts to incorporate shared-use trails and bike lanes in development planning to connect communities, schools, and other facilities, and to increase residents' options for physical activity.

**Action Items:**

- Continue to support efforts that will lead to regional year-round, multi-use trails that link municipalities within Lamoille County and to neighboring municipalities, such as the Lamoille Valley Rail Trail and Stowe-Morristown Path.
- Create regional plans that address recreation, such as open space, bicycling, or recreation plans.
- Assist interested municipalities in identifying locations of future recreation areas in land use plans and regulatory documents, such as zoning bylaws.

**Policy:** This Plan recognizes that much of Lamoille County's recreation is the result of private property owners acting as stewards of the land. LCPC supports State and local efforts to ensure recreation is available to all residents and visitors of the region.

**Action Items:**

- As Lamoille County's population increases, work to educate new residents who may not be accustomed to Vermont etiquette or Vermont's unique recreational culture, such as laws allowing public access on private land for hunting, swimming, hiking, and other activities, and about the economic, cultural, and ecological benefits these activities provide. Educate new residents about respectful use and appropriate etiquette for using private land for recreation.
- Continue efforts to plan for and construct multi-use trails with willing landowner involvement, such as the Stowe- Morristown Path.
- Recognizing that land is being conserved and recreation is an important economic driver, explore how best to responsibly incorporate appropriate public access into publicly funded conserved land.

**Policy:** LCPC supports locally initiated and led efforts to maintain, improve, and ensure access to the region's recreational activities, facilities, resources, and amenities.

**Policy:** Encourage regional and inter-municipal cooperation and coordination on planning for new or expanding recreational offerings.

**Action Items:**

- Support local efforts to create and manage town forests.
- Support local efforts to expand recreational opportunities through new and improved facilities or amenities such as playgrounds, municipal parks, athletic fields, trailheads, kiosks, and signage.
- Encourage recreation user groups to form associations, organizations, or advocacy groups to pool resources, construct and maintain facilities, and encourage growth of new activities.
- Facilitate interested municipalities and regional partners in developing recreational projects that cross municipal or regional boundaries, such as the Stowe- Morristown Path or Lamoille Valley Rail Trail.
- Upon request, provide technical assistance to municipalities in creating recreation committees.
- Assist with creative funding mechanisms to ensure recreational activities, facilities, and amenities are financially feasible and sustainable for the long-term.

**Policy:** *The economy of Lamoille County should continue to encourage and enhance recreation and related recreational activities, organizations, and industries to ensure the vitality of the Region’s tourism industry and quality of life.*

**Action Items:**

- Work with local recreation groups to increase understanding of recreation’s benefits to community economic development.
- Ensure regional growth does not diminish the value and availability of outdoor recreational activities.
- Use recreation as a tool to preserve land and promote land stewardship while encouraging economic development opportunities that consider impacts to natural resources.
- Encourage new businesses and entrepreneurial activity in recreation sectors.

**Policy:** *Lamoille County’s recreation network is disjointed. In order to remain competitive and robust, encourage collaboration and coordination of recreation assets.*

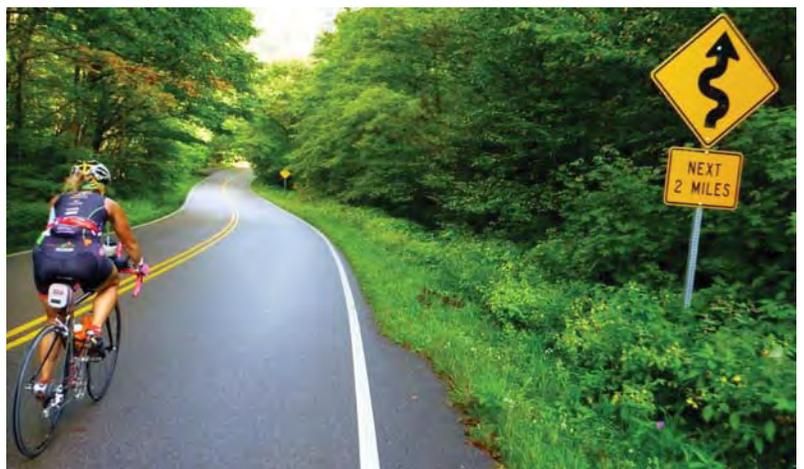
**Action Items:**

- Working with strategic public and private partners, assist in developing a regional marketing plan that unifies the Region’s diverse recreation offerings.
- Encourage the publication of local and regional recreation guides to highlight the Region’s recreational offerings and provide funding opportunities to user groups to create guides or maps.
- Encourage a coordinated trail system and network that connects similar uses to one another throughout the County, building on the strengths that each facility provides.
- Foster communication and cooperation between schools, municipalities, and sporting organizations to build a coalition of recreation enthusiasts in small communities.
- LCPC should assist and support community led organizations as needed to build a strong recreation network of user groups.

**Policy:** *This plan recognizes that climate change may impact the tourism industry, particularly winter recreational activities. LCPC is committed to providing year-round economic and recreational opportunities in order to sustain economic vitality.*

**Action Items:**

- Assist municipalities in planning for recreation facilities that provide ample opportunities to meet future climate change needs, such as year-round recreation opportunities or making recreation an active part of daily life.
- Work closely with municipalities and business owners to diversify recreational opportunities through emerging trends and new investments or re-investments in existing recreation infrastructure.



## Recreation: Background and Inventory

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To many residents and visitors, Lamoille County's sense of place and quality of life is defined by its recreational assets. Recreation is an important component of the lifestyle and livelihoods of many of the county's residents; it is the cultural and economic identity of the region, often transcending other aspects of life in the County.

Recreation is undeniably a four season industry in Lamoille County. In spring and summer, residents and tourists enjoy activities such as wildlife viewing, fishing, and photography along trails and in any of the area's ponds, lakes, and rivers where they can also participate in swimming, kayaking, canoeing, and boating. Summer seasonal homeowners populate areas such as Lake Eden and Lake Elmore, with public beaches and picnic areas. Hiking and bicycling are major activities throughout the county. Mountain biking is a trend gaining traction in northern Vermont as new trails are added to local parks. Local entrepreneurs gear new and expanded businesses towards adapting to the needs of recreationists. Municipal plans address recreation needs, goals, and recommendations for improved facilities.

Winter activities play a strong role in the County's economy, most notably around the ski resorts. Two of Vermont's biggest ski resorts are found in Lamoille County. Not only do the ski resorts and related services employ much of the region's workforce, the towns offer a variety of recreational assets utilized by residents and visitors, such as snowmobiling, mountain biking, and hiking trails. In addition to Alpine and Nordic skiing and snowboarding, Lamoille County hosts trails along the Vermont Association of Snow Traveler's (VAST) route between Elmore and Hyde Park. VAST trails allow for snowmobiles, Nordic skiing, and snowshoeing across its extensive membership network. The Catamount Trail is Vermont's north-south cross-country ski trail, passing directly through Lamoille County on public and private land. Eden is home to the Eden Mountain Dog Sledding Club, which offers tours, lessons, and lodging. Winter biking is a new and rapidly growing trend in the County.

With increased demand for more diversified facilities like multi-use trails that support a variety of activities, public land managers are faced with the challenge of maintaining recreational trails and structures in light of the increased and diversified use. A variety of recreational opportunities may also have a positive impact on Vermont's growing obesity rate, which for adults, rose by 35% from 2000 to 2012. In 2009, it was reported that 26% of Vermont's youth were overweight or obese, putting them at risk for diabetes, high blood pressure, and other diseases. While this number is low compared to other states, obesity rates continue to rise. As obesity rates continue to rise, the population ages, and trends and issues surrounding recreation evolve, so too will recreation. Adapting to new issues and expanding new opportunities will continue to be a challenge in the future.

### **Available Recreational Assets**

Much of the recreation available in rural towns in the Region occurs on privately owned lands, which showcases the Region's strong ties to recreation. Open space preservation and continued public access to these land and water resources can help counter the lack of town owned, developed, recreational activities and facilities. In rural communities that are unable to provide developed recreational options, private landowners as well as state and federal agencies are critical recreation providers. Developed recreation facilities found in the region's rural towns are often indirect benefits of other infrastructure projects, such as school ball fields and playgrounds, and Class 4 roads. See the Lamoille County Recreation Facilities map for locations of major recreation facilities.

### *State Forests, Parks, and Recreation Areas*

Lamoille County is home to three state parks: Elmore State Park, located in Elmore, the Green River Reservoir in Hyde Park and Eden, and Smugglers' Notch State Park, located between Stowe and Cambridge. There are five

state forests in the region: Putnam, Long Trail, Mt. Mansfield, Morristown Bog, and the Cambridge State Forest. The State also has a number of nature areas in the County, including: Mt. Mansfield Nature Area, Daniel's Notch Nature Area, the Morristown Bog Nature Area, and Moss Glen Falls Nature Area.

The Vermont Department of Forests, Parks, and Recreation is responsible for overall management of state lands, and administers the State Park and Forest System. State lands in Lamoille County provide day use access to important natural features and scenic areas. These forests and parks also host hiking trails, and some link together other important conserved lands. The region's State Parks offer camping and picnicking opportunities. Most notably, Stowe Mountain Resort and Smugglers' Notch Resort both have leases with the State of Vermont to use Mt. Mansfield for downhill skiing.

State fishing access areas can be found in Elmore, Lake Eden, Cambridge, Morristown, and Wolcott. Additionally, the Wild Branch Wildlife Management Area is located in Eden and the East Hill Wildlife Management Area is in Wolcott.

#### *Town Forests*

Most Town Forests, or forest land owned and managed by municipalities, were created in the early 1900's through legislation authorizing the establishment of "endowment forests" as part of a statewide effort to reforest the State and promote good forest management practices.

In a 1931 report from the Vermont Commission on Country Life, the value of these resources was described as "a source of public education." Schools as well as the general public can help secure firsthand information that often is obtainable in no other way. Such a forest area may well be the recreational center for the community, and when properly managed and administered, should become a source for revenue."

Historically, municipal forests were managed for timber harvesting. While this is still the case in many instances, recently there has also been a shift to management of these forests for recreational and educational uses as well. Many towns maintain signed hiking trails and wildlife viewing areas as well as other recreational opportunities, and encourage use of the forests by residents and school groups.

Town Forests in Lamoille County include:

Cady Hill Forest (320 acres): Stowe Land Trust, in partnership with the Town of Stowe, acquired Cady Hill Forest in 2011, raising nearly \$1.5 million to make the project a reality. Cady Hill Forest provides permanent, year-round public access for all forms of non-motorized recreation, and is specifically incorporated into a series of mountain bike trails in Stowe and Waterbury through the Vermont Ride Center. It also provides protection of prime deer wintering habitat, sustainable timber harvesting to enhance deer wintering habitat and providing revenue for ongoing maintenance of the property, and viewshed protection from the Route 100 corridor.

Gomo Farm Town Forest: The Gomo Forest is approximately 141 acres and is owned by the Town of Johnson. The Forest is located along the border between the Towns of Johnson and Waterville and is bounded by the Long Trail State Forest to the north and south; Butternut Mountain to the east; and the North Branch of the Lamoille River valley to the west. The property includes beaver ponds and associated wet meadows and scrub-shrub wetlands, riparian habitat along several small streams, upland forests, small openings with predominately herbaceous plants and some trees, and some formerly open field habitat that is reverting back to young forest. The Johnson

Conservation Commission currently manages the Forest for some timber production, firewood, recreational uses, and habitat enhancement.

Morristown Municipal Forest: The municipal forest, over 300 acres in Mud City, is actively managed for timber, wildlife, and recreation. With the help of the State’s Department of Forests, Parks, and Recreation, recent activities are intended to create a model for local forest management at this site.

Moss Woods: Located in the Village of Hyde Park, this six acre forested area provides a significant cultural contribution and substantial ecological resources to the Village. The Village considers it an irreplaceable natural area important to maintaining the character of the Village. As of the drafting of this plan, the Village is in the process of formalizing this as a Village Forest.

Sterling Forest (Stowe-1,500 +/- acres): Sterling Forest was acquired in 1994 and is subject to a forest management plan prepared by the Stowe Conservation Commission. This plan includes detailed information concerning the natural resources found on the property and prescribes ongoing management activities designed to balance timber harvesting with wildlife habitat protection, water quality, and recreation. The Town has recently completed two phases of a three-phase timber management plan for Sterling Forest. In 2007, lumber cut from Sterling Forest was milled on site and used to build nine bridges along the Catamount Trail in Sterling Forest.

#### *Trail Networks*

Lamoille County also has a plethora of recreation trails. Trails include state trails, such as the Catamount, trails maintained by private organizations such as those by Vermont Association of Snow Travelers (VAST), and trails owned and maintained through partnerships, such as the Lamoille Valley Rail Trail.

The Long Trail is known as Vermont's "footpath in the wilderness." Built by the Green Mountain Club between 1910 and 1930, the Long Trail is the oldest long- distance trail in the United States. The Long Trail follows the main ridge of the Green Mountains from the Massachusetts- Vermont line to the Canadian border as it crosses Vermont's highest peaks. The Long Trail passes through Belvidere, Johnson, Waterville, and through Smugglers’ Notch State Forest in Stowe, Cambridge, and Morristown.

Open to the public in the winter, the 300-mile Catamount Trail is North America’s longest cross-country ski trail. This winter-use only trail, which starts at the Vermont- Massachusetts border, winds its way for 300 miles through the heart of the Green Mountains to the Canadian border. The trail runs through Eden, Elmore, Morristown, Stowe, and Wolcott, generally following along the spine of the Green Mountains. Cross-country ski trails are also maintained by private businesses, and can be found in the Mt. Mansfield area.

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#### *Road Network*

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*Our state and local road networks are important for recreational uses, which are perhaps the most frequently used resource for routine recreational uses for residents. In the absence of sidewalk infrastructure, roads are used for a variety of recreational purposes, such as walking, jogging, bicycling, equestrian and other uses. Variable widths of the existing roadway shoulders may limit recreational uses. Additionally, many class 4 town highways are used for snowmobiling, snow shoeing, and cross country skiing; however, their use is subject to local rules and restrictions. In accordance with Vermont’s Complete Streets Law (Act 34, 2011), accommodating all modes of travel (i.e. walking and bicycling) is to be considered in all state and municipally managed transportation projects.*

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The Vermont Association of Snow Travelers (VAST) is responsible for the maintenance and grooming of an extensive snowmobile network across the state. One of the oldest snowmobiling groups in the U.S., VAST is a non-profit, private group that includes over 45,000 members. Eighty percent of VAST's trail system is on private land and permitted by agreement with each landowner. During winter months, the VAST snowmobile network connects Eden to virtually anywhere in the state. VAST trails also pass through Johnson and Wolcott. Upon completion, the Lamoille Valley Rail Trail will provide year-round recreational opportunities for users from St. Johnsbury to Swanton, passing through Wolcott, Hyde Park, Morristown, Johnson, and Cambridge. The 90+ mile line is under development by a partnership of VAST, the Vermont Agency of Transportation, regional planning commissions, and numerous partners.

Many local hiking trail networks are used extensively for day hikes and wildlife viewing and can be found in most municipalities. Extensive trail networks specifically designed for mountain biking exist countywide and are continuing to expand as popularity in the sport grows.

### Water Access

The region also boasts a variety of water based recreational opportunities. The Lamoille River and its tributaries bisect the entire county with ample river based activities such as canoeing, kayaking, fishing, and swimming. The Lamoille is not the only source of water based recreation in the region, with the Wild Branch, Gihon, North Branch, and Little Rivers also providing significant river activity. It is important to note the many lakes throughout the County, particularly in the northern and eastern areas. Streams and ponds throughout the region provide recreational contributions. Many informal swimming holes exist along the network of streams and rivers in the region.

Many sections of the Lamoille are currently under-realized for potential recreation and economic development. In order to encourage diverse recreational users to begin or end their journeys in Lamoille County, and hopefully frequent Lamoille County based businesses, municipalities can consider boat launch points along rivers or incorporate portages with recreational trails. Safe access points to rivers and streams lessen the risk of degrading stream banks and encourage more use.

A 2009 survey of Vermont residents found that the protection of fish and wildlife resources, habitats and lands as well as the opportunity to participate in wildlife-related recreation was important to 97 percent of Vermont residents surveyed. In Lamoille County, there will continue to be the need to balance the protection of fish and wildlife resources with wildlife-related recreation.

### **Unmet Needs**

As important as recreation is to Lamoille County's residents, tourism industry, and quality of life, there are still unmet needs in the recreation system.



Many of these are not uncommon to the entire state, as evidenced in Vermont's 2012 Comprehensive Outdoor Recreation Plan. Some of the regional recreational issues and unmet needs include:

- More funding
- Expanded recreational opportunities
- Better access to existing recreational activities
- Better regional and inter-municipal coordination
- Increased recreation organization through community clubs and organizations, e.g. VAST and Vermont Mountain Bike Association (and other local mountain bike clubs)
- Improved communication between private landowners and recreation users to mitigate conflict.

#### *Expanded recreational capacity, resources, and facility needs*

Low or non-existent recreation budgets in most towns limit the ability of municipalities to adequately plan and provide recreational options. Few municipalities in the Region have a recreation commission or recreation department. The cost of expanding or developing a town forest is often not in a municipal budget, neither is the creation of athletic fields or other facilities.

The capacity of many groups to identify recreational needs, organize sports leagues, conduct feasibility studies for proposed recreational facilities and plan for facility maintenance and enhancement, on top of seeking out new recreational opportunities, is often insufficient. Towns with no recreation director or commission are at an even greater disadvantage and often depend on neighboring towns' recreational facilities and programs.

More recreation lands have been cited as a need for many municipalities. Connecting municipalities through trail networks, for example, is desired but the costly price tag and lengthy planning time slow down the process.

While municipalities may have trouble maintaining existing facilities, there is a recognized need for additional basic facilities such as ball fields and trail networks to meet recreational needs at the local level. Related infrastructure, such as better informational signs, updated equipment for school playgrounds, and extensive budgeting, are also needed in order to meet facility needs.

#### *Access to recreational opportunities*

Access to recreational opportunities is inhibited by transportation, conflicting uses, and cost. The distribution of recreational areas and facilities is concentrated in larger population centers, making access difficult for residents of the region without transportation. Because of the nature of recreation, trailheads, lake access points, and other opportunities are often outside of any public transportation system and generally inaccessible to residents who do not have their own transportation. Automobile dependence could be decreased by better access to facilities by bike or foot travel. Currently, there are few bike / pedestrian connections that link recreational facilities between municipalities.

Loss of access to water resources is also a concern, and towns with important water resources recognize the need to maintain public access points to these resources for those not owning shoreline property.

Conflicts between types of recreation and the desired characteristics of the experience can also affect the enjoyment of recreation in the region. Recreation takes many forms in the region, ranging from motorized ATV and snowmobile touring to activities requiring greater solitude, such as wildlife viewing and backcountry hiking and camping.

Lastly, it is important to consider who has access to recreation. As the population ages and the health benefits of recreating become more evident, there is a need to provide a diverse array of recreational opportunities, including free and fee-based activities, for all types of users, including those with disabilities. Winter ski programs, biking, and exposure to new athletic trends, such as yoga, at area schools offer youth opportunities to try new activities through traditional physical education classes in the school system. These activities are critical so that children develop early interest in physical activity.

*Regional and inter-municipal coordination*

Recreational resources that are open to the public are not fully marketed to the Region’s residents or its visitors. Resources that the Region does have should be meeting the needs of both populations, as well as identifying the recreational resources of the Region that make it a unique place to live and visit. Recreational resources could be more widely used if there was more publicity of opportunities, structured and informal, or better coordination of recreational offerings at a county level.

Municipalities that develop recreational opportunities do not always communicate with one another about proposed facilities. Improving coordination between municipalities would strengthen the recreational network and improve linkages between resources, fostering greater use of the facilities and inspiring new economic opportunity.

While a greater awareness of the recreational opportunities would satisfy users looking for new adventures, this could also increase the use of facilities that may already be overused or in need of maintenance – a separate, but related need.

*Increase recreational organization, e.g. VAST and Vermont Mountain Bike Association (and other local clubs)*

With limited funds and limited resources, recreational users, and the State of Vermont, have found that user groups are vital to sustaining free or low-cost recreational activities. User based groups build a community around new recreational activities, such as mountain biking, and provide a forum for addressing statewide issues, such as the role of VAST in building a snowmobiling network. User groups are also active in supplementing State resources for new activities on State-owned land, such as the use of Vermont Mountain Bike Association in cutting mountain biking trails or ice climbers in Smugglers’ Notch State Park.

Strengthening these groups strengthens and encourages active participation in athletics and in maintaining a recreation network that caters to all current and future users. User groups that serve the local community can also help build relationships between the municipality and the users. One example is the idea of a backcountry ski organization; as this sport becomes increasingly popular, there may be conflicts between land access and skiers.

User groups have also demonstrated their role in providing materials, such as trail guides or maps that show recreational resources and paths. For example, the Cambridge Trails and Greenway Coalition published a local trails guide and the Stowe Conservation Commission has been instrumental in developing and funding various guides to activities in Stowe.



Trail networks well maintained by user groups are utilized most frequently.

### *Communication between private landowners and recreational users to mitigate conflict*

Undeveloped recreational areas—sledding hills, swimming holes, hunting lands, etc.—serve important recreational needs in almost every town in the Region. Private lands comprise about 85 percent of lands in Vermont. It has been a long-standing Vermont tradition for private landowners to allow the public access to their land for hunting, hiking, and fishing, as Vermont’s constitution gives people the right to hunt, hike, and fish on unposted land throughout the state.

Loss of access to private lands is increasing due to liability concerns and the reluctance of landowners to keep their land open to unknown users. Loss of these private lands threatens to eliminate many of the free recreational opportunities available across the Region, especially in smaller towns that do not have the resources to provide municipal recreational facilities. Many private landowners do not post their land, thereby allowing such access for hunting, fishing, hiking, biking, snowmobiling, and other activities.

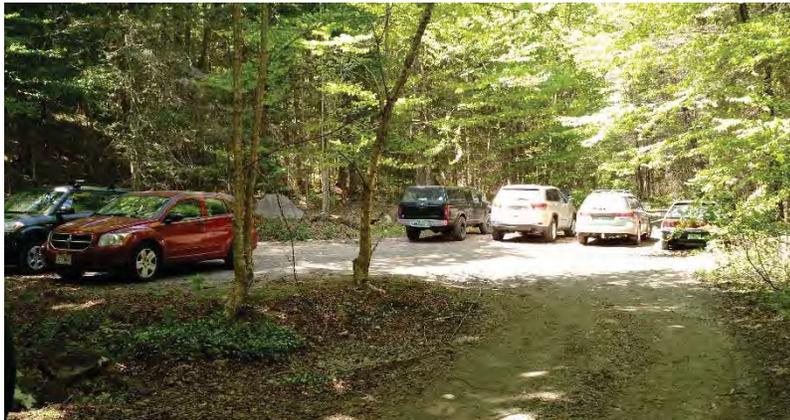
### **Future Trends**

- Continued loss of access to recreational opportunities on private land.
- Potential loss of recreational opportunities and related tourism associated with open space development and fragmentation.
- Changing trends in recreational activities, e.g. mountain biking, backcountry skiing, increase in community gardening.
- Nature-based recreational activities will need increased planning attention as they are recognized as an important component of economic and community development.
- Increased demand for motorized recreation such as snowmobiles and off road vehicles, leading to identification and creation of appropriate areas and support infrastructure.
- Increased management of recreational facilities for a variety of potentially conflicting uses to accommodate increased demand for motorized recreation as well as wildlife viewing and hiking opportunities.
- Increased demand for non-competitive recreational infrastructure (biking/hiking/walking trails, dog parks, etc.) as recreation’s role in quality of life and general health and well-being becomes more recognized. Lifestyle shifts and increasing obesity throughout the country emphasize the need for communities that support active lifestyles.
- As the Region’s population continues to age, the need for well-maintained sidewalks and walking paths, as well as recreational programs focused on meeting the needs of this population, will become an important component of recreational provisions.

### **Meeting Current and Future Needs**

Given that financial resources for recreation are limited throughout the county, communities and organizations should sustain and expand recreational resources. Sharing of resources at the local, State, and Federal level, and with the private sector, is equally important. Statewide trends indicate the total number of recreational participants and days of participating are increasing. Increased demand will put additional pressure on a fixed public land and water base, especially for developed recreational sites and nature viewing activities, where Vermont may add over 100 million participants by 2060.

Local, regional, state, and federal agencies in Vermont should coordinate growth management planning and policies to determine the best places for growth to occur. Public agencies should work with private businesses to ensure that recreational services complement and do not compete with each other. A variety of public, private, and non-profit funding sources are available to support expanding recreational opportunities to incorporate healthy activities into daily functions, such as sidewalks, bike paths, municipal parks, and community gardens.



On a nice day, parking lots to popular recreation spots can be tight.

Agencies, businesses, and organizations providing recreation should work to share feedback from users with each other so that services can be adjusted and coordinated to most effectively meet user needs. The tourism and ski industries are seeking to expand four-season offerings in order to meet user demand and adapt to changing weather conditions. In some cases, this may mean shifting currently managed forest land to recreational use. Ensuring compatibility between existing and future land uses will create new opportunities and challenges.

Additional continued funding for public facilities upgrades and maintenance will be necessary. Smaller, more rural towns may consider grouping resources when applying for recreation related grants and when forming recreation commissions. Community endowments and other private support is also an important component to municipal recreational programs.

Changes to the tax code at the State level that provide tax relief to landowners who allow recreational use of their property could also help keep access to privately owned recreational opportunities open.

### **Recreation, Tourism, and Economic Opportunity**

Tourism is a critical component of Lamoille County’s economic development. Being that many consider Lamoille County “The Heart of Recreational Vermont”, recreational elements are an integral part of Lamoille County’s tourism economy and, as such, should continue to be considered in tandem with economic development efforts.

There is no denying the importance of tourism on Vermont’s economy. A 2009 report from the Vermont Department of Tourism and Marketing found:

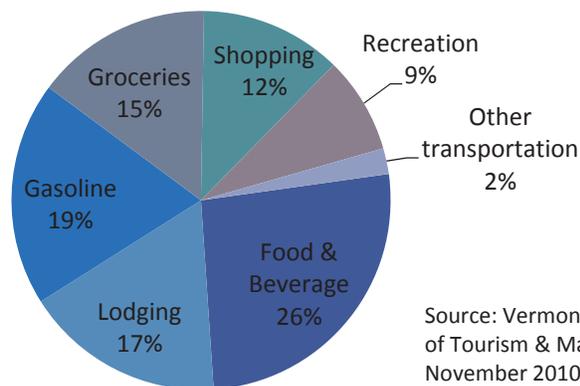
- Visitors made an estimated 13.7 million trips to Vermont for leisure, business, or personal travel;
- Direct spending by visitors for goods and services totaled \$1.424 billion (see Figure 4-1 below);
- Visitor spending supports an estimated 33,530 jobs for Vermonters (approximately 11.5% of all Vermont jobs); and
- Visitor spending contributed \$199.6 million in tax and fee revenues to the State of Vermont.

Lamoille County’s two major ski resorts make it a destination location in the winter but abundant natural resources make it a destination location year-round. It is estimated that \$700 million is spent in Vermont during the ski season. In low snowfall years, that drops to \$46 million. As the climate changes and the northeast warms, the ski industry has found ways to adapt. Smugglers’ Notch and Stowe Mountain Resort, for example, have invested in snow-making equipment and expanded their services and amenities. Smugglers’ Notch spent over \$1 million in snow-making equipment in 2012 alone. Stowe Mountain Resort has recently added a performing arts center, golf course, and a fleet of summer activities. The Trapp Family Lodge has added a large disc golf course, farm operations, and a micro- brewery and has expanded its services to become home to Nordic ski tournaments. Many resorts are adding mountain biking trails as part of local, state, and international networks.

One of the more recently identified challenges to the tourism industry is the growing importance of Vermont’s northern neighbors: appealing to Canadian visitors. When Canadians come to the United States, they see a need for improvements at the border. Border crossings can be intimidating, lengthy, or otherwise cumbersome. When they arrive in Lamoille County, there are few resources translated into French. Bike maps, for example, printed in English and French could broaden the appeal for cycling tours throughout Lamoille County’s rural communities, as would roads, shoulders, and trails that provide adequate room for safe multi-modal transportation.

When Canadians leave the United States, they face problems taking certain foods across the border, such as wine and cheese. This leaves opportunities for Lamoille County to be part of larger discussions to work with Canadians, particularly the province of Quebec. For visitors to Lamoille County, there is a need to show where recreational activities are located, where to park, and how to use the facilities. As demand grows for recreational facilities and new trails, paths, and trailheads are added, the lack of updated guides, maps, and brochures showing connections between recreational facilities is difficult for both residents and visitors alike.

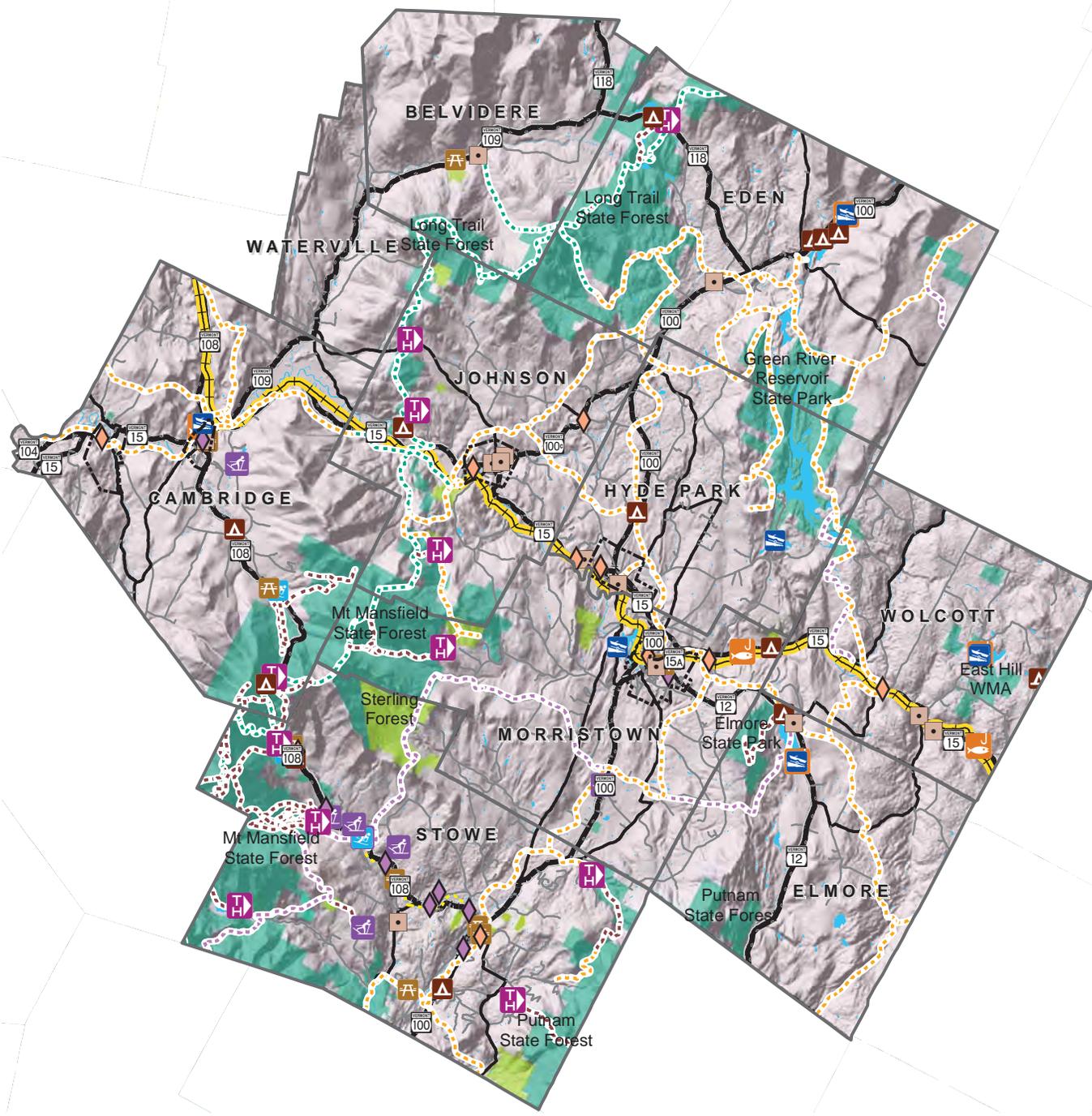
Figure 4-1. Vermont visitor spending patterns, 2009



Source: Vermont Department of Tourism & Marketing, November 2010

# Recreation Facilities

## Lamoille County



### Recreational Sites

- Campground
- Trailhead
- Cross-Country Ski Area
- Downhill Ski Area
- Picnic area
- Private Commercial Recreation area
- Public Recreational area
- School Athletic Fields
- Lake or River Access
- Fishing Access

### Regional Trails

- VAST
- Long Trail
- Catamount Trail
- Local Recreational Path
- Other Trails
- Lamoille Valley Rail Trail

### Public Conserved Lands

- State
- Municipal
- Other Non-Profit/ Private Orgs

### Data Sources:

Political Boundaries: VCGI, 1991.  
 Roads: 1:5000 E-911 Road Data, 2013.  
 Surface Water: VCGI for VHD-USGS, 2001.  
 Regional Trails: ANR 1993, VAST 2011, Catamount Trail Association 2003.  
 Recreation Sites: Vermont Department of Forests, Parks and Recreation, 1999.

Created 7/30/15 by LCPC. Map is for planning purposes only, not for regulatory interpretation.



## Working Lands: Strategy

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The working landscape is a central component of the character and economy of Lamoille County and has shaped the region's human settlements and transportation networks. This landscape is the result of centuries of active land management by generations of Lamoille County residents. The following key strategies must be recognized:

***Ensure the viability of diverse agricultural and forest-based enterprises*** as a key component to maintaining the County's working landscape. Without agriculture and forestry, much of the working landscape would be lost. Agricultural and forest-based enterprises, including agritourism, must be provided with the flexibility to adapt to changing conditions.

***Private property owners are the primary stewards of the County's working landscape.*** Private property must be respected, and education is a more effective tool for encouraging sound stewardship of the environment than regulation. As new residents move to the region, it will be important to educate these residents about the Lamoille County land ethic, and the importance of traditional activities, such as agriculture, hunting/fishing, and forestry in order to minimize conflicts over use of land.

***Public Lands contribute to the County's working landscape.*** Public lands may range from small, community owned parks to large State Forests. Some towns have invested local resources to create "Town Forests" or operate local Land Trusts. Acquisition of new public land should occur in consultation with the host community, and public lands should be open to diverse public uses.

***Lamoille County is home to diverse wildlife resources, including large blocks of unfragmented core forest habitat.*** Wildlife based activities such as hunting and fishing are an important component of the Region's culture and economy. Sound management of the working landscape can enhance these resources, while fragmentation of habitat can undermine its quality.

***The working landscape provides diverse outdoor recreational opportunities,*** which also contribute to the regional economy. Recreation includes traditional activities such as hunting and fishing, as well as newer activities such as mountain biking and dog sledding. With sound land management and cooperative planning, diverse recreational opportunities can coexist with each other and with agriculture and forestry operations.

## POLICIES & ACTION ITEMS

***Policy:*** Support and strongly encourage the continued diversification of the agricultural and forest products produced in Lamoille County.

### **Action Items:**

- Work with communities to ensure that regulations in the Rural and Working Lands Areas allow for diverse farm and forest operations, including onsite value added production, and expanded definitions for State Accepted Agricultural Practices. Modernize regulations to reflect growth of non-traditional activities (such as agritourism, back-yard saw mills, on-farm cafes, etc.).
- Support expansion of workforce training (adult education and vocational education) efforts related to the agricultural and forestry industries. Examples include the GMTCC Forestry and Land Management Program and the Vermont Woodworking School.

**Policy:** Encourage development of the secondary industries needed to support the working landscape, such as food processors, saw/lumber mills, storage/warehousing facilities, and incubators (such as the Vermont Food Venture Center).

**Action Items:**

- Work with municipalities, LEDC, and other economic development agencies to identify viable uses for the County's lower quality timber, such as siting of a biomass co-generation station, wood pellet manufacturer, or similar facility in the region.

**Policy:** Support efforts to increase access to local foods and other locally produced agricultural and forest products.

**Action Items:**

- Work with Regional and State partners to encourage better utilization of local farm and forest products, (such as food, timber, and firewood) at local institutions, schools, resorts, and other major employers.

**Policy:** This Plan recognizes that much of Lamoille County's working landscape is the result of private property owners acting as stewards of the land. LCPC supports State and local efforts to ensure the viability of the agricultural and forestry industries.

**Action Items:**

- As Lamoille County's population increases, work with regional and non-profit partners to educate new residents who may not be accustomed to aspects of the working landscape, such as agricultural operations and hunting, about the economic, cultural, and ecological benefits these activities provide.
- Publicize efforts to promote active land management through resources such as Vermont Fish and Wildlife Landowner/Hunter Access Registry  
[http://www.vtfishandwildlife.com/wildlife\\_hunteraccess.cfm](http://www.vtfishandwildlife.com/wildlife_hunteraccess.cfm)
- Increase awareness of the Region's diverse fish and wildlife populations and the Region's importance in sustaining populations of rare, threatened, and endangered species, such as loons and Peregrine falcons.
- Support efforts by the Vermont Department of Fish and Wildlife and the Lamoille Fish and Game Club to introduce new residents and the younger generation to traditional outdoor activities such as hunting and fishing.
- Encourage the Current Use Program to allow multiple landowners to combine parcels in order to meet minimum acreage requirements.

**Policy:** LCPC supports locally initiated efforts to conserve farm and forestland. Once conserved, plans for management of such lands shall be developed in consultation with the host community.

**Action Items:**

- Support local efforts to create and manage town forests. Encourage efforts that include outreach to private landowners regarding sound forest management techniques.

**Policy:** Whenever a State or Federal agency considers a new land acquisition, it shall consult with the local legislative body prior to making any purchase.

**Action Items:**

- Engage any public entity considering a new land acquisition in Lamoille County early in the process to ensure local concerns are addressed.

**Policy:** *Given the large amount of State owned land within Lamoille County, public use of this land for recreation, wildlife management (including hunting), timber management, and maple sugar production should be allowed and encouraged.*

**Action Items:**

- Work with the Vermont Department of Forests, Parks, and Recreation to determine if areas of State Forest land within the County should be open to maple sugar production. Only areas that would not degrade recreational use or ecological integrity of the forest should be considered. If such areas are present, the Department should consider piloting a test program allowing maple sugar production on State Forest land in Lamoille County.
- Explore opportunities for use of State lands for renewable energy development with consideration given to wildlife, watersheds, scenic resources, and other potential impacts.

**Policy:** *This Plan recognizes the value of the County's forestland in providing recreational opportunities and the important role that all forms of outdoor recreation plays in the Region's economy.*

**Policy:** *Regionally significant ridgelines, such as Mount Elmore and the Worcester Range, Mount Mansfield and the Sterling Range, the Woodbury Range, Butternut Mountain, and Belvidere Mountain, should be protected from major development.*

**Policy:** *Fragmentation of core forest areas and other important wildlife habitat is strongly discouraged.*

**Action Items:**

- To prevent undue fragmentation of farm and forestland, work with communities to investigate innovative tools for maintaining the working landscape. Tools include alternatives to traditional "large lot zoning" such as density averaging and Planned Unit Developments, density transfers/transfer of development rights, and overlay districts.

**Policy:** *State transportation and infrastructure projects shall consider impacts on wildlife connectivity.*

**Action Items:**

- Work with municipalities to obtain funds to improve wildlife passage through the transportation network.

## Working Lands: Background and Inventory

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Lamoille County's topography has shaped the region's landscape, human settlements, and transportation networks. The County is bounded to the west by the Green Mountains, including Mount Mansfield, Vermont's highest peak, and to the east by the Worcester Range. These ranges provide the visual backdrop for which the County is known. Much of the higher elevations are largely undeveloped and contain large swaths of unfragmented forestland and wildlife habitat that are critical to the movement and survival of many species of animals. The summit and surrounding area of Mount Mansfield contains the highest concentration of fragile areas in the County.

In some cases, the underlying geography of these areas is rare itself. For example, the cliffs of Smugglers' Notch contain one of only 11 documented examples in Vermont of a Cold Calcareous Cliff Community. This community type is characterized by large exposures of moderately base-rich bedrock, usually at high elevations, with frequent natural disturbances such as ice fall and rock fall. These cliffs also constitute one of only a few active peregrine falcon nesting sites in the State of Vermont.

The mountain summits and ridgelines also provide the headwaters for streams flowing into the Lamoille River. As these streams run down the mountains, they form numerous waterfalls, cascades, and gorges that are themselves important features of the County's landscape. These features create an attractive recreational resource, but they also provide an important educational resource by illustrating the geologic history of the region and offering specialized habitats and microclimates for many species of flora and fauna. Lamoille County is home to twelve hydrogeological features as documented in *Waterfalls, Cascades, and Gorges in Lamoille County* (December 1991) prepared by the Lamoille County Planning Commission. This report evaluated these sites for their potential for loss due to landowner attitudes towards access, adjacent land uses and development, and over use. The report concluded that, while many of these features are protected by public ownership or land use regulations, communities should recognize the valuable public benefit the private property owners are providing by keeping access open. Efforts should be considered for public or semi-public acquisition where possible.

The biophysical regions of Vermont characterize the landscape into distinct units that share features of climate, geology, topography, soils, natural communities, and human history. Although each region has variation within it, all are widely recognized as units that are more similar than they are different. Lamoille County lies almost entirely within the biophysical region of the Northern Green Mountains, with its westernmost corner lying within the Champlain Valley biophysical region.

The Northern Green Mountains are characterized by high elevations, cool summer temperatures, and acidic metamorphic rocks. The characteristic natural communities include Northern Hardwood Forests and the high elevation communities of the Spruce-Fir Northern Hardwood Forest. The Green Mountain range has a marked influence on the climate of the region, with temperatures in higher elevations typically cooler than at lower elevations and with higher elevations receiving significantly more precipitation than low lying areas.<sup>1</sup>

The Northern Green Mountains today are comprised of primarily metamorphic rocks, mainly schist, phyllites, gneisses, and quartzite. These rock types are generally acidic. Glaciation has influenced the surface geology and topography of the region. Smugglers' Notch is an old stream valley that was significantly enlarged by the passing

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<sup>1</sup> Thompson E. and Sorenson E. (2005) *Wetland, Woodland, Wildland; A Guide to the Natural Communities Of Vermont.*

glaciers. Except for the higher elevations of the Northern Green Mountains where there are extensive areas of exposed bedrock, much of the biophysical region is covered with glacial till<sup>2</sup>.

The highest elevation peaks in Vermont are found in the Northern Green Mountains. The Chin of Mount Mansfield (4,393 feet) stands the tallest. Other prominent peaks within Lamoille County include Belvidere (3,360 feet), Elmore, Laraway, and Butternut Mountains. Besides the primary range of the Green Mountains, Lamoille County contains the secondary ranges of the Worcester, Sterling, Cold Hollow, and Lowell Ranges. The Worcester Mountains include Elmore Mountain and Mount Hunger and are separated from the main range by the Stowe Valley. The Lowell Mountains extend from near Lake Memphremagog southwest to Eden. The Cold Hollow Range begins just north of Route 109 in Belvidere and extends into Franklin County. The Sterling Range lies just east of Route 108 and south of the Lamoille River Valley. Bisecting the Green Mountains, the Lamoille River valley provides topographic diversity in the region. Because of its generally steeply sloping topography, the Northern Green Mountain region has no natural lakes and substantially fewer wetlands than other parts of the state.

This rough topography has shaped human settlement patterns and the economy of the region. Traditionally, villages and downtowns were located at key routes along the rivers, roads, and railroads cut into the lowland river valleys. The narrow river valleys have provided opportunities for agriculture, but not nearly at the scale possible in the wider Champlain Valley. After rapid deforestation in the early 1800s, forests returned to the County's steep hillsides and eventually became an important component of the region's economy. Finally, the hills themselves became valuable for the mineral resources beneath them. All of these economic forces shaped the landscape of Lamoille County. Thus, while Lamoille County is rich in natural resources, it must be remembered that the County is not an "unspoiled wilderness" but rather a working landscape shaped, for better or worse, by current and past generations.

## Agriculture

### **The Changing Face of Agriculture**

Today, while only 17% of land in Lamoille County is actively used for agriculture, farming continues to play an important role in shaping the economy and character of the county. Most of the agricultural activities in the County occur in the Lamoille River Valley and its primary tributary basins -- where the land is level, tillable, and productive. Aside from providing locally produced farm products and employment, agriculture is a critical part of the Vermont way of life and contributes to the County's traditional settlement pattern by providing a diversity of land uses and open space that is characteristic of northern Vermont.

From 2002 – 2007, Lamoille County farm sales increased by 57%. The average Lamoille County farm has sales upwards of \$61,129. The total market value of products sold in Lamoille County was \$21.3 million. A thorough analysis could be conducted in the future to fully evaluate how Lamoille County agriculture compares to its neighbors; Caledonia County farm sales to the east average \$66,509 while Orleans County farms to the north average \$155,656. Washington County farms average about \$50,972 of sales. To the northwest, Franklin County farms average \$250,498 worth of sales.

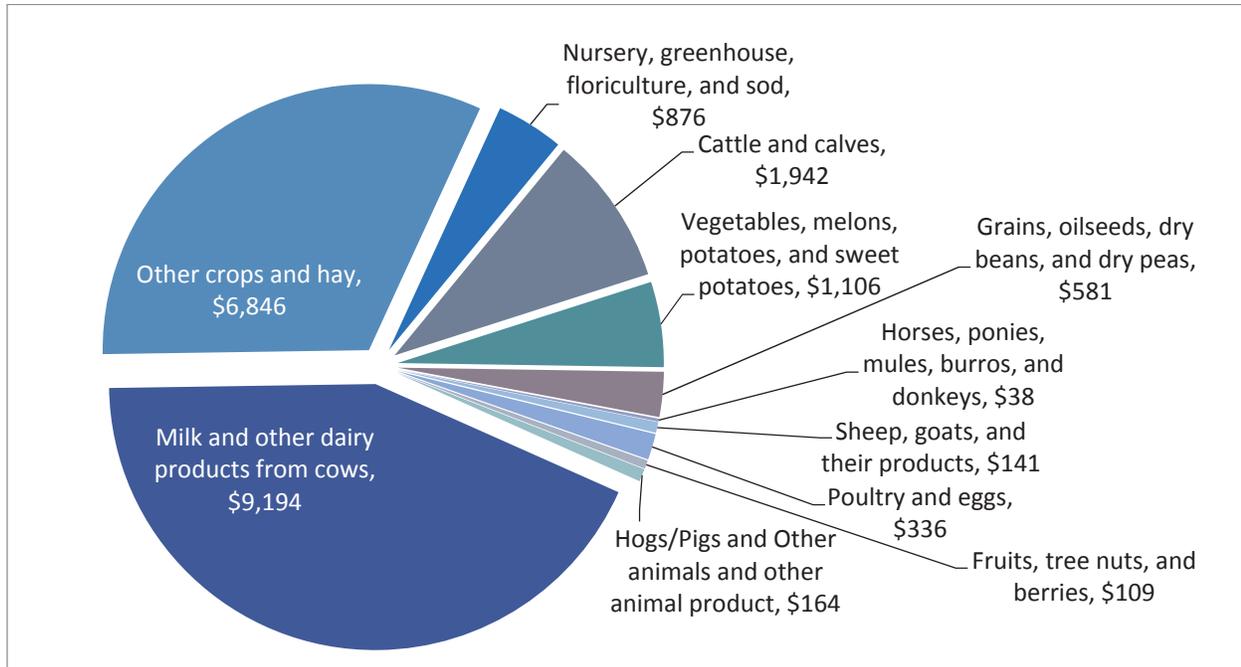
The face of agriculture in Lamoille County is currently in a state of change. Traditionally, dairy farming was the predominant type of agriculture within the County. While dairy still remains an important component of the County's agricultural industry, it is not as dominant as it once was. Of the \$21.3 million worth of agricultural products produced by Lamoille County farms, more than fifty percent is from milk and other dairy products. In

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<sup>2</sup> ibid

2012, there were 36 dairy farms in Lamoille County, down from 85 farms in 1996. In 1995, 38% of all farms in Lamoille County were dairy farms. Today, dairy farms make up only 10% of all farms in the County.

Figure 4-2. Value of Lamoille County Agricultural Sales by Commodity Group (\$1,000)



Source: USDA Census of Agriculture, 2012

While the number of dairy farms has declined, the emergence of new agricultural products has led some to say that Vermont is experiencing an “Agricultural Renaissance.” New agricultural products being produced in Lamoille County include organic farming, wine making, organic beef, seed and nursery production, and specialty products such as cheese and bread. This trend can be seen in the growing variety of commodities represented in the table above. Many of these new agricultural enterprises rely on “direct marketing” of products to the consumer while traditionally, farmers sold a commodity (such as bulk milk) to a producer who then processed the product for sale to the consumer. Under direct marketing, the farmer sells a product, either raw or processed, to the consumer.

In 2007, Vermont led the nation in direct agricultural products sales, with \$36.77 spent per capita at farm stands, farmers’ markets, and through CSAs, Community Supported Agriculture. By selling directly to the consumer, a farmer is able to receive a greater share of the value of products sold by eliminating a distributor or wholesaler. In Lamoille County, the number of farms selling directly to the customer increased by 65% from 2007 – 2012. This is important given that the average Lamoille County farm spends \$55,999 on production expenses, leaving the farm with a net cash income of about \$8,592.

### Agritourism

Visiting an agricultural enterprise to enjoy, be educated, or participate in an activity has taken on a life of its own in Vermont, known as agritourism. Agricultural operations in Lamoille County have diversified their offerings, hosting farm-to-table dinners and special events, adding special events barns, hosting corn mazes, and providing opportunities to enjoy the scenery and inner workings of an active farm. These activities allow agricultural operations to earn new income and cater to larger audiences of visitors to the region. Agritourism is not without

its challenges. Many of these activities do not qualify for state or local “Agricultural Exemptions”, and some local zoning codes may unintentionally restrict agritourism related activities in rural areas.

**What is a Farm?**

The U.S. Census defines a farm as any place from which \$1,000 or more of agricultural products were produced and sold, or normally would have been sold, during the census year. Products include crops such as cash grains, field crops, vegetables, fruits and tree nuts, horticultural specialties, and livestock such as beef cattle, hogs, sheep, goats, dairy cattle, poultry, and eggs, animal specialties, and general livestock. Note that this definition does not necessarily account for small agricultural operations or value added operations that are becoming more common in the County.

Nationally, the number of large farms is growing while the number of small farms is also increasing. These smaller farms are becoming more diversified, thus representing agricultural-related operations rather than specializing in one area, i.e. a dairy farm. Agri-related operations which include aquaculture, apiary, value-added processing (such as cheese operations), and crop diversification are redefining agriculture in Vermont and Lamoille County.

**Number and size of Farms**

The USDA conducts a Census of Agriculture every five years. The most recent Census in 2012 counted 349 farms in Lamoille County. This is a 10% increase from 2002. There was a slight increase in the number of farms in the County between 1987 and 1992 and again between 1997 and 2002, but there is no consistent pattern.

Based on historical data collected through the Census of Agriculture, the average size of a Lamoille County farm has fluctuated over time. The average size of Lamoille County farms decreased over the fifteen-year period between 1978 and 1992 from 230 acres to 182 acres. Today, the average size of farms is 149 acres. Note that the land in these reports is based on ownership and does not include leased-land farming activities (Table 4-3).

Farming trends can be evaluated by examining the amount of land used for agriculture over time. This number has also been fluctuating.

Table 4-3. Number and Average Size of Farms, 1910- 2012

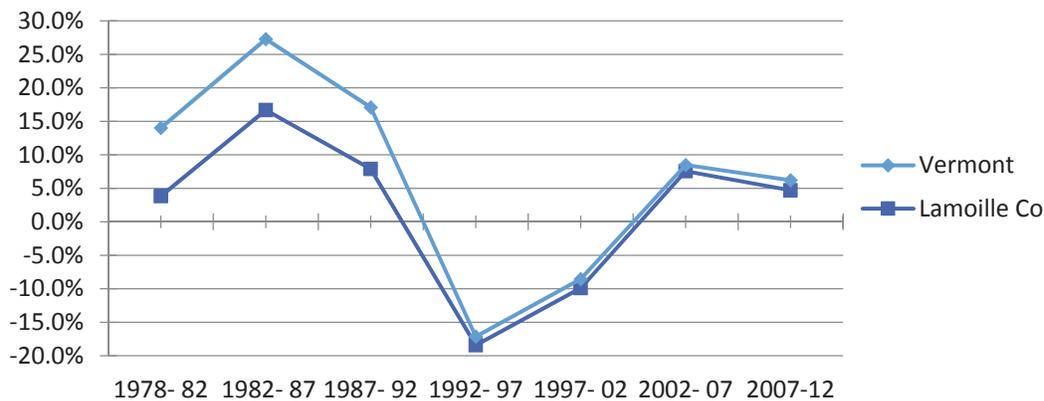
Year	Number of farms (Lamoille County)	Average land in farm – Lamoille County (acres)	Number of farms (Vermont)
2012	349	149	7,338
2007	300	166	6,984
2002	317	170	6,571
1997	297	165	5,828
1992	227	182	5,436
1987	213	211	5,877
1982	255	231	6,315
1978	244	230	7,273
1974	248	223	5,906
1969	312	223	6,874
1964	443	246	9,247
1959	586	219	12,099
1954	826	189	n/a
1950	954	170	n/a
1945	1223	143	n/a
1940	1195	135	n/a
1935	1316	136	n/a
1930	1424	141	n/a
1925	1459	129	n/a
1920	1599	129	n/a
1910	1629	129	n/a

Source: USDA Census of Agriculture 2007, 2012

In 2012, agricultural land in Lamoille County amounted to 52,093 acres, a slight decrease over three decades. This

follows a statewide trend, though the loss of agricultural land in Lamoille County has been less dramatic than in the state as a whole (Figure 4-4).

Figure 4-4. Percent Change in Land in Farms, 1978-2012



Source: USDA Census of Agriculture, 2012

### The Challenging Demographics of Farming

The average age of a farmer in both Lamoille County and in the state is 56 years old. In Lamoille County, less than half of the principal operators of farms count farming as their primary occupation, meaning many farmers are working off farm at another job.

Given the average age of farmers in Lamoille County, one of the major challenges facing the future of agriculture is finding new, young farmers to continue the industry once the current generation retires. The cost of land and equipment can be insurmountable for many young farmers. “Vermont Land Link,” operated by the Lamoille Economic Development Corporation, represents one tool for addressing these challenges. This tool connects farmers with landowners interested in leasing their land. The Vermont Land Trust Farmland Access Program also provides a mechanism for beginning farmers to purchase land at more affordable prices.

### Support Industries

In addition to farm enterprises themselves, a vibrant agricultural economy relies on the availability of appropriate infrastructure, including roads, utilities, processing, and storage capacity. Notable gaps in the existing support infrastructure include the need for additional meat processing and cold storage capacity; the need for facilities for processing and packaging of fresh vegetables, eggs, and other produce; and the lack of facilities for milling and processing wood products. Unless these gaps are addressed, Lamoille County’s farm and forest economy will be unable to reach its full potential.

### Agricultural Soils

According to the USDA Natural Resource Conservation Service, Lamoille County contains 19,727 acres (6.5%) of prime agricultural soil and 61,908 acres (20.4%) of potentially good (Statewide Importance) agricultural soils. These soils are primarily found along the Lamoille River and its tributaries. These prime agricultural soils come under the scrutiny of Vermont’s Land Use and Development Law, Act 250, which considers the productivity of agricultural land when large developments are proposed.

Under this Statute, when a development subject to Act 250 impacts agricultural soils, mitigation of these soils is required. In general, Act 250 is structured to prefer “on-site” mitigation – that is, modifying the site design of the project so that the soils are not impacted (see §6093(a)(2)). However, the District Commission may authorize “off-site” mitigation if “that action is deemed consistent with the agricultural elements of local and regional plans” (see 10 VSA §6093(a)(3)(b)). Specific policies related to mitigation of agricultural soils and other natural resources are found in the Land Use Section of this Plan.

## Forestry

Today, forests are the dominant land cover in Lamoille County. The County’s forests provide a wide range of services which support the region economically, environmentally, and socially. Forests provide economic benefits such as jobs in the woods and the mills and physical products such as lumber. Habitats for numerous game and non-game woodland animals and protection of valuable water resources are among the ecological benefits of the County’s forests. Finally, forests provide quality of life factors too invaluable to quantify, such as hunting, recreation, and aesthetic pleasure.

The region’s forest resources provide an important component to the region’s economy. Without some economic benefit being derived from forestland, it is difficult to imagine landowners keeping their resource lands in production. Many would argue it is the working forest that provides the greatest diversity of benefits to the landowner and public alike. With few exceptions, a healthy working forest provides a greater diversity of habitats for woodland animals, trails for recreationalists, and a blanket of color on our mountains and ridgelines for residents and visitors alike.

Today, approximately 80% of Lamoille County is forested – totaling nearly 240,000 acres. The region is characterized by a diversity of landscapes and elevations, creating a wide variety of vegetative types and natural communities, including early succession forests, northern hardwood and spruce-fir forests, sub-alpine forests; cliffs; rock outcrops; and wetlands. According to the U.S. Forest Service, 235,500 acres (98.5%) of the region’s forest is categorized as timberland – forestland producing, or capable of producing, crops of industrial wood (>20 cubic ft./ac./year) and not withdrawn from timber utilization. Most of the timberland in the County is dominated by maple, beech, and birch, with spruce-fir occurring mostly at higher elevations. Both a majority of acres and volume of the region’s timberland are of sufficient size and quality to be considered saw timber. Sugar maple, yellow birch, beech, and red spruce represent the most abundant species in this size-class.

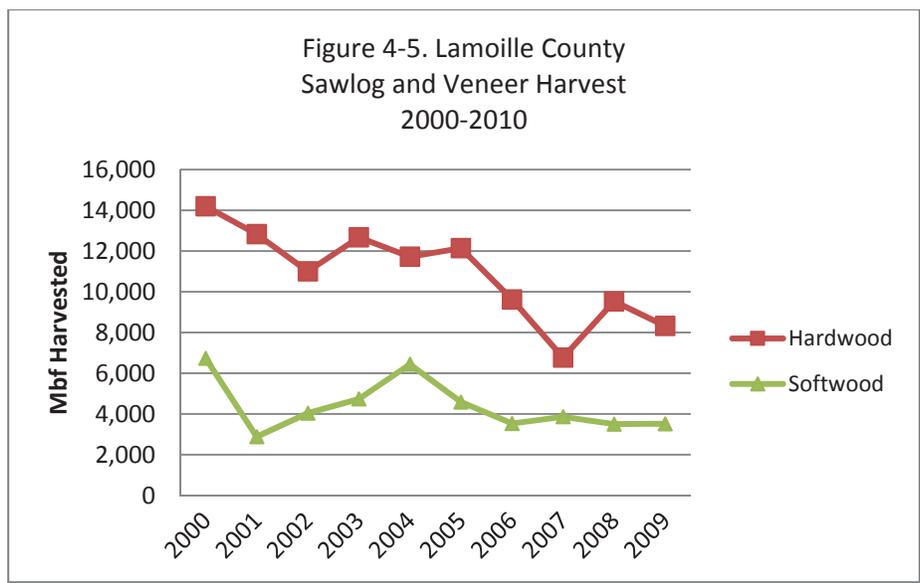
Despite this, much of Lamoille County’s forests are not currently commercially viable for timber management, due to the health and quality of the growing stock and current market forces. According to surveys by the U.S. Forest Service, statewide increases in the volume of growing stock are twice that of harvesting rates. Past harvesting practices have selectively removed only the highest quality stems (high-grading) resulting in roughly 15% of northern Vermont’s growing stock being of such poor quality that it is of little or no commercial value (live culls). This, in combination with irregular markets for wood chips, places further demands on the high quality stems, as landowners and managers need to generate a return from the land. What is needed, according to some forest economists, is a large reduction in the standing volume of both live culls and thinning over-stocked stands and management and harvesting practices that encourage the regeneration of native species in order to improve overall forest quality and value from an economic point of view.

### **Timber and Wood Products Manufacturing**

Forests are a source of raw materials which support traditional forest products industries, such as hardwood

vener, lumber, pulpwood, fuel wood, and chipwood. In 2010, 11% of the State’s hardwood harvest was derived from Lamoille County, making it the second highest contributing county in the State. Most of the large scale harvesting occurs in the upland forest areas of the region as these areas are characterized by high quality soils and relatively easy access. For example, the Atlas Timberlands consist of approximately 26,789 acres of upland forest that have been actively managed and harvested for at least a century.

Forest Resource Harvest Summaries from the Vermont Division of Forestry provide a picture of how our forest resources are being utilized. As a result, we are able to understand the relationship between forest productivity and the commercial demand for wood by consumers. This information becomes even more critical with increasing economic pressures within the wood product industry. Total harvest has declined over the last decade in Lamoille County and the state as a whole (Figure 4-5).



The number of sawmills (both active and dormant) has also decreased, reflecting the lower harvest figures. The past decade has been characterized by significant economic challenges to the Vermont sawmill industry, and with only four operating sawmills in the region, Lamoille County has not been immune to such challenges. The decline of the housing market, the recent recession, and the subsequent decline of construction is further compounding this challenge. An inadequate number of sawmills throughout the region undermines quality forest management and forest diversity. As the number of sawmills declines, the increased transportation distance saw logs must travel to a mill increases the cost of production and harvesting which in turn results in a decreased profit margin on marginal species and grades. This trend significantly reduces the economic incentive for landowners to actively manage forests and can contribute to the conversion of forest land to other uses. Currently, due to the lack of adequate local processing facilities as well as the overall lack of production volume, the majority of the region’s hardwood is filtered into established major supply routes throughout the Northeast. Much of the local hardwood is transported via Interstate 91 to Canadian sawmills for production. As the number of sawmills declines, there is a point where the number becomes too small to adequately support a diverse market.<sup>3</sup>

Quarterly Workforce Indicators (QWI) from the Census provide an indicator for Vermont’s forest industry based

<sup>3</sup> Vermont Department of Forests, Parks and Recreation (2011). 2010 Vermont Forest Resources Plan Division of Forests

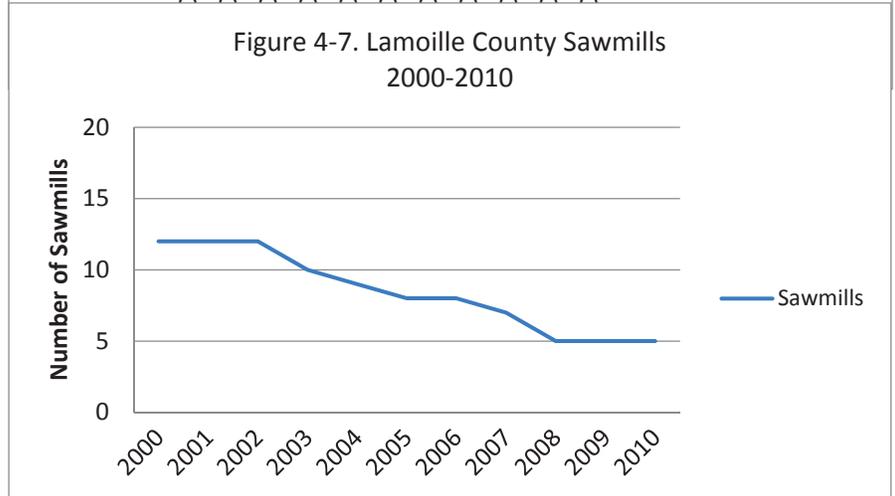
on employment and salaries. The QWI counts jobs, rather than employed workers, and does not include self-employed workers and independent contractor employment. The QWI statistics for Lamoille County for the categories Forestry and Logging and Associated Forestry are largely missing, perhaps due to the fact that the vast majority of forest workers in the County are self-employed. The chart at right (Figure 4-6) indicates the employment statistics for the wood products manufacturing industry as a proxy for forestry related employment overall.

After three years of decreasing demand and production, the forest products industry may be stabilizing. Interestingly, the data for Lamoille County shows a steady decline from 2000-2010 (Figure 4-7), indicating that the wood products manufacturing sector was less directly affected by the economic recession beginning in 2007 than by other factors. Lamoille County represents only a very small fraction of employment in the wood products manufacturing industry in relation to other parts of the state. Thus the graph may be somewhat misleading. The data table indicates that wood products manufacturing employment in Lamoille County declined by two-thirds over the last decade, a steeper decline than occurred across the State of Vermont.

While it may be increasingly difficult to operate an economically viable, traditional sawmill, as with agriculture, diversification may represent an opportunity to maintain the forest products industry in Lamoille County. Small “backyard” mills, portable mills, fire wood suppliers, and cottage furniture makers and wood turners all represent potential opportunities to create local employment while adding value to raw timber materials produced in Lamoille County.

**Maple Products**

While timber harvesting and the wood products industry appear to be in decline, the use of Lamoille County’s forest for maple products is growing. Lamoille County has witnessed a significant expansion within the maple products industry over the past decade, characterized by the growth of existing small and medium scale maple sugaring operations as well as the addition of new operations. Both the number of taps and the total amount of syrup produced in Lamoille County have increased significantly over the last decade (again, town level data is not available). Lamoille County now is the second highest maple syrup producer of any Vermont county (Figures 4-8 and 4-9). Lamoille County is home to one of the State’s largest producers of maple products with merchandise exported worldwide. Through the Lamoille County Planning Commission’s 2011 Forest Stewardship Project,



several consulting foresters reported that land previously managed for timber production is now being managed for maple syrup production.

A large portion of Lamoille County’s forestland is located within a State Forest. Under current State policy, land within a State Forest cannot be used for maple syrup production. In the past, syrup production and timber harvesting have been viewed as conflicting management goals. Traditional sawmills operated on volume and remained profitable by “keeping the saws running.” As a result, trees that had been tapped for sugaring were considered unusable as tap holes contained imperfections and made the lower 5-6 feet of a tree unmillable. This may not be the case for more modern, precision mills that produce more specialized products.

Today, there may be a niche market for furniture and turned wood that contains evidence of tap holes. Given the growth of maple syrup production in the region and changes in the timber industry, the County could consider working with the Department of Forest, Parks, and Recreation to begin a test project of maple production on State land.

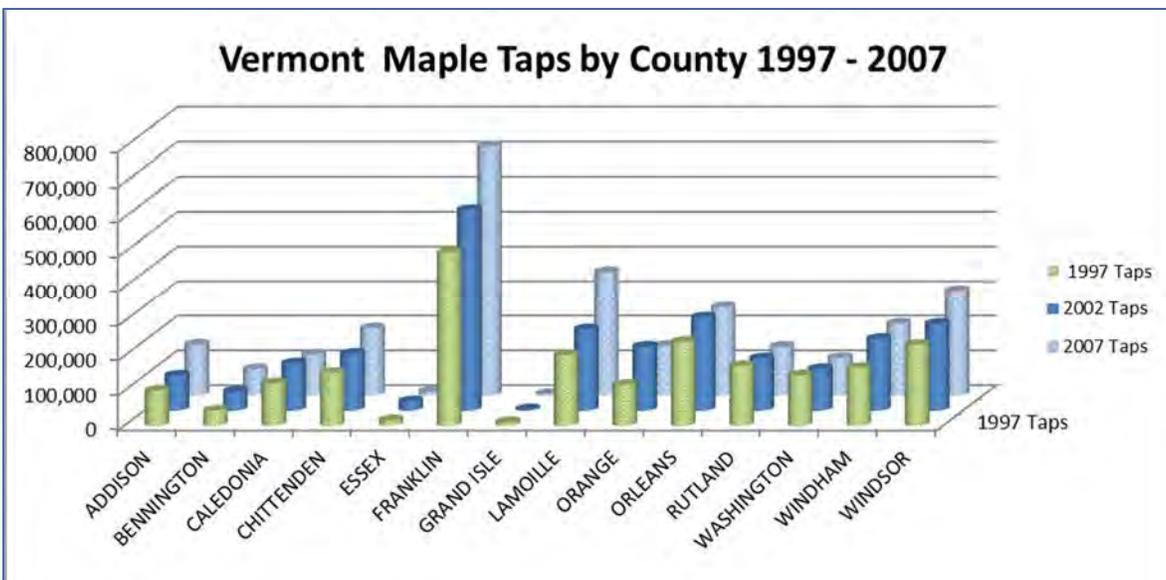
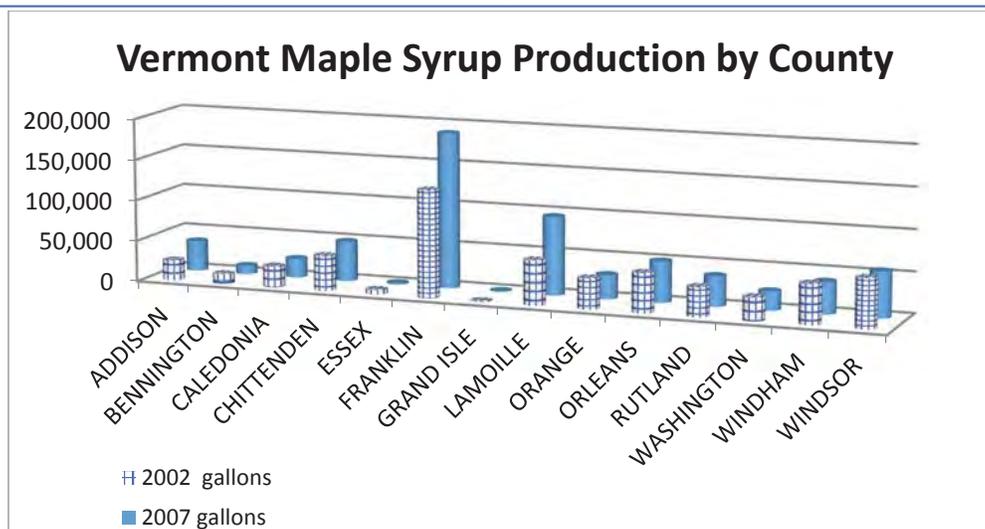


Figure 4-8. Vermont Maple Taps by County 1997- 2007  
Figure 4-9. Vermont Maple Syrup Production by County (below)



### **Wood for Energy**

In addition to timber, wood is also harvested for energy. There has been an overall increase in demand for wood energy, recognized at both the commercial and institutional level, with 35 schools in Vermont converting from fossil fuel to the use of wood chips for heating between 1983 and 2008. Personal consumer demands have also increased over the last decade, with one recent study depicting a residential firewood consumption increase from 275,000 cords per year in 1997 to 315,000 cords per year in 2008. Use of wood for energy represents an opportunity to continue to manage Lamoille County's forests despite the poor timber market and lower quality growing stock as some wood that may not be suitable for timber may be suitable for wood chips, wood pellets, or cordwood.

It should be noted that cordwood is a major medium by which invasive species spread. As a result, the Vermont Agency of Natural Resources recommends that firewood not be transported more than 50 miles from where it originates. Currently, Lamoille County's forests are relatively free of many invasive insects. Better marketing of locally cut cordwood to County residents, as well as visitors to the numerous area parks and resorts, could increase opportunities for local businesses and forestland owners, while also preventing the spread of unwanted pests.

### **Other Forest Products**

While the term "forest products" is often used synonymously with "wood products," a wide variety of non-timber forest resources could be derived from the County's forests. As noted earlier, due to past practices of high grading, much of Lamoille County's existing forests contains timber that is of low commercial value. Since management of a forest for non-timber products often requires less acreage than management of a forest for timber, these products may represent an opportunity to adapt to the challenges related to parcelization. New opportunities for forest landowners that create an economic incentive to manage and maintain woodlands within the County may include the following non-timber forest products:

- Fiddleheads were once primarily foraged and consumed on a personal level. There is a growing demand at specialty restaurants and grocery stores for fiddleheads which grow well in forested riparian and wetland areas.
- Shiitake mushrooms, often grown in newly cut beech trees, could improve the health of those stands as well as associated black bear habitat. As Lamoille County's climate warms, other commercially grown mushrooms, such as Morels, Chanterelles, and Black Trumpets, may be grown in the County's forests. Due to climatic reasons Vermont restaurants currently import most of their supplies of these high priced delicacies from the Pacific Northwest.
- Spruce tips were once a traditional ingredient in ale. Several Vermont based brewers, including Rock Art Brewery in Morristown, now produce beers flavored with spruce tips. Spruce tips can be used for a variety of culinary uses.
- In the past, Lamoille County's forests supplied several commercial stills which produced cedar and pine oil. These products were wholesaled to national manufacturers. New, smaller scale producers may be able to develop niche markets for Vermont "brand" oils or for incorporation into other Vermont value added products.
- Medicinal and herbal products such as ginseng and golden seal.
- Decorative products, including holiday greenery and vines.
- Edible wild products such as ramps, fruits, and various nuts.
- Specialty products such as brown ash used for basketry.

### **Ecological Benefits of Forests – Air Quality**

Overall, within Lamoille County local air quality concerns are primarily related to emissions from traffic, heating systems (e.g. woodstoves), and some agricultural practices. Lamoille County occasionally experiences “bad air days” in which air quality standards are exceeded during the winter months as a result of “cold air” inversion. This is the process by which dense, cold air traps pollutants close to the ground surface. It is important to note that currently neighboring Chittenden County is at risk for non-attainment status due to the amount of particulate matter and ground-level ozone because the cumulative effect of these sources may increase with additional growth and may have greater impacts on local air quality. Tree and forest canopies can have a significantly positive impact on air quality through the sequestration of air-borne pollutants. Simultaneously, the release of volatile organic compounds from trees influences the production of ground level ozone. Maintaining Lamoille County’s working forests is thus essential to maintaining air quality.

Other concerns include impacts on air quality resulting from out-of-state activities that pose a serious threat to fragile high elevation ecosystems. In particular, acid rain, caused in part by coal-fired energy plants operating to the west of Vermont, has damaged plant communities in the vicinity of Mount Mansfield.

### **Ecological Benefits of Forests – Water Quality and Flood Water Attenuation**

Forest cover plays a significant role in the maintenance of water quality and quantity. Upland forests contain the majority of the Class A headwaters in the region as well as many larger streams that include fisheries, waterfalls, swimming holes, and other recreational and scenic resources. Upland forests retain and filter groundwater, an essential resource in a county where many residents draw their water from private or community wells. In addition, forest cover helps to regulate water temperatures. This is extremely important for fish species, such as trout, which rely on cool oxygen rich environments.

While much attention is given to the role of floodplains, which are primarily located in the valley floor, upland forests also play a critical role in reducing flooding and erosion hazards. Forested land attenuates water much more effectively than cleared land. This is especially important on steep slopes with erodible soils. Maintaining upland forest landscapes ultimately reduces the amount of water entering the floodplain and provides protection for human settlements along the County’s water courses.

### **Fish, Game, and Other Wildlife**

Wildlife-based activities, including hunting, fishing, viewing, and photography, are estimated to have brought more than \$383 million to the State’s economy (*Vermont Forest Resources Plan, 2010*). Hunters alone spend more than \$292 million in Vermont annually according to the 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation conducted by the U.S. Fish and Wildlife Service and the U.S. Census Bureau. About \$190 million is spent on equipment, more than \$39 million is trip-related, and more than \$162 million is spent on other items. As discussed below, Lamoille County contains extensive and diverse wildlife habitat, making it an attractive location for hunting. Similarly, the County’s ponds and rivers are attractive areas for people interested in fishing, bird watching, swimming, and other passive recreational activities.

As demonstrated in the figures below (4-10 and 4-11), the number of people purchasing hunting and fishing licenses (both resident and non-resident) has declined significantly over the last several decades. The most dramatic declines occurred between the 1980s and early 2000s. License sales have stabilized somewhat over the last decade (particularly fishing licenses). Of special note is the fact that the number of resident youth hunting licenses sold over the last decade has declined by 25%, meaning fewer young Vermonters are being introduced to

hunting. Note that much of the funding for conservation and wildlife management is derived from sales of hunting and fishing licenses. As license sales decline, so too does the funding for these activities. It is worth noting that the 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation documented a slight increase in the total number of Americans hunting between 2006 and 2011 – the first time interest has increased in decades. However, this nationwide trend does not appear to be occurring in Vermont.

The figure below (4-12) reflect harvest data for four “big game” species tracked by the Vermont Department of Fish and Wildlife (deer, wild turkey, black bear, and moose). The annual harvest is showing an upward trend for each of these species with the notable exception of black bear. While the figures are below are aggregate harvest data on the County level, town level data is also available. Based on this data, Eden had the highest harvests of any town in the County in each of the last ten years. Eden also had the third highest moose harvest of all Vermont towns in 2012. In 2012, Elmore boasts the heaviest cow (female moose) harvested -- a 761 pound three-year-old which is also the sixth heaviest cow harvested in Vermont on record. This data illustrates why two state roads through Eden and Elmore (Route 118 and Route 12) are referred to locally as “Moose Alley”. The Forest Ecological Resources map (below) records animal/automobile collisions and confirms the large number of moose crossing these roads.

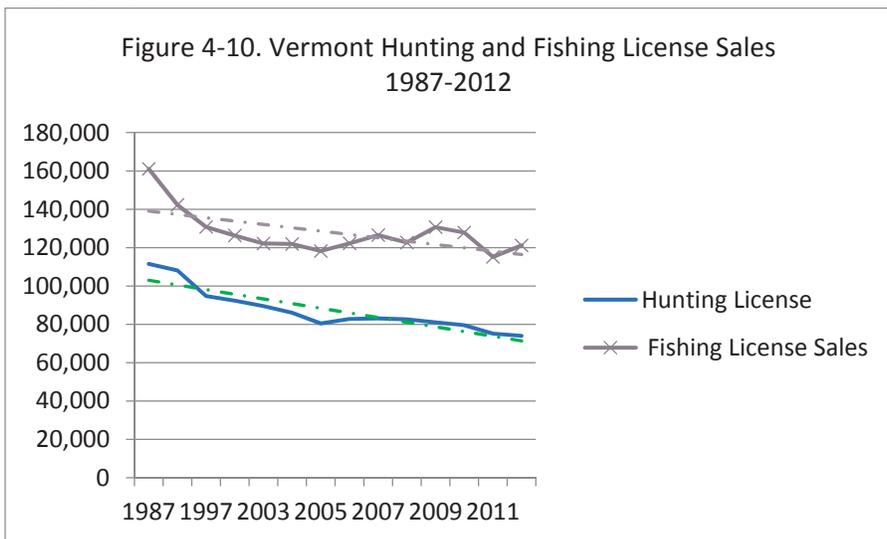


Figure 4-11. Lamoille County Harvest Data 2003-2012

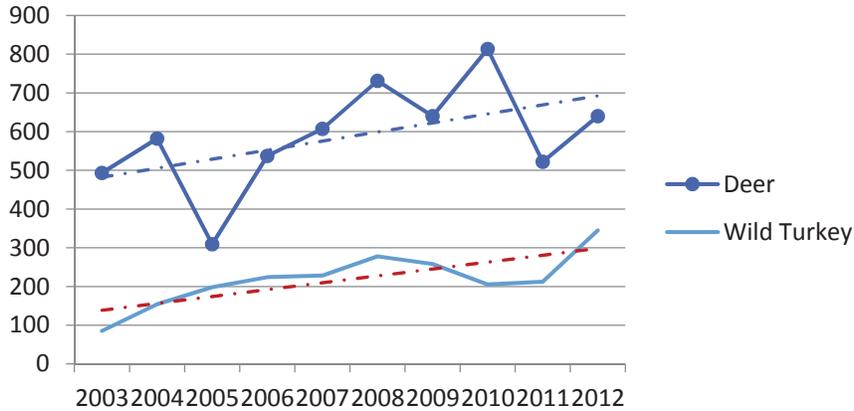
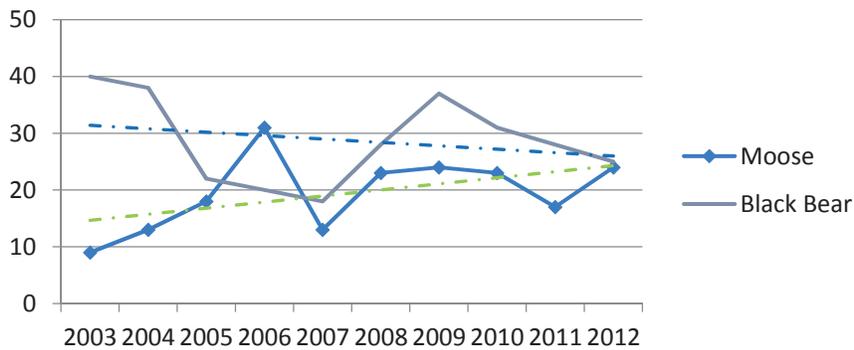


Figure 4-12. Lamoille County Harvest Data 2003-2012

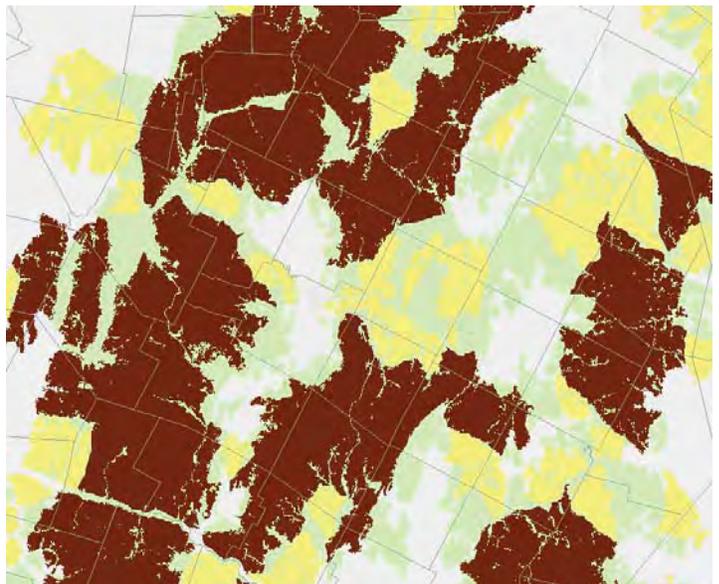


**Core Habitat**

Core Habitat refers to large blocks of unfragmented forestland. These areas provide important mating, nesting, feeding, and denning habitats for species that cannot survive in close proximity to human habitation. Species that rely on such areas include hawks, owls, songbirds, fisher, moose, bobcat, and black bear. Mammals such as deer, moose, bear, bobcat, fisher, and coyote may require very large contiguous forest acreage of up to 600 to 7,500 acres.

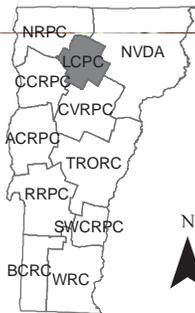
The Vermont Department of Fish and Wildlife Divides Core Habitat into two distinct areas, represented below:

- **Anchor Blocks**, or blocks of unfragmented forestland greater than 10,000 acres in size. Anchor blocks provide large blocks of contiguous



# Wildlife Resources

## Lamoille County



- Bear Mast Area
- Bear Wetland Feeding Area
- Bear Collision
- Bear Crossing
- Moose Collision
- Wetland
- Deer Wintering Area

### Rare Species and Communities

- Animal
- Plant
- Natural Community

### Habitat Blocks

- 20 - 500 acres
- 501 - 5,000 acres
- 5,001 - 10,000 acres
- 10,001 - 50,000 acres
- > 50,000 acres

### Data Sources:

Political Boundaries: VCGI, 1991.  
 Roads: 1:5000 E-911 Road Data, 2014.  
 Surface Water: VCGI for VHD-USGS, 2001.  
 Wetlands: Vermont significant wetland inventory, Vermont Agency of Natural Resources.  
 Wildlife Habitat Blocks: Vermont Department of Fish and Wildlife, Vermont Agency of Natural Resources. Vermont Land Trust.  
 Rare Species and Communities: Vermont Nongame and Heritage Program, Vermont Agency of Natural Resources, 2010.  
 Deer Wintering Areas: Vermont Department of Fish and Wildlife, 2011.  
 Bear and Moose Data: Vermont Department of Fish and Wildlife.

Created 7/29/15 by LCPC. Map is for planning purposes only, not for regulatory interpretation.

- critical habitat for species such as black bears, spotted salamanders, moose, and barred owls. These are the primary homes for many animals. Anchor blocks are the dark brown areas identified in the graphic at right. These areas are found primarily at the outer edge of Lamoille County, in Belvidere, Eden, Elmore, Stowe, Cambridge, and Waterville.
- **Connecting Blocks**, or blocks of unfragmented forestland between 2,000 acres and 10,000 acres. Connecting blocks provide critical habitat for species because they have good forest cover but are not necessarily large enough to maintain populations of wide-ranging species. Connecting blocks are identified in the graphic at right as the yellow areas. These areas are at the edge of the anchor blocks.

Fragmentation of large forest blocks through subdivision and development diminishes wildlife ability to access core habitat functions. Fragmentation (the process of dividing large, contiguous blocks of habitat in to isolated patches) produces less attractive wildlife habitat than contiguous forestland. As a result, wildlife species can change from aesthetically pleasing and recreationally important (deer, moose, bear, bobcat, otter) to less attractive, often undesirable, nuisance species (pigeons, sparrows, starlings, rats, skunks). In addition, as larger blocks of forestland are divided through subdivision, less land is available for hunting and other traditional activities. The largest blocks of unfragmented Core Habitat in Lamoille County are generally found along the region's ridgelines and mountainous areas (see image above).

To assure a high likelihood of native wildlife species, contiguous blocks of habitat should be connected through wildlife corridors. These areas are sometimes referred to as connecting lands (see the green areas above). Connecting lands include unfragmented blocks of forestland less than 2,000 acres in size. These might include individual road sections where wildlife is likely to cross. Wildlife corridors provide for both seasonal and special needs of different species. For example, a wildlife corridor may connect habitat blocks that allow black bears to access important food resources during different seasons of the year (seasonal), or it may prevent isolation of bear populations by allowing free exchange of breeding adults (spatial). Ultimately, wildlife corridors help to ensure that the habitat, movement, migration, and behavior requirements of most native plants and animals are available across a broad landscape. The broader ecological value of connecting habitat is to join fragmented pieces of habitat, thereby reducing the deleterious effects of habitat fragmentation and population isolation.

### **Deer Wintering Areas**

While deer generally accommodate human populations, they require specialized habitat to survive winter conditions. Critical deer wildlife areas are defined and delineated by the Department of Fish and Wildlife. These areas are designated as critical winter habitat for Vermont's deer population because of their vegetation, slope, aspect, and other factors that shelter the deer from the harsh winter. These areas are referred to as deer wintering areas or more commonly "deeryards" and generally consist of areas where coniferous forests dominate. Not only are these sites important, but so too are corridors linking them together and to other undeveloped areas in order to facilitate the deer's annual migration from summer to winter habitats. One community's deer wintering areas may serve a population from several miles around. In addition to deer, nearly half of Vermont's vertebrate wildlife species rely on coniferous forests for at least part of their life needs. It is important to note that deer wintering areas are often located on the "edge" between Core Habitat Areas and areas with more densely populated human settlements.

### **Bear Habitat**

In addition to the deer herd, nearly two-thirds of Lamoille County serves as year-round or seasonal black bear habitat. Bear rely heavily on unfragmented, Core Habitat Areas. These are remote areas and travel corridors,

often at least 1/2 mile from development, containing the mass producing, nut bearing trees and wetlands which support breeding populations of bear. Impacts from forest fragmentation can also make it impossible for bear to move from one habitat to another.

**Wetlands, Riparian Areas, and Aquatic Habitat**

Impacts on fisheries can be categorized as shoreline encroachment, floods, beaver habitats, water withdrawal, erosion, sedimentation, sewage and agricultural runoff, road crossings, and pond construction. Development that occurs too close to a lakeshore or stream bank can cause erosion and destruction of native vegetation which may, in turn, alter the water temperature and lead to eradication or relocation of many aquatic species. Road crossings can inhibit the ability of fish to move from one place to another for feeding and spawning and overall habitat loss. Pond construction, including the sedimentation caused during construction, while benefiting some species, seriously impacts others.

**Avian (Bird) Habitat**

Lamoille County is at the epicenter of loon recovery in Vermont. The Green River Reservoir, which hosts one of the longest unfragmented shorelines in the state (19 miles in all), and the neighboring Zack Woods area is one of the highest productivity loon nesting areas in Vermont. Similarly, the cliffs of Smugglers’ Notch are one of only a dozen suitable nesting areas for peregrine falcons in the State.

As State Parks, both Green River Reservoir and Smugglers’ Notch host numerous human visitors. Left unmanaged, these visitors could have negative impacts on these bird recovery efforts. However, appropriate close contact can also engender understanding and support for recovery of these bird populations. As a result, this Plan supports continued education of the general public, specifically visitors to the State Parks.

**Rare, Threatened, and Endangered Species**

There are at least six threatened and four endangered species known to exist in Lamoille County, as well as another 24 rare species, all of which can be found in the Smugglers’ Notch area (Table 4-13).

Table 4-13. Threatened and Endangered Species in Smugglers’ Notch

Plant Species		Heritage Rank	VT Legal	Date Last Status Documented
Asplenium	viride	S1/G5	Threatened	1994
Calamassp	grostisstricta	S1/G5	Endangered	1908
Carexatra	tiformis	S1/G5	Threatened	1994
Castilleja	septentrionalis	S1/G5	Threatened	1990
Draba	lanceolata	S1/G4 G5	Threatened	1990
Gentiana	amarella	SH/G5	Threatened	1961
Minuartia	rubella	S1/G5	Threatened	1992
Plagiobryum	zierii	S1/G3 G4	Endangered	1989
Lyro	laminor	S1/G5	Endangered	1896
Woodsia	alpina	S1/G5	Endangered	1994
Draba	lanceolata	S1/G4 G5	Threatened	1990
Gentiana	amarella	SH/G5	Threatened	1961
Minuartia	rubella	S1/G5	Threatened	1992
Plagiobryum	zierii	S1/G3 G4	Endangered	1989
Lyro	laminor	S1/G5	Endangered	1896
Woodsia	alpina	S1/G5	Endangered	1994

### Fragile Areas and Natural Areas

Fragile and natural areas in Vermont comprise many of the irreplaceable components of the State's habitats and ecosystems. These resources provide educational, economic, visual, historical, and natural benefits to the State's residents and visitors, both now and in the future. Many of these sites provide important links to our past and aid in our understanding of how our natural environment has changed or may in the future. Lamoille County hosts five fragile areas, more than any other County in the State. These areas total approximately 2,800 acres. Three of these fragile areas are located on, or in close proximity to, the summit of Mt. Mansfield.

Table 4-14. Fragile areas in Lamoille County

Fragile Area	Location	Acreage	Critical Features
Mt. Mansfield	Stowe & Underhill	200	Significant extent of alpine tundra, several rare and endangered species
Cambridge Pine Woods	Cambridge	22	Old-age white pine and hemlock stand
Smugglers' Notch	Cambridge	1,424	Arctic plant species, Peregrine Falcon nesting sites, and geologic features
Miller Brook Cirque	Stowe	1,200	Significant example of mountain valley glaciation
Molly Bog	Morristown	20	Exemplary postglacial bog

In addition to fragile areas, a Natural Areas Inventory of the State was completed prior to the Fragile Areas Registry. In fact, many of the sites found on the Registry were originally documented in the Natural Areas Inventory which was conducted jointly by the Vermont Natural Resources Council and the State Planning Office during the mid-1970s. There are 47 natural areas listed in Lamoille County, of which several are deer wintering areas, glacial features, and bogs (Table 4-14).

### Protecting the Working Landscape

Preserving agriculture and forest industries is achieved through a number of regulatory and non-regulatory tools, many of which are profiled in the Land Use chapter (page 135). In particular, conservation efforts have achieved significant permanent protection of agriculture and forest land through legally binding agreements between a landowner and either a government agency or land protection organization (land trust) that ensures a parcel will be protected indefinitely from certain types of development. Conservation easements are typically created to conserve farm or forest lands, to protect ecologically sensitive areas, or to protect land that has particular importance to an individual, family, or community. Easements are sometimes donated but can also be purchased.

Three land trusts are active within Lamoille County. **The Vermont Land Trust** is a statewide organization that facilitates the implementation of permanent conservation easements to preserve farms, forests, wetlands, and other open space. The Vermont Land Trust has conserved more than 360,000 acres of productive forest lands across the State of Vermont. The Vermont Land Trust was active in the conservation of the Atlas Timber Lands in Eden, Belvidere, and Elmore. **The Stowe Land Trust** is an active local land trust in the Town of Stowe. Since its creation in 1988, the organization has completed 28 conservation projects, five of which are owned and managed by the Stowe Land Trust, and has conserved over 3,200 acres, including the Mayo Farm and Kirchner Woods. **The Nature Conservancy** is an international land protection organization that has protected land in Lamoille County, such as the Babcock Nature Preserve in Eden.

Other land trusts active in Lamoille County include the **Waterville Land Trust**, and the **Northern Rivers Land Trust**, which includes the Lamoille County towns of Wolcott and Elmore, as well as Craftsbury, Greensboro, Hardwick, and Woodbury. Residents of other communities have expressed interest in developing a local or

countywide land trust. Smaller communities may have difficulty maintaining the resources and expertise necessary to administer a land trust which must raise funds and draft and oversee easements. Even if it is impractical for a community to develop its own land trust, local residents can still play a vital role in land conservation by informally discussing conservation with willing landowners, identifying landowners who might be interested in conserving their land, and raising funds for conservation purchases.

## Water Resources: Strategy

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Human activity, both on the land and the water, must consider its impact on the delicate and intricate balance and relationships between land and water resources. Increasingly, Vermonters are placing more and more consumptive demands upon the state's water resources for development and recreation. Demands for commercial and residential developments, transportation and utility corridors, and water withdrawals have the potential to impact both the quantity and quality of these valuable resources. At the same time, we are becoming more appreciative of these resources for their beauty and quality. The competing values and demands placed on the County's water resources must be balanced through the planning process. Planning at the local level has both the responsibility and power to ensure water resource's long-term protection. Planning at the regional level should ensure water resources protection efforts are coordinated, comprehensive, and completed in a way that ensures limited resources are distributed evenly.

The following strategies are proposed for the continued enjoyment and protection of our water resources:

***Lamoille County has abundant high quality water resources that support a variety of recreational, ecological and economic uses.*** At the heart of recreational Vermont are Lamoille County's water resources. Water resources take on a variety of forms and functions. They include rivers and lakes that support many important recreational uses including boating, fishing, swimming, wildlife observation, hunting and the enjoyment of aesthetic values; water for snow-making, groundwater for private and public water supply; and wetlands to store flood waters and filter natural and man-made contaminants. Surface waters and wetlands provide numerous habitats for a variety of aquatic and riparian plant and animal communities, and support numerous economic and recreational activities.

***Healthy riparian areas are restored and maintained.*** Maintaining vegetated buffers along our rivers and streams will help to stabilize the stream banks and thereby improve flood resilience, will benefit fisheries and wildlife by providing natural shade and cover, and will enhance scenic and recreational uses.

***Water resources that provide public recreational opportunities or are areas of significant historical, scenic, and recreational value are protected.*** A coordinated planning effort at the local and regional level ensures that current and future development retains rather than impairs the value of our water resources.

***Wetlands and floodplains are restored and protected.*** Rivers should have access to floodplains wherever possible to establish and maintain stability. Wetlands and floodplains serve valuable functions including flood water storage, sediment trapping, nutrient filtering and aquifer recharge. These functions benefit flood resilience as well as fish and wildlife.

***Lamoille County's groundwater and surface waters are uniformly of high-quality.*** A coordinated regional and local effort to monitor water quality and address impairments, to develop and implement appropriate wastewater treatment systems, and to implement green stormwater infrastructure wherever possible, will improve and protect the water quality in Lamoille County watersheds as well as in the Lake Champlain Basin.

## POLICIES & ACTION ITEMS

***Policy:*** *Preserve the quality of the region's lakes and rivers as a resource for human recreation and wildlife.*

### Action Items:

- Support efforts of lake associations, watershed associations, and other water-related groups to protect water resources and recreational experiences.

- Support adopt-a-river campaigns and annual river clean ups.
- Support sustainable fisheries management.
- Support state water quality regulations

**Policy:** *Healthy riparian areas are critical to stream bank stabilization and fisheries and wildlife habitats; therefore, riparian areas should be restored and protected.*

**Action Items:**

- Strongly encourage restoration of riparian buffers of at least 50 feet along all surface waters.
- Existing riparian and shoreland vegetation should be protected through such tools as management zones, river corridor, riparian buffer and shoreline zoning.
- Support riparian corridor education efforts.
- Winter snow piles should be located an adequate distance from any riparian buffers according to current State standards.
- Assist lake associations and watershed groups in obtaining grant funding to support their efforts.
- Support the intent of State water quality rules.

**Policy:** *Future growth should not significantly impair the public recreational opportunities of waters or destroy or threaten areas of significant historical, scenic and recreational value.*

**Action Items:**

- If a development impacts an important water resource identified in a municipal plan, the developer is encouraged to coordinate layout of the development to retain locally defined values.
- Work with developers and municipalities to protect regionally significant waters and water resources of historical, scenic, and recreational value.
- Encourage communities to protect significant water resources that provide public recreational opportunities or are areas of significant historical, scenic, and recreational value as determined by this regional plan and applicable municipal plans.
- Work with developers and municipalities to protect very high quality rivers, lakes, ponds and wetlands identified as high-priority in the DEC tactical basin plan.
- Encourage the use of ANR's online mapping tools such as Biofinder and the Natural Resource Atlas to identify significant water resources.
- Support State land-use regulation to further the protection of important scenic and recreational water resources as determined by this regional plan and applicable municipal plans.

**Policy:** *Public access to the region's rivers should be improved and made safe.*

**Action Items:**

- Support local efforts to acquire and/or improve river access points.
- Safe and accessible river access points should be made available at strategic locations in order to give the general public access to the region's rivers.
- Educational signage should be provided for recreationists about water and other hazards.

**Policy:** *Wetlands play an invaluable role in storing large volumes of water during flood events and by filtering and purifying surface waters as they make their way to other water bodies and therefore need to be protected.*

**Action Items:**

- Support federal and state wetland protection rules.
- Encourage municipalities to protect wetlands through zoning and subdivision regulations, shoreland protection bylaws, health ordinances and flood hazard regulations.
- Support efforts to map and verify vernal pools.

**Policy:** *Rivers should have access to floodplains wherever possible to establish and maintain stability in order to minimize stream bank erosion and avoid conflicts with human infrastructure.*

**Action Items:**

- LCPC shall identify flood hazard areas and river corridors, based on maps provided by the Secretary of Natural Resources pursuant to 10 V.S.A. § 1428(a) or maps recommended by the Secretary.
- Mitigate floodplain encroachments wherever and whenever possible. Mitigation may include “compensatory storage,” removal of infrastructure, floodplain reconnection/re-vegetation, and/or implementation of projects identified in a river corridor plan or local hazard mitigation plan.
- Complete the remaining geomorphic assessments as identified by LCPC and the Vermont Department of Environmental Conservation.
- Work with State partners, communities and community partners to further refine and revise the statewide river corridors map to better reflect actual on-the-ground conditions
- Assist municipalities in implementing wetland, river corridor and riparian buffer protections to preserve these resources.
- Work with municipalities, developers, and regional partners to encourage land use practices that use appropriate erosion control techniques.
- Stabilization of eroded stream banks is encouraged in accordance with appropriate professionally accepted standards.
- Support State stream alteration regulations.

**Policy:** *For the safety and protection of human resources and infrastructure, new construction within floodplains should be avoided or mitigated and measures should be taken to protect existing structures within the floodplain.*

**Action Items:**

- Flood hazard mapping (Flood Insurance Rate Maps) should be updated.
- LCPC will provide technical assistance to communities wishing to explore or enroll in the National Flood Insurance Program (NFIP).
- LCPC supports flood mitigation projects such as flood proofing, property acquisitions, removal of floodplain encroachments, and the development of flood storage space to reduce damage to property in flood hazard areas.
- Compatible land use activities within floodplains, such as agriculture and recreation, are encouraged.
- LCPC encourages communities to adopt bylaw standards above and beyond the minimum National Flood Insurance Program (NFIP) and river corridor standards, so as to encourage existing buildings in hazardous locations to be made safer from flood damage and less costly to insure.

**Policy:** *All potable water sources should be protected in accordance with State and municipal regulations.*

**Action Items:**

- Support regional and local coordination to identify potential sources of groundwater contamination.
- Work with municipalities to develop and implement long-term groundwater protection measures.
- Support municipalities acquiring title or easements to the wellhead protection areas and recharge areas serving municipal and community water supplies.
- Support State drinking water regulations.
- Wastewater systems and stormwater discharge should be directed away from Source Protection Areas and installed according to appropriate State standards.

**Policy:** *Water quality in Lamoille County should meet Vermont Water Quality Standards. Efforts should be made to reduce point and non-point sources of water pollution.*

**Action Items:**

- Work with regional and state partners to monitor water quality, particularly as an effort to determine impaired waters and remediate impaired waters.
- LCPC will work with ANR and municipalities to implement actions required under the new Water Quality rules.
- Municipalities are encouraged to have and maintain back-up plans and treatment systems for protecting the water resources.
- Work with municipalities to conduct periodic wastewater facilities analysis to determine the remaining capacity of systems based on projected growth and to determine if any system weaknesses exist.
- Municipalities are encouraged to provide tertiary treatment of wastewater.
- Work with municipalities to develop and maintain a capital facilities plan for wastewater facilities.
- The use of tested and approved alternative septic systems in place of traditional systems is encouraged; especially in areas of marginal land / soil.
- Land uses that contribute to non-point sources of pollution should be adequately buffered from surface waters.
- Acceptable Agricultural Practices (AAPs), Acceptable Management Practices (AMPs) and Best Management Practices (BMPs) should be used.
- Encourage land owners to participate in State and Federal cost share programs that reduce non-point source pollutants.
- Planning and implementation of water quality remediation projects should engage the local community where the problems are occurring.

# Water Resources: Background and Inventory

## Watersheds, Rivers and Water Bodies

A watershed, or basin, is a distinct land area that drains into a particular waterbody either through channelized flow or surface runoff. A watershed is defined by topography instead of traditional political boundaries. Lamoille County primarily overlaps the Lamoille watershed, but also contains portions of the Winooski and Missisquoi watersheds (Figure 4-15). All three watersheds flow into Lake Champlain, making them part of the larger Lake Champlain Basin. While the Regional Plan focuses on Lamoille County, water resources planning ideally should be at the watershed level. The Agency of Natural Resource's planning efforts to improve or maintain water quality at a watershed level has been conducted since the 1970s. The state is divided into seventeen planning basins for this purpose. The Agency is responsible for preparing basin plans for each of the 17 major basins and updating them every five years after the plan is originally approved. Much of the information presented in this chapter was derived from the assessment reports and basin planning documents available on the Agency's website (<http://www.vtwaterquality.org>).

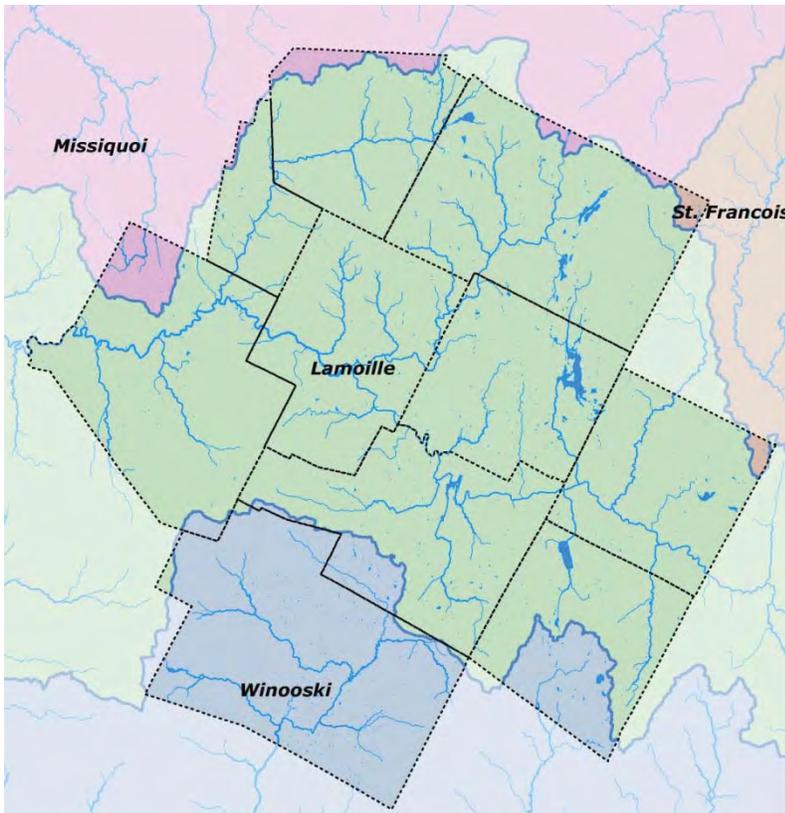


Figure 4-15. Lamoille County Watersheds

### Rivers

The Lamoille River, the state's third longest, bisects the county from east to west on its way to Lake Champlain. Within the region, major tributaries to the Lamoille River include the Wild Branch (39 square miles), Green River (22 square miles), Gihon River (66 square miles), North Branch (37 square miles), Brewster River (21 square miles), and Seymour River (21 square miles). The Little River in the town of Stowe is a major tributary in the Winooski River Basin to the south. There is also a small portion of the Missisquoi River Basin in the towns of Belvidere and Eden.

The County's rivers and streams and the lands adjacent to them provide numerous recreational opportunities in addition to important fish and wildlife habitats. The region's rivers and streams also provide several important non-recreational functions including

assimilation of properly treated wastewater, drinking water, water for agricultural and industrial uses, aquifer recharge, and hydroelectric use. Water resources including rivers, lakes, floodplains, fluvial erosion areas, ground and surface water source protection areas, wetlands, boating and fishing accesses are shown in ensuing maps.

The rivers and streams of the region also have played an important role in the region's history and settlement patterns. Prehistoric native cultures depended upon the rivers as an important transportation network as well as for water and fisheries. For over 10,000 years, these river basins defined community and

hunting territories, and provided geographic markers and access to the region. There are over 1,300 prehistoric and historic archaeological sites listed on the Vermont Archeological Inventory, and 390 river miles with known archaeological sensitivity in the state. Approximately 45 river miles in Lamoille County, all within the Lamoille River Basin, are of expected moderate to high archaeological sensitivity.

European settlers first used the rivers for access routes into the wilderness and later cleared the riverbanks and flood plains for agriculture during the eighteenth century. The early industrial period of the nineteenth century harnessed the river's power to supply local mills, water systems, tanneries, forges and furnaces. Statewide, there are over 364 historic sites located within 1/4 mile of a river including historic districts, mills, and covered bridges. In Lamoille County, 23 historic sites - of which 16 are on the National Historic Register - are located close to a river.

#### *Riparian Areas*

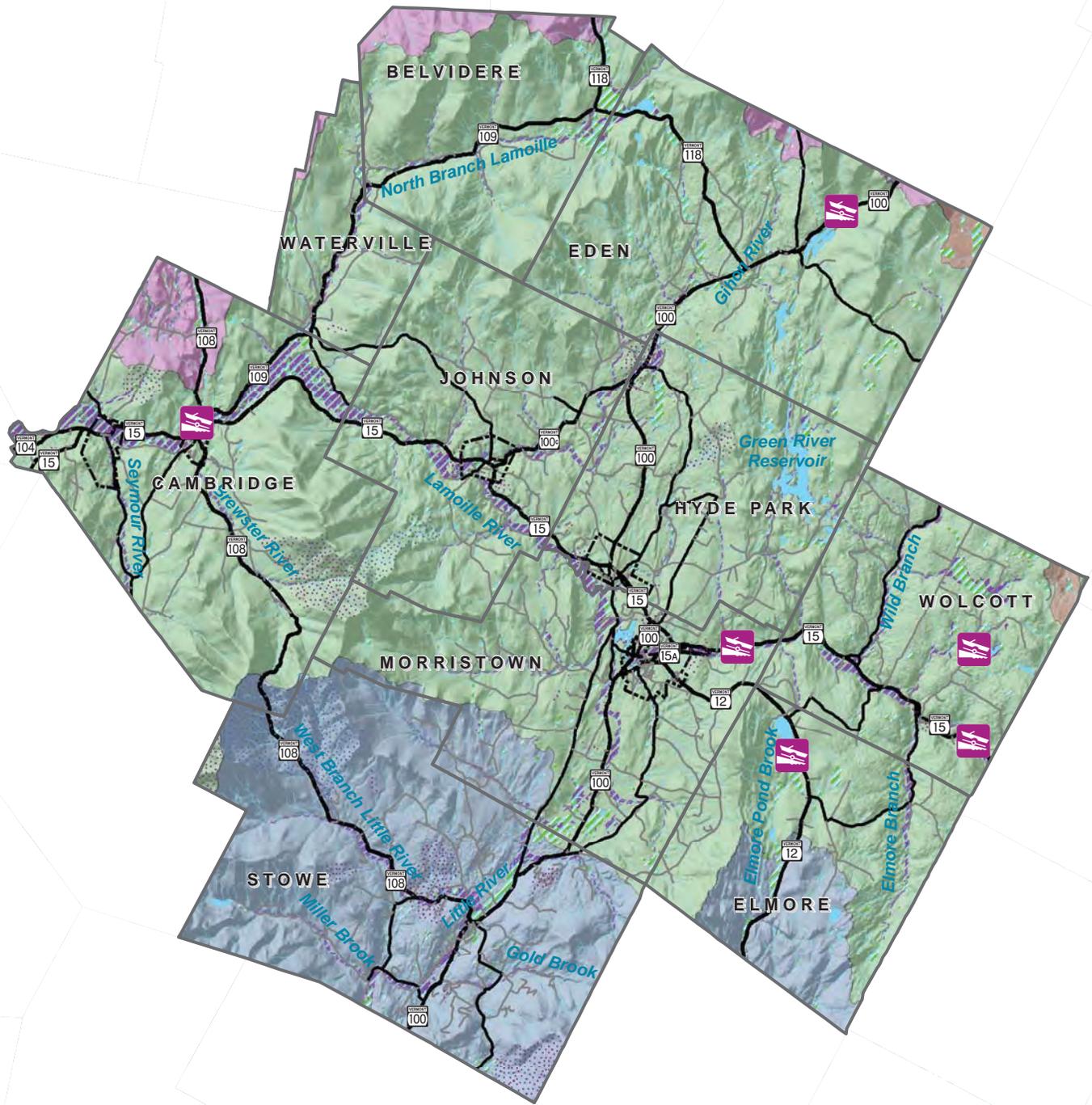
A riparian zone or riparian area is the interface between land and a river or stream. Undisturbed, vegetated riparian areas can prevent water pollution and preserve wildlife habitat, as well as provide open space and scenic beauty, minimize erosion, and provide access to public waters. Riparian vegetation is a key biological component in water quality functions of a riparian area. Vegetation reduces the amount of erosion along a riparian buffer, filters runoff before it reaches a stream, provides habitat, and regulates water temperature, which is essential for fish species such as trout. Lamoille County has over 97 miles of game fish habitat in 26 stream segments. These segments provide an important cold-water fish habitat primarily for rainbow, brown and brook trout. Riparian areas also play an important role in the habitats of deer, moose, beavers, otters, mink as well as smaller mammals, waterfowl, and other birds and amphibians. In order to maximize the effectiveness of riparian areas, a buffer of undisturbed soil and vegetation should be maintained in these areas. LCPC, in partnership with the Lamoille Natural Resources Conservation District, has engaged in a process to identify stream segments that could benefit from re-vegetation and to implement riparian restoration projects along these segments.

#### *Lakes and Ponds*

Lamoille County is within the Lake Champlain Basin, which, in 1990, received national attention through the Lake Champlain Special Designation Act as part of the Great Lakes Critical Programs Act. The Act added Lake Champlain to a list of 10 water bodies eligible for the establishment of a lake water quality demonstration program. The Act also authorized the establishment of the Lake Champlain Management Conference to coordinate activities between federal, state and local governments in Vermont, New York and Quebec. The Management Conference is charged with developing a comprehensive pollution prevention; control and restoration plan for the lake. Many of the associated activities directly involve land use and resource management issues throughout the Basin.

# Water Resources

## Lamoille County



-  Fishing Access Areas
-  Groundwater Source Protection Area
-  Surface Water Source Protection Area
-  Lakes/Ponds
-  Streams
-  Wetlands
-  Floodplains and River Corridors

- ### Major Watersheds
-  Lamoille
  -  Missiquoi
  -  Winooski
  -  St. Francois
  -  Town Boundary

### Data Sources:

Political Boundaries: VCGI, 1991.  
 Roads: 1:5000 E-911 Road Data, 2014.  
 Surface Water: VCGI for VHD-USGS, 2001.  
 Source Protection Areas: Vermont Department of Environmental Conservation, Water Quality Division, 2010.  
 Floodplains: Digitized from FEMA Flood Insurance Rate Maps. DEC, Water Quality Division, 1983.  
 River Corridors: VT ANR, 2015.

Created 7/30/15 by LCPC. Map is for planning purposes only, not for regulatory interpretation.

There are 55 lakes and ponds within Lamoille County. Of these, 13 are lakes or ponds 20 acres or greater in size, and thus considered public waters subject to state protection. These lakes and ponds are listed in the table below. In addition, a small portion of Waterbury Reservoir is located in Lamoille County. While less than 20 acres in size, Sterling Pond is notable due to the fact that it is the highest elevation trout pond in the State of Vermont.

These lakes and ponds provide a variety of benefits to county residents and visitors, including boating, swimming, fishing, hydroelectric power, snow-making, water for fire suppression and wildlife, plant, and fisheries habitat. Several of these ponds, notably the Green River Reservoir, Wolcott Pond, and Zack Woods Pond, also form an important network that provides habitat for migrating water fowl such as loons. While a great majority of these lakes and ponds are supporting their designated uses (see the section on Water Quality) and have generally good water quality, they are threatened by sources of pollution including erosion and sedimentation, adjacent land use activity, aquatic nuisances such as Eurasian milfoil, and by those who use them for recreational purposes. The removal of vegetative buffers, leaching septic systems, over development of the shoreline and erosion and sedimentation all inhibit our ability to use and enjoy these resources.

Table 4-16. Lamoille County Waterbodies 20 Acres or Greater

Lake	Town (Outlet)	Lake Area (Acres)	Watershed Area	Public Land /Access
Lake Eden	Eden	194	2,347	Mun/State
Lake Elmore	Elmore	219	5,574	Mun/State
Green River Reservoir	Hyde Park, Eden	653	9,075	State
Hardwood Pond	Elmore	44	284	None
Lake Lamoille	Morristown	148	142,100	None
Little Elmore Pond	Elmore	24	316	None
Long Pond	Eden	97	723	None
Lake Mansfield	Stowe	35	1,557	None
Schofield Pond	Hyde Park	39	936	None
South Pond	Eden	103	1,382	None
Wapanacki Lake	Wolcott	22	285	None
Wolcott Pond	Wolcott	74	920	State
Zack Woods Pond	Hyde Park	23	36	State

On the local level, there is a need to develop means to protect these resources through local planning. These include information on the resource and the threats to it, and the implementation of measures that encourage the maintenance and improvement of the water quality and the many uses they sustain. Similar to riparian areas, establishing and protecting vegetated shoreland buffers is an important measure now regulated through the Vermont Shoreland Protection Act (see above) that will improve habitat and water quality.

## Recreation

There are numerous recreational uses of Lamoille County waters, including whitewater and quiet water boating, swimming, fishing, hunting, and canoe camping. Lamoille County also contains many scenic water

features such as gorges, waterfalls, wetlands and pristine ponds. Some of the most well-known and significant features are described here.

*Boating*

A number of locations in Lamoille County are good whitewater boating stretches. The Lamoille main stem is used extensively for flat water canoeing and kayaking by the several local outfitter businesses as well as the general public (Table 4-16).

Table 4-16. Recreational Boating Locations in Lamoille County

Location	Documentation	Rating	Characteristics that support use	Put in	Take out
Lamoille River - Wolcott Ledges (1.4 miles)	<i>Vermont's White Water Rivers</i>	Highly important	Class III can be run in wet summers and fall	Behind the Pottersville Dam powerhouse	Downstream of Wolcott Village
Lamoille River (3.4 miles) Morrystown to Fairfax	<i>Vermont's White Water Rivers</i>	Highly important	Class II-IV, whitewater and general touring	Duhamel Road, Morrystown below Cadys Falls	Upstream of Fairfax Falls (man portages)
North Branch (9 miles)	<i>Vermont's White Water Rivers</i>	Not rated	Class II-IV, excellent to outstanding scenery and pristine	Bog Road Bridge, Belvidere	Church Street covered bridge, Waterville
Gihon River (1.5 miles)	<i>Vermont's White Water Rivers</i>	Not rated	Serious Class IV and V used by expert paddlers	Whitcomb Island Road, Johnson	Pearl Street, Johnson
Wild Branch (7 miles)	<i>Vermont's White Water Rivers</i>	Important	Fast, twisty and highly technical Class II-III	North Wolcott Road upstream of Wolcott Craftsbury line	Route 15 at State bridge
Waterman Brook	<i>Let it Rain</i>	Not rated	Class IV and V used by expert paddlers	Waterman Road covered bridge, Johnson	River Road East, town bridge, Johnson
Kenfield Brook	Vermont Paddlers Association recommendations	Not rated	Class IV, outstanding scenery	Tyndal Road, Morrystown	Duhamel Road, Morrystown

The Lamoille River from Pottersville to Wolcott is a nice 1.4 mile stretch of whitewater called the “Wolcott Ledges.” It is considered “highly important” in part because the Class III rapids can be run in wet summers and fall. The North Branch of the Lamoille River is a challenging and noteworthy stretch of whitewater enjoyed by many boaters, which is described as pristine and having “excellent to outstanding” scenery. Another whitewater section in the watershed is a 1.5 mile stretch on the Gihon River, which is a Class IV and Class V reach used by only expert paddlers. The Wild Branch, although it can only be paddled during snowmelt or periods of high water, is considered an important local whitewater resource.

*Swimming*

There are a number of popular swimming holes both on the Lamoille River mainstem and its tributaries. The locations described in the table at right are also generally some of the most scenic and aesthetically pleasing spots on the river and are enjoyed by picnickers, photographers and anglers. Dog’s Head Falls and Sloping Falls in Johnson are well-used recreation areas; as is Picnic Ledges in Wolcott. A number of swimming holes also exist on various tributaries to the Lamoille. Many culturally important swimming holes are also identified in the *Vermont Swimming Hole Study* (1992) and *The Waterfalls, Cascades and Gorges of Vermont* (1991).

*Fishing*

People fish throughout the Lamoille River and its tributaries. Some notable fishing sites include many of the same sites listed as swimming holes. The Vermont Department of Fish and Wildlife owns 25 different riverbank segments totaling 62,000 linear feet (almost 12 miles), which provide riparian zone protection and direct public access for fishing. The Department’s acquisition program assures continued access for fishing in the face of increasing residential development.

**Wetlands**

The term wetland is used to refer to areas that are, or seasonally are, inundated or saturated with water. They are commonly known as swamps, marshes, bogs, or fens. Wetlands comprise 9,154 acres, or 3%, of Lamoille County’s land area. All wetlands share three basic characteristics: the presence of water at or near the surface (wetland hydrology); the presence of water loving plants (hydrophytic vegetation) occurring on the site; and, common types of soil (hydric soils) that have formed as a result of the presence of water. Wetlands serve a variety of important functions including storm and floodwater retention, surface and groundwater protection, fisheries and wildlife habitat, timber, recreational values and erosion control. Wetlands comprise an important element in Lamoille County’s landscape, habitats and ecosystem that must be protected. State and federal regulations govern wetlands, which are categorized as Class I and Class II. Class III wetlands are regulated at the Federal but not at the State level.

The Vermont landscape has undergone vast changes over the past 200 years. These changes have seen the deforestation of the state for agriculture and, as sheep and dairy farming declined, subsequent reforestation to the 80% forested landscape of today. Growth and development over the past twenty to thirty years have also played a role in the destruction of Vermont’s wetlands. Historically, some loss of wetlands has been due to draining and filling for agricultural purposes.

Swimming Site Name	Town	Location
Dogs Head Falls,- lower pool - Lamoille River	Johnson	Patch Road
Picnic Ledges - Lamoille River	Wolcott	Route 15 east of village
Lamoille River, Wolcott Village	Wolcott	Route 15 in village
Terrill Gorge - Kenfield Brook	Morristown	Duhamel Road - F&W parking
Elmore Branch	Wolcott	East Elmore Road
Sheep’s Hole - Foote Brook	Johnson	Foote Brook Road
The Ledges - Foote Brook	Johnson	Cherry Hill Road
Power House Bridge Falls - Gihon River	Johnson	School Street
Rogers Bridge - Seymour River	Cambridge	Lower Pleasant Valley Road
Brewster River Gorge	Jeffersonville	Canyon Road by covered
Codding Hollow Covered Bridge - North Branch	Waterville	Codding Hollow Road
Clavale Brook Cascades	Eden	Route 118

According to the Vermont Significant Wetlands Inventory (VSWI) completed in 2010 by the Department of Environmental Conservation, there are a total of approximately 293,000 acres of wetlands in Vermont, accounting for approximately 4.8% of the state's land area. It is estimated that over 90% of Vermont's wetlands are privately owned. Over half (138,000 acres) of the state's wetlands are forested with nearly equal amounts of broad-leaved deciduous and evergreen tree species. Less than one third (64,000 acres) are classified as scrub-shrub wetlands, with the remainder (26,000 acres) comprising emergent wetlands (marshes and wet meadows).

The significance of any one wetland in Vermont is not based on its size, but rather the degree to which it serves various wetland functions. A variety of values and functions can be directly attributed to the presence of wetlands. Many of these functions provide direct and indirect economic benefits to landowners and communities, as well as many social benefits such as ecological diversity and aesthetic value. While some wetlands may provide only one or two functions, others may fulfill several at one time. Even though only one specific function may be supported, that function may be very important to the area. Regardless of the wetland's size and functions it may provide, the determination of any one wetland's value must be done on a case-by-case basis.

Wetlands associated with rivers and streams (riverine wetlands) provide for the storage of floodwaters by acting as a sponge to absorb the runoff and release it slowly over time. It is often assumed that wetlands with a surface area of 1% or more of the total drainage basin may be important for storm water retention. Wetlands also play an important role in erosion control by trapping sediments, absorption of storm flow, and dissipation of wave and current energy along shorelines.

Many wetlands are important to the recharge of groundwater aquifers and serve to filter impurities and nutrients from surface water sources. This function is very important in helping to ensure and protect potable water supplies. In some areas, the filtering abilities of wetlands are being harnessed to perform limited wastewater treatment functions.

Finally, wetlands provide an important habitat for several game and non-game wildlife species, as well as critical habitat for several threatened or endangered plant and animal communities. Many large mammals utilize wetlands during their seasonal cycles, while many fish, reptile, amphibians and bird species are entirely dependent on wetlands for food, shelter and spawning. Wetlands provide habitat for over 40% of the federally recognized threatened and endangered plant species found in Vermont. Wetlands are also used extensively for agriculture and silviculture.

The implementation of state and federal wetland programs have been responsible for creating incentives, reducing, or mitigating wetland loss. The Vermont Wetland Rules were adopted by the Water Resources Board in 1990 to implement the statutory requirements of the Vermont Wetlands Act (10 VSA §905 7-9). These rules classify all wetlands in the state according to their importance in fulfilling one or more wetland functions. Some wetlands (Class 3) are not protected under the Vermont Wetland Rules but may still be subject to federal regulation. Certain activities, such as most agricultural and some silvicultural activities, are permitted in a wetland without any review. All other development in or near a wetland requires a Conditional Use Determination from the Secretary of the Agency of Natural Resources ensuring no undue adverse impacts on protected functions.

Vermont's wetlands also receive state review and protection under Act 250. In addition to state protection, the U.S. Army Corps of Engineers has the responsibility of administering Section 404 of the Clean Water Act which regulates the dredging or placing of fill into any wetland over one acre in size. The Environmental

Protection Agency and the U.S. Fish and Wildlife Service have review authority over any Army Corps permit. Several other federal agencies, including the National Park Service and the USDA Soil Conservation Service, administer grant programs, which encourage the protection of wetlands. Finally, town plans and local land use regulations may also provide additional protection and consideration of wetlands.

### **Vernal Pools**

Vernal Pools are seasonal wetlands, filling with snowmelt and spring rains, but often drying up by summer, creating a cycle of flooding and drying that prohibits permanent fish populations. These pools provide critical habitat for many salamanders, including some “medium” priority Species of Greatest Conservation Need, such as the Blue-Spotted, Spotted, Jefferson, and Four-toed salamanders, and other vernal pool-dependent invertebrates such as fairy shrimp, and several freshwater snails and dragonflies. The loss of a single vernal pool in any given area could easily cause the demise of the local wood frog population, along with any pool-breeding salamanders, and would certainly cause the extirpation of the pool’s fairy shrimp.

Vernal pools are critical habitats of incredible diversity and productivity. However, vernal pools often receive little or no protection under federal and state regulations. In Vermont, vernal pools are not recognized as significant wetlands under the 1990 Vermont Wetlands Rules, and while they may qualify for protection as “wildlife habitat” under Act 250, they are not considered critical wildlife habitat, a designation necessary for legal protection. As a result, vernal pools are not currently protected if a development is not subject to Act 250 review. In the future, this could become an issue as there are over 100 vernal pools in Lamoille County.

### **Floodplains and River Corridors**

Floodplains are lowlands along rivers, streams, and lakes which periodically become inundated with water during times of high rainfall or spring runoff. Floodplains serve valuable ecological functions, including flood water storage, sediment trapping, nutrient filtering and aquifer recharge. Infrastructure within the floodplain poses both a direct hazard to the inhabitants and an indirect hazard to those living downstream of that infrastructure. Vermont statutes governing the use of areas within the floodplain have been developed to protect people as well as natural resources. Two types of areas have been defined, flood hazard areas and floodways. Flood hazard areas (Title 10 VSA Chapter 32) are areas that have a 1 in 100 chance of being inundated by flood in any given year. If the flood hazard area is improperly used and unprotected, a flood can create a serious threat to the public, private investments can be destroyed, and significant natural resources can be damaged. A floodway (Title 10 VSA Chapter 32) is the channel of a river or other watercourse and the adjacent land area that must be reserved to discharge the 100-year floods without cumulatively increasing the water surface elevation more than one foot. The floodway is the most hazardous section of a flood hazard area. Developments in a floodway are likely to increase the flood height and velocity and probably would be damaged in the event of a flood. Flood hazard areas have been designated by both federal and state governments. New development in these designated flood hazard areas should be discouraged, and existing development should be secured and flood-proofed in accordance with FEMA guidance:

By providing space to dissipate flood waters, floodplains serve an important function in maintaining the stability of river systems, where there is minimal erosion and a balance between water and sediment moving downstream through the system. Modification of watersheds and stream channels through natural processes (landslides, severe storms, fires) and human alterations (de-forestation, ditching, dredging and armoring), causes an imbalance in water and sediment loads that leads to adjustments in river and floodplain geometry until balance is re-established. Since European settlement, repeated watershed and stream channel modification related to intensive land uses has caused widespread loss of floodplain

function. Nearly every Vermont watershed has streams “in adjustment.” Streams and rivers have become confined to deeper, straighter channels and no longer have access to historic floodplains. Rivers that have down cut and lost access to their floodplains will erode their banks until new floodplains are formed. Without floodplains and meanders, rivers deposit the eroded soil and nutrients into the lakes and reservoirs.

As was evident in 2011 during Tropical Storm Irene, catastrophic changes in river channel location and dimensions can occur during a large flood event (*Municipal Guide to Fluvial Erosion Hazard Mitigation*). Most flood related damage in Vermont is caused by fluvial erosion rather than inundation. The increased power of larger floods, contained within the channel, has led to higher rates of bed and bank erosion. The average \$18-20 million being spent annually in Vermont to keep rivers disconnected from their floodplains and static in the landscape has become unsustainable. Erosion hazards and flood losses are increasing. (*Floodplains Key to the Health of Lake Champlain White Paper, DEC*).

The Vermont Department of Environmental Conservation seeks to better understand river behavior through the science of fluvial geomorphology, the physical interrelationship of flowing water and sediment in varying land forms. Since the late 1990s, the Vermont River Management Program has been working with Towns and Regional Planning Commissions to conduct stream geomorphic assessments throughout the State. There are many reasons to do a stream geomorphic assessment, ranging from learning about the natural environment and the effects humans have had on the landscape over time, to identifying high quality aquatic habitats, to characterizing erosion and flood hazards. Part of this process involves delineating river corridors- identifying the area the stream needs for physical adjustment, so that it can attain/maintain a stable equilibrium condition. Limiting the amount of new structures placed in defined river corridors prevents unnecessary threats to life and property and reduces the need for flood control measures.

The Vermont Department of Environmental Conservation and LCPC have completed 10 geomorphic assessments in Lamoille County (see map below). The completed Geomorphic Assessments are in: Little River (Stowe), West Branch (Stowe), Elmore Branch (Elmore, Wolcott), Gihon River (Johnson, Hyde Park, Eden), Centerville Brook (Hyde Park), Foote Brook (Johnson), Green River (Hyde Park), Lamoille River Mainstem (Johnson, Hyde Park, Morrisville, Wolcott), Wild Branch (Wolcott, Eden), and Rodman Brook (Morristown, Hyde Park). In addition to mapping river corridors, the assessments identify and prioritize restoration opportunities. The identified projects will reduce sediment and nutrient loading to downstream receiving waters such as the Lamoille River and Lake Champlain, reduce the risk of property damage from flooding and erosion, and enhance the quality of in-stream biotic habitat. Many of these projects involve conservation and re-vegetation of riparian areas. Since many of these areas are privately owned property, coordination and collaboration with property owners will be especially important to implement these projects. The Vermont Department of Environmental Conservation completed a statewide map of river corridors in 2014; this map replaces previous river corridor delineations developed from river assessments, and can be viewed via the online ANR Natural Resources Atlas (<http://anrmaps.vermont.gov/websites/anra/>) (see map on next page).

## **Groundwater**

Groundwater is a precious and essential resource -- one that is critical to the day-to-day activities of rural Vermonters. Groundwater is used for domestic, commercial and industrial uses and for irrigation of crops. According to studies done by the U.S. Geological Survey, 59% of all Vermonters obtain their domestic water from groundwater sources. On average, every day we require 75 gallons of water per person for domestic use -- toilets, bathing, cooking, drinking, etc. In Lamoille County, this translates into nearly 1.5 million gallons of water every day -- nearly all of which comes from groundwater sources.

Groundwater contamination can come from any number of sources including land use activities, sources of air and surface water pollution. Land use activities have the potential of seriously impacting both the quality and the quantity of groundwater in a given area. The presence of leaking underground storage tanks, road salt application, leachate from landfills, domestic wastewater and sewage, industrial wastes and agricultural applications of pesticides and fertilizers all pose a potential threat to groundwater sources.

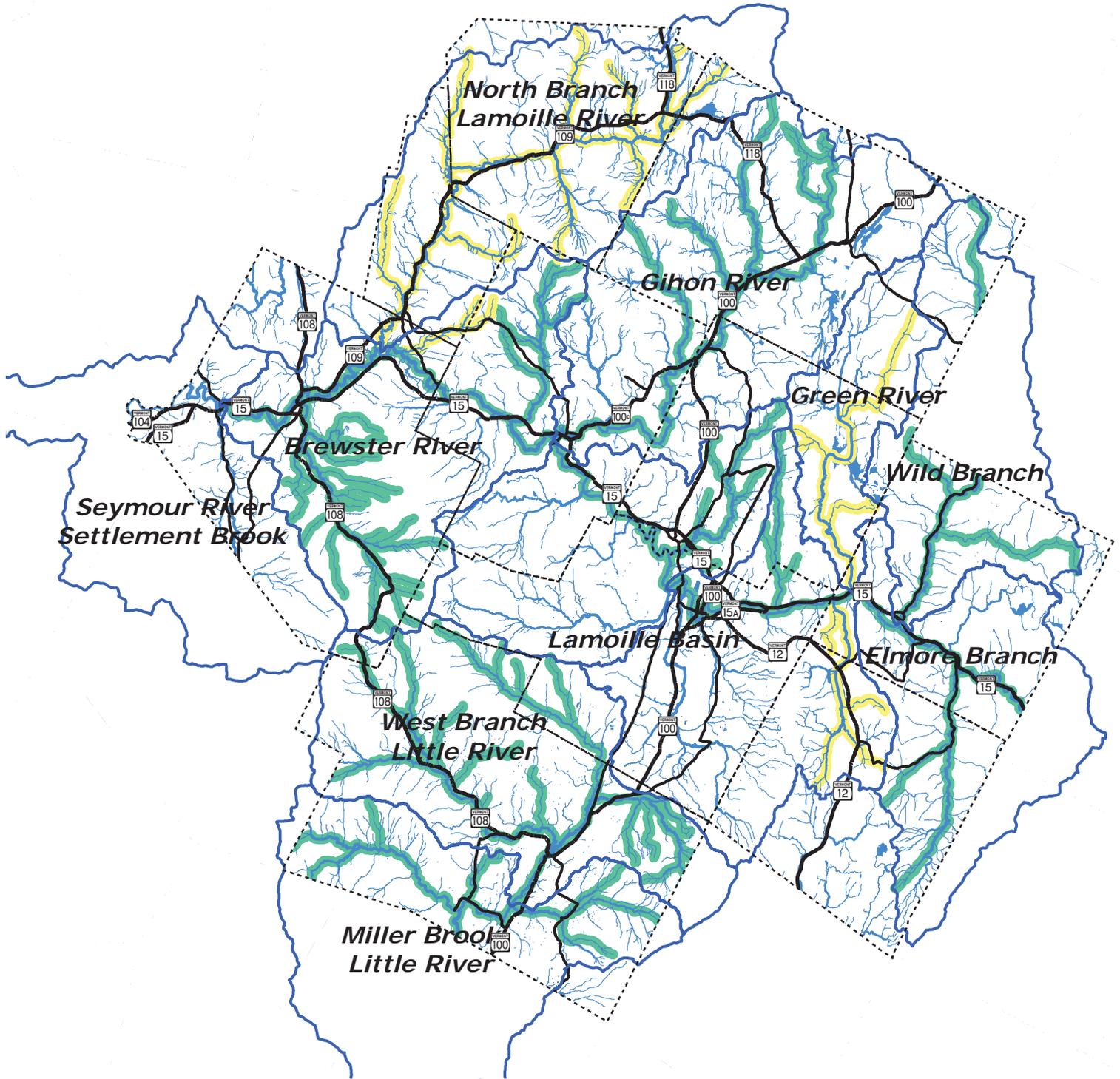
Groundwater in Vermont is protected by the Groundwater Protection Law (10 VSA Chapter 48). The law provides for the classification of groundwater into four types based on existing and future use, and required the Agency of Natural Resources to develop a Groundwater Protection Rule and Strategy. The purpose of this strategy was to develop a process for the identification and delineation of the four classes of groundwater and to protect these sources through existing regulatory programs and the coordination of groundwater management statewide.

Class I groundwater: 1) is suitable for public water supply, 2) has a character that is uniformly excellent, and (3) is not exposed to activities that pose a risk to its current or potential use as a public water supply. Class II groundwater is the same as Class 1 with the exception that it may be exposed to activities that pose a risk to its current or potential use as a public water supply. Class III is suitable as a source of water for individual domestic water supply, irrigation, agricultural use and general industrial and commercial uses. Finally, Class IV groundwater is not suitable as a source of potable water but suitable for some agricultural, industrial and commercial use. By statute, all groundwater in Vermont is designated Class III unless specific areas are reclassified to Class I, II, or IV. The purpose of reclassification to Class I or II is to delineate areas of groundwater requiring extra protection for current or future public drinking water supplies. The purpose of reclassification to Class IV is to prevent people from accidentally drinking non-potable groundwater and to prevent spreading of subsurface contamination.

Protection measures for groundwater at the state level include identification and monitoring, and the prohibition of certain land uses, namely landfills, injection wells and leach fields, within each Groundwater Classification Area with the most stringent restrictions placed in Class I areas. Where private property is included in a Class I area, the Agency must go to the Legislature for approval for permanent protection.

# River Corridor Planning

## Lamoille County



- River/Stream
- Waterbody
- Watershed Boundary
- Town Boundary
- Assessed Stream**
- Phase 1 Assessment
- Phase 2 Assessment

**Data Sources:**

Political Boundaries: VCGI, 1991.  
 Surface Water: VCGI for VHD-USGS, 2001.  
 Assessed Streams: LCPC, 2013.  
 Watershed Boundaries: DEC, 2003.

Created 3/6/14 by LCPC. Map is for planning purposes only, not for regulatory interpretation.

In addition to the Groundwater Protection Strategy, the Agency is also responsible for the implementation of the state's Wellhead Protection Program pursuant to the requirements of the federal Safe Drinking Water Act (SDWA). In Vermont, a wellhead protection area is the surface and subsurface area that serves a public drinking water supply, which is defined as serving fifteen or more connections or 25 or more people. The Vermont Wellhead Protection Program is designed to coordinate various state and local agencies and drinking water providers in the long-term protection of their wellhead protection areas from potential sources of contamination. Within this effort, water systems (both municipally and privately owned) must delineate their wellhead protection areas, identify potential sources of contamination, and develop plans and programs to minimize the risk of contamination. Lamoille County has 34 delineated wellheads, which are listed in Table 4-17.

A 2002 study funded by the Clean Water Act and prepared by LCPC identified land uses within the region's wellhead protection areas and made recommendations for their protection through municipal planning. While many of these water sources are undeveloped and relatively protected for the short term, recent growth rates and patterns of development suggest that many will need to adopt more long-term protection measures over the coming years. Large areas within the rural forested landscape areas support critical public water supply protection areas, including groundwater and surface water protection areas for local municipalities.

The Vermont Department of Environmental Conservation has developed a manual, *An Ounce of Prevention; A Groundwater Protection Handbook for Local Officials*. This handbook outlines a variety of tools ranging from public education to model groundwater protection ordinances, which can be employed to protect groundwater. Whatever the situation or approach to groundwater protection, the loss of this precious resource will be a limiting factor in the continued growth and prosperity of any community. It remains up to the local communities in the region to adequately protect groundwater sources from contamination. At the local level, this effort translates into land use planning and municipal coordination. Rather than the traditional approaches to groundwater protection - control, monitoring and clean-up - there must be a much more proactive and cost-effective approach to preventing contamination. The first of these is learning the location of wellhead protection areas and Class 1 & 2 ground-waters, and identifying potential sources of contamination. Secondly, through public involvement, long-term protection measures for these sources should be developed and implemented.

Table 4-17. Delineated wellheads in Lamoille County

<b>Water Source Name</b>	<b>Number of Wellheads</b>
Birch Hill Water System	1
Cadys Falls Water Coop	1
Cambridge Village Water System	2
Covered Bridge Highland	1
Elmore Water Co-Op	1
Hyde Park Water System	1
Jeffersonville Water System	2
Johnson Village Water Dept	1
Mansfield View Water Company	2
Morristown Corners Coop.	2
Morrisville Water & Light	2
Mountainside Resort	1
North Hyde Park F.D. #1	1
Pinecrest Mhp	1
River Road Apartments	1
Smugglers Notch	7
Sterling View Mhp	1
Stowe F.D. #2 Gold Brook Circle	1
Stowe F.D. #4	1
Stowe Village Water System	1
Stowe Water Dept	1
Village of Johnson	1
Waterville Water Coop	1

## Surface Water Quality

The Agency of Natural Resources is charged with the assessment of water quality in the state through the requirements of the federal Clean Water Act. The water quality of Vermont's surface waters is assessed by evaluating the ability of water bodies to support a set of designated uses. Water uses include, but are not limited to, drinking, aquatic life, recreation, fish consumption and agriculture. For each use, the waterbody or stream segment is evaluated to determine whether the use is fully supported, stressed, altered, or impaired. Fully supported and stressed waters are those that meet the goals of the water quality standards. Impaired waters do not meet goals of the water quality standards because of one or more particular pollutants. Altered waters do not meet water quality standards because of non-pollutant effects (e.g., alteration of flow to generate electricity). The four use support categories are described in greater detail as follows:

**Full Support** - This assessment category includes waters of high quality that meet all use support standards for the water's classification and water management type.

**Stressed** - These are waters that support the uses for the classification but the water quality and/or aquatic biota/ habitat have been disturbed to some degree by point or nonpoint sources of pollution of human origin and the water may require some attention to maintain or restore its high quality; the water quality and/or aquatic habitat may be at risk of not supporting uses in the future; or the structure or integrity of the aquatic community has been changed but not to the degree that the standards are not met or uses not supported.

**Altered** - These are waters where human activity has altered the natural hydrologic flow and/or has modified the river channel, OR where the occurrence of exotic species has had negative impacts on designated uses.

**Impaired** - These are surface waters where reliable data collected through monitoring efforts reveals 1) an ongoing violation of one or more of the criteria in the Water Quality Standards and 2) a pollutant of human or human-induced origin is the most probable cause of the violation. In accordance with EPA guidelines, Vermont DEC reports a List of Impaired Waters determined to be impaired and needing a pollution budget determination otherwise known as a Total Maximum Daily Load (TMDL) determination.

A determination of use support is made by following the Vermont Surface Water Assessment Methodology and using information gathered and provided to the Department of Environmental Conservation by water resources personnel, fish and wildlife biologists, aquatic biologists, lake and river organization members and other qualified individuals or groups (*State of Vermont 2012 Water Quality Integrated Assessment Report*).

Each of Vermont's 17 basins is assessed on a rotating schedule. The most recent *Lamoille Basin Water Quality Assessment* (2001) found that all of the rivers and streams in Lamoille County either partially or fully supported their uses, and all lakes and ponds with the exception of Lake of the Clouds either partially or fully supported their uses. In this lake, water quality is impaired due to high acidification. In addition to Lake of the Clouds, a tributary to the Brewster River is identified as impaired due to iron seepage from an inactive leachfield. Remediation via lime treatments has been applied to this tributary. In the most recent Winooski Basin Water Quality Assessment (2008), the West Branch Little River in Stowe is identified as impaired due to sedimentation from development runoff. Segments of the West Branch have also been altered due to streambank erosion, land development, watershed hydrology changes, stream channel manipulation, floodplain encroachment and snowmaking water withdrawals.

The map below shows the impaired and priority surface waters in Lamoille County. For a detailed listing of these surface waters, see the Vermont Water Management's "Assessment of the Condition of Vermont Waters" webpage at [http://www.vtwaterquality.org/mapp/htm/mp\\_assessment.htm](http://www.vtwaterquality.org/mapp/htm/mp_assessment.htm).

### **Stormwater**

Stormwater runoff is generated when precipitation from rain and snowmelt flows over land or impervious surfaces and does not percolate into the ground. As the runoff flows over the land or impervious surfaces (paved streets, parking lots, and building rooftops), it accumulates debris, chemicals, sediment or other pollutants that can adversely affect water quality. Rapid discharges of stormwater can also adversely impact the hydrology of a water body, leading to erosion or flooding downstream and damage to the built environment. Sediment carried in stormwater can adversely affect aquatic wildlife, and may also be bound with pollutants such as phosphorous.

The State of Vermont regulates stormwater impacts from developments which create more than one acre of impervious surfaces. However, much of the development occurring in Lamoille County falls under this threshold. Therefore, management of stormwater is largely left to local municipalities. In some cases "Low Impact Development" can be used to address stormwater impacts. Low Impact Development techniques include reducing the width of roads and driveways, directing runoff away from impervious surfaces and into vegetated areas, and infiltrating runoff into soil before it reaches surface waters through use of rain gardens or similar techniques.

### **Lake Champlain Restoration Plan**

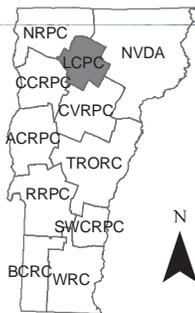
A major effort is under way in Vermont to reduce the inputs of phosphorus into Lake Champlain. A particular focus exists on non-point sources of phosphorus pollution. This is due in part to past efforts aimed at reducing point source loads, which have resulted in a significant drop in point source phosphorus pollution—including a 66% decrease between 1991 and 2000. Non-point sources now account for 97% of the total phosphorous load (Vermont DEC).

Phosphorus pollution from stormwater and agricultural runoff poses perhaps the most significant threat to water quality in Lake Champlain. Phosphorus levels in Lake Champlain continue to increase despite efforts to combat point and non-point pollution sources. Non-point sources are more challenging to control, as they enter waterways through stormwater runoff with pollutants from a wide variety of sources, such as agricultural runoff and roadways. This runoff is often caused by stream bank destabilization/erosion, removal of streamside vegetation, flow modifications and storm water discharge.

As of November 2014, the State of Vermont and the U.S. Environmental Protection Agency are developing and implementing a new restoration plan for the Lake Champlain basin. These efforts associated with the Lake Champlain Total Maximum Daily Load for phosphorous could include increasing inspections and compliance efforts for farms and related stormwater control practices, increasing technical assistance in designing rural roads to reduce erosion and sedimentation, increasing the stability of our streambanks, and assisting municipalities in encouraging stormwater control practices in those projects that fall below the State permit threshold. Strategies that incorporate public education and outreach and require collaboration and pooling resources across public and private sectors will be critical in addressing these issues.

# Impaired and Priority Waters

## Lamoille County



### Priority Rivers and Streams

-  B - Impaired, TMDL not required
-  C - Stressed, needs further assessment
-  D - Impaired with TMDL in place
-  E - Altered exotic species
-  F - Altered flow regulation
-  G - Channel alteration
-  Priority Waterbody

### Major Watersheds

-  Lamoille
-  Missiquoi
-  Winooski
-  St. Francois
-  Lake/Pond
-  Streams
-  Town Boundary

### Data Sources:

Political Boundaries: VCGI, 1991.  
 Roads: 1:5000 E-911 Road Data, 2014.  
 Surface Water: VCGI for VHD-USGS, 2001.  
 Impaired Surface Waters: Vermont DEC Water Quality Division.  
 Priority Surface Waters: Vermont DEC Water Quality Division.

Created 7/30/15 by LCPC. Map is for planning purposes only, not for regulatory interpretation.

## Flood Resilience: Strategy

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Resilience is the capability to anticipate, prepare for, respond to, and recover from significant multi-hazard threats with minimum damage to social well-being, the economy, and the environment. This section focuses specifically on resilience to flooding, including the capacity to plan for, respond to, and recover from floods.

The following strategies are proposed for building flood resilience in Lamoille County:

**Communities are flood resilient** when they are able to anticipate, prepare for, respond to, and recover from significant floods with minimum damage to social well-being, the economy, and the environment. In the last 50 years, severe storms have gotten more common in Vermont and across the Northeast. While the future is not fully predictable, current models of climate change suggest this trend will continue. We need to take careful steps to ensure that our communities are prepared for and resilient to increasingly frequent floods.

**Development is concentrated in areas safe from flooding.** Currently in Lamoille County, 6% of residential structures, 12% of commercial facilities and 12% of critical facilities are in the flood hazard areas. Locating new development outside of hazardous areas is one way to reduce future losses. Moving existing buildings, especially critical facilities, out of hazardous locations may be prudent in some cases. Communities need to examine their public and critical facilities to be sure they are accessible, safe and functional when needed.

**Development in flood prone areas is protected from flooding damages and does not cause an adverse impact to downstream areas.** For those buildings and other infrastructure that can't be moved, steps can be taken to help them experience less damage in the next flood. Some measures include elevating the bottom floor of the building, elevating utilities, changing a below-ground basement into an above-grade level crawl space, and providing vents for flood water to enter and leave the crawl space. Conversely, filling in a floodplain area will only exacerbate flooding downstream and should be avoided.

**Floodplains and upland forested areas are protected.** Protecting our intact floodplains and river corridors is the single most cost effective way to prevent future flood damage. When we protect these critical areas we give rivers more room to spill over their banks and release their energy when severe storms occur. Over time, rivers connected to their floodplains become rivers less prone to catastrophic flooding. Likewise, forested areas provide multiple watershed benefits including capacity to retain precipitation and moderate flows. Forests in the watershed and even individual trees can help temper peak flows from small storms and larger events. Forests, particularly on higher and steeper locations, provide self-renewing areas that retain and delay water and reduce sediment loading. Branches and trees in the stream channel slow waters, and trap sediment appropriate to an equilibrium condition. Protecting forested lands in the watershed is an important strategy to prevent damaging peak flows. If water is not intercepted, retained and delayed in forest cover then more water may come sooner and quicker - exacerbating flash-flooding and erosive impact.

**Ditches and water control structures for transportation infrastructure such as roads and trails are adequately designed, constructed and maintained.** Currently most road crossing structures are undersized leaving the transportation infrastructure ripe for injury, loss of emergency services and economic disruption. In the event of a disaster, the loss of services can be devastating and the unbudgeted costs for repairs can be formidable. On the other hand, a transportation network with appropriately sized and spaced culverts and ditches withstands flooding events. To establish and maintain a reliable transportation network requires an assessment of needs, prioritization of infrastructure upgrades, and budgeting for future upgrades. There are state and federal funding sources available to help Towns fund repairs and replacements to safe and resilient standards.

**Local communities are well-prepared for flooding emergencies.** Communities that are well-prepared greatly reduce the loss of life and property damage when a disaster occurs. Preparedness is a responsibility of

residents, business, and government and includes emergency personnel acquiring suitable equipment and conducting training and exercises, developing and updating local emergency operations plans, establishing evacuation procedures, and communications protocols for disasters. Even simple preparedness measures like having disaster supplies on hand, installing smoke detectors, and knowing basic first aid help to lessen the impact of a disaster.

## **POLICIES & ACTION ITEMS**

**Policy:** *Discourage new development in flood hazard areas and river corridors.*

### **Action Items:**

- LCPC shall identify flood hazard areas and river corridors, based on maps provided by the Secretary of Natural Resources pursuant to 10 V.S.A. § 1428(a) or maps recommended by the Secretary.
- LCPC encourages municipalities to adopt flood hazard regulations that prohibit new development in the flood hazard areas and river corridors and encourage mitigation of existing development within these areas.

**Policy:** *Protect areas that help to attenuate flooding, such as wetlands, floodplains, river corridors and upland forests*

### **Action Items:**

- LCPC encourages the protection of wetlands, floodplains, river corridors, land adjacent to streams, wetlands, and upland forests, to reduce the risk of flood damage to infrastructure and improved property.
- Restoration of riparian buffers of at least 50 feet is strongly encouraged along all surface waters.
- Existing riparian vegetation should be protected through such tools as management zones and shoreline zoning.
- LCPC supports riparian corridor and upland forest education efforts.
- LCPC supports federal and state wetland protection rules.

**Policy:** *Rivers should have access to floodplains wherever possible to establish and maintain stability in order to minimize stream bank erosion and avoid conflicts with human infrastructure.*

### **Action Items:**

- Mitigate floodplain encroachments wherever and whenever possible. Mitigation may include “compensatory storage,” removal of infrastructure, floodplain reconnection/re-vegetation, and/or implementation of projects identified in a river corridor plan or local hazard mitigation plan.
- Complete the remaining geomorphic assessments as identified by LCPC and the Vermont Department of Environmental Conservation.
- Work with State partners, communities and community partners to further refine and revise the statewide river corridors map to better reflect actual on-the-ground conditions.
- Assist municipalities in implementing wetland, river corridor, and riparian buffer protections to preserve these resources.
- Work with municipalities, developers, and regional partners to encourage land use practices that use appropriate erosion control techniques.

- Stabilization of eroded stream banks is encouraged in accordance with appropriate professionally accepted standards.
- LCPC supports State stream alteration regulations.

**Policy:** *For the safety and protection of human resources and infrastructure, new construction within floodplains should be avoided and measures should be taken to protect existing structures within the floodplain.*

**Action Items:**

- Flood hazard mapping (Flood Insurance Rate Maps) should be updated.
- LCPC will provide technical assistance to communities wishing to explore or enroll in the National Flood Insurance Program (NFIP).
- LCPC supports flood mitigation projects such as flood proofing, property acquisitions, removal of floodplain encroachments, and the development of flood storage space to reduce damage to property in flood hazard areas.
- Compatible land use activities within floodplains, such as agriculture and recreation, are encouraged.
- LCPC encourages communities to adopt bylaw standards above and beyond the minimum National Flood Insurance Program (NFIP) and river corridor standards, so as to encourage existing buildings in hazardous locations to be made safer from flood damage and less costly to insure.
- LCPC encourages elevation of existing structures within the flood hazard areas at least 2 feet above the base flood elevation.
- LCPC will provide technical assistance to communities wishing to explore or enroll in the Community Rating System Program.
- In light of the high percentage of critical facilities located in the Special Flood Hazard Area (SFHA) or river corridor, LCPC encourages communities to either (a) relocate such facilities to less vulnerable areas or (b) elevate the lowest floor and attendant utilities to at least 2 feet above the base flood elevation.
- LCPC will assist municipalities in obtaining grant funding or other financing to relocate or flood proof critical facilities
- LCPC will assist municipalities in identifying suitable areas of development outside of flood hazard areas and river corridors.

**Policy:** *Ditches and water control structures for transportation infrastructure such as roads and trails should be adequately designed, constructed, and maintained.*

**Action Items:**

- LCPC encourages municipalities to adopt and implement design standards for bridges and culverts to accommodate a 50-year flood event.
- Ensure additional scrutiny for major transportation infrastructure investments near river confluences, as traditional hydrological modeling may not properly account for the complex water movements in these areas. LCPC will provide technical assistance related to resources for developing local standards, such as the Vermont Better Back Roads Handbook.
- LCPC encourages and provides technical assistance for municipalities to develop inventories, geomorphic assessments of stream-crossing structures, and capital plans.
- LCPC will pursue funding to conduct road erosion assessments in all Lamoille County Towns.

- Regular maintenance of existing bridges and culverts, such as clearing debris, is strongly encouraged to ensure they are operating at full capacity.
- Work with communities to identify infrastructure at risk for and/or known for flood damage and review these for possible mitigation strategies; pursue HMGP and/or water quality grant funding opportunities to further scope out and implement potential mitigation strategies.

**Policy:** *New development should have adequate stormwater treatment and control mechanisms*

**Action Items:**

- LCPC encourages the use of municipal stormwater ordinances to address projects under the threshold for state regulation; especially in conjunction with waste water management.
- Proposed development projects must conform to the Vermont Stormwater Management Handbook. LCPC strongly supports use of the voluntary stormwater management credits found in this manual.
- Encourage low-impact development techniques to minimize stormwater runoff impacts.
- Assist municipalities with the development of stormwater design guidelines for both new and existing development.
- Recognize and address impacts of stormwater runoff from both new and existing development.

**Policy:** *Ensure an efficient, coordinated regional response network exists during flooding emergencies.*

**Action Items**

- Assist LCPC staff, emergency responders, and municipal officials with proper training and equipment to respond to anticipated disasters.
- Provide support for Citizen Corps Programs that bring emergency responders and volunteers together.
- Continue to provide support and assistance to local and regional emergency response organizations, committees, and individuals for trainings, coordination, drills, and exercises.
- LCPC supports efforts by municipalities to provide emergency response services for all residents.
- Communities are encouraged to develop emergency response plans and provide education to households about emergency preparedness activities. Response plans should be shared with LCPC and with the Vermont Division of Emergency Management and Homeland Security.

**Policy:** *Reduce the loss of life and damage to property from flooding hazards.*

**Action Items**

- LCPC will continue to map and track critical facilities, mitigation priorities and vulnerable populations for use in local and regional emergency planning.
- Assist municipalities in adopting and updating all-hazard mitigation plans, emergency operations plans, flood hazard regulations, and other planning documents to strengthen emergency preparedness and community resiliency.
- Assist emergency responders with securing funding for preparedness equipment, such as advanced warning systems and USGS Stream Gages.
- Upgrades to local and regional public safety facilities and equipment are supported and encouraged.

- LCPC supports new residential and commercial developments that include development standards that incorporate disaster resistant designs, such as appropriate emergency response vehicle access, drainage systems, siting, proximity to existing water resources, and flood proofing measures.
- Critical local and regional emergency and governmental facilities should be built and located to be disaster resistant and able to continue to function during disasters.
- Work cooperatively with Emergency Management Directors and the Local Emergency Planning Committee to improve emergency planning.

## Flood Resilience: Background and Inventory

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Mountainous geography influenced the settlement and historical development patterns of our Vermont communities, so that many of our population centers and farms occupy valley floors where there is more gently sloping land with generally richer and less rocky soil. Many of the valley floors, whose gentle slopes, rich soils, and diverse ecological resources made them so attractive for development, are actually floodplains formed by the meandering movement of streams eroding and re-depositing soil and organic matter. Consequently, our valleys surrounded by steep hills flood often (at least yearly in some locales) and stream channels frequently change position.

Most Vermont watersheds have been altered by human activities including deforestation and farming, channelization, stream bank retaining walls, filling, and construction of roads, bridges, dams, and buildings. When development encroaches or stream channels are altered, conditions in the flood erosion hazard zones become more unstable, exacerbating dangers to downstream occupants and structures.

For more than 200 years we have incurred significant, recurrent, and ever-increasing expenses to control and stabilize our moving rivers, creating a cycle of ever increasing safety risks and maintenance costs. Therefore the most beneficial and least costly course over the long term lies in an approach that reduces flood and erosion hazards; minimizes the recurrent costs of trying to control our streams and repairing/replacing community infrastructure; and allows us to keep our valuable and irreplaceable soil resources while improving stream water quality and aquatic habitat. The goals of protecting our community and our natural resources are interdependent and mutually supportive.

### **What is Flood Resilience?**

Resilience generally refers to “a capability to anticipate, prepare for, respond to, and recover from significant multi-hazard threats with minimum damage to social well-being, the economy, and the environment.”<sup>4</sup> This section focuses specifically on resilience to flooding, including a community’s capacity to plan for, respond to, and recover from floods.

### **Types of Flooding**

There are generally two types of flooding, flooding caused by inundation and flooding caused by erosion. Inundation, or overbank flooding, occurs when a stream channel or waterbody receives a significant amount of rain or snow melt from its watershed, or when the stream channel is blocked by a debris or ice jam. The excess water spills out onto or inundates the floodplain. This type of flooding can occur slowly or in a short duration; flood waters can cover a small area or a large area.

While inundation-related flood loss is a significant component of flood disasters, the more common mode of damage is associated with fluvial erosion – the dynamic, and oftentimes catastrophic, physical adjustment of stream channel dimensions and location during storm events. These adjustments are often due to bed and bank erosion, debris and ice jams, or structural failure of or flow diversion by man-made structures.

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<sup>4</sup> National Research Council. *Adapting to the Impacts of Climate Change*. Washington, DC: The National Academies Press, 2010. [http://www.nap.edu/openbook.php?record\\_id=12783](http://www.nap.edu/openbook.php?record_id=12783).



Inundation (left) and erosion (right) flood hazards.

### **Causes of Flooding**

Flooding in our region is caused by different weather related events, and the severity and duration of flooding is influenced not only by the event itself but also by the condition of the surrounding landscape. By far the most common type of weather event to occur in our region is a severe storm, which may include thunder, lightning, hail, high winds, and precipitation. Severe storms with particularly heavy precipitation have the ability to create flash flood conditions. However, over an extended period of time, severe storms may cause inundation flooding due to the cumulative effects of continuous rain, saturated soils and a high water table/high aquifer levels.

Both severe storms and hurricanes/tropical storms occur during the summer and into the fall months, but ice jams and the combination of melting snow and rain leave our region vulnerable to the impacts of flooding in the winter and early spring. Ice jams typically occur during the spring when river ice begins to break up and move downstream, but may occur during a thaw period in the winter months. Sheets of ice become hung up on a narrow portion of the stream or river, such as under a bridge, culvert or another obstruction, creating a “dam” and additional ice and water begin to back up behind the hung-up ice sheets. This creates inundation flooding immediately adjacent to the site of the “dam,” and additional inundation flooding upstream.

Once the “dam” breaks free, flash flooding may occur downstream as well. Ice jams in our region typically cause minimal damage, but they can damage road infrastructure, and flood homes and businesses. The Lamoille mainstem and North Branch have experienced ice jams or are vulnerable to them. Finally, the combination of melting snow and rain, can lead to flooding in the region. The communities of Cambridge Village, Jeffersonville, and Johnson were particularly hard hit by this combination during the spring of 2011, in which inundation flooding resulted in costly damages to infrastructure located in the floodplain, as illustrated below (Figure 4-18).

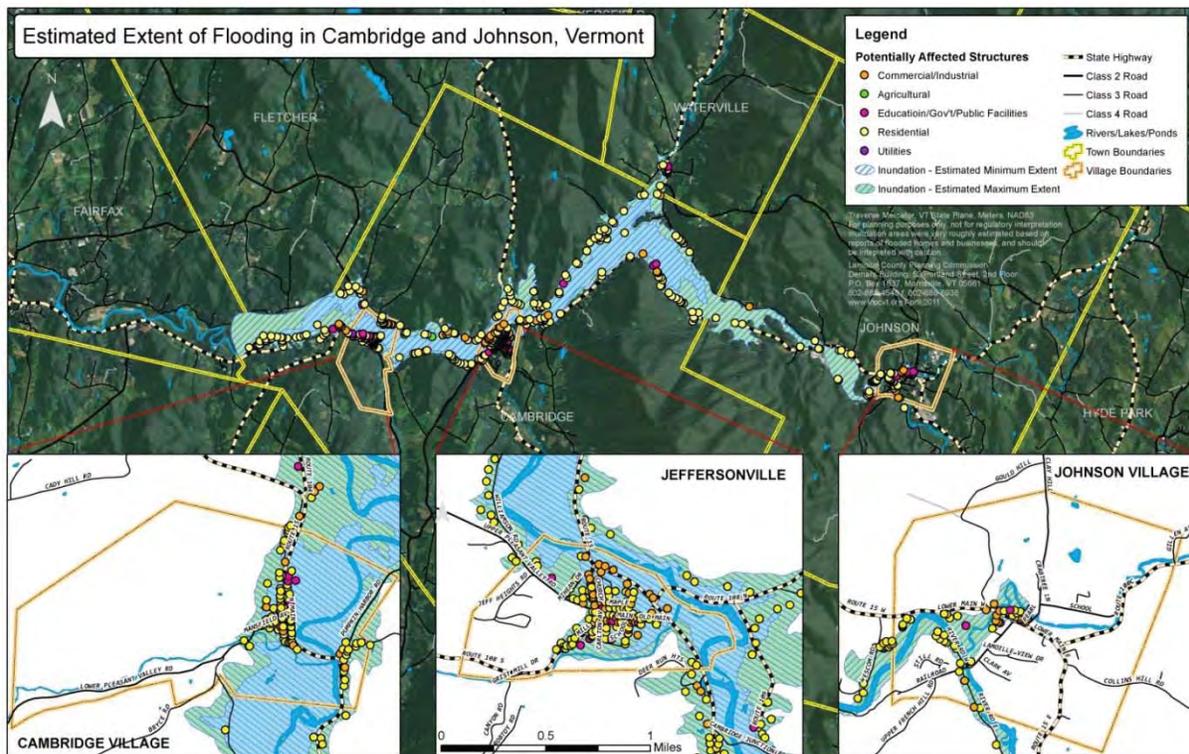


Figure 4-18. Approximate extent of 2011 Spring flooding in Cambridge Village, Jeffersonville and Johnson Village

### Regional Impacts of Flooding

Flooding is a natural occurrence in a floodplain, the land adjoining a water body. If floodplain areas were left in their natural state, void of development, floods would cause significantly less damage. Flooding is worsened by land uses that create hard surfaces that lead to faster runoff, and past stream modifications that have straightened or dredged channels, creating channel instability. Furthermore, development in a floodplain can raise the floodwater height as the storage capacity of the floodplain is reduced.

Floods can damage or destroy public and private property, disable utilities, make roads and bridges impassable, destroy crops and agricultural lands, cause disruption to emergency services, and result in fatalities. People may be stranded in their homes for a time without power or heat or they may be unable to reach their homes. Long-term collateral dangers include the outbreak of disease, loss of livestock, broken sewer lines or wash out of septic systems causing water supply pollution, downed power lines, loss of fuel storage tanks, fires, and release of hazardous materials.

Of all types of natural hazards experienced in Vermont, flooding has historically caused the greatest magnitude of damage suffered by private property and public infrastructure. According to the State of Vermont, from 1990 to 2014, over \$8 million dollars has been spent to repair the publicly-owned infrastructure (FEMA Public Assistance) in Lamoille County due to damage that has occurred during Presidentially Declared Disasters (see Table 4-19 for full list). Since 2000, Vermont has had more than one federally-declared disaster per year. Since 1990, Lamoille County has had 17 federally-declared disasters due to severe storms and/or flooding.

Table 4-19. Federally declared flood related disasters in Lamoille County, 1990 – 2014

Date	Disaster Number	Description	Damage Costs
April 2014	4178	Severe Storms and Flooding	\$350,000
July 2013	4140	Severe Storms and Flooding	\$120,000
May 2013	4120	Severe Storms and Flooding	\$200,000
May 2012	4066	Severe Storm, Tornado, and Flooding	\$194,000
August 2011	4022	Tropical Storm Irene	\$551,459
April 2011	1995	Severe Storms and Flooding	\$1,124,558
August 2008	1790	Severe Storms and Flooding	\$150,000
July 2008	1784	Severe Storm, Tornado, and Flooding	\$300,000
April 2007	1698	Severe Storms and Flooding	\$40,000
August 2004	1559	Severe Storms and Flooding	\$40,000
June 2002	1428	Severe Storms and Flooding	Unknown
September 1999	1307	Tropical Storm Floyd	\$187,930
June 1998	1228	Severe Storms and Flooding	\$771,661
July 1997	1184	Severe Storms and Flooding	\$1,606,517
January 1996	1101	Mid-winter Flooding	\$35,555
August 1995	1063	Severe Storms and Flooding	1,870,692
June 1990	875	Severe Storms and Flooding	\$658,555

Floods can have a potentially devastating impact on the regional economy. Tropical Storm Irene, arriving just prior to fall foliage season, caused road closures throughout Vermont and disrupted travel for many in-state residents and out-of-state tourists. For Lamoille County, which had minimal transportation impacts, even the perception of potential road damage hurt the region’s economy.

**Implications of Climate Change and Flooding**

There is evidence of increasing frequency and severity of flooding. Whereas the 100-year flood, the standard basis for floodplain management, is by definition 1% likely to occur in any given year, evidence suggests that actual flooding hazards are significantly underestimated. For example, the 100-year event is now closer to a 20% likelihood in any year, and FEMA itself has estimated that the size of flood zones could increase by nearly 50% in the coming decades. Consequentially, the 500-year flood (by definition 0.2% likely to occur in any given year, but the chance of occurrence is actually much higher), may be a more appropriate level for floodplain management. Unfortunately given the age of flood hazard mapping in the county, many floodplains do not have the 500 year (0.2%) flood data delineated.

The greatest increases in severe floods are expected in the Northeast (and Pacific Northwest). This will potentially lead to increased damage from flooding in homes and along roadways; and will also tax the capacity of our wastewater treatment systems, thus impacting our drinking water supply. More frequent and intense rainfall events can also cause direct flooding damage to above-ground utility facilities and buried infrastructure. This, of course, has a financial cost to communities. A changing climate may bring about dramatic social, economic, and environmental change to the region. Accordingly, we should plan for ways to adapt to the changing climate and prevent or minimize the resulting hardships.

**Assessing Risks and Vulnerabilities**

The first step in becoming more flood resilient is to better understand the risks and vulnerabilities. Where are the areas prone to flooding and fluvial erosion? How many and what kinds of infrastructure are located in and near

these areas? Are there suitable areas located outside the floodplain that could be targeted for future development without fragmenting or encroaching upon the forested areas that are valuable for flood attenuation?

### **Mapped Flood Plains and River Corridors**

Two complementary flood hazard mitigation programs are: (1) the National Flood Insurance Program (NFIP) promoted by FEMA to address inundation hazards, and (2) the river corridor program developed by the Vermont ANR River Management Program to address fluvial erosion hazards.

The National Flood Insurance Program (NFIP) is a voluntary program that provides access to flood insurance to participating communities. These communities adopt and administer land use regulations in flood hazard areas, so as to reduce property damage from inundation. Residents of participating communities are then able to purchase NFIP flood insurance to protect their buildings and possessions. Flood insurance rates are based on Flood Insurance Rate Maps (FIRMs), which delineate areas of the floodplain likely to be inundated during a flood. Inundation areas are divided into zones according to flood risk and include the Special Flood Hazard Area and the FEMA regulatory floodway.

NFIP maps have been created nation-wide, and may be based on assorted data sources, such as studies of historical river flows, rainfall, community knowledge, floodplain topographic surveys, and hydrologic and hydraulic data. There is some degree of variability in how much detail and accuracy is captured in a given location's map. This variability is related in part to the extent of supporting data available. For example, elevation data for rural areas may be unavailable; as a result, many Vermont streams have more "approximate" floodplain delineations than streams mapped in more populated, developed areas.

The NFIP maps focus on a *particular type of flood risk* to the low-lying lands next to the river channel. They show the areas that would be covered, or "inundated," by water as flood waters rise. Technically speaking, the Special Flood Hazard Area (or floodplain) includes the stream channel plus adjacent land inundated by river discharge during a "base flood". The base flood is sometimes referred to as the "100-year flood", which may give the false impression that a base flood can only occur once every 100 years. A more accurate way of describing the base flood is to say that in any given year, there is a 1% chance that a flood of this size will occur. Some Vermont rivers have experienced more than one "100-year flood" within a decade. For example, the upper Lamoille River and Wild Branch experienced flooding of that magnitude in both 1995 and 1997.

In order to enable property owners to be eligible for federal flood insurance through the NFIP, municipalities must adopt and enforce a floodplain management ordinance, often called "flood hazard bylaws," "flood hazard area regulations," or "flood hazard overlay districts" in Vermont. A community's flood hazard regulations must apply to at least the Special Flood Hazard Areas (SFHA) identified by FEMA. The regulations regulate new structures in the floodplain and place restrictions on other types of activities within the floodplain. They also specify land, area, and structural requirements to be adhered to within the SFHA. Paradoxically, using only the minimum required regulations can *increase* flood risk, as they allow filling in flood zones, potentially increasing velocities and/or flood elevations.

The Vermont ANR River Management Program has developed an additional program to supplement the NFIP called the river corridor program. The river corridor program maps a river corridor specially tailored to protect against the predominant form of flood damage in Vermont—fluvial erosion. Based on studies of each stream's

geomorphic (or physical) condition and inherent sensitivity to erosion, river corridor maps provide towns with a powerful flood hazard planning tool. Once the river corridor map is created, towns have the option to adopt a river corridor overlay district, limiting development in the river corridor

The river corridor is designed with the recognition that rivers are *not static*, and that flood damages in Vermont are often a result of fluvial erosion hazards. Considerable damage can occur when a flooding river dramatically enlarges or makes a catastrophic change in course, resulting in severe erosion of the river bed and banks. Typical and costly damage occurs when streams and rivers cannot flood and the power of the trapped water digs the channel deeper until the nearby roadbank fails, houses fall in, or culverts blow out.

A certain amount of erosion is natural in Vermont floods because of the region’s relatively steep terrain and flashy, frequent storms. However, due to human encroachments and historical channel engineering (e.g., bank armoring, berming, and channel straightening), many Vermont rivers have become unstable and can no longer flood leading to increasing stream power and damage.

The river corridor zone includes both the channel and the adjacent land. The purpose of the zone is to identify the space a river needs to re-establish and maintain stable “equilibrium” conditions. In other words, if the river has access to floodplain and meander area within this corridor, the dangers of flood erosion can be reduced over time. The river corridor is delineated based on scientific, location-specific assessment of the fluvial geomorphic (or physical) condition of a river.



Aerial photo showing a river's natural meander pattern.

Because the underlying methods of mapping differ significantly, it is not surprising the flood maps differ. In some situations, the river corridor is narrower than the FEMA floodplain, usually as a result of bedrock or elevated landforms that may not have been evaluated in the NFIP studies. In other areas, the river corridor may extend beyond the FEMA regulatory floodway or even the Special Flood Hazard Area boundaries. These locations are potentially hazardous, and under minimum NFIP guidelines alone, development and infrastructure in these areas may be susceptible to flood damage and/or may contribute to further instability and erosion hazard upstream or downstream. Moreover, on streams where FEMA has mapped “approximate” flood hazards (Zone A areas), river corridor maps provide communities with essential, more detailed flood risk data.

### Mapping Vulnerable Locations

The maps below show the flood hazard areas and river corridors in Lamoille County and areas vulnerable to flooding. The flood hazard areas are derived from the most recent FEMA maps developed largely in the 1970s and 80s (with the exception of Wolcott and Stowe, both produced in 2006). The Vermont Department of

Environmental Conservation completed a statewide map of river corridors in 2014, the results of which are shown below. This map is available online at [www.lcpcvt.org](http://www.lcpcvt.org) and the mapping data can also be viewed on the [ANR Natural Resources Atlas](#). Another map below depicts transportation infrastructure within the FEMA designated Special Flood Hazard Area (SFHA) or within the ANR designated river corridors. In Lamoille County there are 59 miles of road within a SFHA or river corridor. Of this, 11 miles are classified as State Highway and 38 miles are classified as Class 1, 2 or 3 Town Highway. Town bridge and culvert inventories conducted since 2011 (not including Morristown and Stowe) indicate that 19 “critical culverts” (culverts less than 25% open or that have critical deficiencies) are within a SFHA or river corridor area.

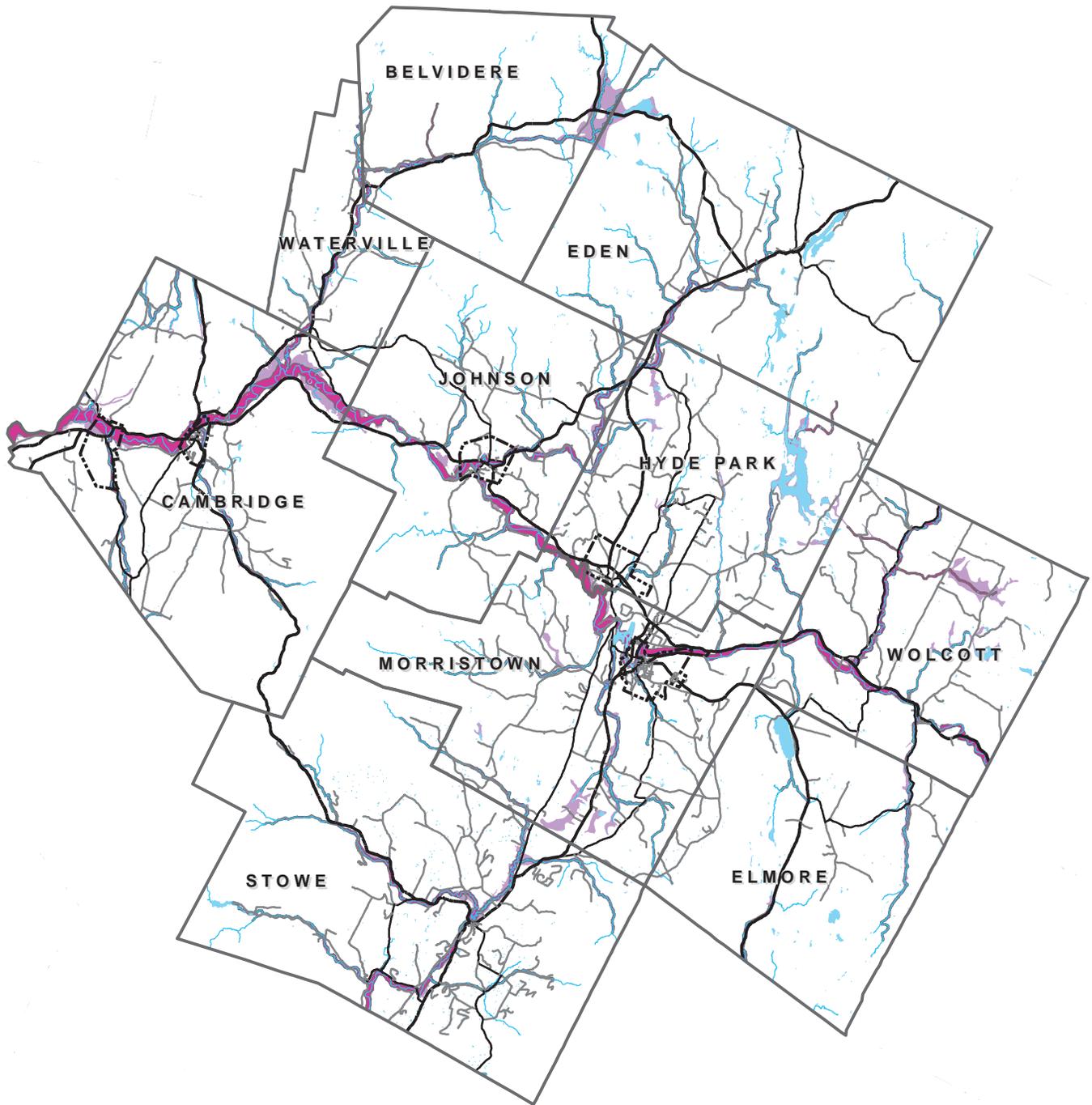
Where geomorphic assessments have been conducted, the ‘percent of bankfull width’ has been calculated for bridge spans and culvert diameters to indicate how compatible the structure is by design. A percent of bankfull width less than 100% contributes to the likelihood of sediment buildup, requiring maintenance and leading to a higher risk of failure. This data can be found in River Corridor Plans.”

Structures at risk of damage from flood events are those structures that are within the FEMA designated Special Flood Hazard Area (SFHA) or within the ANR designated river corridors. The Structure Vulnerable to Flooding map below overlays the SFHA and river corridors with E911 structures. Structures were divided into the following categories:

**Residential:** Camp, mobile home, multi-family home, single family home, seasonal home, and other residential.  
**Commercial/Industrial:** Industrial, commercial, commercial farm, commercial with residence, lodging, and other commercial.  
**Public/Critical Facilities:** Cultural, educational, fire station, government, health clinic, house of worship, law enforcement, public gathering, and utility.  
**Other:** Accessory building, abandoned, development site, gated without building, public telephone, other, unknown.

# Special Flood Hazard Areas and River Corridors

## Lamoille County



-  State Highway or Class 1 Town Highway
-  Class 2 Town Highway
-  Class 3 Town Highway
-  Lake/Pond
-  Stream
-  River Corridor
-  Special Flood Hazard Area

0 2.5 5  
Miles



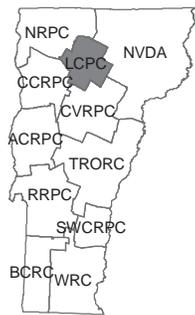
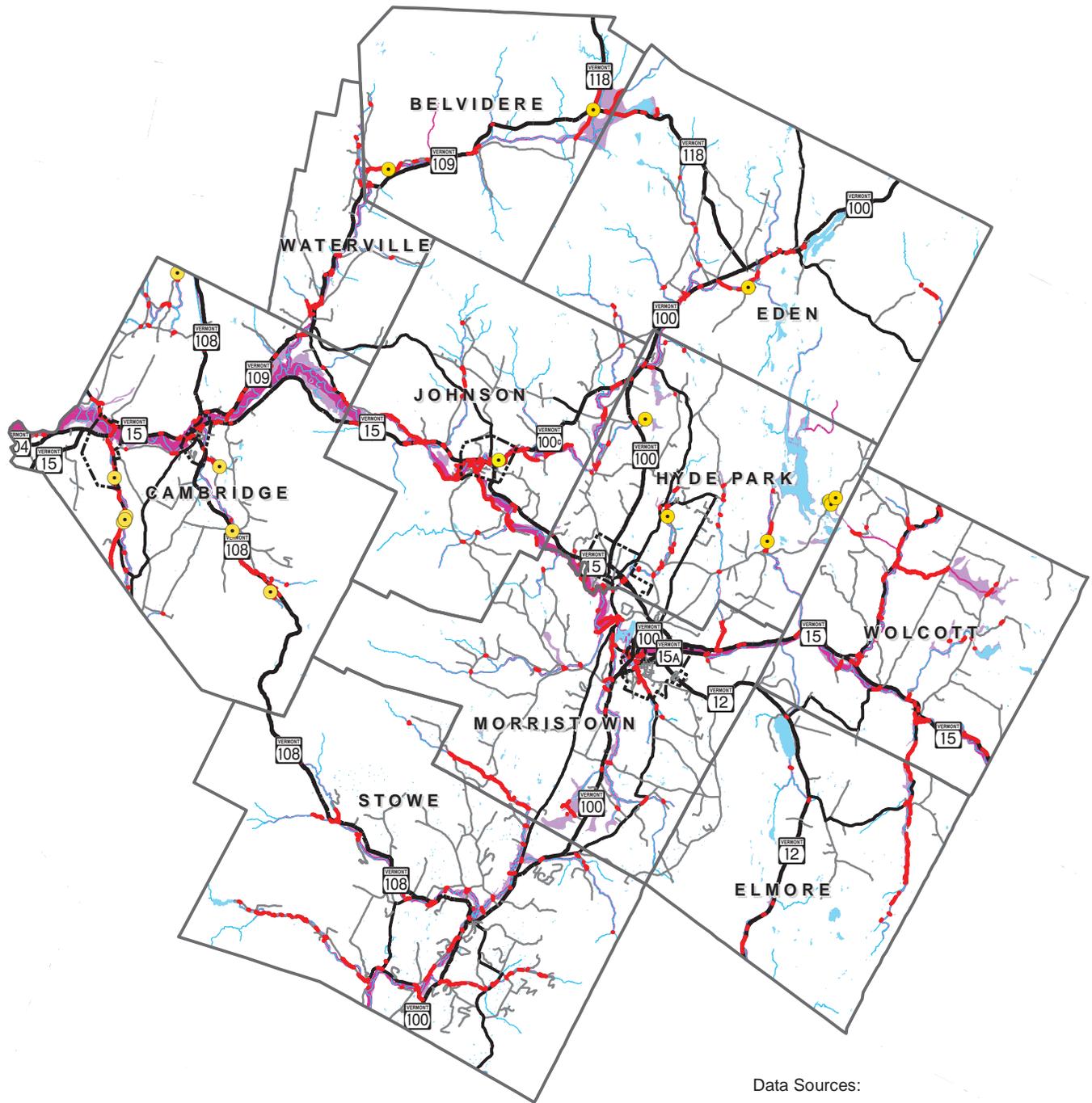
### Data Sources:

Flood Hazard Areas: Digitized from FEMA Flood Insurance Rate Maps. DEC, Water Quality Division, 1983; Wolcott and Stowe Digital Flood Insurance Rate Map (DFIRM), FEMA, 2006. Floodplains for planning purposes only.  
River Corridors: VT ANR River Management, 2015.

Created 7/30/2015 by LCPC. Map is for planning purposes only, not for regulatory interpretation.

# Transportation Infrastructure Vulnerable to Flooding

## Lamoille County



- Critical Culverts in SFHA or River Corridor
- Roads in SFHA or River Corridor
- State Highway or Class 1 Town Highway
- Class 2 Town Highway
- Class 3 Town Highway
- Lake/Pond
- Stream
- River Corridor
- Special Flood Hazard Area



**Data Sources:**

Flood Hazard Areas: Digitized from FEMA Flood Insurance Rate Maps. DEC, Water Quality Division, 1983; Wolcott and Stowe Digital Flood Insurance Rate Map (DFIRM), FEMA, 2006. Floodplains for planning purposes only.

River Corridors: VT ANR River Management, 2015.

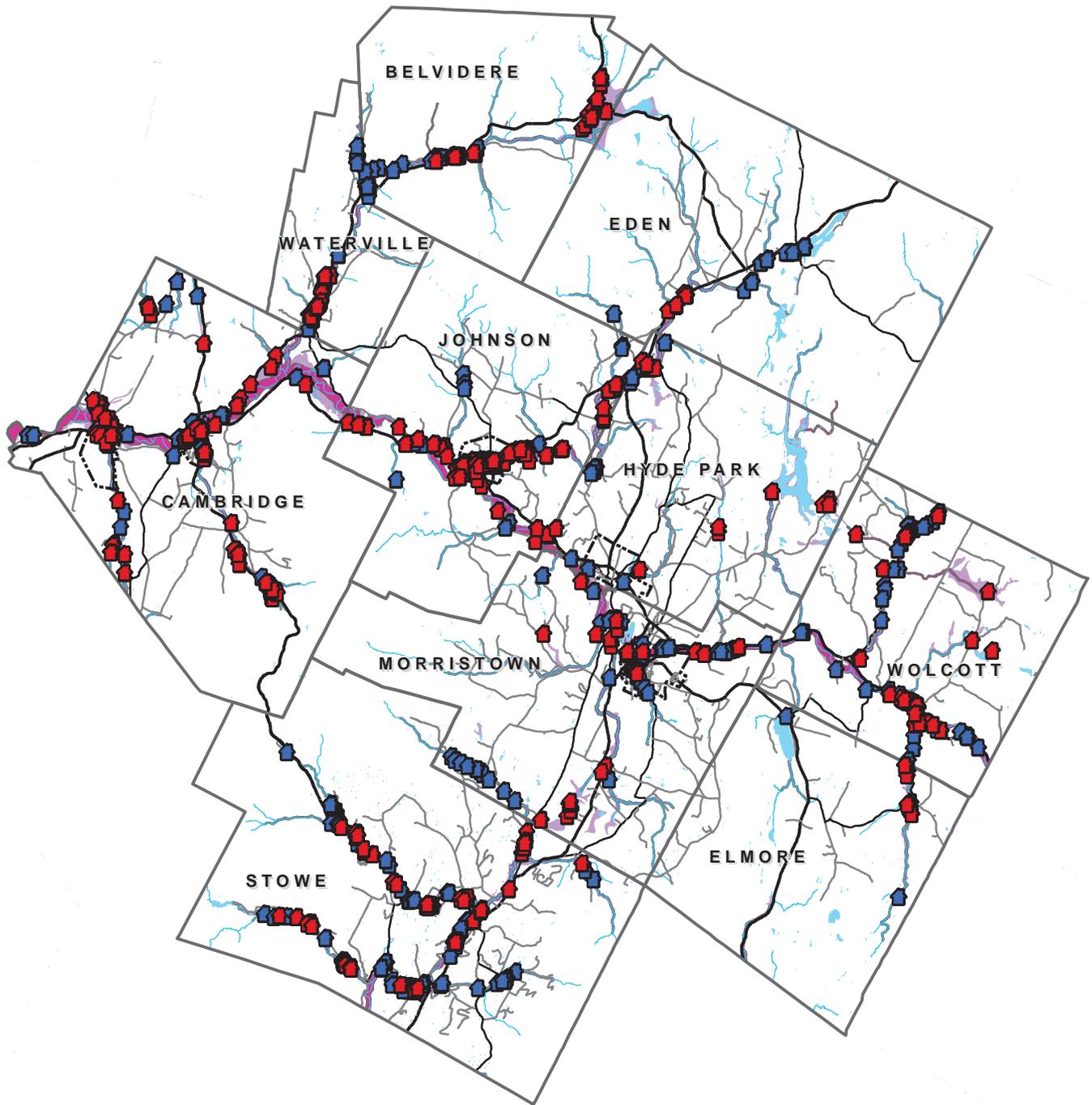
Roads in River Corridor or Special Flood Hazard Area: Based on intersecting E911 roads data with mapped floodplains and river corridors.

Critical Culverts in River Corridor or Special Flood Hazard Area: Based on intersecting critical culverts with mapped floodplains and river corridors. Culverts rated as "critical" or "urgent" in inventories conducted by LCPC since 2011. Stowe and Morristown are excluded due to the age of their structure inventories.

Created 7/30/15 by LCPC. Map is for planning purposes only, not for regulatory interpretation.

# Structures Vulnerable to Flooding

## Lamoille County



-  Structures in SFHA
-  Structures in River Corridor
-  Lake/Pond
-  Stream
-  River Corridor
-  Special Flood Hazard Area

**Data Sources:**

Flood Hazard Areas: Digitized from FEMA Flood Insurance Rate Maps. DEC, Water Quality Division, 1983; Wolcott and Stowe Digital Flood Insurance Rate Map (DFIRM), FEMA, 2006. Floodplains for planning purposes only.  
 River Corridor/Fluvial Erosion Hazard Areas: VT ANR, 2015.  
 Structures: E911 data, 2014.



Created 3/10/2015 by LCPC. Map is for planning purposes only, not for regulatory interpretation.

In Lamoille County 736 of 12,453 structures (not including “other” as defined above) are within the SFHA or the river corridor. As shown in Figure 4-20 at right, although residential homes comprise 89% of E911 structures, only 5% are in the flood hazard areas. Contrasting this, 12% of critical facilities, comprising only 2.6% of the total structures, are in the flood hazard areas. Likewise, 12% of commercial facilities lie within the flood hazard areas. Notably, much of the flood related damage to public infrastructure in the Lamoille region has historically not occurred within the identified 100-year flood zone, but within the river corridors due to the persistent impacts of fluvial erosion.

**National Flood Insurance Program**

Since 1978, there have been 101 NFIP policy claims amounting to \$ 1,057,976 in Lamoille County. There are 143 NFIP policies in effect. Towns in Lamoille County not participating in the NFIP are Eden and Waterville. Neither town participates due to a lack of perceived threat from flooding. LCPC will continue to support NFIP compliance in each of its local jurisdictions by working with municipalities on the review and update of floodplain management ordinances, as well as bylaws, floodplain identification, and mapping.

The NFIP was instituted in 1968 to make flood insurance available in those communities agreeing to regulate future floodplain development. As a participant in the NFIP, a community must adopt regulations that: 1) require any new residential construction within the 100 year floodplain to have the lowest floor, including the basement, elevated above the 100 year flood elevation; 2) allow non-residential structures to be elevated or dry flood proofed (the flood proofing must be certified by a registered professional engineer or architect); and 3) require anchoring of manufactured homes in flood prone areas. The community must also maintain a record of all lowest floor elevations or the elevations to which buildings in flood hazard areas have been flood proofed. In return for adopting floodplain management regulations, the federal government makes flood insurance available to the citizens of the community. In 1973, the NFIP was amended to mandate the purchase of flood insurance as a condition of any federally regulated, supervised or insured loan on any construction or building within the 100-year floodplain.

Communities with a large number of structures already in the flood hazard zone may benefit from participation in the FEMA Community Rating System (CRS) program. The CRS program provides a discount on premiums to flood insurance policy holders in towns that choose to participate. Participating towns accrue rating points by exceeding the minimum NFIP requirements, for example, by prohibiting the development of new structures within the SFHA and the river corridor, or through public outreach efforts, storm water maintenance, and other actions.

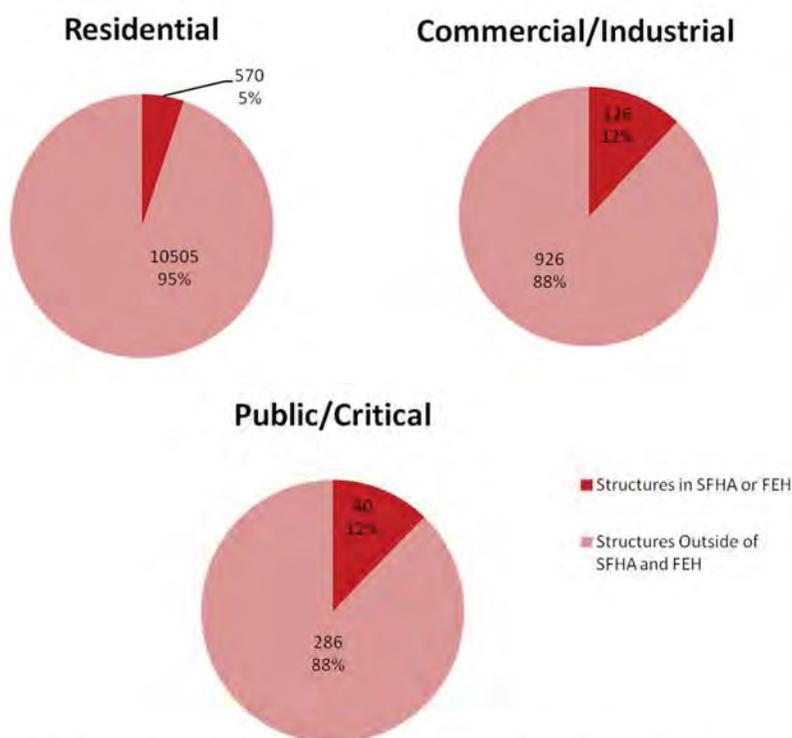


Figure 4-20. Number and percentage of structures within flood hazard areas.

## Becoming More Flood Resilient<sup>5</sup>

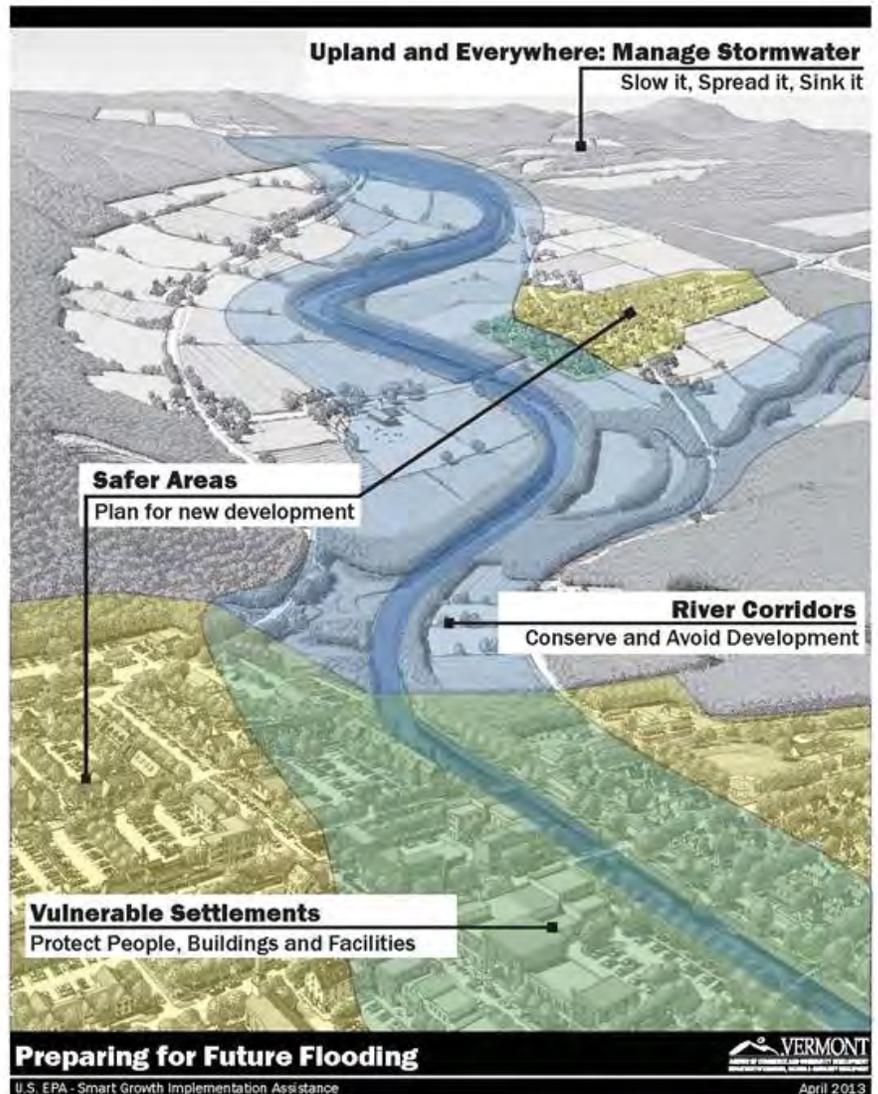
There are many steps that communities can take to reduce the risks of flooding, and the loss, disruption, and repetitive costs that may occur. Many towns are already taking these steps. Specific local land use policy options to improve flood resilience are organized into four categories, representing different geographic areas in a community:

- **River Corridors:** Conserve land and discourage development in particularly vulnerable areas along river corridors such as flood plains and wetlands.
- **Vulnerable Settlements:** Where development already exists in vulnerable areas, protect people, buildings, and facilities to reduce future flooding risk.
- **Safer Areas:** Plan for and encourage new development in areas that are less vulnerable to future floods.
- **The Whole Watershed:** Implement enhanced stormwater management techniques to slow, spread, and infiltrate floodwater.

The policy options in these categories offer multiple and interrelated benefits. For example, directing development out of flood plains not only keeps people and property safe, it also protects the ability of flood plains to hold and slow down flood water before it reaches downstream settlements.

### River Corridors

Communities that wish to reduce future flood risk can consider conserving land and discouraging development in particularly vulnerable areas, such as flood plains along river corridors. Conserving land in river corridors, especially land that is in a natural, vegetated state, can reduce flood risk by absorbing and making room for water during floods. Moreover, discouraging development in these areas can reduce the risk that homes, businesses, and critical infrastructure will be damaged by floods. Some strategies for conserving land and discouraging development in flood-prone areas include:



Four categories of approaches to enhance resilience to future floods. Credit: VT ACCD

<sup>5</sup> The information contained in this section was obtained and modified from the EPA authored report entitled [Planning for Flood Recovery and Long-Term Resilience in Vermont: Smart Growth Approaches for Disaster-Resilient Communities](#).

**1. Acquire or protect land in flood-prone locations**, through such means as conservation or river corridor easements, property buyouts, Transfer of Development (TDR) programs, and restoration of riparian buffers. Numerous riparian buffer projects have been implemented within Lamoille County. Several Lamoille County communities including Jeffersonville, Wolcott, and Stowe have purchased river conservation easements in the floodplain or river corridor, and those easements are managed as recreational green spaces. Stowe has developed a TDR program. Under a TDR program, sensitive or vulnerable lands, such as flood plains or land in a river corridor, are zoned to restrict development and designated as a “sending area.” Communities then designate “receiving areas” where they wish to see additional development. Those “receiving areas” are zoned to allow additional density.

**2. Encourage agricultural and other landowners to implement pre-disaster mitigation measures.** Agricultural land in flood plains may be subject to erosion during floods, impacting farmers’ ability to continue agricultural activities on their property. However, with planning and implementation of pre-disaster mitigation measures, agricultural land can be protected and can provide flood storage capacity during heavy rains, reducing flood-related damage and associated losses to both the farm and the community. Where farmers have access to upland fields they can have fall-back crops during flood years. Also, river corridor easements are available to help farmers manage fields in a way that is compatible with dynamic channel adjustments.

Agricultural landowners could also implement specific flood mitigation measures, such as storing hay bales in areas less likely to be flooded, since these bales can be carried into the river during floods, clogging culverts and bridges, which can create a dam downstream and inadvertently contribute to increased flooding along the riverbanks. Farmers and forestland managers can also install ponds or swales to capture stormwater and plant vegetation that can tolerate occasional inundation. Utilizing such techniques can help reduce damage from flooding and can also help recharge aquifers.

**3. Implement flood plain development limits that exceed FEMA requirements.** Paradoxically, using only the minimum required regulations can *increase* flood risk, as they allow filling in flood zones, potentially increasing velocities and/or flood elevations. The experiences of communities across the country demonstrate that simply adopting the NFIP minimum standards does not guarantee avoidance of flood damage and losses. The Community Rating System (CRS) is a part of the NFIP. The CRS reduces flood insurance premiums to reflect what a community does above and beyond the NFIP’s minimum standards for floodplain management. The objective of the CRS is to reward communities for what they are doing, as well as to provide an incentive for new flood protection activities. The reduction in flood insurance premium rates is provided according to a community’s CRS classification.

There are 10 CRS classification levels for communities. All NFIP communities start at Class 10 and begin to receive reduced premium rates at Class 9. Each time a community goes to a lower class, premiums for properties in the special flood hazard area are reduced by 5%. The maximum benefits under the program are at Class 1 with a 45% reduction. Only a handful of communities in Vermont are CRS communities.

To earn CRS credit involves such actions as preserving open space in the floodplain; enforcing higher standards for safer new development; maintaining drainage systems; and informing people about flood hazards, flood insurance, and how to reduce flood damage.

**4. Protect River Corridors and Floodplain Functions.** Development in river corridors can cause erosion and changes to the river channel. To further protect vulnerable land and avoid exacerbating downstream flooding, communities can adopt hazard area bylaws to protect river corridors and floodplain functions. Stowe has incorporated river corridor protection regulations in its development codes, and other Lamoille County communities are considering adoption of river corridor protection area overlay districts. If communities choose to allow limited development in river corridor areas, they could require protecting alternative river corridor/floodplain areas to balance the loss of area for channel adjustments caused by that development and thereby offset impacts on existing structures and public safety. However, this strategy might not reduce flooding risk as effectively as limiting development and redevelopment in these areas altogether.

**5. Adopt agricultural or open space zoning.** Agricultural or open space zoning is another technique available to communities that wish to protect land to allow flood water to spread and soak in the soil. This type of land use policy can limit or prohibit development in agricultural or other natural areas by limiting the number of residential units allowed on a parcel. Increasing the agricultural or open space zoning to require a minimum lot size of 20 acres or more might more effectively preserve agricultural and open space uses and manage flood water.

### **Vulnerable Settlements**

Many historic downtowns and village centers are located along rivers in vulnerable areas and in flood plains, which often contributes to their attractive character and to the town's or region's economy. These centers represent significant investments in infrastructure over generations, and many communities choose to repair and rebuild these areas after floods because of their economic, cultural, and social importance. If communities choose to rebuild in areas that are particularly susceptible to future flooding, they can take some steps to reduce the damage that might occur in future floods, although they cannot eliminate these risks entirely.

**1. Adopt conservation or cluster subdivision ordinances.** Some communities are adopting conservation or cluster subdivision ordinances that encourage or require new development to protect tracts of intact open space (including sensitive natural areas like river and stream corridors) while clustering development into a smaller section of the parcel. These types of ordinances might help conserve land that is important for retaining flood water.

**2. Encourage natural protection methods.** Conventional, engineered approaches to protect development in flood and erosion prone areas such as armoring riverbanks with rock riprap and channelizing rivers, while necessary in some cases, should be discouraged or at least combined with non-structural techniques, such as planting trees and vegetation along riverbanks. One of the challenges of conventional, structural engineered approaches to flood resilience is their cost. Armoring riverbanks and rebuilding and elevating structures can be very expensive. Engineered approaches can also cause future unintended flood damage upstream and down. Riprap tends to increase the speed of water flow and can cause erosion downstream in some areas while contributing to siltation in other areas. As streams and rivers come into a fluvial geomorphic equilibrium slope, the need for engineered barriers will be reduced and vegetated streambanks should provide adequate resistance to the lower stream power and rates of erosion.

**3. Upgrade regulations to protect vulnerable structures.** Many communities control flood plain development through special flood plain or flood hazard area zoning overlay districts with associated development standards. Many of these standards require the lowest floor of any structure in these districts to be elevated at least 1 foot

above the base flood elevation. Base flood elevation is the elevation to which flood water is expected to rise during a 100-year flood (a flood that has a 1% chance of being equaled or exceeded in any given year). Communities should consider increasing this requirement to a minimum of 2 or more feet above the base flood elevation to provide an extra margin of safety, although as noted above, this may not be sufficient in some places subject to fluvial erosion processes. Alternatively, towns could consider prohibiting development in the floodway or flood plain entirely to reduce risk further.

**4. Address nonconforming uses.** Many areas of Lamoille County were developed before implementation of the National Flood Insurance Program. As a result, some communities have development that does not comply with current flood damage prevention requirements. Often these homes and businesses fail to comply with zoning-related requirements such as setbacks, off-street parking, or design-related provisions. Because modifications to these older structures would trigger the requirement for full compliance with all development standards, which can be cost-prohibitive, these nonconformities continue unchanged through the years. To address these problems, some communities are implementing nonconforming use regulations that recognize partial compliance with development standards and incorporate incentives for property owners to redevelop and/or reconstruct nonconforming structures using more hazard-resilient techniques, such as building elevation or flood-proofing of heating, ventilation, and air conditioning (HVAC) equipment. Incentives for redeveloping nonconforming structures, when coupled with requirements for greater hazard resilience, can help development in flood-prone areas better withstand future floods. The home or business owner can increase the value of their property without incurring the expenditure of full code compliance, while the community benefits from a structure that is less likely to sustain serious damage during a future flood.

**5. Create new flood storage capacity through redevelopment.** When redevelopment opportunities arise in vulnerable areas next to rivers, communities can require developers to design projects to include additional flood storage capacity. New flood storage capacity could mean creating parks and other open spaces in flood-prone locations, replacing a vertical wall along a river bank with a more gradual slope to create more room in the river channel for rising water, creating a shallow depression in a lawn that can accommodate inundation, or designing buildings to enable the first floor or basement to flood (and then be readily repaired when the waters recede). Localities can encourage developers to create flood capacity in new development by providing density bonuses or reduced stormwater fees in exchange for creating flood capacity improvements on site and/or adding zoning overlays that indicate where new development must include additional flood capacity features.

**6. Develop a local flood model** – Given the age of many of the NFIP maps in the county, changes in the watersheds, and climate change considerations, communities may look to develop updated flood models to determine current and future risks. This type of model allows for better planning of current and future development needs while identifying opportunities for mitigation measures to reduce or eliminate flood risks. Also, an interactive, visual model is a very effective way to engage the local community. Jeffersonville incorporated watershed modeling into their current Hazard Mitigation Plan, and is taking recommended actions to reduce flood risk and improve flood resiliency.

**7. Help people connect with the river.** Opportunities to see and engage with the river could increase residents' consciousness of the river's presence and motivate them to engage in planning for future flooding and river protection. In vulnerable settlements, communities can consider creating parks, outdoor dining and vending, river-based recreation like fishing and kayaking, and other activities that can withstand flooding and bring people closer to the river during normal flows. Implementing these approaches can also provide important economic

development opportunities for communities. Wolcott's School Street Park and Wild Branch Park, Morrisville's Oxbow Park, and Stowe's Mayo Farm are some examples of communities' efforts to highlight rivers as scenic and recreational assets while preserving the resource of the surrounding floodplain.

**8. Relocate structures to less vulnerable areas.** As certain structures are flooded time and again, some communities and property owners might determine that it would be preferable to relocate them or rebuild them in safer areas. When the community decides to relocate structures through extensive and thorough community outreach, local governments can make the process easier for those who choose to relocate by creating a coordinated package of relocation services and resources for residents, including financial and logistical assistance with relocation. Through the relocation process, local governments can also move critical facilities such as town halls, fire and safety facilities, and drinking water facilities to less vulnerable locations, if possible. Some communities have created funding mechanisms, such as sales tax or stormwater utility fees, to buy properties that are susceptible to future floods. In addition to local funding, there might be opportunities to leverage federal assistance, such as FEMA's Pre-Disaster Mitigation Grant program, Hazard Mitigation Grant Program, or Flood Mitigation Assistance Program; and HUD's Community Development Block Grant program.

### **Safer Areas**

Communities seeking to enhance their resilience to future floods can identify areas within or near centers that are less vulnerable to flooding, where growth can occur more safely in the future. By encouraging development in these safer growth areas, communities can accommodate new growth while reducing flooding risk. After communities have identified *where* they can more safely grow in the future, they can then also shape *how* development is built in those locations by using the smart growth principles. Several approaches and policies can help communities' direct growth into safer locations.

**1. Identify locations suitable for development and redevelopment that are safer from flooding.** Communities that are interested in targeting growth in *safer* locations would need to ensure that their desired growth areas are also located in areas that can more safely accommodate growth. They can then identify these safer growth areas in the land use plan or comprehensive plan. To identify where growth can occur more safely in the future, communities will need information about where flooding has occurred in the past and, to the extent possible, projections for future flooding that take climate change into account. The Vermont Agency of Natural Resources [Flood Ready](#) website has mapping resources that can be used for this purpose. The identification of safer areas for development needs to allow for the protection of natural areas like wetlands and upland forested areas, as these areas provide valuable flood attenuation and storage capacity, wildlife habitat, recreational and scenic value, and resources for forestry and forest products. Therefore, suitable safer areas for development should ideally be located within or in close proximity to downtowns and village centers.

**2. Steer public policy and investments to support development in safer locations.** Once communities have identified locations that are safer for development, they can adopt and implement policies and make public investments that will encourage development in those safer locations. Localities can update their zoning and subdivision regulations to remove barriers to development in safer areas. Localities can also direct public investments in new infrastructure, facilities, and schools into safer locations, which might help attract additional

private investment in these areas. By prioritizing capital investments such as sewer, water, and streetscape improvements in safer areas, communities can provide incentives for development to locate there.

### **The Whole Watershed**

Communities can also implement policies to more effectively manage stormwater throughout the entire watershed. Adopting these policies can help slow stormwater, spread it out over a larger area, and allow it to infiltrate into the ground rather than running off into nearby streams and rivers.

**1. Explore watershed-wide stormwater management.** Flood damage mitigation measures, such as constructing levees or armoring banks, that are implemented in one jurisdiction in a watershed can have unintended consequences for other communities in that watershed by speeding the flow of floodwaters downstream. Recognizing this, some communities are joining together to take a regional, watershed-wide approach to stormwater management. To do this, communities can develop educational programs and stormwater master plans for their watersheds and use hydrologic data and watershed modeling to understand more clearly what actions to take to absorb and slow down stormwater across the watershed to reduce flooding risk.

The State of Vermont Department of Conservation recently completed a stormwater infrastructure mapping project for five Lamoille County towns. The primary goal of the project was to enhance the towns' capacities to develop stormwater management plans, while a secondary goal was to establish potential locations for Best Management Practice (BMP) stormwater retrofit sites. Final reports and data of the mapping project were provided to each municipality and are also available at:

[http://www.watershedmanagement.vt.gov/erp/htm/SW\\_IDDE\\_program.htm](http://www.watershedmanagement.vt.gov/erp/htm/SW_IDDE_program.htm).

Some communities create stormwater utilities to address stormwater management across a wider geographic area. A stormwater utility is an entity established to generate and administer a dedicated source of funding for stormwater pollution prevention activities. Generally, users pay a fee to the utility based on land use and their contribution of runoff to the stormwater system. Stormwater utilities can oversee stormwater management regulation and can help prioritize, coordinate, and finance critical pre-disaster mitigation efforts such as streambank restoration projects.

**2. Better manage stormwater from roads, driveways, and parking lots.** Roads, driveways, and parking lots made of impervious surfaces do not allow stormwater to infiltrate back into the ground and can increase stormwater runoff volumes, especially during heavy rains. In addition, the runoff collects the debris, oils, and pollutants from these paved surfaces and carries them into surface waters. Communities could consider implementing policies that can reduce the effect that roads, driveways, and parking lots have on exacerbating flooding and degrading water quality. They could encourage the use of pervious material in new driveways and parking lots, and in new roads where feasible. In addition to green infrastructure practices (see paragraph below) such as pervious pavement and roadside swales that allow stormwater to infiltrate into the ground, communities could also require that culverts, which are often too small to adequately drain stormwater from large storms, be upgraded to protect roads from damage during flooding.

Communities can require techniques to slow the flow of water by spreading it into vegetated areas and infiltrating it in areas with pervious soils. Communities can also provide information about stormwater management techniques that private landowners could use for their driveways. Such techniques not only reduce flooding risk but can also improve water quality. LCPC recently conducted a stormwater analysis for the Town of

Elmore. The analysis provided valuable information about the effect of impervious surfaces on stormwater runoff, and influenced the Town's decision not to increase the allowable lot coverage in the Lake Elmore Shoreland District.

**3. Adopt local stormwater management regulations that allow the use of green infrastructure techniques.**

Green infrastructure, also known as Low Impact Development (LID), is an approach that uses vegetation and soil to manage rainwater where it falls. It can help retain and/or reuse stormwater near where it is generated and can be less costly and less environmentally damaging than conventional stormwater treatment, particularly when it is designed into development from the start. Some examples of green infrastructure include directing runoff into rain gardens or bioswales, where it can be absorbed; using pervious concrete for parking lots and driveways; using rain barrels to collect and reuse rain water; and constructing green (vegetated) roofs that can absorb stormwater. In Vermont, state stormwater permits are required only for developments with more than 1 acre of impervious surface and sites that disturb more than 1 acre through the stormwater program. Most developments in Lamoille County's rural jurisdictions fall beneath this threshold. Communities that want to improve stormwater management can consider requiring new developments to prepare stormwater management plans that use best management practices including green infrastructure. More information on green infrastructure practices can be found at [http://www.vtwaterquality.org/stormwater/htm/sw\\_green\\_infrastructure.htm](http://www.vtwaterquality.org/stormwater/htm/sw_green_infrastructure.htm).

**4. Adopt tree protection measures.** Large trees can absorb significant amounts of rain and can reduce stormwater velocity. To protect trees, communities could start by preserving existing, undeveloped forested areas. Communities could also require that larger trees, such as those that are more than 8 inches in diameter, be preserved on a development site as much as possible. Or, if those trees must be removed, a community could require that they be replaced at a minimum one-to-one basis on site or mitigated through payment into a municipal tree protection fund.

**5. Adopt steep slope development regulations.** Development on steep slopes can cause erosion and can increase stormwater volumes. Some communities recognize that development on steep slopes can affect stormwater volume and erosion and are adopting standards that discourage or prohibit development on very steep slopes. Several communities require conditional use review for any development on slopes greater than 15%, and prohibit development on slopes greater than 25%.

**6. Adopt riparian and wetland buffer requirements.** Stream and wetland buffer standards require development setbacks from rivers and other water bodies. These buffers can allow stormwater to infiltrate into the soil, reducing flood flows downstream in more developed areas of the community and reducing erosion by stabilizing river banks. Buffers can also remove some pollutants that would otherwise run off into local rivers. Studies show that in more rural areas, a buffer of 100 feet can significantly reduce stormwater runoff and improve water quality.

## Section 5: Our Culture and Community

Public Safety, Culture and Community, and Public Facilities and Services



## Public Safety: Strategy

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Protecting public safety falls under the four phases of emergency management – Preparedness, Response, Recovery, and Mitigation. Preparedness is a continuous cycle of planning, training, and organizing activities to prepare for an emergency incident or natural hazard event. Response is action taken by first responders (fire, police, and emergency medical services) during an incident to save life and property. Recovery is what happens after a disaster strikes to resume basic operations and functions. Mitigation is action taken to reduce the loss of life and property from natural and/or human-caused disasters by avoiding or lessening the impact of a disaster. While the Response phase is a function of local responders, it takes regional collaboration to ensure communities are prepared for emergencies. Similarly, recovery often requires the generosity and assistance of neighboring communities. LCPC is active in all four phases.

The ability to provide adequate public safety services is a concern among municipalities throughout the region. Many of these services are provided by volunteers. Public safety is a local concern but regional cooperation among public safety service providers is critical. One example is a mutual aid system. However, in order to keep up with increased demands, volatile weather patterns, and requirements from the state and federal governments, emergency response providers, municipalities, and regional entities must work together in emergency planning and preparedness, response, recovery, and mitigation.

### Preparedness

- Perhaps the most important part of ensuring public safety is preparedness. This is the act of planning for emergency incidents. LCPC is most active in preparedness activities at a local and regional level.
- Preparedness activities include emergency operations planning, assisting communities with flood hazard regulations, mapping critical facilities and E-911 structures, and coordinating regional emergency response committees and activities.

### Response

Emergency response is primarily a function of local government and local emergency responders. Given the capacity of local response organizations throughout Lamoille County, regional collaboration and mutual aid are critical to respond to large-scale events. LCPC works with local responders and municipalities to identify response capabilities and conduct trainings and exercises at a regional level. (see Table 5-1)

### Recovery

- LCPC acts as a liaison between federal, state, regional, and local partners to coordinate recovery activities after a disaster occurs.

### Mitigation

- Mitigation is any sustained action that reduces or eliminates long-term risk to people and property. Lamoille County currently has a *Multi-Jurisdictional All-Hazards Mitigation Plan* with individual hazard mitigation plans for each town. These hazard mitigation plans recognize hazards and their associated risks while prioritizing mitigation actions, projects, and programs.
- The hazards most impacting Lamoille County are flood / flash flood, hazardous materials spills, winter storms, and shortages (power, food, water, fuel).

Table 5-1. Emergency response organizations in Lamoille County

Town	Fire	Police	Emergency Medical Services (EMS)
Belvidere	Johnson Fire Dept.	VT State Police	Northern Emergency Medical Service (NEMS)
Cambridge	Cambridge Fire Dept.	VT State Police	Cambridge Rescue
Eden	North Hyde Park / Eden Fire Dept.	VT State Police	NEMS Eden Fast Squad (no longer active)
Elmore	Elmore Fire Dept.	VT State Police	Elmore Fast Squad
Hyde Park	Hyde Park Fire Dept. North Hyde Park / Eden Fire Dept.	Lamoille County Sheriff	NEMS Hyde Park Fast Squad
Johnson	Johnson Fire Dept.	Lamoille County Sheriff	NEMS
Morristown	Morristown Fire Dept.	Morristown Police	Morristown EMS
Stowe	Stowe Fire Dept.	Stowe Police	Stowe EMS
Waterville	Johnson Fire Dept.	VT State Police	NEMS
Wolcott	Wolcott Fire Dept.	Lamoille County Sheriff	Hardwick Rescue

## POLICIES AND ACTION ITEMS

**Policy:** Reduce the loss of life and damage to property from all hazards.

### Action Items

- LCPC will continue to map critical facilities and vulnerable populations for use in local and regional emergency planning.
- Assist municipalities in adopting and updating all-hazard mitigation plans, emergency operations plans, flood hazard regulations, and other planning documents to strengthen emergency preparedness and community resiliency.
- Assist emergency responders with securing funding for preparedness equipment, such as advanced warning systems and USGS Stream Gages.
- Upgrades to local and regional public safety facilities and equipment are supported and encouraged.
- LCPC supports new residential and commercial developments that include development standards that incorporate disaster resistant designs, such as appropriate emergency response vehicle access, drainage systems, siting, proximity to existing water resources, firefighting infrastructure, and flood proofing measures.
- Critical local and regional emergency and governmental facilities should be built and located to be disaster resistant and able to continue to function during disasters.
- Work cooperatively with Emergency Management Directors and the Local Emergency Planning Committee to improve emergency planning.

**Policy:** Ensure an efficient, coordinated regional response network exists during emergencies.

### Action Items

- Assist LCPC staff, emergency responders, and municipal officials with proper training and equipment to respond to anticipated disasters.
- Provide support for Citizen Corps Programs that bring emergency responders and volunteers together.

- Continue to provide support and assistance to local and regional emergency response organizations, committees, and individuals for trainings, coordination, drills, and exercises.
- As demand for service continues to increase as town population increases, LCPC supports efforts by municipalities to provide emergency response services for all residents.
- Communities are encouraged to develop emergency response plans and provide education to households about emergency preparedness activities. Response plans should be shared with LCPC and with the State's Emergency Management Department.
- LCPC staff are becoming an integral part of the Incident Command Team at the State Emergency Operations Center. To this end, LCPC supports continuing efforts for staff to provide regional and statewide response capability.

**Policy:** *Dry hydrants have proven effective in firefighting in rural communities. To this end, LCPC supports installation and continued maintenance of dry hydrants.*

**Action Items**

- Increase the total number of dry hydrants available in rural areas of the county.
- Assist communities in developing rural water supply plans.
- Assist communities with efforts to access, repair, and upgrade dry hydrants through grant funding and capital planning.

**Policy:** *LCPC will provide staffing and assistance to municipalities, emergency responders, regional partners, and state agencies to assist with recovery efforts in the wake of regional or statewide emergencies.*

**Action Items**

- Encourage inter-agency communication between affected property owners, the State of Vermont, and the Federal Emergency Management Agency after a disaster.
- LCPC will assist property owners and municipalities with damage assessments and documentation in the event of a disaster.
- Encourage communities to develop documentation systems for recording damage to infrastructure and property for full realization of federal benefits resulting from a disaster.

**Policy:** *Lessen financial losses and property damage incurred by municipalities, businesses, and private citizens due to disasters.*

**Policy:** *Public safety services in Lamoille County should have the capacity to address the types and magnitudes of the region's predictable hazards as defined by the All-Hazard Mitigation Plan for Lamoille County and individual town and village all-hazard mitigation plans.*

**Action Items**

- Upon request, assist municipalities in revising bylaws to require a dry hydrant or fire pond at any new development more than one mile from nearest rural water source.
- Assist municipalities with increasing the amount of fire suppression capabilities rated for the ISO, Insurance Services Office.

- Upon request, assist municipalities in revising bylaws so that new developments meet emergency response codes, including but not limited to road upgrades, culs-de-sac, dead-ends, and long, narrow driveways.
- Support the implementation of local and regional mitigation activities, projects, and programs that reduce impact to life and property.
- Support regional and local coordination to identify natural and human-made hazards and risks and develop mitigation actions to address these hazards.
- LCPC will work with interested applicants to apply for funding for mitigation activities.
- Municipalities participating in the National Flood Insurance Program are encouraged to strengthen flood hazard regulations above NFIP minimum standards.

# Public Safety: Background and Inventory

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## **Preparedness**

Emergency preparedness is a broad category of emergency management. Preparedness includes emergency personnel acquiring suitable equipment and conducting training and exercises. Preparedness covers those actions that individuals, businesses and communities take in order to prepare themselves for the effects of a disaster before it happens. The more prepared we all are at all levels, the less loss of life and damage to property will be when a disaster occurs. Preparedness is also a responsibility of residents, business and government. Simple preparedness measures, like having disaster supplies on hand, installing smoke detectors, and knowing basic first aid will all help to lessen the impact of a disaster. Preparing emergency plans is also a preparedness activity.

Preparedness can also avoid personal financial disasters that would have rippled throughout the community. Not only can a disaster affect individual residences but can also ruin business and commercial operations. While businesses can do their part to support their communities and employees in their own preparedness efforts, businesses can and should take actions that will help them weather the strain of a disaster.

Governmental agencies and other quasi-public organizations that perform important governmental functions must also take care of themselves during an emergency, as well as perform their functions of assisting their constituents. This includes the standard emergency response agencies such as police, fire and medical services, but it also includes sewer and water, health inspectors, and elected officials. LCPC assists communities in developing and updating localized emergency operations plan to be used in advance of and during a disaster as well as coordinating and facilitating trainings and exercises. Training and exercising is vital to ensure emergency response is organized, coordinated, and efficient during an emergency. The adage “if you don’t use it, you lose it” is most true in emergency response, so continual trainings in new equipment, exercising your emergency operations plan, and operating a functioning Emergency Operations Center is crucial. Other preparedness activities include education and outreach related to fire prevention, promoting the National Flood Insurance Program, updating flood hazard regulations, and supporting regional organizations such as the Local Emergency Planning Committee.

## *Emergency Management Directors*

The role of the Local Emergency Management Director is of vital importance to the community. The Local Emergency Management Director is responsible to ensure that the community:

- Knows its vulnerabilities, hazards, and threats;
- Plans for any emergencies;
- Responds timely and effectively in any emergency; and
- Conducts recovery operations.

According to Vermont State Statute, if a Local Emergency Management Director is not appointed by the Selectboard or governing body of a community, the responsibility defaults to the Selectboard Chair or the Town Manager.

The Local Emergency Management Director is responsible for coordinating the various components of the emergency management system including fire, law enforcement, emergency medical services, public works, volunteer groups, and State resources. By incorporating the four phases of emergency management (mitigation, preparedness, response, and recovery) into municipal functions, the Local Emergency Management Director can effectively respond to all situations that might occur. There are several core functions a Local Emergency

Management Director must perform, including updating the local emergency operations plan. LCPC works closely with Emergency Management Directors in many areas of preparedness, response, recovery, and mitigation. Additionally, the Emergency Management Directors are the core membership for the Local Emergency Planning Committee.

#### *Local Emergency Planning Committee*

The Emergency Planning and Community Right-to-Know Act of 1986 imposed upon state and local governments planning and preparedness requirements for emergencies involving the release of hazardous materials. The role of the federal government in response to an emergency involving the release of hazardous materials is to support local and state emergency operations. As a result of the Community Right-to-Know Act, each State was required to establish a State Emergency Response Commission to designate and oversee emergency planning districts. The Local Emergency Planning Committees (LEPC) were developed out of this Commission. Additionally, any business, company, school, hospital, municipality, or other facility storing chemicals on-site are required to submit this information through a Tier II reporting form to the LEPC if the chemical quantity meet or exceeds a given threshold as identified by the Vermont Occupational Safety and Health Administration.

Vermont has 13 LEPCs. Lamoille County's LEPC #11 consists of representatives from businesses, local government, emergency responders, and citizen groups located in the County. Its mission is to provide emergency preparation, response and mitigation resources, and guidance to communities through education, coordination, and assistance. Members take an active role in all-hazard mitigation review, plan maintenance, preparedness, response and recovery planning, trainings, and exercises to assure public health and safety for Lamoille County residents. LCPC provides staff support for LEPC #11.

The LEPC is also the coordinating group for various federal Citizen Corps Programs, including the Community Emergency Response Team (also known as CERT) and the Medical Reserve Corps. CERT is a volunteer organization that brings together first responders, firefighters, law enforcement, EMS, emergency managers, and the volunteer community to involve all citizens in emergency preparedness, mitigation, response, crime prevention, and emergency medical training. CERT members are trained and are activated to assist with fires, vehicle accidents, severe storms, floods, and traffic control. Lamoille County's CERT is currently re-establishing its core membership and mission. The mission of the Medical Reserve Corps is to engage volunteers to strengthen public health, emergency response, and community resiliency. The Medical Reserve Corps is a newer program and falls under the reach of the Vermont Department of Health. The Medical Reserve Corps primarily utilizes trained health professionals. Other Citizen Corps Programs either active or being organized in Lamoille County include a Disaster Animal Response Team (DART), Radio Amateur Civil Emergency Services (RACES), FireCorps, Volunteers in Police Service (ViPS), and Neighborhood Watch.

#### *Emergency Planning*

As part of regional emergency planning efforts, the LCPC assists municipalities with planning for various hazards and coordinates with regional partners on emergency planning efforts. This means LCPC provides information to communities, such as E-911 structures mapping, or assists communities in identifying vulnerable populations, such as critical facilities mapping. Other times, LCPC provides technical assistance on localized emergency planning efforts. In 2011, LCPC worked with the towns of Hyde Park and Johnson to develop a Community Wildfire Protection Plan. The Community Wildfire Protection Plan for the Towns of Johnson/Hyde Park, Vermont addresses wildfire risk in areas where housing meets or intermingles with undeveloped wildland vegetation. The Plan was collaboratively developed by representatives from both towns and addresses threats to human life and property as a result of a wildland fire disturbance event. These towns are both identified as at-risk communities

due to their rising populations and vast forest cover. As funding becomes available, Wildfire Protection Plans for additional Lamoille County communities may be necessary.

LCPC also works with communities to develop and modify flood hazard regulations. Flood resiliency is, indeed, a major factor for all of Lamoille County. For more information on flooding, fluvial erosion, riverine management, and flood resiliency protective measures, please see section XX.

Finally, emergency planning involves a multi-disciplinary approach. Emergencies and weather hazards affect every aspect of life from the individual home to the road network to the ability of a municipality to provide services to residents. LCPC's emergency planning program intersects with other planning areas such as transportation, natural resources, Geographic Information Services (GIS), municipal planning, regional planning, and energy. Two specific planning activities are detailed below.

#### *Hazardous Materials Emergency Planning*

LCPC annually applies for and receives funding to conduct projects under the Hazardous Materials Emergency Planning program. The goal of this program is to strengthen preparedness for hazardous materials spills and releases. Hazardous materials have the ability to impact anyone, anywhere there is a road, pipeline, or fixed facility storing hazardous materials. Most accidents are small spills and leaks, but some result in injuries, property damage, environmental contamination, and other consequences. These materials are poisonous, corrosive, flammable, and radioactive, or pose other hazards. A petroleum spill is the most likely potential hazardous materials incident to affect Lamoille County. Preparedness is key to containing the consequences of a spill or release. Large volumes of hazardous materials are transported to and through the county daily. For this reason, LCPC assists with projects such as: Commodity Flow Studies, Extremely Hazardous Substances site visits, Green River Reservoir Dam breach exercises, and other studies, workshops, and exercises to prepare emergency responders and community officials for expedient response.

#### *Commodity Points of Distribution*

In the event of a major catastrophe, a Commodity Point of Distribution (CPOD) may need to be activated. A CPOD is an established point where the general public will obtain life sustaining emergency relief supplies, such as water and food, until such time as power is restored and traditional facilities, such as retail establishments, re-open. At a CPOD location, relief commodities are offloaded and distributed to victims of the disaster. The locations need to be large, open, and allow for a continuous flow of traffic. Three locations have been identified in Lamoille County: the Waterville Elementary School, People's Academy in Morrisville, and the Elmore State Park in Elmore. Plans need to be updated annually and submitted to the Division of Emergency Management and Homeland Security. It is often the work of the Local Emergency Planning Committee to organize these locations and ensure proper communication is received when mobilizing and demobilizing a CPOD. As Lamoille County's population continues to grow, more CPOD locations may need to be designated.

#### **Response**

Response operations are greatly enhanced by proper preparedness. Most emergencies of any scale will require towns to work together, and often to work with state or federal agencies. Practicing with all of these partners before an actual emergency is critical to smooth emergency operations. Response is the immediate effort by emergency response agencies and the general public during and after a disaster to save lives and property. Proper equipment, training, and coordination among responder agencies, and a well-educated and resilient general public, will make response activities more effective when needed. Response is inherently a local issue but regional, state, and federal resources are available upon request if needed.

### *Law Enforcement*

There are four types of entities that provide police coverage in the region: local constables, municipal police departments, the Lamoille County Sheriff's Department, and the Vermont State Police.

Local constables are elected in the municipality in which they serve. Constables in this region do not have any dedicated facilities or vehicles provided for their use. Each of the region's towns has a constable. Constables are limited in their police powers according to 24 VSA §1936a.

There are municipal police departments in Stowe and Morristown that provide law enforcement within the local jurisdiction. These services are funded by the municipality through appropriations from local tax revenues and are provided for by professionally trained law enforcement personnel.

The Lamoille County Sheriff's Department is located in Hyde Park and its services are available to all towns in Lamoille County. In addition, the Sheriff's Department provides more extensive coverage in the towns of Hyde Park, Johnson, and Wolcott with traffic enforcement in Elmore, based on individual contracts for police service. The Sheriff's Department provides back-up, as requested, to all public safety requests in the county. The Lamoille County Sheriff's Department (LCSD) also provides emergency dispatch service for phone exchanges located in the county (911 calls) and to some towns in Caledonia County.

The LCSD is located in facilities originally constructed in 1911-12. In 1989 and 1996, LCSD identified an existing need to expand their facilities, however, they did not have any specific plans for expansion or relocation.

The actual service area and the types of services covered by LCSD vary by town:

- For matters involving the civil process, LCSD serves the entire county.
- For the equivalent of full-time municipal police coverage, LCSD has contracts with Johnson, Hyde Park and Wolcott.
- For transport of municipally arrested prisoners, LCSD covers its contract towns as well as Morristown and Stowe (State Police provide their own transport).
- For emergency dispatch service (911 calls), they cover the entire county.
- For fire dispatch service, they cover Cambridge, Stowe, Morristown, Elmore, Johnson, Wolcott and Hyde Park Fire Departments.
- For rescue dispatch, they directly dispatch the Stowe and Morristown squads and the Eden and Cambridge Volunteer first response.

Other municipalities that do not have primary coverage by either its own municipal police department or by contract with the LCSD may be served by the Vermont State Police. The State Police provide routine patrol coverage in the towns of Belvidere, Cambridge, Eden, Elmore, and Waterville. They are also the primary responders to citizen complaints as requested by each town's constable and as requested by the Stowe and Morristown Police Departments. In Lamoille County, the Vermont State Police is part of Troop A, based out of the Williston Barracks with an outpost in Morrisville. Troop A is home to the Vermont State Police Traffic Safety Unit, the Vermont State Police / Marine Snowmobile Enforcement Unit and the "A" Troop Communications Center. Many of the State Police Special Teams vehicles are located at the Williston Barracks.

In 2007, the Vermont State Legislature created the Lamoille County Special Investigations Unit (LCSIU) as a multi-disciplinary task force to conduct criminal investigations and provide victim services in response to reports of

child sexual abuse, sexual offenses, domestic assault, serious child physical abuse, as well as abuse of vulnerable adults and the elderly. The LCSIU consists of two full-time detectives (one assigned to LCSD and one assigned to VSP), a prosecutor with the Lamoille County State's Attorney's Office, a victim advocate, and administrative staff. LCSIU headquarters are co-located with the State's Attorney's Office in Hyde Park Village. LCSIU is funded in part through annual municipal appropriations.

## **Rescue**

There are five rescue organizations providing emergency medical services in the region. Morristown Rescue Squad, a volunteer organization with one full-time staff person and one part-time staff person, provides service to Morristown and Elmore. Morristown Rescue Squad offers paramedic level care as well as specific trainings in other response and education areas, such as suicide prevention. Stowe Rescue, staffed by full and part-time employees, also provides paramedic level care as well as advanced care programs such as Advanced Life Support, airway management, medication administration, and defibrillation. The Hardwick Emergency Rescue Squad provides service to Elmore and Wolcott.

Northern Emergency Medical Services (NEMS), a division of Newport Ambulance Services, is a mutual aid organization providing service to Belvidere, Eden, Hyde Park, Johnson, and Waterville and is centrally located in Johnson. NEMS includes both paid staff and volunteers. NEMS offers transfer service to Copley Hospital.

Cambridge Rescue, located in Jeffersonville, has transformed from a "First Response Squad" to a full transport service ambulance squad, operating at the advanced life support level. Their response area includes the entire Town of Cambridge and one-third of the Town of Fletcher. They also assist with mutual aid in surrounding areas upon request. Cambridge Rescue has the capability of transporting sick and injured patients from the Town of Cambridge to one of the local hospitals. They also provide advanced care including intravenous therapy and semi-automatic defibrillation. Cambridge Rescue has discussed the possibility of a Community Paramedic Program (CPP). CPP is a voluntary program that expands the role of Emergency Medical Services professionals in underserved populations by allowing EMS workers to provide health services where access to physicians, clinics, and/or hospitals is difficult. CPP partners with primary care physicians to oversee the program. For older adults, CPP offers an alternative, affordable means of providing reliable home care based in the community.

Most rescue squads operate as a volunteer service and are funded through annual town tax support or fundraising. A nominal fee is often charged for transport services.

First Response Squads are supported with heavy rescue equipment by the Hyde Park, Stowe, Morristown and Cambridge Fire Departments. Additionally, Stowe's Hazardous Terrain Team has evolved into Stowe Mountain Rescue, a branch of the Rescue Squad. Stowe Mountain Rescue has led the state in back-country rescue operations.

The LCSD has a state-of-the art Communications Center and receives 911 calls in Lamoille County. LCSD also dispatches and provides 911 service for Hardwick, Greensboro, and Barre.

## *Fire*

Fire response is a truly regional effort. There are eight fire departments (including both municipal departments and private non-profit departments) providing primary service in Lamoille County, with Johnson Fire Department covering Johnson, Belvidere, and Waterville and the North Hyde Park / Eden Fire Department serving Eden and North Hyde Park. All the departments provide first response, upon notification, to fires in their service area. Most

departments provide fire prevention and education services, maintenance of equipment and structures, and member training. They also provide other emergency services such as search and rescue and help in times of flooding. The departments also provide first-response rescue service, equipment and vehicles in support of the medical response services of the region's rescue squads. Additionally, Elmore, Johnson, and Stowe Fire Departments also have water rescue teams and equipment.

Lamoille County fire departments participate in a regional mutual aid agreement through the Lamoille County Mutual Aid Association. The member departments can be called upon to render help to, or may request help from, the other departments in the Association. Additionally, Cambridge Fire Department, through its mutual aid agreement, provides assistance to Fletcher as needed and Wolcott and Elmore share a fire response agreement. Stowe and Morrystown also have a separate mutual aid agreement for emergency response and Stowe and Waterbury also have a mutual aid agreement. Wolcott is a member of the Capital Mutual Aid association to the east.

Calls in Lamoille County are serviced by the 911 Communications Center at the Lamoille County Sheriff's Department. Enhanced 911 with locatable addressing is available for all commercial and residential properties.

Towns with municipal water system are able to operate pressurized fire hydrants. In areas without pressurized hydrants, firefighters rely on tanker engines or "dry hydrants" located throughout towns. A dry hydrant is essentially a 4.5 to 6 inch diameter threaded pipe capable of drawing water from a nearby pond or stream using a pumper engine. The installation of these hydrants improves overall fire safety and provides an added benefit to property owners in the form of lower home insurance premiums. Dry hydrants are important in areas where access to a stable water source is limited.

## **Recovery**

Recovery is the more long-term process of putting life back to normal, and includes many state and federal agencies, especially the Federal Emergency Management Agency (FEMA) in large disasters. As events like Hurricane Katrina and Tropical Storm Irene showed, recovery can take a long time and is hindered if a disaster is severe or widespread. Recovery also involves much less state and federal assistance than is commonly thought, so the best strategy is to avoid disaster-prone behavior in the first place.

There are a wide variety of programs and organizations to help people, businesses and governments recover from disasters. It is important to understand that none of these programs is intended to return everything to its pre-disaster state, but they can help the public and private sectors to not be overwhelmed by the effects of a disaster. Recovery will be least painful where mitigation and preparedness steps have already reduced the extent of damage and fast response has limited the toll on lives and property. Recovery efforts will be helped by having well-practiced regional coordination in place prior to the disaster so that towns can help each other and so that the local/state/federal administrative issues are handled smoothly. Thorough and prompt documentation of losses, good media outreach communicating the assistance that is available, and the interim provision of basic services will all enable communities to recover as fast and fully as possible.

LCPC works with communities after a disaster occurs to assist with the recovery phase by connecting other agencies with homeowners, business owners, and municipalities for funding assistance or basic services. LCPC also acts as a liaison between FEMA, DEMHS, and municipalities for FEMA's Public Assistance and Individual

Assistance programs. During the recovery phase, which can span months or years, there are opportunities to implement mitigation activities, projects, and programs.

## **Mitigation**

Hazard mitigation means any sustained action that reduces or eliminates long-term risk to people and property from natural or human-caused hazards and their effects. Mitigation planning begins with an assessment of likely hazards, and then targets activities to reduce the effects of these hazards. Given that the largest threat in Vermont is flood related, good mitigation measures include proper road and drainage construction, as well as limiting development in flood prone areas.

### *All-Hazards Mitigation Planning*

The impact of expected yet unpredictable natural and human caused events can be reduced through community mitigation planning. Hazard mitigation is any sustained action that permanently reduces or eliminates long-term risk to people and property from natural and human-caused hazards and their effects. Based on the results of previous FEMA efforts in the early 2000s, FEMA and Vermont agencies have come to recognize that it is less expensive to prevent disasters than to repeatedly repair damage after a disaster has struck. Floods, winter storms, high winds, severe storms, and hazardous material spills are some of the hazards experienced by Vermont and communities of Lamoille County. Hazard mitigation planning identifies specific hazards that are common to a jurisdiction and establishes a framework for the reduction of risks associated with those hazards.

An all-hazard mitigation plan conducts a hazard identification and risk assessment, provides an overview of the jurisdiction, reviews recent disaster history, and identifies mitigation strategies, projects, and programs. Hazard mitigation strategies and measures **avoid** the hazard by stopping or limiting new exposures in known hazard areas, **alter** the hazard by eliminating or reducing the frequency of occurrence, **avert** the hazard by redirecting the impact by means of a structure or land treatment, and **adapt** to the hazard by modifying structures or standards.

Currently, the *All-Hazards Mitigation Plan for Lamoille County*, adopted in 2012, is comprised of a regional hazard mitigation plan with ten annexes, one for each town. The *Plan* is used to assist local governments and LCPC in identifying hazards facing the county and individual communities. It also identifies and outlines strategies to begin reducing risks from those identified hazards. When that plan expires in 2017, many municipalities in Lamoille County will be under a single-jurisdiction all-hazards mitigation plan specific to the town or village. The *All-Hazards Mitigation Plan for Lamoille County* can be found on our website, [www.lcpcvt.org](http://www.lcpcvt.org).

As the State of Vermont strives to achieve a more disaster resilient state following devastation from the spring 2011 flooding and Tropical Storm Irene in August 2011, the importance of hazard mitigation planning is underscored through programs and financial incentives to encourage mitigation planning at the local level. For example, changes to the State's Emergency Relief Assistance Fund (ERAF) in 2014 provide a greater reimbursement from the State to the municipality if a municipality has a FEMA approved hazard mitigation plan. LCPC works closely with municipalities to develop and update hazard mitigation plans.

### *Hazards*

Lamoille County is vulnerable to a variety of hazards. They range from natural to technological to civil/ political disorder. The Lamoille County hazard Inventory and Risk Assessment was developed by LCPC in consultation with regional and local emergency management volunteers and professionals. All hazards that could affect Lamoille County on a county-wide basis were considered. The *All-Hazards Mitigation Plan for Lamoille County* identified

the following hazards in Table 5-1. Other potential threats are not included in the analysis as they were considered to occur infrequently and/or not a significant enough threat to the County. The vulnerability of each community to the hazards identified throughout Lamoille County and others unique to that jurisdiction including any repetitive loss properties are identified in separate, individual community plans.

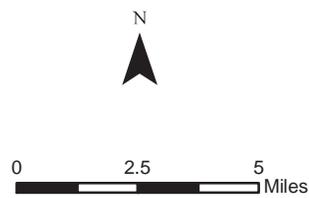
Table 5-1. Lamoille County Hazard Inventory and Risk Assessment

Possible Hazard	Frequency	Severity	Risk	Most vulnerable
Flood*	Frequent	Catastrophic	High	Roads, culverts, bridges, structures, public facilities
Flash Flood*	Frequent	Serious	High	Roads, structures, water source contamination, culverts, bridges, public facilities
Power Shortage Failure*	Frequent	Extensive	High	Special needs populations, critical facilities
Winter /Ice Storm*	Frequent	Extensive	High	Loss of access, loss of power, property damage
Hazardous Materials Release	Unusual	Extensive	High	Structures, environment, roads
Structure Fire	Likely	Serious	Moderate	High population centers, elderly housing, structures
Major Hailstorm	Unlikely	Minor	Low	Structures, property damage
Highway/Railroad Accidents	Likely	Serious	Moderate	3 major intersections identified with a history of accidents including hazardous materials
High Wind	Likely	Serious	Moderate	Trees down, loss of power, limited road access, structures
Drought	Unlikely	Serious	Moderate	Private well failures, wildfires
Hurricane	Unlikely	Serious	Moderate	High winds, floods, power failure
Water Supply Contamination	Unlikely	Serious	Moderate	Wellhead protection areas, structures, businesses public facilities
Tornado	Unusual	Serious	Moderate	Structures, power lines, public facilities
Wildfire/Forest Fire	Unlikely	Extensive	Moderate	Structures, public facilities, power infrastructure
Aircrash	Unlikely	Minor	Low	
Earthquake	Unlikely	Serious	Low	See VT Geological Survey HAZUS report (9/03 Tab)
Dam Failures	Likely	Serious	Low	Roads, structures
School safety issues	Unlikely	Minor	Low	Hazmat incidents, children
Landslide/Erosion	Unusual	Minor	Low	Roads, structures
Chemical and/or Biological Incident	Unlikely	Minor	Low	General population, environment
Radiological Incident	Rare	Serious	Low	UPS trucks: largest carrier of radiological materials general population
Terrorism	Rare	Minor	Low	General population

\*Hazards marked with an \* indicate consistently significant hazards in Lamoille County

# EMS and Rescue Services

## Lamoille County



-  Ambulance Station
-  Rescue Service

- EMS Service Areas**
-  CAMBRIDGE RESCUE
  -  HARDWICK RESCUE
  -  MORRISTOWN AMB
  -  NEMS
  -  STOWE RESCUE

**Data Sources:**

Political Boundaries: VCGI, 1991.  
 Roads: 1:5000 E-911 Road Data, 2014.  
 Emergency Service Areas: E911 Data, 2014.  
 Emergency Service Providers: E911 Data, 2014.

Created 7/27/15 by LCPC. Map is for planning purposes only, not for regulatory interpretation.

# Fire Protection Services

## Lamoille County



Fire Station

### Fire Service Area

- CAMBRIDGE FD
- ELMORE FD
- HYDE PARK FD
- JOHNSON FD
- MORRISTOWN FD
- NORTH HYDE PARK/EDEN FD
- STOWE FD
- WOLCOTT FD

### Data Sources:

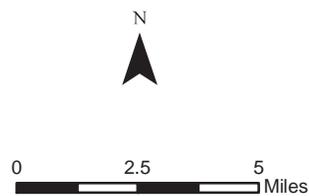
Political Boundaries: VCGI, 1991.  
 Roads: 1:5000 E-911 Road Data, 2014.  
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 Emergency Service Providers: E911 Data, 2014.

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# Law Enforcement Facilities

## Lamoille County



Police Station

### Police Service Area

- LAMOILLE COUNTY SHERIFF
- MORRISTOWN PD
- STOWE PD
- VERMONT STATE POLICE

### Data Sources:

Political Boundaries: VCGI, 1991.  
 Roads: 1:5000 E-911 Road Data, 2014.  
 Emergency Service Areas: E911 Data, 2014.  
 Emergency Service Providers: E911 Data, 2014.

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## Culture and Community: Strategy

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The human connection is what makes a municipality a community: the services, activities, and resources that are accessible to all. As communities develop over time, these resources may change, become threatened, or provide essential services. Human services in this section include health services and health care, childcare, access to affordable food, and cultural facilities such as museums and galleries. A map of resources as discussed throughout this chapter is found at the end. The following policies must be considered to maintain or expand human services for a vibrant, thriving region, with the primary strategies:

***All children deserve the opportunity to grow and develop in a safe, respected environment.*** Children are an integral part of the development of Lamoille County. Ensuring adequate support for children and families is important for LCPC.

***Ensure health and wellness needs, services, and facilities are available, affordable, and sufficient for Lamoille County residents and visitors.*** A healthy and educated workforce is vital for future growth and development of the region. Ensuring access to and support for wellness needs for the region's diverse populations will require inter-disciplinary partnership.

### POLICIES & ACTION ITEMS

***Policy:*** Strategies for maintaining our quality of life and creating economically vibrant and socially connected communities are the same strategies needed for creating healthy communities: pedestrian-friendly environments, access to parks and recreation, substance-free public spaces, green space, and access to healthy foods.

#### Action Items:

- Encourage more accessibility by social service providers and municipalities to parents and guardians, particularly in understanding the availability of services and State assistance.
- Continue to participate in regional discussions and initiatives aimed at encouraging implementation of the Regional Plan and municipal plans, and by providing demographic information as needed.
- Work with municipalities and regional partners to identify ways of incorporating health and wellness into youth daily activities, such as providing safe walking routes to schools or expanding recreational opportunities.
- Encourage communities to utilize healthy community design principles, such as walkable and bikable communities, access to healthy food, access to parks and recreation, and mixed-use development.
- Support developing “healthy indicators” for Lamoille County towns and villages.
- Support substance free facilities, events, and spaces throughout the region.
- As the region's elderly population grows, ensure “Choices for Care” are available to assist people with everyday activities at home, in residential care, or in nursing facilities.
- Support services, facilities, and opportunities for the aging population to remain active members of the community.
- Collaborate with regional and local partners to ensure a variety of healthy activities and health care services are available throughout the region, with an emphasis on substance misuse prevention and

treatment.

**Policy:** *LCPC supports the availability of high-quality, affordable childcare providers and facilities throughout Lamoille County to meet the needs of families and employers and provide an enriching environment for the Region's children.*

**Action Items:**

- Work with municipalities to address identified needs for child care facilities or services.
- Conduct a needs assessment along with an evaluation of suitability and availability of space in public buildings to be used as child care facilities.
- Assist employers and child care facility operators with access to financing child care facilities.
- Support initiatives to develop child care facilities where a need has been proven.
- Offer free child care at LCPC sponsored events, which may attract wider participation by parents and guardians. Encourage municipalities and other partners to do the same at their meetings and events.

**Policy:** *LCPC supports cultivating an environment with a well-trained workforce that meets the needs of employers and employees for the present and future.*

**Action Items**

- Encourage local economic assessments in an effort to determine how tourism and development can be better integrated as part of comprehensive economic strategies for residents and visitors in order to build awareness of and connections with existing programs that support these efforts.
- Work with strategic partners to ensure a range of services such as child and adult daycare and continuing education are available to support a productive, employable workforce.
- Collaborate with community partners, regional workforce organizations, educational facilities, local employers, and the business community to evaluate workforce development needs, strategies, and trends.

**Policy:** *Increase access to, availability of, and affordability of locally grown, healthy foods to residents of all income levels.*

**Policy:** *Regardless of age, ability of income, ensure all Lamoille County residents and visitors will have access to healthy affordable options that make the healthy choice the easy choice.*

**Action Items:**

- Encourage private and community gardening through volunteer organizations, Planned Unit Developments, and other regulatory and non-regulatory means.
- Assist farmers' markets with pursuing grant opportunities to participate in the EBT / Debit program.
- Assist municipalities with bylaw amendments that encourage, rather than prohibit, gardening opportunities.

- Support infrastructure and provide assistance to farmers’ markets, healthy retailer initiatives, food co-operatives, and farm-to-school or farm-to-institution programs.
- Support food shelves, foodbanks, and organizations and facilities that offer free or reduced costs of food to residents in need.

**Policy:** *Cultural resources and facilities continue to be preserved, strengthened, and supported.*

**Action Items:**

- Continue to support and assist local and regional cultural facilities to exist and expand as necessary.
- Work with regional and local partners to identify types of and new locations for cultural facilities.
- Assist with grant opportunities to preserve, restore, and expand libraries, museums, and other cultural facilities.
- Assist libraries, museums, and historical societies with opportunities and resources to protect and preserve collections from theft, deterioration, damage, and “wear and tear”.
- Libraries are critical in providing access to knowledge and information to the general public. To that end, LCPC supports efforts made by libraries to increase access to modern technology and equipment to be incorporated into existing or new programs.
- Upon request, assist municipalities with identifying appropriate locations to support new cultural facilities and expanded amenities, such as parking, for existing facilities, while maintaining historical character of buildings.

**Policy:** *Efforts to grow the region’s creative and arts-based economy are supported.*

**Action Items:**

- Develop measures to track and account for the impact of creative arts-based businesses and entrepreneurs in Lamoille County.
- As requested, assist municipalities with regulatory updates and planning to accommodate creative and arts-based businesses.
- Assist municipalities with improving cellular and broadband coverage to encourage creative arts-based businesses to locate in Lamoille County.

## Culture and Community: Background and Inventory

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### **Health and Wellness Facilities & Services**

Health and wellness, as a singular concept, is defined as the state of optimal well-being, not simply the absence of illness, but improved quality of life resulting from enhanced physical, mental, and spiritual health. As Lamoille County's population continues to grow and change, with that comes factors that affect the quality of life residents have come to expect. It is important for residents to be able to access livable wage jobs, education and recreational resources, and health care options as a means to increase wellness.

#### *Health Providers*

The primary healthcare providers servicing Lamoille County and the surrounding region are Copley Hospital and Community Health Services of Lamoille County (CHSLV), both headquartered in Morrisville. Copley Hospital is a 25-bed critical access facility that serves as an emergency care center, while providing in-patient and out-patient services, a family oriented birthing center, and physical therapy and rehabilitation services. Copley functions as part of the larger Vermont health care system, with the Medical Center Hospital of Vermont in Burlington acting as the major tertiary referral hospital.

Copley also sponsors a Wellness Center for the community. The Wellness Center focuses on proactive prevention versus reactive treatment, offering flu vaccines, birthing classes, diabetes education, and dietitians, among others. Copley Hospital also operates Mansfield Orthopedics, the Health Center Building, Copley Terrace, and Copley Woodlands (housing for elderly populations).

CHSLV, a federally qualified health center, also offers quality medical, dental, and behavioral health services to residents of Lamoille County, including the uninsured and under-insured. Their primary and specialty care practices include Morrisville Family Health Care, Stowe Family Practice, the Women's Center, the Neurology Clinic, the Behavioral Health & Wellness Center, and the Community Dental Clinic. Other local health service agencies include Lamoille Valley Community Connections, the Manor Nursing Home, the Lamoille Family Center, Johnson Health Clinic, Diabetes Center of Lamoille County, Lamoille Home Health & Hospice, and the Vermont Department of Health (Morrisville District Office). For more information on health and human service providers within the community, residents are encouraged to dial 2-1-1 from their phones, or visit [www.vermont211.org](http://www.vermont211.org).

Local health and wellness services are available through the Cambridge Regional Health Center and many private practices and specialists in the region.

The Hardwick Area Health Center is a regional medical center which serves Wolcott and communities in Caledonia County. Staff at the Center include family practitioners, internists, and nurse practitioners. The Center provides an array of medical services, with the exception obstetrics.

For more advanced medical care, the following hospitals are also visited by Lamoille County: Fletcher Allen Health Care (Burlington, VT), Central Vermont Medical Center (Berlin, VT), Dartmouth-Hitchcock Medical Center (Lebanon, NH), North Country Hospital (Newport, VT), Northeastern Vermont Regional Hospital (St. Johnsbury, VT), Northwestern Medical Center (St. Albans, VT).

Private practitioners can be found in many communities for medical, dental, and eye care, as well as mental health counselors and physical therapists. Many communities have identified additional needs for better access to health care services, such as federally qualified health centers or pharmacies in their communities.

### *Vermont 2-1-1*

Vermont 2-1-1 is a simple three digit telephone number to dial for information about health and human service organizations in one's community. By dialing 2-1-1, Vermonters receive free access to community resources through information and referral. This access includes personal assistance by telephone or is online at [www.vermont211.org](http://www.vermont211.org) through a searchable database of services.

### *Community Wellness and Social Services*

A number of regional organizations are active throughout the county. Many municipalities choose to appropriate funding towards these organizations' continued involvement. Many of these services are critical to families in order to meet day-to-day needs. Some are social organizations that provide enrichment opportunities to a diverse audience.

### *Youth Wellness*

The availability of safe, quality child-raising is vital to Lamoille County's economy, wellness initiatives, educational development, workforce, and future. As the next generation, it is important that children receive adequate opportunities to develop, learn, and thrive. It is projected that Lamoille County's population of 10 – 14 year olds could increase as much as 16% by 2020. The availability of services and assistance to parents, grandparents, and guardians is critical. The Agency of Health Service's Department for Children and Families provides a number of opportunities and services for guardians, including pre-natal education on parenting. While this section focuses on the availability of child care, it is important to understand all that goes into nurturing child development, from birth through high school and beyond.

### **Child Care**

Quality child care makes good economic sense in preparing young children for success later in life. Quality child care benefits families by preparing children for schooling and social interaction while enabling parents to work and provide income. It benefits employers by expanding the workforce and creating more reliable, productive employees. Furthermore, child care facilities are commercial operations and their existence expands local and regional economies.

Despite the economic and social good created by child care services, Vermont appears to have a shortage of affordable, quality providers. The Agency of Human Services estimates that only 50 – 60% of capacity of regulated facilities meets the State's need.

### *Child Care Programs*

There are resources available to assist parents and guardians in finding available child care. The Department for Children and Families, Child Development Division oversees the child care industry and allows registered home care providers to serve 10 children: six children under the age of six and four children of school age during the school year. Legally Exempt Providers are those adults who are caring for the children of no more than two families in addition to their own (this does not mean per day, it means in total) on a regular or continuous basis for less than 24 hours per day. By law, if someone is providing regular or continuous care for children of more than two families, they are required to be a Registered Child Care Provider.

Building Bright Futures, a program of the Vermont Department of Children and Families, operates an online childcare directory (see [www.brightfutures.dcf.state.vt.us](http://www.brightfutures.dcf.state.vt.us)).

The STep Ahead Recognition System (STARS) is Vermont's quality recognition system for child care, preschool, and afterschool programs. Programs that participate in STARS are stepping ahead – going above and beyond state

regulations to provide professional services that meet the needs of children and families. Parents and guardians can look to STARS as one indicator of quality when choosing child care. There are 34 Lamoille County child care facilities rated on the online STARS database.

Lamoille Family Center (LFC) also offers a variety of child care programs and services including the Birth to Three Project, resource development, care referral, financial assistance, the LFC Child Care Center, playgroups, and the Child and Adult Food Care Program. Programs may provide mentors for families or specialists that work with professional child care providers. Other LFC opportunities include literacy and child care visits as well as trainings on childhood development, positive learning environments, active listening, nutrition, and Vermont Early Learning Standards.

*Availability*

Given that many residents commute outside their towns for employment, residents may also utilize child care resources in neighboring communities. As Lamoille County continues to grow, additional home and center-based child care facilities may be needed. In particular, there is additional need for off-hour child care for working parents. There is an unknown number of unregistered at-home child care facilities.

Table 5-2 Child Care Providers by Town

	Number of registered providers – home based	Number of registered providers – facility based
Belvidere		1
Cambridge	6	4
Eden	4	2
Elmore		
Hyde Park	8	2
Johnson	6	3
Morristown	10	10
Stowe	4	6
Waterville	1	
Wolcott	1	1

Source: Bright Futures Child Care Information System, <http://www.brightfutures.dcf.state.vt.us/>, Retrieved 4/3/14

*Workforce Development*

Essentially, workforce development means providing opportunities for education and training for high-quality jobs for everyone. The Vermont Workforce Development Council, a statewide initiative, aims to provide the following to all Vermonters: a well-rounded education, innovation and creativity with a passion for lifelong learning, and to have the personal and social skills to succeed in collaborative workplaces. Competition for jobs occurs at the local, regional, state, and national levels.

Vermont is a state that is susceptible to the “brain drain”: young adults are educated in Vermont but leave the state for higher salaries and more challenging employment opportunities. Retirees then move back to Vermont to enjoy the quieter life. This is noticeable in Vermont’s changing population, where the population of older citizens is increasing but overall population growth is declining.

Organizations such as the Lamoille Workforce Investment Board, Lamoille Chamber of Commerce, and GMTCC are focused on workforce development and investment throughout the county. Their current focus is on education at all age levels. For example, through encouragement of the Workforce Investment Board, GMTCC students are not only graded on academic performance but also on their life skills, such as how they perform in mock interviews, courses in finances, how they dress, and their demeanor. These grades stay on their permanent transcripts and have been requested by prospective employers. In this way, students learn both the “hard” and “soft” skills.

Workforce development is not the responsibility of one organization. Community collaboration can identify the needs and strategies to develop new and improve upon workforce development strategies already in place, while encouraging adaptation to changing economic trends. The needs of employers and employees must be considered. Including the expertise of retirees in transferring skill development to the next generation is an unexplored avenue in Lamoille County.

Regional discussions have identified the following workforce opportunities:

- There is a need for adequately trained workers currently residing in the Region or willing to move to Lamoille County
- Improve Lamoille County workforce basic skills knowledge, such as computer proficiency
- More competitive salaries in Lamoille County to compete with neighboring regions
- Inter-regional communication regarding available training and education opportunities, for example connecting local resorts to the hospitality training program at Johnson State College or expanding hospitality training opportunities

### **Volunteer Opportunities**

Volunteers play integral roles in communities at all times, but particularly when resources are strained. Volunteers take part in schools, on local boards, for municipal committees, in the arts, through sports, organizing local events, or for other community or social causes. Volunteering is a way to connect retirees and seniors to the community and to youth. RSVP, once an acronym for “Retired and Senior Volunteer Program”, maintains a list of prospective volunteers and matches them with available volunteering activities. RSVP volunteers can be found in elementary schools, hospitals, nursing homes, chambers of commerce, libraries and bookmobiles, meal sites, adult education, transportation programs, county law enforcement and court systems. RSVP maintains an office in Morrisville with volunteering opportunities offered throughout Lamoille County and greater northeastern Vermont.

The same way that connecting retirees to youth can foster dialogue between the two sometimes conflicting populations, connecting youth to the broader community fosters greater inclusion. Oftentimes young people feel disenfranchised from the world. Providing youth with responsibilities for their community, school, church, or hobbies helps them develop into adults connected to their communities.

### **Food Access**

#### *Food Security*

The ability for people to access affordable food is referred to as “food access”. Food access is influenced by travel time to shopping, availability of healthy food, product prices, and the relationship between food shopping, spending patterns, diet, and health. “Food security” is often tied to access. A community is food insecure when its residents do not have access to enough nutritious, quality, affordable food to lead an active, healthy life. It is

important to consider food security and food access in order to increase the self-reliance of communities. According to the 2012 American Community Survey, 10.3% of Lamoille County households used the Supplemental Nutrition Assistance Program (SNAP, formerly known as “food stamps”), and 12.5% of people live under the poverty threshold. Given those statistics, there is a demonstrated need for a coordinated effort to increase food security throughout Lamoille County.

There is a range of policies and programs dedicated to addressing food security, which includes:

- Food availability and affordability
- Direct food marketing
- Diet-related health problems
- Participation in and access to Federal nutrition assistance programs
- Ecologically sustainable agricultural production
- Economic viability of rural communities
- Economic opportunity and job security
- Community development

Some communities have large supermarkets and grocery stores. For other communities, getting to major supermarkets can be a 20 – 40 minute drive. Small, local markets and grocery stores supply much of the food stock for rural residents. While residents support and value existing local markets, there may be a need and demand within the communities for a larger selection of food products.

Many of the County’s farms benefit from open fields within the floodplain, which contain some of the best and most fertile agricultural lands. Some farms have a retail store or farmstand on-site. Some towns and villages have farmers’ markets held weekly throughout the summer and fall. Farmers’ markets bring together local food producers and artisans in a central location. Markets often feature a diversity of food products including conventional, organic, and chemical-free produce, bread, meats, eggs, and cheese. Some farmers’ markets accept SNAP benefits through the Electronic Benefits Transfer (EBT) program. While this can be a major investment for a small farmers’ market, it is worthwhile to increase access to the markets’ offerings, especially given the high percentage of residents receiving SNAP benefits in some communities. Markets provide access to fresh food, provide a source of income for farmers and producers, and bring communities together. All of this contributes to the food security and health and wellbeing of Lamoille County towns and villages.

#### *Food affordability*

Integral to food security is food affordability. While there is no measure for how much a household should be spending on food like there is for housing, food affordability calculations are often based on far a person has to go for food, size of the nearest grocery store(s), and household income. The USDA offers guides for spending plans based on family size. The range for a family of four is \$127 a week up to \$289 a week.

Farmers’ markets and local retailers offer a selection of food, but some items are not necessarily affordable for all income types. There are a number of public and private programs for those who cannot afford food. Local food shelves are one of those programs. Food shelves offer limited hours weekly for eligible individuals to pick up food. They are often volunteer run. Some food shelves offer clothing for residents in need. Because they are volunteer run and often rely on donations, food shelves face tenuous arrangements. Given the small size of communities and social stigma attached to food shelf patrons, many residents will drive to neighboring communities to utilize a food shelf.

Many local churches and social groups offer free lunches to residents. Not only do lunches provide an option for residents in need, they also provide a social gathering space for the community and are open to all. There are often no eligibility requirements to enjoy free lunches.

The Vermont food stamps program is called 3SquaresVT. This program, for those who are eligible, works with participants to increase their food budgets and ensure “three square meals” are available for every household participating. Changes to the program in 2013 now require a community service component to receiving the benefits. The Commodity Supplemental Food Program provides staple items and nutrition assistance to qualifying individuals and households.

The Vermont Foodbank also sponsors four fresh food initiatives. The “gleaning program” harvests excess or unmarketable produce from farms and redistributes it throughout the state. “Pick for your Neighbor” is a partnership with tree fruit growers that allows citizens and companies to visit participating orchards to pick and purchase extra apples for donation to the Foodbank. The Foodbank also operates its own farm in Warren to grow produce for local food shelves. Lastly, the Foodbank organizes the Backpack Program for school-aged youth. During the school year, bags of kid-friendly nonperishable vitamin fortified food from all five food groups are packed and distributed to participating schools.

The Vermont Agency of Education administers two meal programs for school children during the summer. The Seamless Summer Option has a free meal service for participating school food providers. The Summer Food Service Program sponsors serve public or private non-profit schools, local, municipal, county, tribal or state government, private non-profits, public or private non-profit camps, and private or non-profit universities or colleges. The Agency of Education offers more information about eligibility and operation of these programs.

#### *Healthy Retailers Practices*

Ensuring farmers and local food and beverage producers are able to remain viable is a critical piece of food access. Financial, promotional, and distributional support are necessary for producers and institutions such as markets and stores. Having locally produced agricultural products available at local stores and grocers helps ensure local dollars stay in their communities and in Lamoille County. The Vermont Department of Health encourages retailers to incorporate healthy practices into their business models.

Voluntary healthy retailer practices focus on three key areas: tobacco, alcohol, and healthy foods. Practices include moving alcohol to the back of the store, separating it from sodas and other beverages, and reducing the amount of signage for tobacco and alcohol products. Raising signage to adult eye-level instead of at a child’s eye level targets legal age drinkers rather than increased visibility to youth. Offering fruits and vegetables, and placing them in the front of the store, is another way to encourage healthier eating practices. Retailers can also work to promote the EBT program for qualifying products. The goal of these practices is to remind shoppers that healthy changes can be easy to make while allowing retailers to highlight healthy items they may already have in their store.

#### *Marketing Local Products*

Direct marketing of locally produced food provides another option for increasing food access and security. Direct marketing occurs when local producers sell directly to the customer rather than going through a distributor or wholesaler. A farmers’ market is an example of direct marketing. A Community Supported Agriculture model (CSA) is also a direct marketing tool. Under the CSA model, a customer purchases a “share” up front from a farm, and the farm then distributes a weekly box of produce to the customer. This model gives the farmer an assurance of income and ensures the customer receives a share of food throughout the growing season. CSAs have

expanded to include winter shares, meat shares, egg shares, and shares of other food products. Many farms offer a reduced rate for households under a certain income level.

Direct marketing is also found in the Farm to School and Farm to Institution model. These programs encourage farmers to sell products directly to schools or institutions, such as hospitals. Increasing the amount of locally grown produce available for sale at local retailers is also important. Efforts can be enhanced to achieve this by such organizations as the Healthy Retailers Initiative or the Lamoille Fit and Healthy Council.

### *Community and Backyard Gardening*

While communities are limited in what they can do to influence dietary decisions by individual households, they can be instrumental in providing resources and opportunities to increase access to healthy, affordable food. One way is by encouraging the use of gardening, such as community gardening or “backyard” gardening. A community garden is simply a garden where two or more individuals grow plants. Community gardens can be located on private or public property and are often tied into existing organizations, such as schools, senior housing complexes, apartment or multi-family buildings, and religious organizations. Housing complexes may have small gardens for residents. Organizations such as food pantries and food shelves may use community gardening as both a learning tool and a food source. Farmers in some communities make space available for gardeners, for free or for a fee. Some barriers to community gardening include conflict with road crews, costs, and water access. Resources are available to communities through the Vermont Community Garden Network or American Community Gardening Association.

In rural farm communities, it is more common for households to each have their own garden or wild berry patch. Barriers to having a backyard garden include lack of space, lack of tools, and lack of knowledge about how to grow your own food. In villages, residential neighborhoods are generally densely compact, limiting yard space available for backyard gardens. Additionally, some villages have an increasing young, rental population who are often times limited in terms of how they can use rental property. While some lots in these communities provide reasonable space for backyard gardens, other residents, especially those residing in the Village Core areas, may benefit from a local community garden plot. Currently, many towns in Lamoille County do not have a community garden. As towns and villages continue to explore green space opportunities, potential community garden space should be given consideration during the design and planning process of new residential developments and recreational facilities.

Organizations throughout the state, such as 4-H and the UVM Master Gardeners Program, provide training in growing and preserving food at home, which is one way to improve food security and self-sufficiency. Similarly, a community tool set is an option for households, especially smaller households such as renters in the village, to share implements such as shovels, hoes, and rakes without a major investment. Gardening is a way to increase access to affordable, healthy foods.

### **Cultural Facilities**

Cultural resources are those that develop, improve, and enrich the mind. Culture is manifested differently among people and regions. The wealth of cultural opportunities throughout Lamoille County continues to make it a tourist destination and a quality place to live and work. The region’s culture is made up of the talented individuals who are artists, musicians, writers, designers, photographers, and crafters who have migrated here or cultivated their craft. Providing a fertile, supportive environment for cultural activities to flourish is crucial for Lamoille County. A multitude of festivals, galleries, museums, theaters, and patron organizations enable these activities to thrive.

### *Libraries*

Libraries in the region are owned by either a municipality and operated by an elected or appointed board, or they are owned by private organizations. There are a total of 11 libraries in the region. Seven of those libraries are municipal, with two of those being “community libraries”. Other libraries can be found at Johnson State College, Copley Hospital, which houses a medical library, and two privately owned library facilities.

The county's libraries offer a variety of services including: normal circulation of materials (books, movies, audiobooks, CDs, periodicals, e-books), reference, selection and purchase of materials, culling of the collection, materials circulation, special programs, audio-visual equipment and collections, desktop and laptop computers, children’s programming, and in some cases, housing of locally important historical artifacts. Some libraries also participate in the state’s inter-library loan program, which allows patrons to borrow paper and digital media from other participating libraries across the state.



Libraries also serve as community gathering spaces, employment centers, and a place for creativity. Many libraries display artwork from local artists or offer discount passes to education programs (such as the ECHO Lake Aquarium in Burlington). Community space allows for physical activity, community meetings, or library special events.

Additionally, as information technology and communications becomes ever more present in daily life, libraries provide services beyond the typical book. Computers at public libraries are used for daily life functions, often because they are Wi-Fi “hotspots”. As trends continue towards “going paperless”, everything from job applications to health care to access to basic resources now happens by using free computers at libraries.

Libraries in Lamoille County vary in accessibility. The Waterville Library is located in the old elementary school where it is not ADA compliant nor is it open year-round. The Wolcott Library is housed in the Wolcott Elementary School. Centennial Library in Morristown and the Lanpher Library in Hyde Park both spent many years fundraising for improvements which have been completed in phased approaches as fundraising has allowed.

While specific funding varies in each town, it generally comes from investments of past endowments, annually from the municipality’s budget, or through grants for which the libraries specifically apply. For libraries to be eligible to receive state or federal grant money, they must be financially supported, at least in part, by their municipality.

Because of the role that libraries play in filling needs for citizen access to information and resources, LCPC supports and encourages library expansions, ADA accessibility, and increased visibility.

### *Museums, Galleries, and Cultural Facilities*

There are a number of cultural facilities in the region, including museums and galleries. Not all are listed below. Many of the county’s eight historical societies operate their own facilities and many are non-profit organization. Others, such as the Noyes House Museum, are owned by municipalities. They all care for their own collections. Historical societies often hold lectures and talks open to the public and preserve town history and photographs. Some historical societies have adequate facilities to store and display artifacts while others are looking for ways to better preserve their collections.

The Ski and Snowboard Museum is housed in the 1818 Old Town Hall in Stowe. The museum houses a collection of skis, snowboards, boots, bindings, memorabilia, photographs, art, and library and archive materials, more than 10,000 items chronicling the evolution of winter sports in Vermont.

River Arts is a community arts organization based in Morrisville, formed in 1999 as the result of a community planning forum that set creating an intergenerational community arts center as a top priority. At that time, there were no arts programs available to most residents of Lamoille County. River Arts offers classes, workshops, exhibits, concerts, and other special events to the residents of Lamoille County for free or at affordable costs. River Arts offers youth programs, adult programs, an Elder Art Program, events, and galleries. In the future, River Arts may consider expanding their programming. The benefit this non-profit organization provides to the region makes it an example of a collaborative partnership to be supported.

Founded by artists in 1984, the Vermont Studio Center in Johnson is the largest international artists' and writers' Residency Program in the United States. The Center is spread across 30 historic buildings in Johnson and provides invaluable resources to the region.

Dibden Center for the Arts houses a 500-seat theater and an incubator for the Johnson State College Performing Arts Department. Events range from local to nationally known performers. Performances are open to the community. The Center also houses the Julian Scott Memorial Gallery that hosts student, faculty, and touring art exhibits.

Performing arts space is formalized, such as the Spruce Peak Performing Arts Center a 420-seat center in Stowe and the Hyde Park Opera House, a non-profit organization dedicated to the arts, and informal, using available facilities like schools, parks, and senior centers.

Art galleries feature locally and nationally known artists. Art exhibits can be found in formal galleries, restaurants, and post offices.

Public art installations range from decorative banners on light posts to bike racks to sculptures in parks and on streets. Public art helps create an inviting community and showcases local talent.

### **Arts and the Creative Economy**

The arts help to define many of Lamoille County's towns and villages. Not only do they help define regional character, they also provide local employment and bring visitors to the region's village centers who may frequent other businesses. As the number of studios and art galleries grow, so will the demand for local sources of supplies.

In addition to the arts, the "Creative Economy" includes film and new media, software and game development, publishing, advertising and marketing, and high-tech manufacturing arts. The creative economy provides clean, well-paying, skilled jobs. Provided high-speed internet is available, many Creative Economy firms can "locate anywhere". In a 2013 survey conducted by the Vermont Office of the Creative Economy, 65% of businesses in the sector stated that Vermont's "clean, natural environment and working landscape" was a key factor in determining where to locate. Other important factors included Vermont being an "environmentally conscious state", a past history and residence in Vermont, and proximity to family and friends. One-third of businesses also indicated a desire to locate in a compact, walkable, "authentic" community or downtown. Lamoille County's natural beauty, authentic historic character, wealth of recreational assets, growing art community, and proximity

to the Burlington and Montpelier areas place Lamoille County in an attractive location for businesses operating in the Creative Economy.

Creative Economy firms in Lamoille County range in size from one person advertising studios to a publishing company with several dozen employees. Locating additional firms in Village Centers represents opportunities to create “economic anchors” for other businesses that rely on a local customer base (such as local retailers and restaurants). Larger Creative Economy firms (and other professional offices) may be able to locate in larger Victorian homes located in Village Centers, providing property owners with an alternative to conversion of these properties into multi-unit rental housing. Still other Creative Economy endeavors require little infrastructure. Some arts-based industries may be appropriate uses for properties going through a brownfields remediation.

## Public Facilities and Services: Strategy

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Access to a quality education is necessary to Lamoille County's economy. Public services provided to the community include education, cemeteries, and solid waste management. Electrical utilities can be found in the Energy Chapter while Land Use outlines municipal wastewater and water systems. Other public services are found in the Human Services and Public Safety Chapters. The educational needs of Lamoille County should support a highly skilled regional workforce that meets the needs of existing employers and supports new ones, while growing healthy, active, and engaged young people ready to face the next decades.

The following strategy is intended to guide policies and action items related to public facilities and services:

***Community investments such as educational, cultural, recreational, healthcare, and municipal services will aid in attracting economic development opportunities.*** Many people who choose to settle in Lamoille County do so because of the quality of life they find here. People who grow up here may choose to stay for many of the same reasons. Maintaining and strengthening community investments and public services will stimulate local and regional economies to encourage growth.

### POLICIES & ACTION ITEMS

***Policy:*** Encourage efforts to develop a safe, stimulating, and inclusive region that offers good schools and opportunity for its young people, and respects the region's values, natural beauty, and resources (including both the natural and constructed).

#### Action Items

- Upon request, assist municipalities with amendments to ordinances and zoning that promote crime prevention in licensed establishments, retail outlets, and public spaces.
- Assist municipalities with identifying non-regulatory tools to strengthen healthy communities.
- Collaborate with regional and local partners to improve and identify new parks, recreation, and green spaces as well as strategies to build vibrancy throughout the region.

***Policy:*** Support broad access to enriching educational opportunities for residents of all ages.

#### Action Items

- Support the expansion of education offerings for all levels of education.
- Assist school boards and communities with tracking population changes to ensure enrollment needs and capacities are met.
- Support inter-municipal coordination in planning for changes in school capacity, class sizes, and programs.
- Support schools and parent – teacher groups with grant writing and research to expand, improve, or develop facilities, resources, services, and programs.
- Foster connections between Farm-to-School organizations and schools in Lamoille County to increase access to healthy foods and support local food producers.
- Encourage schools and educational institutions to work with retirees in transferring skills to the next generation through volunteering, mentoring, or other partnerships.
- Working with schools, municipalities, parents, and other organizations, find creative ways to improve safe walking routes to school and reduce student time on busses.
- Upon request, assist communities and schools with utilizing facilities during off hours and vacations.

- Aid organizations and schools with linking and developing trail systems and recreation in the region.
- Encourage schools and school facilities to be disaster resilient. Many schools also serve as local emergency shelters so equipping them with generators and increasing flood resiliency is important.
- Encourage emergency preparedness education in the classroom by collaborating with emergency responders.

**Policy:** *An adequate supply of public facilities is encouraged in downtowns and village centers.*

**Action Items**

- LCPC supports locating community “anchors”, such as municipal offices, schools, and churches in downtowns and village centers.
- Infrastructure extensions should be focused in designated growth centers and in municipalities that have current Capital Budgets in place.
- The location of State of Vermont agencies, departments, divisions, and programs are encouraged in Lamoille County communities.

**Policy:** *An adequate supply of materials collection facilities should be made available throughout the region for all residents.*

**Policy:** *Lamoille County businesses, residents, and public facilities should be equipped to enact and follow Act 148, Vermont’s Universal Recycling law.*

**Action Items**

- LCPC supports working closely with public facilities and solid waste management organizations in appropriate siting for new facilities for waste collection. Enterprise Areas may be most appropriate for new waste facilities provided siting criteria are met.
- Infrastructure is encouraged to support implementation of Vermont’s Universal Recycling law, including increased accessibility to composting sites for organics diversion.
- LCPC is committed to working with public facilities, such as schools, and large businesses to reduce the amount of waste created or sent to a landfill.
- Work to ensure local and state regulations allow and encourage agricultural operations to continue composting organics to increase diversification of operations, support on-farm activities, and increase number of locations that accept organic waste.
- Support Lamoille Regional Solid Waste Management District with enacting Universal Recycling changes as requested.

# Public Facilities and Services: Background and Inventory

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## **Education**

Access to a system of quality education is necessary to achieve social and economic goals. Sustained regional and economic development will be impossible in the region unless financial and geographic access to education is affordable and geographically convenient. Without a well-educated work force, the region, like the rest of Vermont, will be unable to compete with other states for well-paying jobs.

Throughout the late 1980s and 1990s, recessions emphasized the relationship between economic development and an educated work force. Economic restructuring has resulted in a shift away from jobs in manufacturing to service sector employment. Many of these new jobs are at lower wage levels. Personal income levels increase with gains in educational attainment. The earning gap between college graduates and high school graduates remains significant, with college graduates earning 70% more. Poverty decreases with educational attainment.

In particular, workforce development needs to start at an early age. Ensuring the systems, partnerships, and support networks are in place for a coordinated and appropriate education system across the county is one of the roles of LCPC.

### *Early Education*

Early education has been shown to be critical to the future success of children in school. There are a variety of early care and educational opportunities available to residents of Lamoille County. As of the drafting of this plan, several private, pre-kindergarten educational programs are located within many communities' elementary schools. The Lamoille Family Center (LFC) offers a range of early education services through a coordinated service network known as Children's Integrated Services (CIS). Programs offered through this network include Maternal Child Health, Early Childhood and Family Mental Health, and the Early Intervention Program for children with developmental delays.

### *Primary School*

There are 10 public elementary schools in the region, one in each of the local school districts associated with the 10 towns in the region. These schools range in size from a one-room school house in Elmore to the Hyde Park Elementary School, which is almost at capacity. Due to declining enrollment, Belvidere Elementary School students now attend Waterville Elementary School. Pre-kindergarten classes for both towns are held at the Belvidere School.

In addition, a private Mennonite School in Wolcott provides education to members of their community. Bishop John A. Marshall School, in Morrystown, is an independent Catholic school for children in pre-kindergarten through eighth grade. Home schooling in most of the school districts in the region is monitored through the Vermont Department of Education.

### *Secondary Education*

There are three public high schools (Lamoille Union, Peoples Academy and Stowe High School), as well as the Green Mountain Technology and Career Center, serving the secondary educational needs of the county. Some students also attend Hazen Union or Craftsbury Academy.

*Peoples Academy*

Peoples Academy, located at Copley Avenue overlooking Morrisville, serves the secondary educational needs of the community of Morristown. Peoples Academy also serves students from the neighboring communities of Elmore and Wolcott.

*Stowe Middle / High School*

Stowe Middle/High School, located on Barrows Road in Stowe, serves the educational needs of students from grades 6 through 12. Stowe Middle/High School also serves students from the nearby communities of Elmore and Wolcott.

*Lamoille Union High School*

Lamoille Union High School is located in Hyde Park, Vermont. It is part of the Lamoille North Supervisory Union which serves the six towns of Belvidere, Cambridge, Eden, Hyde Park, Johnson, and Waterville with five elementary schools. The High School shares a campus with the Lamoille Union Middle School and the Green Mountain Technology and Career Center.

Table 5-3. School Enrollment Trends

	Enrollment 2003 – 2014	Enrollment 2013 – 2014	Supervisory Union	Capacity Concerns?
Belvidere	22	<i>Attend Waterville Elementary</i>	Lamoille North	No. May re-open if population trends change.
Cambridge	324	377	Lamoille North	Potentially if capacity surpasses 400.
Eden	148	131	Lamoille North	No concerns.
Elmore	15	20	Lamoille South	No concerns.
Hyde Park	229	251	Lamoille North	Yes. Concerns about capacity; renovations scheduled for 2015
Johnson	268	257	Lamoille North	No. Renovation in 1997 has capacity for 350.
Morristown	380	366	Lamoille South	Yes. Concerns about capacity.
Stowe	318	386	Lamoille South	No. Expansion in 1991
Waterville	68	95 ( <i>includes Belvidere students</i> )	Lamoille North	No. New facility opened in 1996.
Wolcott	133	150	Orleans Southwest	Yes. Monitoring enrollment and population trends.
Lamoille Union Middle School	309	245	Lamoille North	No. Expansion in 2002.
Lamoille Union High School	596	554	Lamoille North	No. Expansion in 2002 has capacity for 640.
People’s Academy Middle	268	281	Lamoille South	Unsure due to changing enrollment.
People’s Academy High	376	250	Lamoille South	Unsure due to changing enrollment.
Stowe High	400	409	Lamoille South	No. Expansion in 1991.

Source: Vermont Agency of Education District Enrollment Reports

### *Green Mountain Technology and Career Center*

The Green Mountain Technology and Career Center (GMTCC) has a close association with, but is separate from, the Lamoille Union High School. It shares the same physical location and the same Board of Directors on matters concerning finances. GMTCC falls under the Lamoille North Supervisory Union.

GMTCC provides technical education to area high school students and adults. GMTCC offers programs in 13 different areas to students from Lamoille Union High School, Hazen Union High School (Hardwick), Stowe High School, People's Academy (Morrisville), and Craftsbury Academy. Many of the programs have agreements with colleges and universities that allow students to earn college credit. Students who are interested in attending a full-day technical program are selected based on an application process that includes academic record, interest, attendance record, credit status for graduation, and potential for success. Part-day opportunities exist on an individual basis.

GMTCC students participate in activities at their home high school. Academic coursework is available to all students during the day. College preparatory classes are offered in addition to classes that support students who plan to enter the workforce immediately after high school graduation. Noteworthy and award-winning programs include forestry and land management, automotive technology, culinary arts, and HVAC.

### *School Choice*

Vermont's statutes allow for school choice. Towns that do not maintain secondary grades may tuition students to a school determined by the parent or guardian of the student. Parents may choose from public or approved independent schools. The school board will pay full tuition to any public school, or any school deemed by law to be a public school. The school board will pay full tuition for an approved independent school or the state average tuition for union high schools, whichever is less. The electorate may authorize a higher payment to independent schools.

Wolcott "tuitions" its 7<sup>th</sup> – 12<sup>th</sup> grade students to regional schools of their choice. Most students attend Lamoille Union Middle and High School, Hazen Union High School in Hardwick, Craftsbury Academy in Craftsbury Common, People's Academy in Morrisville, or Stowe Middle and High School in Stowe. Elmore also "tuitions" its middle and high school students outside the town. Since bus transportation is provided to Morrisville, the majority of Elmore's middle and high school students attend People's Academy in Morrisville but other students attend surrounding schools within the Lamoille Valley.

### *School Boards and Supervisory Unions*

Each Vermont town is a School District with a governing School Board. School Districts are grouped together to form Supervisory Unions, governed by a Board with representatives from each member School District and employing a Superintendent and staff. The Supervisory Union budget is voted annually.

Supervisory Unions are statutory creations to coordinate educational efforts, increase economies of scale, enhance cost efficiencies, and expand educational opportunities for students. The Supervisory Unions, through their superintendents, administratively oversee the member towns' schools. The Unions also provide special educational, financial, and planning services. The supervisory unions do not own any of their own facilities. Lamoille County is part of three Supervisory Unions.

### *Schools and Health*

Much can be done to maintain and enhance the educational and nutritional programs at schools throughout the region in order to improve health and wellness among children, including:

- Providing ample recreation and physical activity opportunities
- Education students on healthy eating habits
- Increasing access to healthy and locally produced food

Schools may have gardens, which can serve as a teaching tool, source of food for the school’s lunch program, offer physical activity for students, and increase exposure to new foods for kids. Some schools in the region implement tenets of the farm-to-school movement. For example, the Green Mountain Farm-to-School Network, based out of northern Vermont, provides resources, education, and assistance to schools for fresh food in cafeterias, to support local farms, and to provide education programs, events, and activities for students and the community.

Providing recreation facilities, such as playgrounds, fields, or gyms, encourage students to be more active. Nurturing partnerships with existing athletic facilities or ski resorts, nearby trails, and recreation users provides kids with exposure to routine physical activities. Schools may choose to adopt wellness policies and utilize resource tools to promote wellness among children while building on existing curricula. After school programs may offer classes that promote fitness and wellness.

Additionally, schools can encourage healthy practices such as walking and biking to school by coordinating safe school routes and identifying improvements made to the transportation network. Many parents will drive their children to school because of unsafe or inadequate routes because of poor sidewalks, lack of crosswalks, dangerous traffic situations, or long travel times on busses. This is time children could spend on school work, recreation, or social interaction.

Ensuring schools stay current with changes in dietary needs, food system advancements, transportation needs, and educational tools is a collaborative effort for school officials, parent – teacher organizations, supervisory unions, farmers, and other partners.

## **Post- Secondary Education**

### *Johnson State College*

Founded in 1828 and later designated as a college dedicated to teacher training, Johnson State College (JSC) is one of five colleges in the Vermont State College system. Today JSC offers more than three dozen undergraduate programs, three master’s degrees, and associate’s and certificate offerings. In addition to education, notable programs include the sciences and the fine and performing arts.

JSC encourages area residents to take advantage of campus facilities and programming. The JSC Library is open to residents year-round. During the academic year, JSC offers an array of cultural educational and athletic events that are free and open to the public. These include music and theater performances, guest lectures, readings and exhibits by visiting writers and artists, and home games for 13 varsity sports.

One of the campus facilities most widely used by area residents is the JSC SHAPE Center. Features include an Olympic-sized indoor swimming pool, modern fitness center and weight rooms, an indoor rock-climbing wall and a spinning studio. Group fitness classes are offered throughout the academic year. JSC also offers an 18-hole disc golf course to area residents.

Other, less tangible services provided by JSC are the volunteer efforts of its students and employees; serving the greater community is a core value of JSC. In 2013, JSC became an outpost of the South Burlington Vet Center, providing counseling and advice to area veterans and military-connected students on Fridays. Previously, veterans and their families had to travel to South Burlington or even farther to meet with a veterans' representative to discuss such issues as benefits, readjusting to civilian life or personal concerns. As of 2014, JSC is exploring a partnership with the Veterans Administration in order to further increase the campus-based services available to area veterans.

Public service permeates the culture at JSC in numerous other ways as well. The "SERVE Local" program provides weekly opportunities for students to volunteer with regional organizations. Activities include cleaning up the Lamoille River, serving lunch at the weekly Johnson CommUNITY Lunch program (and raising funds for the Johnson Food Shelf in the process), hosting blood drives for the American Red Cross, stacking firewood and helping to weatherize the homes of low-income residents, and collecting food for Thanksgiving dinner baskets distributed by the Johnson Food Shelf. JSC students also serve as mentors to local youth.

In addition to participating in many student-led service programs, JSC faculty and staff hold leadership positions with a number of civic, educational and charitable organizations. In 2013, a survey showed they served as board members and representatives of at least 19 local organizations.

Since 1971, Johnson State College has housed Vermont's longest running Upward Bound program, a federally funded program that serves high school students from families with modest incomes who show academic potential to succeed in college. It consists of a six-week campus-based residential program in the summer and academic support and programming throughout the school year. Over 100 high school students from seven area high schools in Lamoille and surrounding counties participate annually.

The JSC campus encompasses 350 acres that extend into both the Town and the Village of Johnson. The College also owns and manages the Babcock Nature Preserve in Eden.

JSC is one of the largest employers in Lamoille County, with more than 250 full- and part-time employees. The College generates an estimated \$23 million in economic activity for the region annually.

#### *Community College of Vermont*

The Community College of Vermont (CCV) is an accredited member of the Vermont State College System. CCV offers programs for students seeking an Associate Degree and those interested in a Certificate Degree in a particular field. Many CCV students are adults returning to college for higher educational opportunities in order to improve their income earning ability.

CCV has 12 field offices across the state, including one in Morrisville. The Morrisville office has an enrollment each semester of 200 to 250 students. Classes are offered five days a week and four evenings a week. The Morrisville office is looking to expand their facilities in the near future. Classes are currently held at the CCV office and at two local high schools.

#### **Other Educational Opportunities**

##### *Vermont Studio Center*

The Vermont Studio Center is a private, not-for-profit institution located in the Village of Johnson offering advanced study for established artists, many of whom have advanced degrees. The Center owns and/or leases

facilities throughout the village that provide residential housing and space for studios, galleries and Center administration. Throughout the year, the Studio Center offers exhibitions, public lectures, and readings for the community.

The Studio Center offers a free summer art program for children, teenagers, and adults. In addition, the Center's Community Arts Director teaches art classes at the Johnson Elementary School.

#### *Central Vermont Adult Basic Education*

CVABE offers free literacy instruction for adults and out-of-school youth in downtown Morrisville. CVABE helps students in reading, writing, math, computer literacy, and/or English as another language. CVABE helps students achieve a high school credential and prepare for employment and/or further education. CVABE has six learning centers through Lamoille, Orange, and Washington Counties. Paid and volunteer staff delivers the free instruction.

#### *Laraway Youth and Family Services*

Laraway Youth and Family Services is located in Johnson, a private non-profit organization employing over 100 people. Laraway's two main programmatic components include the Laraway School and Substitute Care program. Laraway is a licensed independent school, approved for special education. The School serves 4<sup>th</sup> – 12<sup>th</sup> grade students who have special emotional and behavioral circumstances that keep them from being successful in their own schools and who want to return to their own schools once they get their behavior under control. Laraway Substitute Care is a behavioral treatment program that serves youth who experience problems that make it difficult for them to live in their own communities. Laraway provides services designed to support children, adolescents, and their families as they identify effective ways to address those problems.

Laraway is also a Licensed Child Placing Agency administering a statewide Foster Care program that provides daily care, intensive care management, treatment, and crisis intervention services.

#### *Learning Together*

The Lamoille Family Center's Learning Together program is a Vermont-recognized independent school for adolescent girls who are pregnant, parenting, or are at-risk for becoming pregnant.

#### *Athletic Academies*

The Mt. Mansfield Winter Academy (MMA) is an independent winter sports academy that provides a quality academic program for alpine and snowboard student-athletes in grades 7 through 12. Since 1993, students from New England and beyond have come to MMWA for a highly individualized winter program in Stowe.

Also located in Stowe is the North American Hockey Academy (NAHA). NAHA offers girls in grades 8 - 12 a student athlete high-performance program for athletic and academic experience. Students work directly with coaching staff on a hockey training program. This is a unique program in the world of girls hockey and prepares them for competition at the college level. NAHA is a fully recognized Vermont Independent Secondary School.

Other ski and recreation-based schools are located throughout northern Vermont. These private institutions offer a targeted education curriculum combining recreation and skills-based learning opportunities.

### **Non-formal Education Opportunities**

Vermont Interactive Technologies (VIT) is available at Johnson State College. VIT allows participants to engage in classes or meetings that are held off-site. UVM Extension, for example, offers Master Gardener courses through VIT. This technology allows for greater exposure to educational opportunities offered close to home.

Numerous groups exist throughout the county which support and enrich the educational opportunities of all Lamoille County residents of all ages and abilities. These groups, organizations, and activities should be supported as they provide non-formal education opportunities. Further, schools that work with special populations or focus areas provide targeted education opportunities for diverse audiences. Examples include therapeutic horse farms, charter schools, and art-based curricula.

### **Workforce Development**

Essentially, workforce development means providing opportunities for education and training for high-quality jobs for everyone. The Vermont Workforce Development Council, a statewide initiative, aims to provide the following to all Vermonters: a well-rounded education, innovation and creativity with a passion for lifelong learning, and to have the personal and social skills to succeed in collaborative workplaces. Competition for jobs occurs at the local, regional, state, and national levels.

Vermont is a state that is susceptible to the “brain drain”: young adults are educated in Vermont but leave the state for higher salaries and more challenging employment opportunities. Retirees then move back to Vermont to enjoy the quieter life. This is noticeable in Vermont’s changing population, where the population of older citizens is increasing but overall population growth is declining.

Organizations such as the Lamoille Workforce Investment Board, Lamoille Chamber of Commerce, and GMTCC are focused on workforce development and investment throughout the county. Their current focus is on education at all age levels. For example, through encouragement of the Workforce Investment Board, GMTCC students are not only graded on academic performance but also on their life skills, such as how they perform in mock interviews, courses in finances, how they dress, and their demeanor. These grades stay on their permanent transcripts and have been requested by prospective employers. In this way, students learn both the “hard” and “soft” skills.

Workforce development is not the responsibility of one organization. Community collaboration can identify the needs and strategies to develop new and improve upon workforce development strategies already in place, while encouraging adaptation to changing economic trends. The needs of employers and employees must be considered. Including the expertise of retirees in transferring skill development to the next generation is an unexplored avenue in Lamoille County.

Regional discussions have identified the following workforce opportunities:

- A need for adequately trained workers residing in the Region or willing to move to Lamoille County
- Improve Lamoille County workforce basic skills knowledge, such as computer proficiency
- More competitive salaries in Lamoille County to compete with neighboring regions
- Inter-regional communication regarding available training and education opportunities, for example connecting local resorts to the hospitality training program at Johnson State College or expanding hospitality training opportunities

## Public Facilities

Municipalities in Lamoille County have town and village offices. For information on the condition, capacity, and prospective use of those facilities, please contact the municipality.

The State of Vermont has located a number of services and offices in Lamoille County. As the Shire Town, Hyde Park hosts a branch of the State's Court System, including the Lamoille Superior Court, Lamoille Probate Court, Lamoille Family Court, and Lamoille District Court.

The Department of Health has a district office located in Morrisville. This office offers the following programs: Breastfeeding & Mother-to-Mother Support, Children's Integrated Services (through the Department of Children and Families), Early Periodic Screening, Diagnosis, and Treatment Program, Eligibility Screenings for 3SquaresVT, Reach UP, and Medicaid, Ladies First, and Vermont WIC: Women, Infants, and Children. The District Office includes all of Lamoille County plus Craftsbury, Greensboro, Hardwick, Stannard, and Woodbury.



The Agriculture Building in Morrystown offers branches of the federal Natural Resources Conservation Service and Farm Services Agency as well as the UVM Extension. The VTrans has district garages located in Cambridge, Eden, and Morrisville. All towns have a post office with varying levels of service provided. State offices are encouraged to locate in Lamoille County.

### *Cemeteries*

There are approximately 121 acres of cemetery in Lamoille County.

In Vermont, authority to manage public cemeteries is vested with the local legislative body. The day-to-day maintenance and care of cemeteries in the region falls to three types of entities: cemetery associations, cemetery commissions and interested individuals. Cemetery associations are private, non-profit corporations that exist to own property and act on a regular basis to take care of the cemeteries under their purview. Cemetery commissions also act routinely to care for the cemeteries; however, their authority to act in this capacity is a delegation of the authority granted to the Selectboard.

The cemetery commissioners and the cemetery associations are responsible for laying out the cemeteries, selling lots, and securing on-going care and maintenance of the cemeteries, as well as maintaining records of the cemetery. Local commissions are responsible for assessing cemetery need.

There are no crematory facilities in Lamoille County. Those seeking cremation are serviced out of South Burlington or St. Johnsbury. There are three operating mortuaries in the county.

## Solid Waste and Materials Management

Under Vermont law (10 VSA §6602), solid waste is defined as any discarded garbage, whether solid or liquid, including hazardous waste. Excluded from this definition is animal manure. Solid waste management is any activity resulting in the storage, transportation, treatment, or disposal of the wastes. Historically, refuse in Vermont has been trucked to two state-controlled landfills or recycling facilities, private landfills or recycling centers, composted, or trucked out of state to landfills. With the passage of Act 148 (Universal Recycling Law) in 2012, and the closing of one of Vermont's state landfills, Vermont's waste management system is undergoing a change.

All towns in Lamoille County, plus Craftsbury and Worcester, belong to the Lamoille Regional Solid Waste Management District (LRSWMD). The LRSWMD is one of 15 solid waste management districts established by the State of Vermont. Lamoille County has eight transfer stations, with six maintained by LRSWMD and two privately owned (see map below). Six private facilities accept refuse.

### *Universal Recycling Law (Act 148)*

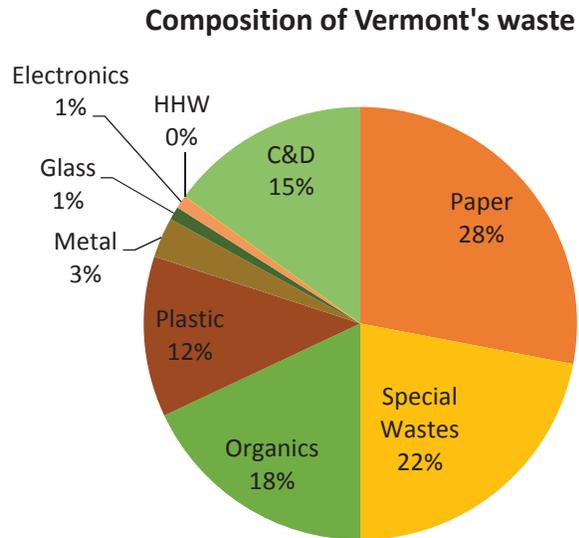
Act 148 is the nation's first ever statewide Universal Recycling Law. Starting July 2015, it will be illegal to throw away mandated recyclables. By 2016, leaf and yard debris and clean wood scraps will be illegal to landfill. By 2020, food scraps will be banned from landfills.

The law is being phased in over time by material and generator type to allow for the services and infrastructure to be developed.

LRSWMD, and private facilities and collectors who offer trash or curbside services, must also provide services for mandated recyclables, leaf and yard debris, and food scraps. The type and location of services needed for rural areas of Vermont is under development by ANR. The fee structure for these services is controlled to protect ratepayers and provide incentives for higher diversion of valuable materials. Public buildings and public lands with garbage and/or recycling containers will be required to offer separate bins for trash, recyclables, and organic materials (i.e. food scraps).

### *Compost*

The move to composting organics may be the biggest change. Everyone, from private residences to large institutions such as hospitals and schools, will be required to divert organic residuals from landfills. Residential organic residuals are almost 1/3 of all residential waste! As organics decompose in landfills, they emit methane gas, which is a greenhouse gas that is 20 times more harmful than carbon dioxide. The Food Recovery Hierarchy offers ways to reduce, divert, and recover organics (at right).



The new law provides new opportunities for residents and businesses. Currently, facilities are limited in Lamoille County to receive organic materials for composting (the apple core image on the map below). It is best to check for available facilities regularly. Some unregistered facilities also accept organic materials. Anything above a “backyard” level of composting is regulated under Vermont law, with certain exemptions offered for qualified agricultural operations. In recent years, composting has gained traction and interest as the “food renaissance” has blossomed.

The green and red nodules shown on the map below demonstrate where food producers or distributors (including restaurants and stores) are located.

Consider:

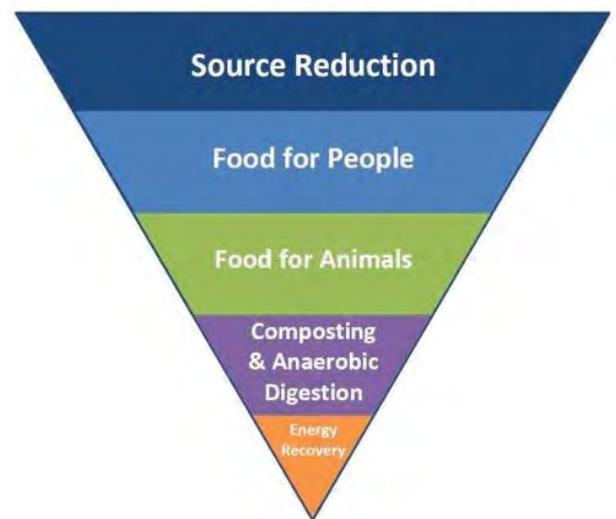
- Composting reduces greenhouse gas emissions (some people estimate that composting a 5 gallon bucket of food scraps equals 1 gallon of gasoline that is not burned)<sup>1</sup>
- Composting reduces costs and energy associated with managing waste
- Compost is a better use of organic matter and nutrients than sending food scraps to the landfill
- Compost creates a rich, healthy fertilizer for gardens and landscaping
- A dearth of composting facilities in Vermont is an opportunity waiting to happen
- Composting improves water quality by building healthier soil to retain water and controlling erosion and strengthening our resilience to climate change
- Using compost instead of fertilizer not only saves farmers and gardeners money, it helps their nutrient management plans by improving soil quality

### *Hazardous and Other Wastes*

Hazardous wastes have properties or contain chemicals which make them dangerous or capable of having harmful effects on public health or on the environment. A waste is considered to have been “generated” when it is put into a container for disposal or a determination has been made that the material is no longer useable. Hazardous wastes managed in the course of running a business – this includes wastes from municipalities and from businesses operated out of a home – are regulated by the State. Household hazardous wastes are common household products that exhibit characteristics of hazardous waste, such as being toxic, corrosive, ignitable, or reactive. As a result, these products may be harmful to human health and/or the environment. These products include household cleaners, automotive products, and lawn and garden products.

LRSWMD offers hazardous waste collection periodically throughout the year. Contact the LRSWMD for more information. Paint can often be recycled through PaintCare, a program that allows leftover paint to be returned anytime of the year at no cost to registered collectors. More information is available at [www.paintcare.org](http://www.paintcare.org). Vermont offers a free “e-cycle” program: computers, monitors, televisions, printers, and computer peripherals, regardless of age or condition, can be recycled at registered facilities for free. Check with the LRSWMD for more information and locations. Fluorescent bulbs containing mercury, a substance banned from landfills in Vermont, can also be recycled through various retailers in the area, or can be dropped off at any of the LRSWMD stations.

## Vermont Food Recovery Hierarchy



<sup>1</sup> Vermont Agency of Natural Resources, Department of Environmental Conservation, Waste Management & Prevention Division, <http://www.anr.state.vt.us/dec/wastediv/compost/main2.htm>

Unwanted pharmaceuticals also pose safety, health, and environmental threats. Unwanted medications can pose environmental risks when flushed or discarded in the trash as their residue may ultimately end up in-ground or surface water. As a result, consumers are encouraged to use year-round collection locations such as police departments and pharmacies or one-day collection events for proper disposal so that unwanted pharmaceuticals can be collected and then incinerated. Information on where to properly dispose of unwanted pharmaceuticals is available through Healthy Lamoille Valley.



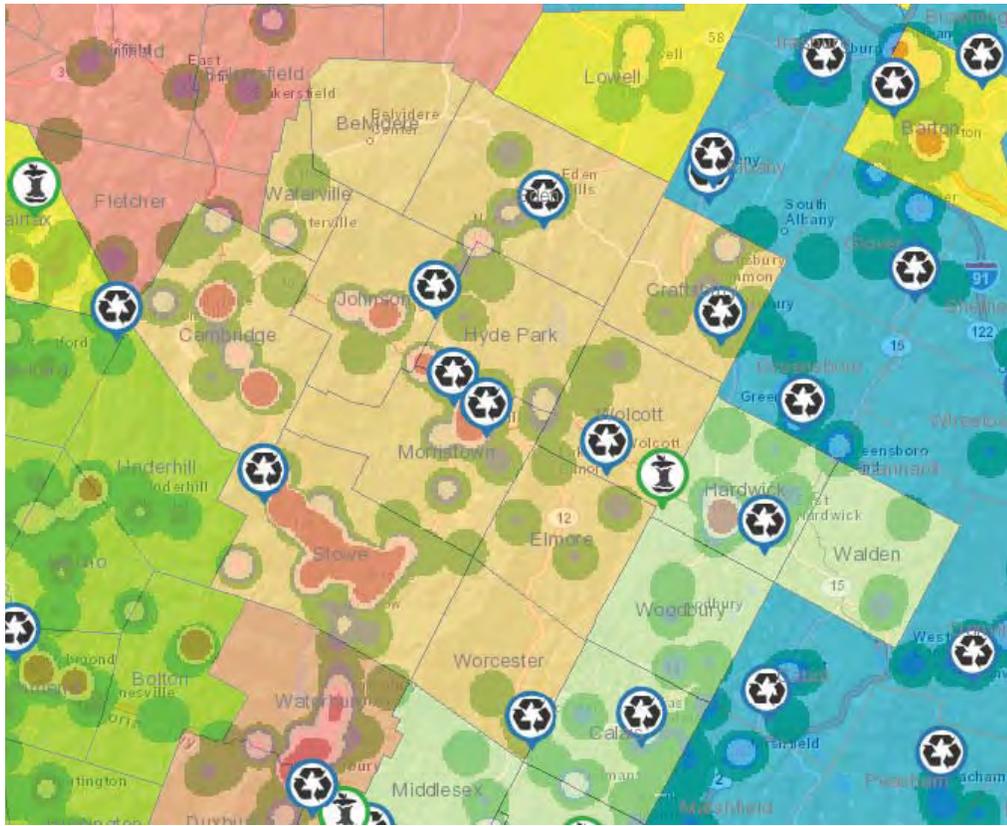
#### *Needs Assessment*

When the State landfill in Moretown closed in 2012, landfill traffic was consolidated to the state-owned landfill in Coventry, most easily accessible by driving up Route 100 through Eden, with trucks traveling the length and width of Lamoille County. While ANR estimates sufficient landfill capacity in Vermont, the increased truck traffic hauling waste to Coventry through Lamoille County has caused negative impacts on the transportation network and community fabric of Lamoille County. To address these issues, expanding facilities capable of receiving solid waste are needed across the state to remove undue burden from Lamoille County. Ultimately, no solid waste solutions are complete unless the amount of waste created and landfilled is reduced. The Universal Recycling Law is a step towards addressing waste that cannot be reclaimed.

To meet the intent of Universal Recycling, there is a lack of registered composting facilities in the region. Transfer stations that accept waste are limited in the rural reaches of the region. Appropriate trucks will be needed to haul the different types of residuals. The LRSWMD and private haulers will need to adapt to the changes and are in the process of charting future opportunities. These needs are anticipated but the full depth of need is unknown without further assessment or until the law is phased in. Lastly, all Vermont residents, businesses, and public facilities will need to adapt to the Universal Recycling law. Convenient and consistent materials management across Vermont is a goal of the new law, and ensuring all residents and business owners understand the law is integral to its success.

With the implementation of Universal Recycling, some municipalities have begun discussing how to meet the law. Schools, hospitals, and other large or public buildings will need to install equipment and enact new systems for collecting and sorting refuse, including food scraps and organics. These upgrades come at a capital cost. LCPC is available to provide assistance with meeting the new regulations. The Agricultural Land Use Planning Modules also provide guidance in how to plan for composting facilities. It is available at [www.vtfarmtoplate.com](http://www.vtfarmtoplate.com).

Universal Recycling Materials Management Map, LRSWMD highlight

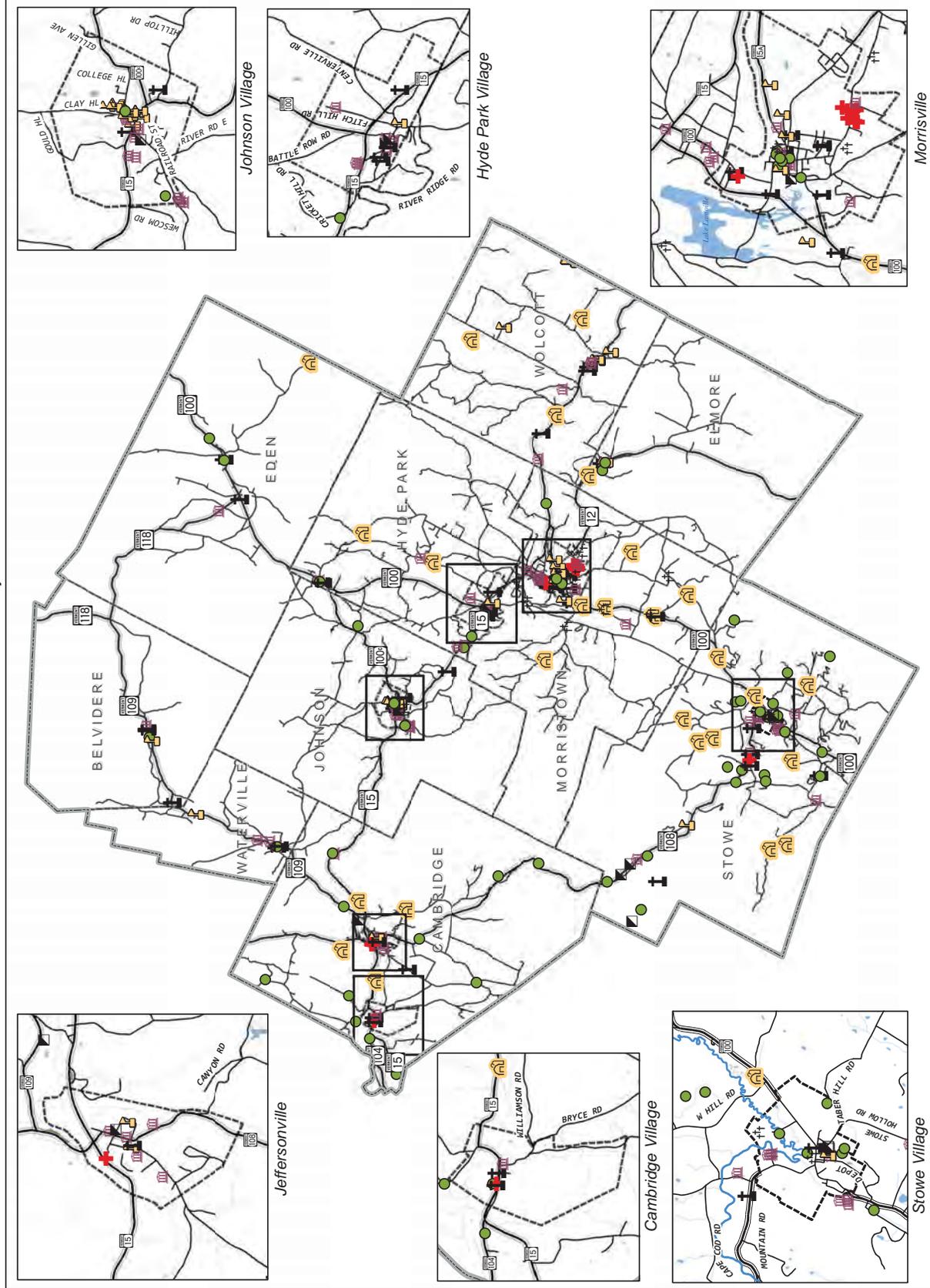


 = Transfer station  = Compost facility



# Community Resources

## Lamoille County

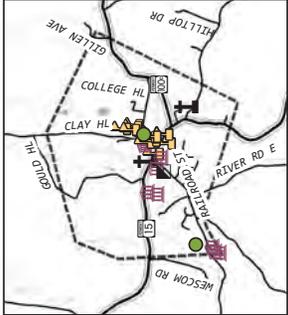
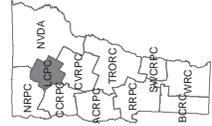


- Community Facilities**
- Cemetery
  - Commercial Farm
  - Cultural
  - Educational
  - Governmental
  - Health Clinic
  - House of Worship
  - Public Gathering
  - Village Boundary
  - Town Boundary

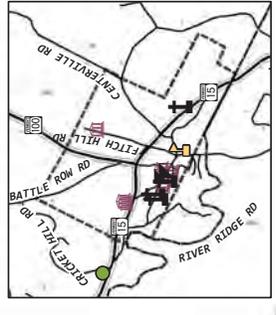


Data Sources:  
 Political Boundaries: VCGI, 1991  
 Roads: 1:50000 E-911 Road Data, 2014.  
 Political Boundaries: VCGI, 2001  
 Rivers and Lakes: VCGI, 2001  
 Community Resources: E-911 ESITES data, 2014

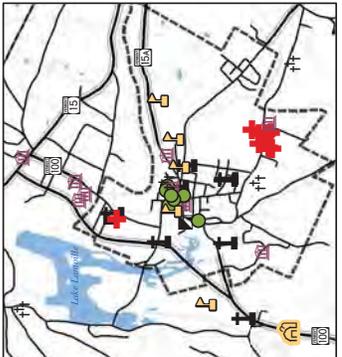
Created 7/27/15 by LCPC. Map is for planning purposes only, not for regulatory interpretation.



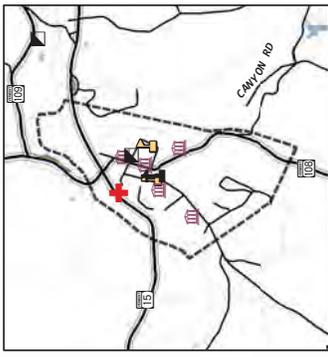
Johnson Village



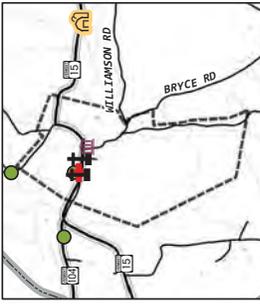
Hyde Park Village



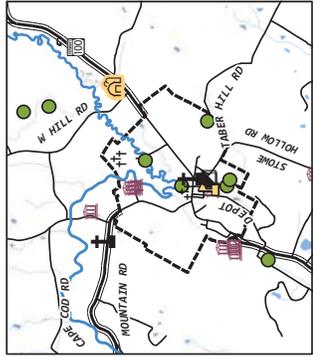
Morrisville



Jeffersonville



Cambridge Village



Stowe Village