

Chapter Three: Utilities & Facilities

INTRODUCTION

This chapter of the regional plan identifies existing educational, recreational, and public facilities, and utilities including power generating plants, transmission lines, telecommunications facilities, public water supply, and sewage disposal systems.

The economic stability and orderly land use development of communities largely depends on the capacity of local and regional utilities and facilities. This chapter identifies areas where facilities need to be expanded in order to accommodate the growth that communities desire and/or that will result from pending significant development projects in the region. Goals, and strategies to achieve them, are contained at the end of each subsection in this chapter.

I. EDUCATIONAL FACILITIES

Overview

The Northeast Kingdom currently has 39 public schools, and 10 publicly-funded independent schools serving the 55 towns and gores in the region. Additionally, there are 6 independent schools that are approved or recognized by the Vermont Department of Education, but which are not eligible for publicly-funded tuition payments due to a religious affiliation. Of these 55 schools, 11 serve the secondary grades only (grades 7th or 9th through 12th), including two career/technical centers. Three public schools and two independent schools in the region provide education for primary and secondary grades in one school. (see Table 3.2)

Independent schools having boarding or home-stay programs add greatly to the cultural diversity of the community and act as a generator for the local economy. Three schools in the region have boarding programs: Burke Mountain Academy, Lyndon Institute, and St. Johnsbury Academy.

Sixteen towns in the region, including the six Essex County towns of the Unified Towns and Gores (UTG), do not operate schools and instead pay tuition for all students in grades K-12 to attend other schools. Another 16 towns operate an elementary school or belong to a union elementary district, but tuition all students in the secondary grades. Two towns tuition students in the 7th and 8th grades only, and two towns tuition just the elementary grades. (See Figure 3.1)

Both public and approved independent schools accept students from “school choice” towns (as schools that tuition some or all grades are known) and are eligible to receive payment via the tuition voucher system unless the school is religiously affiliated. Some of the independent schools offer specialized education to serve particular educational needs. In order to be approved by the State of Vermont, independent schools are required to provide a minimum level of curriculum and instruction.

School Choice towns generally allow families to send students to the school of their choice, usually provided the tuition cost does not exceed an amount pre-set by the sending school district. Transportation to school in these towns is generally left to the students’ families.

Average Daily membership is a count of resident and state-placed students who receive an elementary or secondary education at public expense. “Elementary” students include those in Early Education, PreKindergarten, Kindergarten, and 1st through 6th grades. ”Secondary” students include those in grades 7-12.

Table 3.1 gives an indication of the number of students sent from school choice towns to independent schools and public schools in other districts in the 2016 - 2017 school year.

Every year the State Department of Education publishes the “Average Announced Tuition” for public and approved independent schools in Vermont. In the 2017-2018, the Average Announced Tuition of Union Elementary Schools was \$13,496, and Union 7th-12th Grade Schools was \$15,130. The Department also publishes the Announced Tuition for each school as reported by the Supervisory Unions/Districts. It is noted that tuition rates do not necessarily correspond to per-pupil spending – rather, it is the amount that is paid by the sending district (usually one that does not operate a school) to the receiving school district. The tuition rates of private schools in the region are generally competitive with tuition rates at the region’s public schools. Schools in New Hampshire are also a desirable option for students in Vermont school choice towns, particularly in the eastern Essex County towns along the Connecticut River.

School District	County	Grades Tuitioned	ADM FY 2017	
			Elem.	Second.
Barnet	Caledonia	9-12	NA	127
Burke	Caledonia	9-12	NA	130
Kirby	Caledonia	K-12	46	40
Lyndon	Caledonia	9-12	NA	293
Newark	Caledonia	9-12	NA	34
Peacham	Caledonia	7-12	NA	45
Sheffield	Caledonia	9-12	NA	46
St. Johnsbury	Caledonia	9-12	NA	534
Stannard	Caledonia	7-12	NA	19
Sutton	Caledonia	9-12	NA	66
Walden	Caledonia	9-12	NA	66
Waterford	Caledonia	9-12	NA	104
Wheelock	Caledonia	9-12	NA	44.2
Bloomfield	Essex	K-12	8	13
Brunswick	Essex	K-12	2	9
East Haven	Essex	K-12	29	22
Ferdinand	Essex	K-12	NA	NA
Granby	Essex	K-12	2	1
Guildhall	Essex	K-12	11	12
Lemington	Essex	K-12	11	7
Lunenburg	Essex	9-12	NA	70
Maidstone	Essex	K-12	7	5
Norton	Essex	K-12	5	8
Victory	Essex	K-12	7	6
Coventry	Orleans	9-12	NA	63
Morgan	Orleans	K-6	37	NA
Newport Town	Orleans	7-8	NA	90
Westfield	Orleans	7-8	NA	27
Westmore	Orleans	K-8	13	NA

Source: Vermont Department of Education, Average Daily Membership report for 2016-2017

NVDA Region: School Choice

Figure 3.1

November 8, 2017

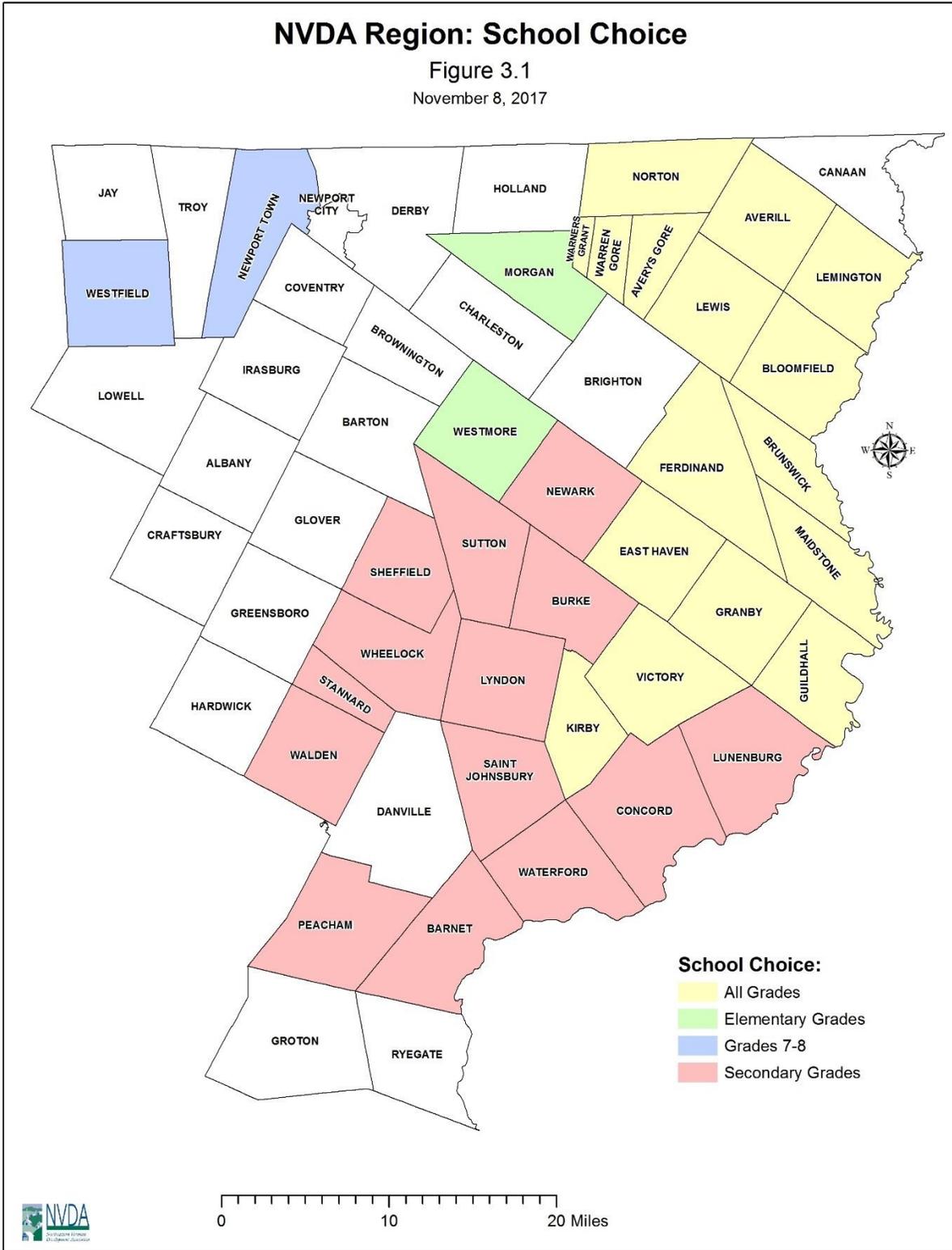


Table 3.2 Schools in the Northeast Kingdom												
School Name	Town	County	Type	Description	Grades served	Enrollment School year ending ...					Fiscal Year 2018 Announced Tuition	
						2013	2014	2015	2016	2017	Elem.	Second.
CALEDONIA COUNTY												
Barnet Elementary School	Barnet	Caledonia	Public	Day School	PK-8	219	217	213	213	206	\$15,800	\$15,700
Burke Mountain Academy	East Burke	Caledonia	Approved Independent	Boarding School with skiing program	8-12	54	59	63	66	56	NA	NA
Burke Town School	Burke	Caledonia	Public	Day School	PK-8	201	204	217	210	206	\$ 14,747	\$14,747
Arlington School (formerly Caledonia School)	St. Johnsbury	Caledonia	Approved Independent	Special Education Day School	9-12	26	19	20	17	16	NA	NA
Cornerstone School	St. Johnsbury	Caledonia	Approved Independent	Special Education day School	4-12	21	24	27	29	20	NA	NA
Danville School	Danville	Caledonia	Public	Day School	PK-12	374	356	346	366	366	\$12,300	\$15,100
East Burke School	East Burke	Caledonia	Approved Independent	Day School	8-12	8	11	13	8	9	NA	NA
Green Mountain Technology and Career Center (Forestry & Land Management Program)	Hardwick	Caledonia	Public	Career/Technical Center and adult education	7-12	NA	NA	NA	NA	NA	NA	\$15,415
Hardwick Elementary	Hardwick	Caledonia	Public	Day School	PK-6	276	275	277	253	253	\$15,800	NA
Hazen UHSD #26	Hardwick	Caledonia	Public	Day School	7-12	368	368	347	330	332	NA	\$17,700
Lyndon Educational Alternative Resources Network, Inc.(LEARN)	Lyndonville	Caledonia	Approved Independent	General and Special Education Day School	7-12	22	23	17	18	19	NA	NA

Lyndon Institute	Lyndon Center	Caledonia	Approved Independent	Day and Boarding School, offers special education in all disability categories	9-12	574	542	549	571	586	NA	\$ 16,995
Lyndon Town School	Lyndon	Caledonia	Public	Day School	PK-8	484	518	492	472	506	\$14,747	\$14,747
Millers Run School USD #37	Sheffield	Caledonia	Public	Day School	PK-8	130	126	116	110	118	\$ 14,747	\$ 14,747
Newark School	Newark	Caledonia	Public	Day School	PK-8	67	57	59	67	61	\$14,747	\$14,747
Peacham Elementary School	Peacham	Caledonia	Public	Day School	PK-6	50	49	48	49	56	\$17,400	NA
Riverside School	Lyndonville	Caledonia	Approved Independent	Day School	K-8	71	81	72	73	78	NA	NA
St. Johnsbury Academy	St. Johnsbury	Caledonia	Approved Independent	Day and Boarding School, offers Special Education in all disability categories	9-12	914	984	949	963	933	NA	\$16,885
St. Johnsbury Schools	St. Johnsbury	Caledonia	Public	Day School	PK-8	658	690	685	742	710	\$10,025	\$ 10,025
Sutton School	Sutton	Caledonia	Public	Day School	PK-8	108	107	110	99	104	\$14,747	\$14,747
Thaddeus Stevens School	Lyndon Center	Caledonia	Approved Independent	Day School	1-8	60	72	76	80	60	NA	NA
Walden School	Walden	Caledonia	Public	Day School	PK-8	108	101	93	92	102	\$12,100	\$10,200
Waterford Elementary School	Waterford	Caledonia	Public	Day School	PK-8	174	151	152	143	147	\$12,500	\$12,500
ESSEX COUNTY												
Brighton Elementary School	Brighton	Essex	Public	Day School	PK-8	88	91	93	93	104	\$14,425	\$ 14,425
Canaan Schools	Canaan	Essex	Public	Day School	PK-12	202	184	193	195	189	\$16,000	\$ 17,500
Concord School	Concord	Essex	Public	Day School	PK- 8	208	218	212	146	132	\$13,500	\$ 13,500
Lunenburg Schools	Lunenburg	Essex	Public	Day School (separate elem. & middle schools)	PK-8	114	110	120	134	139	\$14,500	\$ 14,500

ORLEANS COUNTY												
Albany Community School	Albany	Orleans	Public	Day School	PK-8	95	95	94	93	78	\$ 10,050	\$ 10,050
Barton Graded School	Barton	Orleans	Public	Day School	PK-8	197	181	193	172	159	\$ 10,050	\$ 10,050
Brownington Central School	Brownington	Orleans	Public	Day School	PK-8	110	116	106	112	124	\$ 10,050	\$ 10,050
Charleston Elementary	Charleston	Orleans	Public	Day School	PK-8	113	130	122	114	112	\$ 12,019	\$ 12,019
Coventry Village School	Coventry	Orleans	Public	Day School	PK-8	108	102	105	132	137	\$10,951	\$ 10,951
Craftsbury Schools	Craftsbury	Orleans	Public	Day School	PK-12	160	168	179	190	196	\$13,800	\$ 17,900
Derby Elementary School	Derby Line	Orleans	Public	Day School	PK-6	395	384	385	455	423	\$ 10,968	NA
Glover Community School	Glover	Orleans	Public	Day School	PK-8	136	135	134	128	127	\$ 10,050	\$ 10,050
Holland Elementary School	Holland	Orleans	Public	Day School	PK-6	68	67	52	36	41	\$13,500	NA
Irasburg Village School	Irasburg	Orleans	Public	Day School	PK-8	136	148	140	144	134	\$ 10,050	\$ 10,050
Jay/Westfield Joint Elementary	Jay	Orleans	Public	Day School	PK-6	97	86	86	93	79	\$13,266	NA
Lake Region UHSD #24	Barton	Orleans	Public	Day School	9-12	361	346	352	359	394	NA	\$ 14,700
Lakeview USD #43	Greensboro	Orleans	Public	Day School	PK-6	78	83	90	89	91	\$14,100	NA
Lowell Graded School	Lowell	Orleans	Public	Day School	PK-8	112	118	115	114	107	\$ 10,500	\$ 10,500
Newport City Elementary	Newport City	Orleans	Public	Day School	PK-6	345	343	335	350	353	\$ 11,000	NA
Newport Town School	Newport	Orleans	Public	Day School	PK-6	100	105	89	107	120	\$ 13,250	NA
North Country Career Center	Newport City/ Derby	Orleans	Public	Career/Tech. Ctr. & adult education	7-12	NA	NA	0	NA		NA	\$ 14,662

North Country Junior UHSD# 22	Derby Center	Orleans	Public	Day School	7-8	272	257	270	281	259	NA	\$ 16,000
North Country Senior UHSD #22	Newport City	Orleans	Public	Day School	9-12	850	836	796	724	711	NA	\$ 15,900
Orleans Elementary School	Barton	Orleans	Public	Day School	PK-8	114	114	115	125	119	\$ 10,050	\$ 10,050
Troy School	Troy	Orleans	Public	Day School	PK-8	158	199	184	173	189	\$ 12,400	\$ 12,400
Turning Points School	Newport City	Orleans	Approved Independent	Special education school	1-12	NA	NA	27	28	21	NA	NA

*Residents in 2015 voted to close grades 9-12 at the Concord School.

Independent Schools in Northeast Kingdom Not Eligible for Publicly-Funded Tuition Payments										
School Name	Town	County	Type	Description	Grades served	Enrollment Year ending...				
						2013	2014	2015	2016	2017
Caledonia Christian School	St. Johnsbury	Caledonia	Approved Independent	Seventh Day Adventist Day School	1-8	9	8	14	11	12
Cornerstone Christian School (the Fold, Inc.)	Lyndonville	Caledonia	Recognized Independent		6-12	5	11	6	4	4
Good Shepherd Catholic School	St. Johnsbury	Caledonia	Approved Independent	Roman Catholic Day School	PreK-8	156	138	104	88	75
St. Paul's Elementary	Barton	Orleans	Approved Independent	Roman Catholic Day School	K-8	95	76	69	17	69
United Christian Academy	Newport City	Orleans	Independent, Recognized	Christian Day School	K-12	82	87	103	64	77
Twelve Tribes Community Church School	Island Pond (Brighton)	Essex	Recognized Independent		Ages 6 -16	NA	1	6	3	--



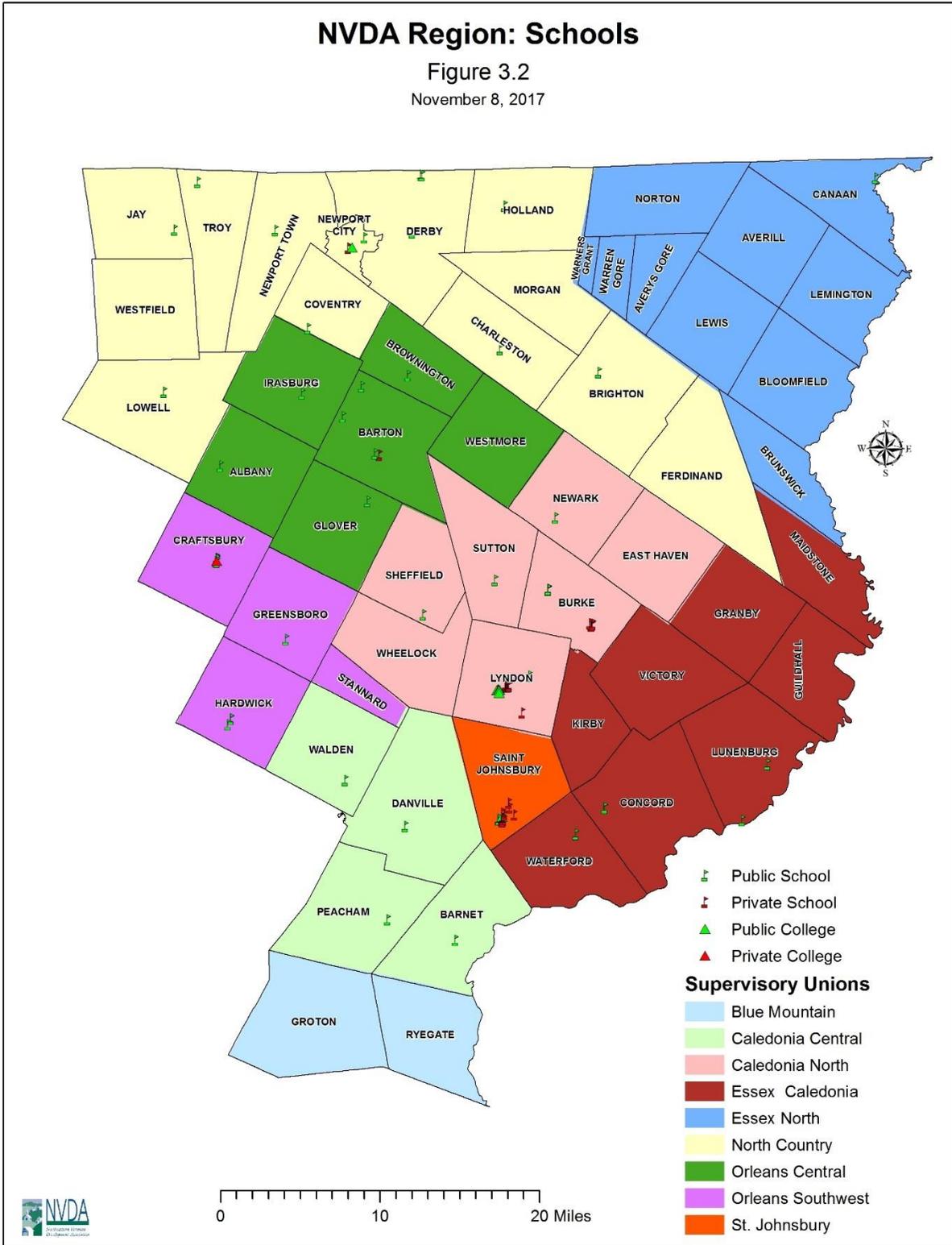
Schools that experienced increased enrollment > 10 % (and at least 10 students) from 2013-2017



Schools that experienced a decrease in enrollment > 10% (and at least 10 students) from 2013 to 2017

NVDA Region: Schools

Figure 3.2
November 8, 2017



School size, distance from home, student diversity, physical facilities, academic programs offered including availability of Advanced Placement courses, and sports and extracurricular offerings are among the many factors considered by families in school choice towns when choosing a school.

Figure 3.1 depicts School Choice towns in the region, by grade levels tuitioned. Benefits of school choice include more flexibility for families and no school buildings to maintain. Some drawbacks are long travel times and high transportation expenses for families (or for towns that provide school bus transportation.) In addition, due to state formulas, a town tuitioning a handful of students may actually have a *higher* education tax rate than a town that maintains a school with hundreds of students.

Home Study & Home School

Some families opt for "Home Study" programs to educate their children. The child is still taught a minimum course of study according to 16 V.S.A. Section 906, with an evaluation at the end of each school year by a qualified teacher, a standardized achievement test, or a portfolio. The number of home-schooled students in the Northeast Kingdom over the past 8 has ranged from a low of 327 in the 2009/10 school year to a high of 372 in the 2013/14 school year. (See Table 3.3). Data specifying the grade level was not available, and numbers tend to vary throughout the school year. Some students are home-schooled in some subjects, and attend school for other subjects or extracurricular activities.

In total, homeschoolers in the 2016/17 school year accounted for about 3.5 percent of the student population in the region.

County	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17
Caledonia	162	171	193	210	215	216	201	192
Essex	30	26	24	23	23	15	15	25
Orleans	135	144	139	139	134	126	134	130
Total NEK Region	327	341	356	372	372	357	350	347
Source: Vermont Agency of Education, response to data request, October 2017								

Supplemental Educational Programs

Another important educational resource in the region is educational/non-profit organizations which run programs for youth that lie outside traditional academic subjects. For example, the University of Vermont Cooperative Extension coordinates a variety of 4-H programs based in locations throughout the region, in subjects such as arts and crafts, cooking, agriculture and livestock, natural resources, energy, and teen leadership.

In 2012, Catamount Arts and the St. Johnsbury Athenaeum initiated an arts education program geared towards pre-k through 8th grade students. Daytime and afterschool programs have served elementary students in St. Johnsbury and neighboring towns in Caledonia County, and have included classes in music, dance, and studio art. Most recently, Catamount Arts has initiated an afterschool violin instruction program in the St. Johnsbury School which is free to all students, based on the international "El Sistema" model.

Other examples of non-profit organizations that provide arts-based education and enrichment programs include the Greensboro Arts Alliance and Residency (GAAR), based in Greensboro, Orleans County, that serves residents of all ages; and Vermont Children's Theater, based in Lyndon, Caledonia County, that provides a free summer theater program for students in the elementary and high school grades.

Secondary Education

Table 3.4 shows the 2015-2016 data on dropout rates of the publicly-funded secondary schools in the three counties of the Northeast Kingdom. Since some secondary schools begin at grade 7 and some at grade 9, both drop-out rates are shown. When students fail to graduate from a secondary level institution (or levels beyond), their opportunities for gainful employment in the future are greatly diminished. It is important that schools and communities strive to help students complete their education.

County	School	Dropout rate Grades 7-12	Dropout rate Grades 9-12
Caledonia	LYNDON INSTITUTE	--	2.88%
Caledonia	ST JOHNSBURY ACADEMY	--	0.97%
Caledonia	DANVILLE	1.27%	1.83%
Caledonia	HAZEN UHS #26	1.49%	2.17%
Essex	CANAAN SCHOOLS	1.79%	2.38%
Essex	CONCORD SCHOOL	0%	--
Orleans	CRAFTSBURY SCHOOLS	0%	0%
Orleans	LAKE REGION UHS #24	3.06%	3.06%
Orleans	NORTH COUNTRY UHS #22A	--	3.89%
Vermont	STATEWIDE TOTAL	1.95%	2.8%

Source: VT Agency of Education, 2013-2014 Dropout & High School Completion Report

Table 3.5 depicts education levels of residents of the Northeast Kingdom as compared to the State. Region-wide, Caledonia County has the population with the highest education levels of the three counties, although it still lags behind the State. About 90 percent of the adult population in Caledonia County has a high school education, compared to about 92% of the State's population. 27% have a Bachelor's degree or higher in Caledonia, as compared to 36% of State's residents.

2015	Caledonia	Essex	Orleans	Vermont
Population 25 years and older	21,639	4,689	19,585	436,657
Less than 9 th Grade	2.9%	7.1%	5.0%	2.9%
9 th to 12 th Grade, no diploma	7.0%	8.4%	8.7%	5.3%
High School Graduate (includes equivalency)	36.1%	43.3%	38.7%	30.1%
Some college, no degree	18.6%	15.7%	18.2%	17.4%
Associate's Degree	8.3%	9.5%	7.2%	8.4%
Bachelor's Degree	16.0%	10.7%	14.4%	21.7%
Graduate or Professional Degree	11.0%	5.3%	7.7%	14.3%
High School Graduate or Higher	90.1%	84.5%	86.3%	91.8%
Bachelor's Degree or Higher	27.0%	16%	22.1%	36.0%
2000				
Population 25 years and older	19,596	4,384	17,814	404,718
High School Graduate or Higher	82.6%	75%	78.2%	86.4%
Bachelor's Degree or higher	22.5%	10.8%	16.1%	29.4%

Source: U.S. Census Bureau, Census 2000, American Community Survey 2015

Residents of Essex County have the lowest level of educational attainment of the three counties, with about 85% having a High School diploma. However, when comparing the education levels of the region's 25 and older population to what it was in 2000, there has been a marked improvement.

Higher education enables residents to be more competitive in the higher-wage job market. An educated population is something that businesses will look for when making a decision to locate in an area, so a highly-educated population in the Northeast Kingdom is important to the future economic outlook of the region.

Post-Secondary and Adult Education

At the post-secondary level, the region is home to four colleges: Sterling College in Craftsbury, two branches of the Community College of Vermont in Newport and St. Johnsbury, Springfield College in St. Johnsbury (School of Human Services), and Lyndon State College in Lyndon. Effective July 1, 2018, Lyndon State College and Johnson State College will merge to become Northern Vermont University, a two-campus institution of higher education.

Lyndon State College has signature programs that draw students from outside the State. The college has been recognized nationally for both its Atmospheric Sciences and Electronic Journalism programs.

Colleges and educational facilities are often viewed as "clean industries" and communities vie to have them. Expanding education institutions within the region is encouraged.

Vermont's adult education and literacy programs are offered through 10 full-service centers and several satellite centers across the state. Full-service centers provide a full range of services, from beginning to advanced literacy in math, reading, writing, interpersonal skills, workplace skills, General Educational Development (GED), Adult Diploma Program (ADP), English to Speakers of other Language (ESOL), High School Completion Program (HSCP) and basic computer instruction. Service centers in the Northeast Kingdom are located in Canaan, Newport, St. Johnsbury and Hardwick and are operated by Northeast Kingdom Learning Services (neklsvt.org).

Technical and Alternative Education

Technical education has become an important and viable part of our educational system, allowing individuals to specialize in work areas typically not addressed by more traditional secondary school programs, and to earn industry-recognized credentials. These programs serve both high school-aged students and adult learners.

Technical education centers in the Northeast Kingdom include: The Canaan Career Center, Lyndon Institute Technical Center, St. Johnsbury Academy Applied Technologies Center, the North Country Career Center (NCCC), and the Green Mountain Technology and Career Center (GMTCC). The school districts of Ryegate and Groton in southern Caledonia County are served by the River Bend Career and Technical Center in Bradford.

The Canaan Career Center at Canaan School in Essex County offers technical education programs with courses of study in business administration and technology, building trades and restoration carpentry, diversified agriculture, fire and emergency services, and health services. The building trades program makes student labor available to nonprofit organizations seeking carpentry work, and students develop advanced skills in building conservation and historic preservation, gaining a sense of pride and ownership in the community.

The St. Johnsbury Academy program offers course in the career clusters of Agriculture, Food, & Natural Resources; Arts and Communication; Architecture and Construction; Business; Hospitality and Tourism; Human Services; Information Technology; Transportation; and Distribution and Logistics.

Lyndon Institute offers career sciences programs in Automotive Technology, leading to NATEF certification; Human Services with an emphasis on Early Childhood Education; Allied Health, leading to LNA

certification; Precision Machining; Welding, leading to AWS certification; Innovation/Engineering Career Academy; and Environmental Stewardship.

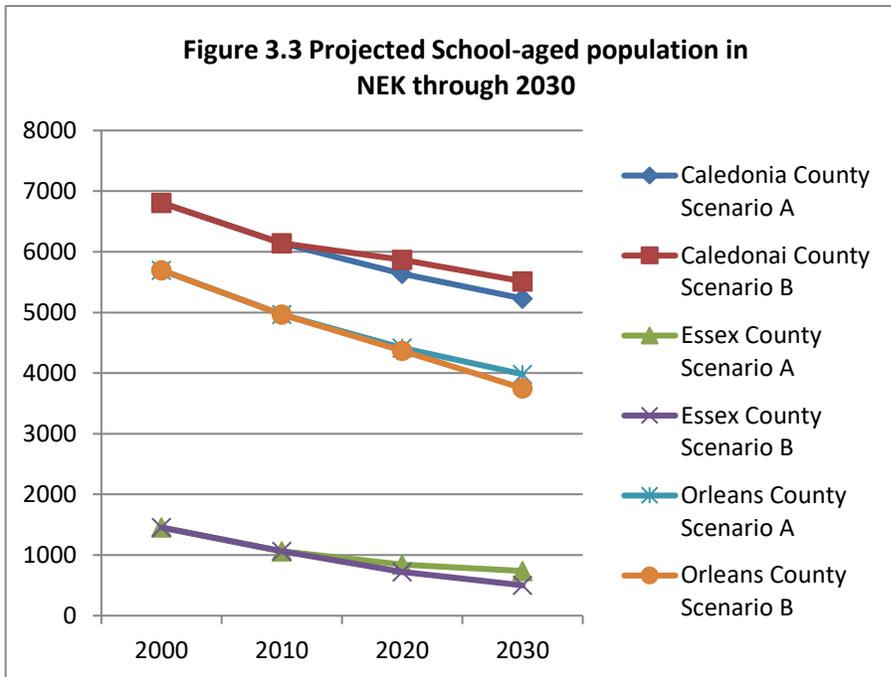
The NCCC is based in Newport and serves high school students and adults with programs in Agriculture and Natural Resources, Arts and Communications, Engineering and Technical Systems, Business Systems, and Health and Human Services. The Harold J. Haynes Memorial Land Lab of NCCC is located on 60 acres on Lower Quarry Road in Derby. Students in the Natural Resources, Building Trades, Heavy Equipment and Protective Services Programs participate in classroom activities as well as hands on land management, vehicle repair, construction and fire & emergency response safety training at this facility. In 2014 NCCC added a program in hospitality and tourism, and in 2015 a program in mechatronics and robotics was introduced. NCCC also provides a smaller selection of satellite programs and technical training at Lake Region High School in Barton.

GMTCC, based in Lamoille County, serves students at Hazen Union and Craftsbury schools. A satellite program in Hardwick located in a building behind the Hazen Union School campus offers a program in Forestry and Land Management Technology. This program provides students with introductory and basic training in areas of forest products, natural resource management, wood production, value added wood products, and the technologies associated with these applications. Student field experiences are conducted with forest land at Hazen, Lamoille Union, and at wood manufacturing facilities. Traditional sugaring operations are conducted in Hardwick with field experiences at advanced commercial operations.

Issues and Concerns

The condition of the physical plant (buildings and grounds), the ability of school buildings to accommodate the student population, student to teacher ratios, and the academic strength of the school (measured largely by standardized test scores) are all items that provide an indication of the ability of a school to provide a good education to all students. Schools, in turn, are often a good indicator of the stability and economic health of the larger community.

The capacity of the physical plant of public schools in the Northeast Kingdom is expected to be sufficient for the foreseeable future. Based on population projections prepared by the State in 2013, the school-aged population is projected to decrease in all three counties of the Northeast Kingdom through 2030 (see Figure 3.3).



The State provided projections under two different scenarios: “A” based on the healthy growth experienced in the 1990s, and scenario “B”, based on the slower growth rates of the 2000s.

On shown on table 3.2, . nine schools in the region experienced growth of greater than 10% from 2013 to 2017. Seven schools in the region experienced a decrease in enrollment of greater than 10% during this period.

A more pressing issue than capacity of the region’s schools is the rising per-

pupil cost of education. As populations shrink and pupil count goes down, per pupil cost can rise in towns that operate their own schools, resulting in a higher homestead education tax rate. It is important to note that because of the way in which education funding is structured, growth in a community that leads to more school-aged children does not necessarily result in an increase in the education tax rate in that town, even if the overall school budget increases. Vermont’s state-funded education system links property tax rates to per-pupil spending rather than the overall school budget, so districts that have schools with high enrollment or that belong to a union school district typically tend to see lower education tax rates because of the economy of scale.

School choice Towns do not deal with physical plants of schools, and the budget of school districts in these towns are largely dependent on decisions made by neighboring school districts or the boards of independent schools. For school choice towns, education costs are dependent on tuition rates at the schools which students attend and vary widely (see table 3.2). In fiscal year 2017, both the highest and one of the lowest spending school districts in the region were in towns that tuitioned all grades: Lemington, with 14.98 equalized pupils, had the highest per-pupil spending in the State at \$ 23,947.8. Brunswick, with 19.18 equalized pupils, spent just \$ \$7,444.53 per pupil. These figures represent spending “per equalized pupil” which assigns a weight to students based on grade level and other special education needs. (It is noted that the school districts of Lemington and Brunswick are among the ten towns that have voted to merge to form the NEK Choice school district, which will become effective in April 2018). In Caledonia County, one of the highest- and lowest-spending districts in 2017 were towns that had a designated elementary school but tuitioned its high school grades: Peacham had a total equalized pupil count of 87.59 in FY 2017, and its PK-6 elementary school had enrollment of 56., Peacham spent \$18,112.83 per equalized pupil in FY2017, while St. Johnsbury, which maintains an elementary school with enrollment of 710 in 2017, and tuitions grades 9-12, had per-pupil spending of just \$12,541.14. St. Johnsbury had a total of 1,119.29 equalized pupils in grades PK-12 in 2017.

There are many expenses and funding sources that contribute to the determination of per-pupil spending, but in general, low-per pupil spending is easier to accomplish in schools with high enrollment. It is noted that the St. Johnsbury Elementary School has the largest enrollment of any elementary school in the Northeast Kingdom. In addition, the location of the school in the center of a densely developed residential area allows many of the students to walk to school, alleviating some of the school transportation costs.

School District Consolidation

In recent years State legislation has been introduced to address the issue of high education costs, including legislation designed to encourage, or even mandate, school consolidation.

In the Northeast Kingdom, several schools have closed in the last 10 years. Most recently, Guildhall closed its elementary school, and the Concord School eliminated the high school grades, and now tuitions those students to other schools.

The benefits of further school consolidation to increase efficiencies and reduce per pupil spending are limited in the region, in part due to the long distances between schools and the cost of student transportation. (See Figure 3.2)

Although many communities in the Northeast Kingdom are opposed to dissolution of local school boards and the forced closure of local schools, Supervisory Unions in the region are looking at ways to reduce costs by sharing items such as financial accounting systems and maintenance services.

Under State Act 46, study committees were formed to investigate the possibilities for merger of school districts.

In 2017, ten school districts in the Northeast Kingdom combined to form the NEK Choice School District, and eight school districts combined to form the Kingdom East School District.

The NEK Choice School District includes the school districts of Bloomfield, Brunswick, East Haven, Granby, Guildhall, Kirby, Lemington, Maidstone, Norton and Victory. This district will become part of the Essex North Supervisory Union (ENSU), and will become operational on July 1, 2018. Prior to creation of the NEK Choice School District, the ENSU included one school district that operated a PK-12 School (Canaan) and four nonoperating districts (Bloomfield, Brunswick, Lemington, and Norton). Assignment of the NEK Choice School District to the ENSU results in an Supervisory Union with two member districts (Canaan and NEK Choice) encompassing 11 towns. The NEK Choice School District's proposal anticipates potential cost reductions in the amount of \$95,900.

The Kingdom East School District includes Burke, Concord, Lunenburg, Lyndon, Newark, Sheffield, Sutton and Wheelock, and will become operational on July 1, 2018.

The school districts of Barnet and Walden from the Caledonia Central Supervisory Union (CCSU) and the school district of Waterford from the Essex Caledonia Supervisory Union (all of which are PK-8 operating / 9-12 tuitioning) formed a study committee and developed a proposal to form the Caledonia Cooperative Unified Union School District. In addition, the Danville School District from the CCSU and the Cabot and Twinfield School Districts from the Washington Northeast SU have formed a study committee that is considering the advisability of creating a unified district that operates all grades (unified PK-12 operating district). These proposals have not yet been put to a vote by the electorate of the districts involved.

Academic Achievement

Because of the nature of the state-funded education system in Vermont, the ability of a town to provide adequate educational facilities is not based on the wealth of local residents and grand list values. This has enabled higher-poverty school districts (defined here as schools with at least 50% of students eligible for free or reduced price lunch) to provide high-quality educational facilities without raising local tax rates to unsustainable levels. Vermont's school funding system has alleviated many of the funding problems associated with low-income school districts, ensures equal access to education for all the state's students, and is recognized as one of the most equitable school-funding systems in the nation. However, the system is not able to address other socioeconomic factors that are linked to student achievement. In general, statistics show that students in high-poverty school districts tend to perform more poorly than students in "middle class" districts (defined as districts where the proportion of students on free or reduced lunch is less than 50%).

According to an article by Richard D. Kahlenberg in *American Educator*, (Winter 2012-2013), boosting academic achievement in schools is dependent on economic integration. The article cites research that shows that the performance of low-income students improve when they attend schools serving students in the middle and upper-middle income brackets, and this improvement is independent of any benefits resulting from better-funded schools. The article identifies middle-class schools as those where less than 50 percent of students are eligible for free or reduced-priced lunch, and high poverty schools as those where at least 50 percent of students are eligible for free or reduced-price lunch. Link to the complete article: <http://www.aft.org/pdfs/americaneducator/winter1213/Kahlenberg.pdf>

Because of the significant effect that socioeconomic factors have on student performance, communities that support a balance of income levels through new housing development and job creation can better help assure that residents of all economic backgrounds have access to good schools, functional government and economic opportunity.

GOALS AND STRATEGIES FOR EDUCATIONAL FACILITIES

EDUCATIONAL FACILITY GOALS

- School districts will seek to maximize educational opportunities for students, including extracurricular offering, and increase economic efficiency by sharing services with neighboring school districts when feasible.
- To provide the most favorable outcomes for students, school districts should be economically integrated.
- Adult literacy resources will continue to be available to residents of the Northeast Kingdom to increase the percentage of residents that have earned a high school diploma.
- Post-secondary institutions in the region are vital to the economic development potential of the region and will be supported.
- Post-secondary schools will be closely integrated with the local communities they serve, including the business community, and should have a mutually beneficial relationship.
- Affordable educational and training opportunities should exist for all persons within the region.

EDUCATIONAL FACILITY STRATEGIES

- Investigate opportunities for shared facilities between municipalities and institutions.
- Provide opportunities for the involvement of school officials in the local planning process.
- Promote the development of economically integrated school districts through policies and programs that promote a range of housing options for all income levels within each school district.
- Promote cooperation between institutions of higher learning and local businesses to support quality training and employment opportunities for local residents.
- Support the expansion of post-secondary institutions in the region, to continue to build a highly-educated workforce.
- Support local and regional efforts for workforce development and adult education.
- Support the efforts of local and regional libraries to provide quality facilities and materials for independent learning and education.

II. RECREATION FACILITIES & PROGRAMS

The Northeast Kingdom is home to numerous State Parks, Wildlife Management Areas and Natural Areas that provide passive and active recreational opportunities. In addition, many towns in the region offer public recreation facilities in some form, including town parks or commons, town forests, tennis and basketball courts, ball fields, ice rinks, and public beaches. There are also school recreation facilities, and municipal buildings hosting local recreation programs.

The two major commercial recreational facilities in the region are Burke Mountain Resort, and Jay Peak Resort.

Burke Mountain has Nordic ski trails, Alpine ski trails served by four ski lifts and a J-bar, a full-service restaurant, and a hotel and conference center currently under construction. In the summer, the Burke ski trails are used for mountain biking.

Jay Peak, located in the town of Jay, also hosts a large hotel and conference center, with adjacent golf course. There are a number of alpine ski trails served by nine lifts that can reportedly service 12,820 people per hour. The Pump House Indoor Waterpark is attached to the hotel and is a major draw for tourists year-round. The Ice Haus Arena at Jay Peak offers ice skating lessons and public skating sessions for a reduced rate to Vermont residents.

Municipalities, especially the more rural ones, tend to rely to an extent on private property to meet residents' recreation needs. The Vermont Association of Snow Travelers (VAST) is an organization that relies in part on agreements with private property owners to allow winter access for recreational snow travel. However, unless there are permanent access easements on these properties, property owners can decide to exclude public access at any time.

Towns with higher populations, including St. Johnsbury, Lyndon, Newport City, and Derby, have an array of community recreational facilities and programs. In recent years St. Johnsbury closed its municipal recreation center located in the old armory building and partnered with St. Johnsbury Academy to provide the capacity and staff for its municipal recreation program, which continues to operate year-round and provide a variety of sports teams and activities. Catamount Arts, which is a non-profit arts organizations based in St. Johnsbury, also plays an important role in providing recreational and cultural programs for children year round. It also serves as a "regional box office" for events as diverse and geographically far-ranging as musical theater productions at the Haskell Opera House in Derby Line, to water skiing camps on Harvey's Lake in Barnet.

Parks or "greens" in the center of town are important for passive recreational opportunities. For example, Danville, St. Johnsbury, Newport and Lyndonville all host free outdoor summer concert series in centrally located public spaces.

Table 3.6 is a list of facilities available for use by the general public either free of charge or for a modest fee, organized by county and town. The facilities are generally operated by a municipality, state agency, or a non-profit. The list is not exhaustive, and does not include small pocket parks, school recreational facilities or other passive recreational facilities that may be highly valued by individual communities.

County	Town	Facility/Program	Owner/management organization
Caledonia	Barnet	Harvey's Lake/swimming beach, swim lessons, beach house, picnic areas, boating, water skiing	Town of Barnet, Harvey's Lake Beach Committee
Caledonia	Burke and Kirby	Darling State Park/primitive camping, hang gliding launch sites, observation/fire tower,	Vermont Department of Forests Parks and Recreation

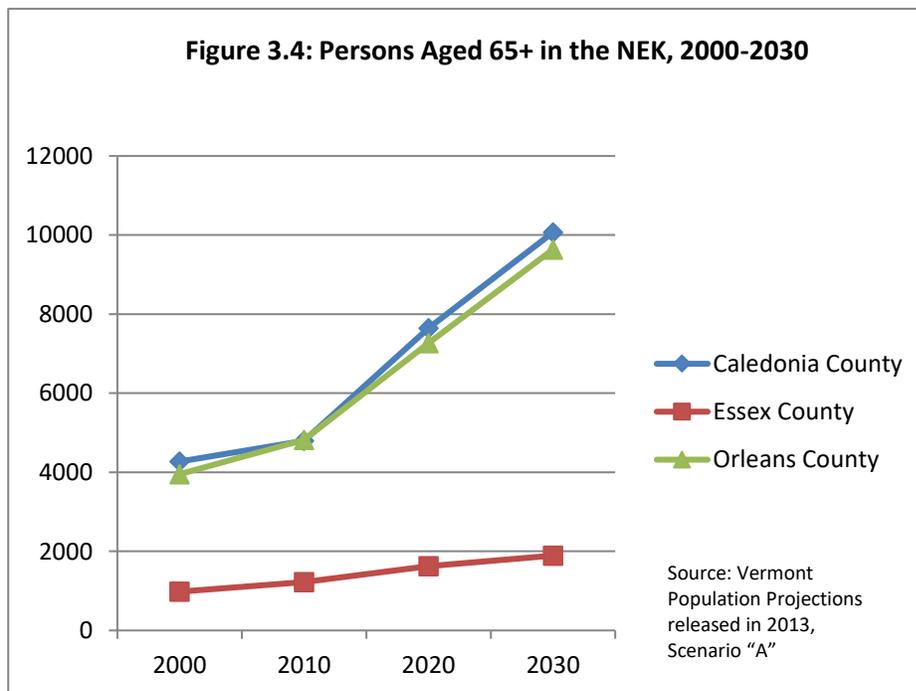
		rustic pavilion (portions leased to Burke Mountain ski area)	
Caledonia	Groton	Seyon Lodge State Park (in Groton State Forest)/lodge and conference center, fly fishing, boat rental, cross-country ski trails	Vermont Department of Forests Parks and Recreation
Caledonia	Groton	Ricker Pond State Park (in Groton State Forest)/campsites, lean-tos, cabins, swimming beach, boat launch, hiking trails	Vermont Department of Forests Parks and Recreation
Caledonia	Groton	Big Deer Sate Park (In Groton State Forest)/campsites, lean-tos, nature trails	Vermont Department of Forests Parks and Recreation
Caledonia	Groton	Stillwater State Park (In Groton State Forest)/ camp sites and lean-tos, swimming beach, boat launch	Vermont Department of Forests Parks and Recreation
Caledonia	Groton	Boulder Beach State Park (in Groton State Forest)/day use picnic areas, swimming beach, boat launch, boat rental, play area	Vermont Department of Forests Parks and Recreation
Caledonia	Lyndon/Burke	Cross Country ski/bike trails	Kingdom Trails
Caledonia	Lyndonville	Powers Park/outdoor swimming pool, tennis courts, swim lessons, arts and crafts program	Village Improvement Society/Powers Park Board
Caledonia	Lyndonville	Fenton Chester Arena (indoor ice rink/indoor field sports)	Lyndon Area Sports Association
Caledonia	Lyndonville	Community ski hill, rope tow, T bar	Lyndon Outing Club
Caledonia	Peacham	New Discovery State Park (in Groton State Forest)/ camp sites, lean-tos, seven horse camping sites, pond for fishing, trails	Vermont Department of Forests Parks and Recreation
Caledonia	Sheffield	Perry Holbrook State Park/ hiking trails, two ponds for fishing and picnicking. Dispersed recreation, including hunting and trapping.	Vermont Department of Forests Parks and Recreation
Caledonia	St. Johnsbury	Public outdoor swimming pool/free swim lessons	Kiwanis Club
Caledonia	St. Johnsbury	Playground, outdoor ice rinks(2), playing fields, tennis courts	Town of St. Johnsbury, Kiwanis Club, American Legion
Caledonia	St. Johnsbury	Town Forest hiking trails	Town of St. Johnsbury
Caledonia	St. Johnsbury	Fred Mold Park/picnic area and fishing pier at confluence of Moose and Passumpsic Rivers	Town of St. Johnsbury
Caledonia	St. Johnsbury	St. Johnsbury Country Club Golf Course/day rates available to the public	St. Johnsbury Country Club
Caledonia	St. Johnsbury (eastern terminus of LVRT)	Three Rivers Recreation Trail to Lamoille Valley Rail Trail/ four seasons transportation trail	Town of St. Johnsbury/VAST
Caledonia	St. Johnsbury	Dog Mountain: Dog Chapel, the Stephen Huneck Gallery and hiking trails on 150 acres	Friends of Dog Mountain
Caledonia and Essex	Averill, Avery's Gore, Bloomfield, Brighton, Brunswick, Burke, East	Kingdom Heritage Lands (West Mountain Wildlife Management Area, the Silvio Conte National Wildlife Refuge- Nulhegan Basin Division, and the Plum Creek private timberlands) / hiking trails, snowmobile trails, equestrian trails	Green Mountain Club/Vermont Agency of Natural Resources/VAST/ Vermont Horse Council

	Haven, Ferdinand, Granby, Lemington, Lewis, Maidstone, Morgan, Victory		
Essex	Canaan	Canaan Recreation Park/ Adjacent to Library and Historic Society Museum, playground, golf range, softball fields, camp sites, picnic pavilion	Town of Canaan Recreation Committee/Canaan Historical Society
Essex	Concord, Granby, Lunenburg, and Victory	Victory State Forest/ primitive camping, hiking, hunting, trapping, wildlife viewing, snowmobiling, snowshoeing, and horseback riding	Vermont Department of Forests Parks and Recreation/Vermont Horse Council
Essex	Maidstone	Maidstone State Park/campsites, lean-tos, swimming beaches, playground, hiking trails, pavilion with picnic tables	Vermont Department of Forests Parks and Recreation
Essex	Norton	Black Turn Brook State Forest/ hiking, cross country skiing, snowshoeing, hunting, and fishing, primitive camping	Vermont Department of Forests Parks and Recreation
Orleans	Barton	Crystal Lake State Park/ Swimming beach, bathhouse, picnic area	Vermont Department of Forests Parks and Recreation
Orleans	Brighton (Island Pond)	Brighton State Park/Spectacle Pond public beach and bathhouse, campsites, lean-tos, cabins, boat rental, nature museum, amphitheater, hiking trails	Vermont Department of Forests Parks and Recreation
Orleans	Charleston	Northwoods Stewardship Center/ mapped trails, day camps, expeditions, science programs	Northwoods Stewardship Center
Orleans	Craftsbury	Hosmer Point, camp programs, sailing on Hosmer Pond	Hosmer Point
Orleans	Craftsbury/ Albany	Craftsbury Outdoor Center/Nordic ski trails, rowing center (sculling)	Craftsbury Outdoor Center (non-profit)
Orleans	Derby	Bike Path along Lake Memphremagog from Canadian Border to Newport City	Town of Derby
Orleans	Derby	Baxter Park/ Playground, Baseball Fields, Tennis Courts, Basketball Court	Town of Derby
Orleans	Derby	Lake Salem Beach House/ Beach House, Sand Beach, Volleyball Court, Horse Shoe Pits	Town of Derby
Orleans	Derby	Petsafe Kingdom Dog Park/off leash dog park	Town of Derby/Dog Park Committee
Orleans	Derby	Clyde River Park/picnic areas, passive recreation	Town of Derby
Orleans	Derby	Derby skating rink w/ warming shack at North Country Union Jr. High	Town of Derby
Orleans	Greensboro	Caspian Lake/ swimming beach, boat launch, picnic areas, natural areas	Greensboro/Hardwick Electric
Orleans	Newport	Prouty Beach and Campground	City of Newport
Orleans	Newport	Gardner Memorial Park: playground, basketball, picnic areas, Clyde River access, Lake	City of Newport

		Memphremagog access, fishing dock, playing fields, skatepark, ice rinks	
Orleans	Newport	Newport Recreation Path/non-motorized recreational uses. Joins the Beebe Spur Rail Trail in Canada	City of Newport
Orleans	Newport	Newport City Dock/ marina, boardwalk, lake cruises	City of Newport
Orleans	Newport	Gateway Center/ event space on Lake Memphremagog	City of Newport
Orleans	Troy	Big Falls of the Missisquoi Natural Area/ swimming, fishing	Vermont Department of Forests Parks and Recreation
Orleans	Westfield	Hazen's Notch Natural Area, Hazen's Notch State Park/ hiking trails, rare plants and peregrine falcon viewing, intersects Long Trail	Vermont Department of Forests Parks and Recreation
Orleans	Westmore	Willoughby Cliffs Natural Area/Lake Willoughby (in Willoughby State Forest) fishing, hiking trails, swimming. Boat launch on north end of lake	Vermont Department of Forests Parks and Recreation
Orleans	Westmore	Sentinel Rock State Park/hiking, ADA- accessible interpretive center	Vermont Department of Forests Parks and Recreation

Planning Considerations

Communities should plan for adequate facilities to meet residents’ needs, and financial sustainability is a key consideration. Towns should research funding options before undertaking a project, as certain loan programs offer loan forgiveness in communities that are financially stressed.



Programs for seniors are an important part of the region’s recreational programs, particularly since population projections predict that seniors over age 65 will continue to make up a greater percentage of the population in the Northeast Kingdom. By 2030, people aged 65 and older are expected to represent 32% of the region’s population.

Some senior programs are organized by local non-profit community groups and receive support by the municipality through an annual appropriation.

For example, “Wonder and Wisdom” receives an annual appropriation from the town of Greensboro to

provide programs for local seniors that are designed to enable them to maintain social contact, and make new friends through outings, cultural activities, and age-appropriate exercise classes.

The Northeast Kingdom Council on Aging, which is supported by the Vermont Agency of Human Services, offers fitness classes at locations throughout the NEK region especially designed for seniors, such as “Growing Stronger” and “Tai Chi for Arthritis.”

Providing an adequate number of recreational programs and facilities adds to the residents’ overall well-being and the community’s quality of life, and thus are important for any town. Publicizing these recreational facilities to town residents and visitors is just as important as developing and maintaining them in the first place.

GOALS AND STRATEGIES FOR RECREATIONAL FACILITIES

RECREATIONAL FACILITIES GOALS

- Towns in the region will provide recreational facilities according to the population’s particular needs.
- State-managed lands in the region will continue to be accessible to the residents of the region, and improvements will be made as appropriate to serve the identified needs of the population, as articulated in municipal plans (e.g., blaze new trails, maintain parking areas and points of entry into state-controlled lands used for passive recreation, create improved access to waterbodies)

RECREATIONAL FACILITIES STRATEGIES

- NVDA will assist municipalities in identifying recreational needs and securing appropriate funding sources to develop new facilities.
- NVDA will direct municipalities to appropriate resources (e.g., Northeast Kingdom Travel and Tourism Association) to develop strategies to increase visibility of existing recreational resources to residents and potential visitors.

(Note: For discussion of goals related to recreational use of land, see Chapter One: Land Use Section V. Recreation Land Use Goals.)

III. CHILD CARE

Safe, reliable and affordable childcare is a resource that is important to the economic and social well-being of Northeast Kingdom communities. It should be a consideration in any development that is designed to house families, particularly affordable housing developments as defined in state statute. It is also important to have childcare facilities near places of employment. The lack of sufficient childcare facilities poses a particular hardship to single parents struggling to find employment and care for a child.

The regional child care system is diverse, and includes independent day care homes, relative care, and center based group care.

The Vermont Department for Children and Families (DCF) operates the Bright Futures Child Care Information System, which is a database of child care providers searchable by town. The site also provides information on how to become a licensed childcare provider. A link to the database can be reached through the DCF website: <http://www.brightfutures.dcf.state.vt.us>

Regional agencies and organizations that offer child care programs or provide referrals to programs include Northeast Kingdom Community Action, Inc. (NEKCA), which oversees the Headstart and Early Headstart programs in the region; and Umbrella, Inc., which operates the Kingdom Childcare Connection program.

GOALS AND STRATEGIES FOR CHILD CARE

CHILD CARE GOALS

- Child care entrepreneurs and child/family service centers should be supported.
- Additional site-based or community child care centers that offer high quality, affordable care should be developed in employment centers and as a component of affordable housing developments.
- The efficiency and effectiveness of existing child care, early education, and family service programs should be improved.
- Child care issues will be integrated into the planning process.

CHILD CARE STRATEGIES

- Provide assistance to municipalities and non-profits seeking to develop child care facilities and/or programs.
- Assist municipalities in assessing the future local need for and supply of childcare services, and whether local barriers exist for the provision of needed services, and assist in developing an action plan.
- Municipalities periodically should review land-use and development regulations to identify needed amendments to authorize quality child-care services in appropriate locations convenient to households, including as home occupations.
- Employers, schools, and community organizations should collaborate to ensure that affordable, quality child-care services are available to meet the different needs of households.
- Municipalities should encourage the inclusion of childcare facilities in the plans for any multi-family housing development that will accommodate families with children, and any large commercial development, to provide more options for employees.

IV. TELECOMMUNICATIONS

The region can gain many economic, social, safety and cultural benefits with a strong telecommunication infrastructure.

The 2014 Vermont Telecommunications Plan issued by the State of Vermont Department of Public Service sets forth ambitious goals that, if realized, will help close the gaps in broadband and cell coverage experienced in many locations in the Northeast Kingdom.

Among the goals of the Plan:

1. **Broadband Speed.** Every E-911 residential and business locations in Vermont should have available broadband Internet access with the minimum technical requirements of 4 megabits per second (Mbps) download and 1 Mbps upload. By year end 2020, a majority of addresses in Vermont should have access to the Internet at speeds of at least 100 Mbps symmetrical, and every address should have access at speeds of at least 10 Mbps download. **By 2024, every address should have broadband speeds of 100 Mbps symmetrical.**
2. **Broadband Deployment.** Every address in Vermont should have access to wired and wireless broadband Internet access service.

3. Affordability. Broadband service should be affordable to all members of every customer class.
4. Local Public Generated Content. The state should promote locally generated content that is used and useful to the community.
5. Adoption and Usage. Vermont should support the universal adoption and use of broadband service at home and at work.
6. Mobile Service. Vermont should have universal availability of mobile service along roadways and near universal availability statewide.
7. Basic Service. Vermont should have reliable, economical telephone service in all areas of the state, including rural areas. All residents, regardless of income or location, should have access to basic telephone service.
8. Enhanced 911. Vermont should have available the best possible E-911 service. The State should endeavor to find greater efficiencies within the E-911 system without sacrificing public safety.
9. Competition. Vermont's telecommunications marketplace should be competitive and all Vermonters should reap the benefits of competition.
10. Regulatory Fairness. Like services should be regulated alike, regardless of the platform or technology used to provide the service.

For an in-depth description of Vermont's telecommunication goals refer to the Vermont Telecommunications Plan at:

http://publicservice.vermont.gov/sites/psd/files/Pubs_Plans_Reports/State_Plans/Telecom_Plan/VT%20Telecom%20Plan%202014.pdf

According to the Vermont Public Service Department, Essex County is one of the most underserved counties in the State, with DSL, cable and fixed wireless broadband services available to less than half of the population.

Table 3.7 below indicates broadband coverage in the Northeast Kingdom, as of January 2017.

County	Town	# Buildings	Served 100/100 or Better		Served 25/3 or Better		Served 4/1 or Better		Underserved*	
			#	%	#	%	#	%	#	%
CALEDONIA	Barnet	1,026	0	0	224	21.8%	748	72.9%	278	27.1%
	Burke	1,018	0	0	579	56.9%	634	62.3%	384	37.7%
	Danville	1,421	0	0	751	52.9%	862	60.7%	559	39.3%
	Groton	706	0	0	199	28.2%	405	57.4%	301	42.6%
	Hardwick	1,413	16	1.1	964	68.2%	1,245	88.1%	168	11.9%
	Kirby	274	0	0	29	10.6%	92	33.6%	182	66.4%
	Lyndon	2,302	0	0	1930	83.8%	1,988	86.4%	314	13.6%
	Newark	586	0	0	0	0	256	43.7%	330	56.3%
	Peacham	557	0	0	163	29.3%	316	56.7%	241	43.3%
	Ryegate	682	0	0	277	40.6%	446	65.4%	236	34.6%
	Sheffield	461	0	0	109	23.6%	265	57.5%	196	42.5%
	St. Johnsbury	2,918	0	0	2542	87.1%	2,649	90.8%	269	9.2%
Stannard	139	0	0	0	0	84	60.4%	55	39.6%	

	Sutton	476	0	0	119	25%	162	34.0%	314	66.0%
	Walden	646	0	0	9	1.4%	509	78.8%	137	21.2%
	Waterford	664	0	0	118	17.8%	403	60.7%	261	39.3%
	Wheelock	505	0	0	63	12.5%	264	52.3%	241	47.7%
ESSEX	Averill	246	0	0	0	0	18	7.3%	228	92.7%
	Averys Gore	8	0	0	0	0	0	0	8	100.0%
	Bloomfield	239	0	0	0	0	147	61.5%	92	38.5%
	Brighton	950	0	0	610	64.2%	721	75.9%	229	24.1%
	Brunswick	76	0	0	0	0	18	23.7%	58	76.3%
	Canaan	611	0	0	0	0	398	65.1%	213	34.9%
	Concord	886	0	0	279	31.5%	621	70.1%	265	29.9%
	East Haven	216	0	0	0	0	83	38.4%	133	61.6%
	Ferdinand	77	0	0	0	0	13	16.9%	64	83.1%
	Granby	105	0	0	0	0	63	60.0%	42	40.0%
	Guildhall	183	0	0	0	0	126	68.9%	57	31.1%
	Lemington	94	0	0	0	0	53	56.4%	41	43.6%
	Lewis	47	0	0	0	0	0	0	47	100.0%
	Lunenburg	878	0	0	0	0	582	66.3%	296	33.7%
	Maidstone	332	0	0	0	0	130	39.2%	202	60.8%
	Norton	226	0	0	0	0	95	42.0%	131	58.0%
	Victory	100	0	0	0	0	63	63.0%	37	37.0%
	Warners Grnt	2	0	0	0	0	0	0	2	100.0%
	Warren Gore	59	0	0	0	0	4	6.8%	55	93.2%
ORLEANS	Albany	617	20	3.2%	20	3.2%	480	77.8%	137	22.2%
	Barton	1,474	0	0	926	62.8%	1,214	82.4%	260	17.6%
	Brownington	542	0	0	318	58.7%	493	91.0%	49	9.0%
	Charleston	757	0	0	460	60.8%	601	79.4%	156	20.6%
	Coventry	475	0	0	227	47.8%	319	67.2%	156	32.8%
	Craftsbury	693	59	8.5%	59	8.5%	606	87.4%	87	12.6%
	Derby	2,505	0	0	1932	77.1%	2,197	87.7%	308	12.3%
	Glover	807	0	0	117	14.5%	620	76.8%	187	23.2%
	Greensboro	830	7	0.8%	84	10.1%	724	87.2%	106	12.8%
	Holland	456	0	0	5	1.1%	303	66.4%	153	33.6%
	Irasburg	616	0	0	175	28.4%	340	55.2%	276	44.8%
	Jay	532	0	0	336	63.2%	345	64.8%	187	35.2%
	Lowell	560	0	0	0	0	255	45.5%	305	54.5%
	Morgan	816	0	0	535	65.6%	649	79.5%	167	20.5%
	Newport City	1,957	0	0	1936	98.9%	1,947	99.5%	10	0.5%
	Newport Town	842	0	0	406	48.2%	687	81.6%	155	18.4%
	Troy	885	0	0	688	77.7%	771	87.1%	114	12.9%
Westfield	374	0	0	121	32.4%	174	46.5%	200	53.5%	
Westmore	585	0	0	0	0	402	68.7%	183	31.3%	

Source: Vermont Public Service Department

*Underserved locations are potentially served at 4/1 by FairPoint

The Public Service Department provides up-to-date information on wireless and broadband coverage on its website: <http://publicservice.vermont.gov>

Geographic distance to markets traditionally posed a barrier for rural businesses. With the development of e-commerce and secure online transactions, rural businesses and residents can join in an expanded modern

economy. Tourism information and marketing of local products is available to customers anywhere at any time on the Internet. A strong telecommunications infrastructure serves to improve quality of life, supports businesses, and provides information to residents and tourists about the region.

As telecommuting becomes more popular, settlement patterns may change as more people work in "cyber-jobs" or further away from their employment locations. Video conferencing and teleconferencing allow people to work while away from their offices, reduce some time and expense of transportation to meetings and relieve the burden to drive in hazardous winter conditions. Although the availability of these systems has increased significantly in the last decade, there are still some gaps in coverage in the Northeast Kingdom region, as noted above.

In the Northeast Kingdom, an initiative of the Vermont Telecommunications Authority was the Northeast Kingdom Fiber Network. A fiber optic network benefits cell service and broadband internet expansion in the following way, as noted by the VTA:

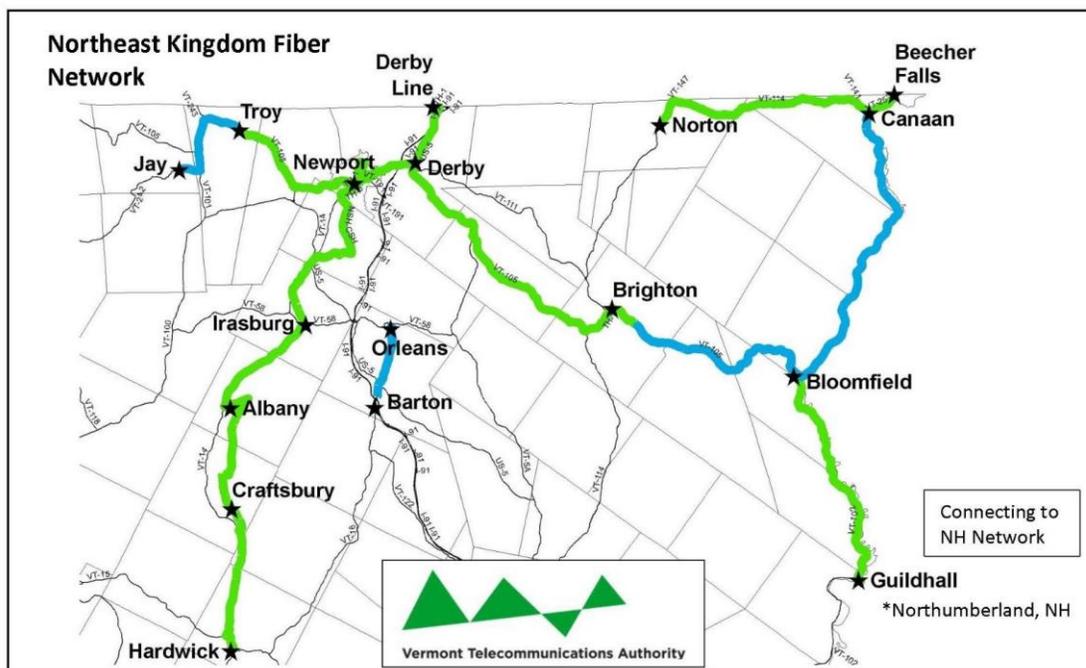
- Cellular towers and other cellular infrastructure need fiber optic routes for "backhaul," the means of transmitting signals from the wireless antennae to carriers' nationwide and global networks.
- For broadband Internet, getting fiber optic cable closer to end users makes faster Internet access possible even when the final leg of service to homes and businesses is a copper telephone line, coaxial cable TV lines or wireless signal.

The network includes the following connections:

- Derby Line to Derby, Route 5
- Derby to Brighton, Route 105
- Brighton to Bloomfield, Route 105
- Newport to Jay, Routes 105, 101 & 242
- Newport to Irasburg, Routes 5 and 14
- Irasburg to Albany, Route 14
- Albany to Craftsbury, Craftsbury Road
- Craftsbury to Hardwick, Route 14
- Orleans to Barton, Telfer and Baird Roads
- Guildhall to Beecher Falls, Route 102
- Beecher Falls to Norton, Route 114

The route connects from Guildhall across to Northumberland, NH to a 744-mile New Hampshire fiber optic network (see Figure 3.5)

Figure 3.5



In 2015, the activities of the Vermont Telecommunications Authority were absorbed by the Connectivity Division in the Vermont Department of Public Service.

Regulations of Wireless Telecommunication Facilities

In 2007, the Vermont Legislature created 30 V.S.A. § 248a. Section 248a provided telecommunications carriers seeking to construct telecommunications facilities the option of obtaining a “Certificate of Public Good” from the Public Service Board (PSB) as an alternative to local zoning and Act 250 environmental review. Although municipalities may still adopt local ordinances pertaining to telecommunications towers, carriers typically choose to have projects reviewed by the PSB.

New legislation enacted in 2014 sought to clarify the role of the municipal and regional plan in Act 248a proceedings. Act 190 amendments to Section 248a directed the Public Service Board to describe how it interprets the terms “substantial deference” and “good cause” as used in the statute. These terms were intended to provide direction to the PSB as to how to weigh recommendations of municipalities with regard to their town plans and conservation measures.

The Public Service Board adopted the following definitions:

“Good cause” means a showing that deferring to the land conservation measures in the plans of the affected municipalities and the recommendations of the municipal legislative bodies and the municipal and regional planning commissions regarding the municipal and regional plans, respectively, would be detrimental to the public good or the State’s interests articulated in 30 V.S.A. § 202c.

“Substantial deference” means to give significant and meaningful weight to the land conservation measures in the plans of the affected municipalities and the recommendations of the municipal legislative bodies and the municipal and regional planning commissions regarding the municipal and regional plans, respectively.

It is important that municipalities clearly describe their visions for telecommunication planning within their town plans, since the plans are consulted by both the Act 250 commission and the Public Service Board when reviewing projects.

NVDA encourages towns to prepare the most appropriate plans and regulation for their individual needs.

GOALS AND STRATEGIES FOR TELECOMMUNICATIONS

TELECOMMUNICATIONS GOALS

- Northeast Kingdom residents, business, organizations and public entities will be served by an up-to-date telecommunications infrastructure.
- Affordable fixed and wireless communications systems, as well as high-speed Internet broadband, will be available throughout the region.
- Land conservation measures and protection of scenic resources identified in local and regional plans will be given substantial deference when telecommunications projects are under review.

TELECOMMUNICATIONS STRATEGIES

- Solicit input from towns in the region to determine where gaps in broadband and cell coverage may still exist.
 - Encourage communities to set up wi-fi zones in public areas (libraries, municipal buildings, etc.) that are available free of charge to residents.
 - Support development efforts that reduce the cost of high-speed telecommunications throughout Vermont and the Northeast Kingdom.
 - Continue to work with state and regional agencies, as well as the private sector, to attain the coverage goals as set forth in the State Telecommunications Plan.
-

V. SECURITY & EMERGENCY SERVICES

Enhanced 9-1-1

Since 1998, enhanced 9-1-1 dispatch service has reduced the response time of emergency services for Northeast Kingdom towns. A person dialing 9-1-1 is automatically routed to the appropriate Public Safety Answering Point (PSAP), regardless of telephone exchange boundaries. The Derby State Police Barracks has been the regional PSAP, however due to state budget cuts the Vermont Department of Public Safety is consolidating from four PSAP's to two. Dispatching that is now done out of the Derby PSAP will be done out of Williston. This should not diminish the service provided or response times for first responders, however there has been some concern from citizens, first responder agencies, and local legislators. This change will take place as of September 30, 2015. The PSAP call taker has the caller's phone number, locatable address from a Geographic Information System (GIS), and contact information for the nearest emergency services (police, fire, ambulance, EMS). This enhanced service has shortened response time in the dispatch of appropriate local emergency services and finding the location of the caller without having the caller provide that information.

The Orleans County Sheriff's Department has researched the costs and logistics involved to keep dispatching local. There has been some interest from first responder agencies that now use the Derby PSAP to join this

dispatch system, if it occurs; however this new dispatch system managed by and located at the Orleans County Sheriff's Department would not occur until sometime in 2016.

Fire Protection

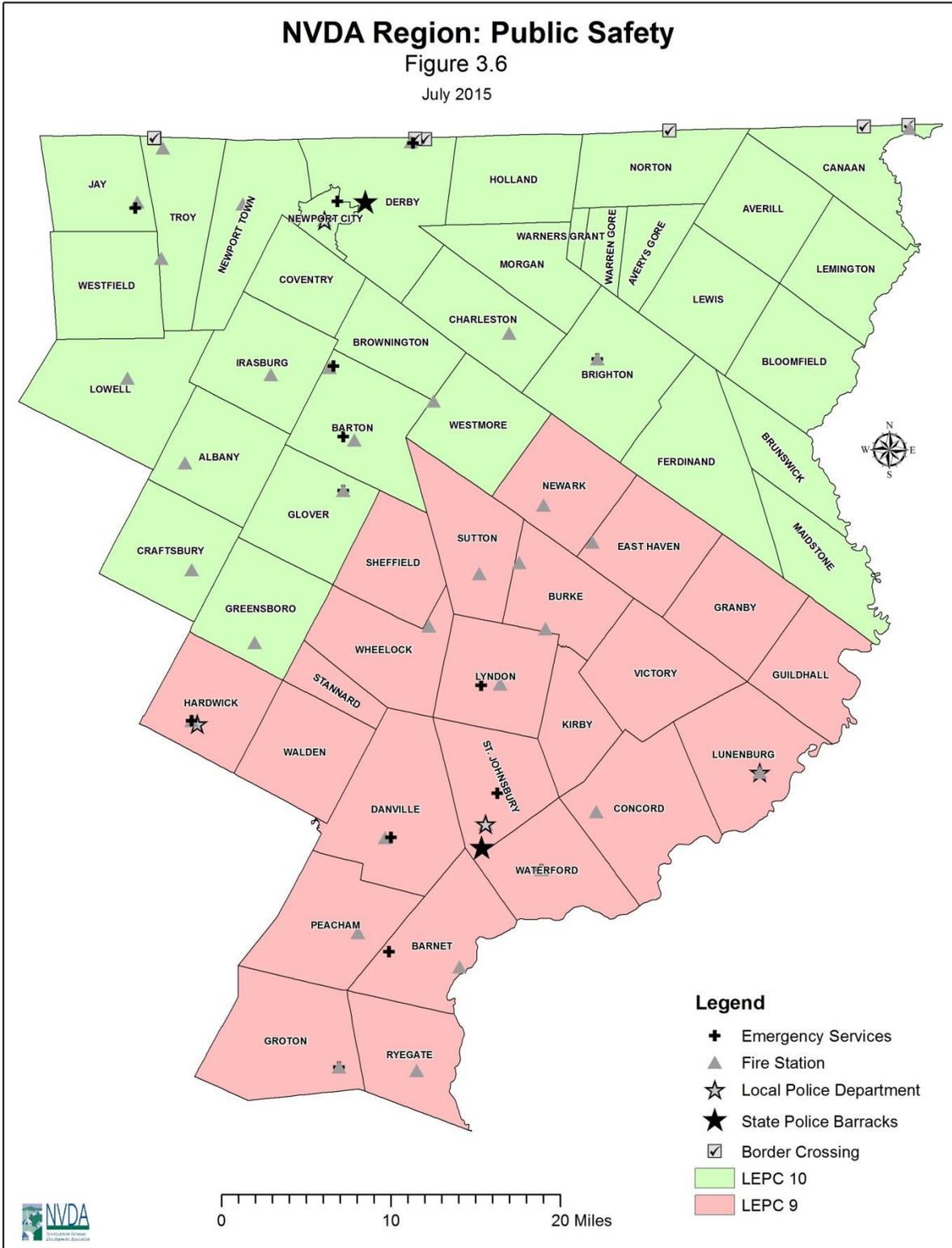
The region is served by a variety of local fire departments. The majority of incorporated towns have their own fire protection. Other communities do not have a fire department and rely on neighboring towns to provide their protection. The types of departments vary from combination full/part-time to paid on-call, to all volunteer. The responsibilities of each department vary according to the population they serve. Major responsibilities of fire departments continue to be fire suppression, prevention and education. The majority of housing in the region (older, wood buildings) was constructed without modern building or fire code standards, making fire prevention a challenge in buildings with outdated wiring or heating. Fire departments also respond to calls for auto accidents, hazardous materials spills, Emergency Medical Services (EMS), and natural and man-made disasters. The capability of these departments to handle such incidents ranges from very good to very poor. If a technical response is needed that a department is not suited to handle, such as rope rescue or hazardous materials mitigation (Haz-Mat), the services will come from the nearest available department or the State Hazardous Materials Response Team. All towns have a fire warden.

Within the three counties there are mutual aid organizations which enable the departments to work collaboratively to mitigate problems in each other's communities. Some departments may travel as much as 40 to 50 miles if needed. One of the major hindrances for small towns is the lack of local firefighters to respond to incidents. Many communities are without immediate fire response because their staff/volunteers work outside the town and will not be able to respond quickly. In addition, departments face challenges to recruit new members due to the high level of training required and responsibilities within fire departments. It is necessary to maintain the proper level of skill and knowledge to respond to the wide range of complex emergencies in our communities. Our communities have had fire departments made up of a large number of dedicated individuals who were called upon frequently to perform in emergencies. The number of volunteers has decreased over the past ten years. Increased funding for equipment and training would assist our fire departments with keeping up with the demand for their services.

NVDA Region: Public Safety

Figure 3.6

July 2015



Ambulance Service

The towns of the Northeast Kingdom belong to one of three State Ambulance Districts. Within the districts there are several ambulance services. Parts of the region are served by ambulance services based in New Hampshire. Ambulance services provide medical first aid, CPR training, non-emergency medical transportation, and back up service to neighboring ambulance coverage areas. The chart below is a summary of the statistics and level of service provided by emergency medical teams operating in the region. Many of the trained first aid responders are volunteers. The "level of service" ranges from low to high service for technical certification and training. The towns listed in table 3.7 include the base locations for ambulance service. The level of service definitions are as follows:

FR-B First Responder EMT Basic Service

FR-I First Responder EMT Intermediate Service

FR-P First Responder EMT Paramedic Service

EMC-B Emergency Medical Certification Basic Ambulance Service

EMC-I Emergency Medical Certification Intermediate Ambulance Service

EMC-P Emergency Medical Certification Paramedic Ambulance Service

Base Town	District #	Level of Service	Base Town	District #	Level of Service
Barnet	5	FR-I	Newport	2	EMC-P
Barton	2	EMC-I	Orleans	2	EMC-I
Brighton	2	EMC-I	St. Johnsbury CALEX	5	EMC-P
Concord	5	FR-I	St. Johnsbury Fire Dept.	5	FR-B
Danville	5	EMC-I	Walden FAST Squad	5	FR-B
Derby Line	2	EMC-I	Waterford Fire Dept.	5	FR-B
Gilman-Lunenburg	5	FR-B	Colebrook, NH	2	EMC-B
Glover	2	EMC-I	Groveton, NH	5	EMC-B
Groton-Ryegate FAST Squad	5	FR-B	Lancaster, NH	5	EMC-I
Hardwick	4	EMC-I	Pittsburg, NH	2	EMC-B
Jay Peak FAST Squad/Ski Patrol	2	FR-I	Stratford, NH	5	EMC-B
Lyndon	5	EMC-I	Woodsville, NH	5	EMC-P
Missisquoi (Troy)	2	EMC-I			

Source: NVDA 2003

Medical Services

The region is fortunate to have two full-service health care centers available, the North Country Hospital (www.nchsi.org) in Newport, and the Northeastern Vermont Regional Hospital (www.nvrh.org) in St. Johnsbury. The Northeastern Vermont Regional Hospital is a member of the larger, regional Dartmouth-Hitchcock Alliance. Other hospitals near the region include the Copley Hospital in Morrisville, the Littleton (NH) Regional Health Care, the Cottage Hospital in Woodsville (NH), and the Weeks Medical Center in Lancaster (NH). Fletcher Allen Health Care, located in Burlington, is available for many specialized medical services.

Emergency mental health services, substance abuse counseling, and crisis support is provided by Northeast Kingdom Human Services on a twenty-four hour basis. The region's towns and villages also contain small medical clinics or physician offices, providing a greater level of access for local residents. Similarly, veterinarian services are available in a number of towns for pet and livestock care.

Border Protection

The Border and Transportation Security Division, under the Department of Homeland Security, patrols the Northeast Kingdom portion of the Canadian border. The Division has six border crossings on the Canadian border in the region. The main border crossing facility is at Derby Line on I-91 and provides monitoring services of the movement of people and goods and processes immigration and emigration. The amount of security and level of surveillance at border crossings has been dramatically increased over the past few years.

Police Protection

Municipal police departments are located in Hardwick, Lyndon, St. Johnsbury and Newport City. The towns of Brighton and Canaan use the same Officer for their Police coverage and when he is off-duty, that area is serviced by the Essex County Sheriff's Department or the Vermont State Police-Derby. County Sheriff's Departments are located in the towns of St. Johnsbury (Caledonia County), Newport (Orleans County), and Lunenburg (Essex County).

The Vermont State Police have barracks in St. Johnsbury (Caledonia County) and Derby (Orleans County). The St. Johnsbury State Police barracks covers 21 towns in Caledonia and southern Essex counties. The Derby barracks serves 32 towns in Orleans and Northern Essex. Trooper activities include patrolling rural roads, responding to auto accidents, and reducing the number of speeding and intoxicated vehicle operators. Troopers investigate domestic assaults, burglaries, child abuse, and arson.

The St. Johnsbury barracks provides dispatch service for Enhanced 9-1-1 service including four ambulance squads (Lyndon Rescue, Calix Rescue in St. Johnsbury, Danville Ambulance, Concord FAST Squad), Hardwick Police, Department of Fish and Game, Sheriff's Department (Caledonia, Essex, and Orange counties), and Bradford State Police. The Derby barracks provides dispatch service for State Police as well as Newport Police, Orleans County Sheriff's Office, Brighton Constable, as well as sixteen fire departments and seven ambulance squads. The Derby Marine Patrol covers Lake Memphremagog, an international waterway with Canada as well as many other lakes. Snowmobile patrolling is also a big part of police activity in the winter months, with the Orleans/Northern Essex County area having the most extensive trail system in the state (Source Vermont State Police, Derby, <http://www.dps.state.vt.us>). Crime statistics are also available at the Department of Public Safety website.

Facilities, Prisons, and Courts

Correctional facilities are located in St. Johnsbury and Newport. St. Johnsbury hosts the Caledonia Community Work Camp, the Northeast Regional Correctional Facility, The St. Johnsbury Community Correction Center, and the St. Johnsbury Court and Reparative Services. Newport hosts the Northern State Correctional Facility, the Newport Court and Reparative Services, and the Vermont Correctional Industries. Courts in the region are located in each of the three counties (Caledonia, Orleans, and Essex) and serve as district, family, probate, small claims and superior courts.

Disaster Planning and Services

The key to responding to disasters is to have sound emergency planning in place. Many services and grants at the federal, state and local levels support such planning efforts. The Directorate of Emergency Preparedness and Response, a division under the Department of Homeland Security, has designated mitigation as the cornerstone of emergency management. Mitigation begins with local communities assessing risks and repetitive problems and making a plan for creating solutions to these problems.

The Emergency Planning and Community Right-to-Know Act (EPCRA) of 1986 requires each state government to establish a State Emergency Response Commission (SERC). The SERC is charged with developing integrated plans for responding to chemical emergencies and making chemical information available to the public. The SERC appoints Local Emergency Planning Committees (LEPC) to prepare for

and respond to emergencies at the local level. Two LEPC's work in this region: one, serving Orleans County, and the other serving Caledonia and Essex counties.

NVDA, working as a liaison with the LEPC's, assists all towns in the region to keep the Local Emergency Operations Plans updated. These are efficient guides for use in the early stages of disaster response. The plans give contact information for the organizations and people responsible in an emergency including: emergency medical services (EMS), fire chief, hospital, select board chair, road foremen, law enforcement, town clerk, state contacts, and other resources. The plan describes the method for alerting and evacuating the population if necessary, the site of an alternate "emergency operations center", and locations of local emergency shelters. Other towns have Hazard Mitigation Plans which aim to prevent damage from natural hazards and outline improvements to structures and facilities in the event of damage.

Committees and partnerships aid in the ability to respond to disasters. For example, most of the states and territories have adopted a legal mechanism called the Emergency Management Assistance Compact, which allows states to assist one another during emergencies, but does not force a state to help if that state is unable. Vermont has recently become a partner in this mutually beneficial compact. Other local organizations like the Connecticut River Watershed Council have joined in cooperation with state and local emergency management and planning organizations to create plans for preventing disasters within the Connecticut River Watershed.

Disasters such as severe winter storms, droughts, floods, wildfires, high winds, earthquakes, and tornados have all been known to affect our region. The Vermont Emergency Management agency focuses on preparing and responding to these emergencies. In light of the past few years of drought throughout the state which has left groundwater and surface water reservoirs at very low levels, the Vermont Drought Task Force recommends that every town have an emergency plan to deal with drought preparedness.

The National Flood Insurance Program encourages each town to plan for flood hazards by designating flood prone areas in the town and restricting construction and development in these areas. Most of the towns in our region have adopted Flood Hazard Regulations to limit development in flood hazard areas.

Other aid agencies are designed to provide services in the event of disasters. The Northern Vermont Chapter of the American Red Cross offers service to the three counties of the region including training (First Aid, CPR, AED), HIV/AIDS education, disaster relief, armed forces emergency services, international tracing and communication services, language bank and youth services. In the event of a disaster, the American Red Cross provides shelter, food, health and mental health services to address basic human needs.

GOALS AND STRATEGIES FOR SECURITY & EMERGENCY SERVICE

SECURITY & EMERGENCY SERVICE GOALS

- Emergency services should be provided to all residents of the Northeast Kingdom through Enhanced 9-1-1, local departments, and mutual aid districts.
- Towns should have up-to-date Local Emergency Operations Plans.
- All buildings should meet current state fire code and safety standards.
- Emergency services training should be available to keep all emergency service providers current with regard to service provision and certification.

SECURITY & EMERGENCY SERVICE STRATEGIES

- Support regional approaches to disaster planning and mitigation, including partnerships between neighboring communities and states and Canada.
- Support local efforts for disaster planning, response, recovery and mitigation.

- Assist communities to apply for safety and emergency equipment grants by disseminating information on available funding programs.
- Assist interested municipalities with the adoption of building and fire codes for non-public buildings and rental properties.
- Ensure that adequate emergency services (personnel, facilities, and equipment) are available for new developments prior to placing additional demands on existing services.
- Assist Local Emergency Planning Committees (LEPCs) and Towns to identify gaps in disaster planning, such as increased flood and drought protection, and work to eliminate gaps through an interagency, inter-jurisdictional approach.
- Encourage all communities to participate in the National Flood Insurance Program (NFIP) and to adopt the Vermont Transportation Highway Codes and Standards.
- Discourage development in identified or known flood prone areas to avoid costly potential damage to life and property.

VI. WATER SUPPLY

The Northeast Kingdom region has a number of lakes, ponds, rivers, streams, and springs providing fresh water for our residents. The water supply in the region is used for a multitude of residential, agricultural, industrial, and commercial purposes. Thus, it is important that we work to ensure an adequate supply of usable water to meet the needs of all the region's residents and businesses. Generally, the water quality throughout the area is considered excellent. The majority of the region's water supply comes from groundwater, and the majority of water supply systems are privately-owned, on-site wells.

Results of regular testing by municipal water systems seems to indicate Vermont's water quality is generally good, but that contamination can and does occur. Common threats to our water supply systems come from agricultural runoff, salt storage areas, road salt, contaminated runoff from paved surfaces, and failing septic systems. Occasional contamination is a primary reason the state requires many public water systems to have source protection plans, well-head protection areas, test regularly for contaminants, and report those results to water customers.

Public Water Supply

The *Vermont Water Supply Rule* is applicable to all Vermont water systems, including public and non-public water supply systems, privately owned water sources, and bottled drinking water facilities (only portions of the rule apply to each type of system). Its primary purpose is to regulate water systems in the state for the provision of clean and safe drinking water for Vermont's citizens, regardless of the type or size of system involved. The Vermont Water Supply Rule is administered by the Department of Environmental Conservation, Drinking Water and Groundwater Protection Division. The last Rule was adopted in 2010, a revision of the Water Supply Rule is currently underway.

All water systems are initially classified as Public or Non-public. Classification as a Public water system depends on the number of service connections (15 or more) or people served (25 or more) by the system.

Public water systems are further divided into Public Community water systems (serving residents on a year-round basis) and Public Non-Community water systems (serving non-residential groups of people such as schools, restaurants, etc.). These Public Non-Community water systems are subdivided into Non-Transient, Non-Community (NTNC) systems whose non-residential users don't change over time (i.e. schools and offices), and Transient Non-Community (TNC) systems whose non-residential users do change over time (i.e. restaurants and motels). Each type of public system requires a different level of chemical monitoring with Transient, Non-Community systems requiring the least.

The NVDA Region: Sewer & Water Map (Figure 3.6) shows the municipalities with public community water supply facilities.

Source Protection

Public Community and Non Transient, Non-Community systems (such as systems serving schools) are required by the state to develop Source Protection areas (SPAs) and have Source Protection Plans. Included in most SPAs are three zones: 1, 2 and 3. The SPAs for groundwater sources are configured differently from surface water sources, but both establish Zone 1 as the immediate area of 200 feet around the water source or intake. This is the area where impacts from contamination are likely to be immediate and certain. The water system does not have authority to control land uses on any land within the SPA unless they own the land or have specific legal agreements with the landowner. However, Towns have the ability to enforce local ordinances with overlay districts that correspond with the SPAs for public water supply sources.



All public water systems are subject to regulation under the federal Safe Drinking Water Act. These federal regulations are administered by Vermont's Department of Environmental Conservation (DEC). Permits are administered by the Drinking Water and Groundwater Protection Division of the DEC. All public water systems are required to have a Permit to Operate. The Permit to Operate includes a description of the water system, findings from the most recent sanitary survey, conditions, requirements, violations and a compliance schedule to correct significant deficiencies. Operating permits do not expire and are non-transferable when ownership changes. The Drinking Water and Groundwater Protection Division conducts sanitary surveys at every three years for community water systems and in-state bottled/bulk water facilities, and every five years for non-community water systems.

In Vermont, public water supply systems may be owned and operated by municipalities or privately-owned (either individually or cooperatively). Municipally-owned water systems may be managed by the town or a fire district. Public drinking water systems are required to have an Operator certified by the Drinking Water and Groundwater Protection Division. The class of Operator Certification is based on the source water type, treatment, and population of a water system. Jurisdiction over protection of public water supply sources rests with the Drinking Water and Groundwater Protection Division and the District Environmental Commission (through the Act 250 review process). Local zoning decisions made by municipalities can also affect public water supplies.

Public water system violations are published in an annual report made available to the public by the Department of Environmental Conservation. "*Consumer Confidence Reports*" are made available by public water suppliers for public community residential systems on an annual basis.

In addition to providing adequate water supply systems to meet the demands for domestic, commercial and industrial uses, there must be a level of flow necessary for fire protection. This depends, in part, on the amount of water stored or available, the size of the water mains and the level of pressure needed.

The active public community water systems in the Northeast Kingdom, along with the number of people they serve, are shown in Table 3.8 below.

Figure 3.7 depicts Towns that have public community water systems, although most of these systems serve a very limited geographic area within the town. It does, however, indicate the potential for more compact development in these towns.

**Table 3.8:
Public Community Water Systems – Caledonia, Essex, & Orleans Counties**

Caledonia County					
Water System Name	System Type	Primary Source	Owner Type	Town	Pop
BARNET Fire District 2	C	GW	P	BARNET	205
PASSUMPSIC FIRE DISTRICT 1	C	SWP	L	BARNET	140
MCINDOE FALLS FIRE DISTRICT 3	C	SW	L	BARNET	176
KARME CHOLING	C	GW	P	BARNET	140
WEST BURKE HOUSING	C	GW	P	BURKE	40
BURKE FIRE DISTRICT 1	C	GW	L	BURKE	142
BURKE MOUNTAIN WATER SYSTEM	C	GW	P	BURKE	1058
DANVILLE FIRE DISTRICT 1	C	GW	L	DANVILLE	450
EAST HARDWICK FIRE DISTRICT 1	C	GW	L	HARDWICK	350
HARDWICK TOWN WATER SYSTEM	C	GW	L	HARDWICK	1900
LYNDONVILLE WATER SYSTEM	C	GW	L	LYNDON	4500
LYN HAVEN FIRE DISTRICT 1	C	GW	L	LYNDON	100
NORTHEAST KINGDOM MHP	C	GWP	P	LYNDON	156
PEACHAM FIRE DISTRICT 1	C	GW	L	PEACHAM	150
RYEGATE FIRE DISTRICT 2	C	GW	L	RYEGATE	131
SHEFFIELD FIRE DISTRICT 1	C	GW	L	SHEFFIELD	50
ST JOHNSBURY WATER SYSTEM	C	SW	L	ST. JOHNSBURY	5000
ST JOHNSBURY CENTER F D 1	C	SWP	L	ST. JOHNSBURY	370
GREEN LANTERN MHP	C	SWP	P	ST. JOHNSBURY	144
SUTTON WATER SYSTEM	C	GW	L	SUTTON	190
WHEELLOCK FIRE DISTRICT 1	C	GW	L	WHEELLOCK	50
Essex County					
BLOOMFIELD	C	GW	L	BLOOMFIELD	50
BRIGHTON WATER SYSTEM	C	SW	L	BRIGHTON	1782
CANAAN FD #2	C	GW	L	CANAAN	350
CANAAN FIRE DISTRICT 1	C	GW	L	CANAAN	970
SORRELL MHP	C	GW	P	CONCORD	112
AQUA HAVEN	C	GW	L	EAST HAVEN	150
GUILDHALL WATER SYSTEM	C	GWP	L	GUILDHALL	136
LUNENBURG FIRE DISTRICT 2	C	GW	L	LUNENBURG	400
LUNENBURG FIRE DISTRICT 1	C	GW	L	LUNENBURG	250
Orleans County					
ALBANY WATER SYSTEM	C	GW	L	ALBANY	200
BARTON WATER SYSTEM	C	SW	L	BARTON	950
ORLEANS WATER SYSTEM	C	GW	L	BARTON	846
MAPLE LANE NURSING HOME	C	GW	P	BARTON	181
COVENTRY FIRE DISTRICT 1	C	GW	L	COVENTRY	251

CRAFTSBURY FIRE DISTRICT 2	C	GW	L	CRAFTSBURY	420
BEEBE PLAIN WATER SYSTEM	C	GW	P	DERBY	142
DERBY LINE VILLAGE WATER DISTRICT	C	GW	L	DERBY	1630
DERBY CENTER WATER SYSTEM	C	SW	L	DERBY	1100
SHATTUCK HILL MHP	C	SWP	P	DERBY	129
DERBY MHP	C	SWP	S	DERBY	265
UNION HOUSE NURSING HOME	C	GW	P	GLOVER	56
GREENSBORO FIRE DISTRICT 1	C	GW	L	GREENSBORO	551
GREENSBORO BEND FIRE DISTRICT #2	C	GW	P	GREENSBORO	71
IRASBURG FD #1	C	GW	L	IRASBURG	200
JAY PEAK SUBDIVISION II	C	GW	P	JAY	66
JAY PEAK WATER SYSTEM	C	GW	P	JAY	6740
TRILLIUM WOODS WATER SYSTEM	C	GW	P	JAY	27
NEWPORT CITY WATER SYSTEM	C	GW	L	NEWPORT CITY	4766
NEWPORT CENTER WATER SYSTEM	C	GW	L	NEWPORT TOWN	330
HOLBROOK BAY COMMONS	C	GW	P	NEWPORT TOWN	95
NORTH TROY WATER SYSTEM	C	GW	L	TROY	860
TROY WATER SYSTEM	C	GW	L	TROY	315
WESTFIELD FIRE DISTRICT 1	C	GW	L	WESTFIELD	120
ALPINE HAVEN	C	GW	P	WESTFIELD	250
C= Community, GW= Groundwater, SW= Surface Water, SWP= Groundwater purchased, SWP= Surface water purchased, L= Local Government, P= Private, S= State Source: ANR Water Supply Division, 2014					

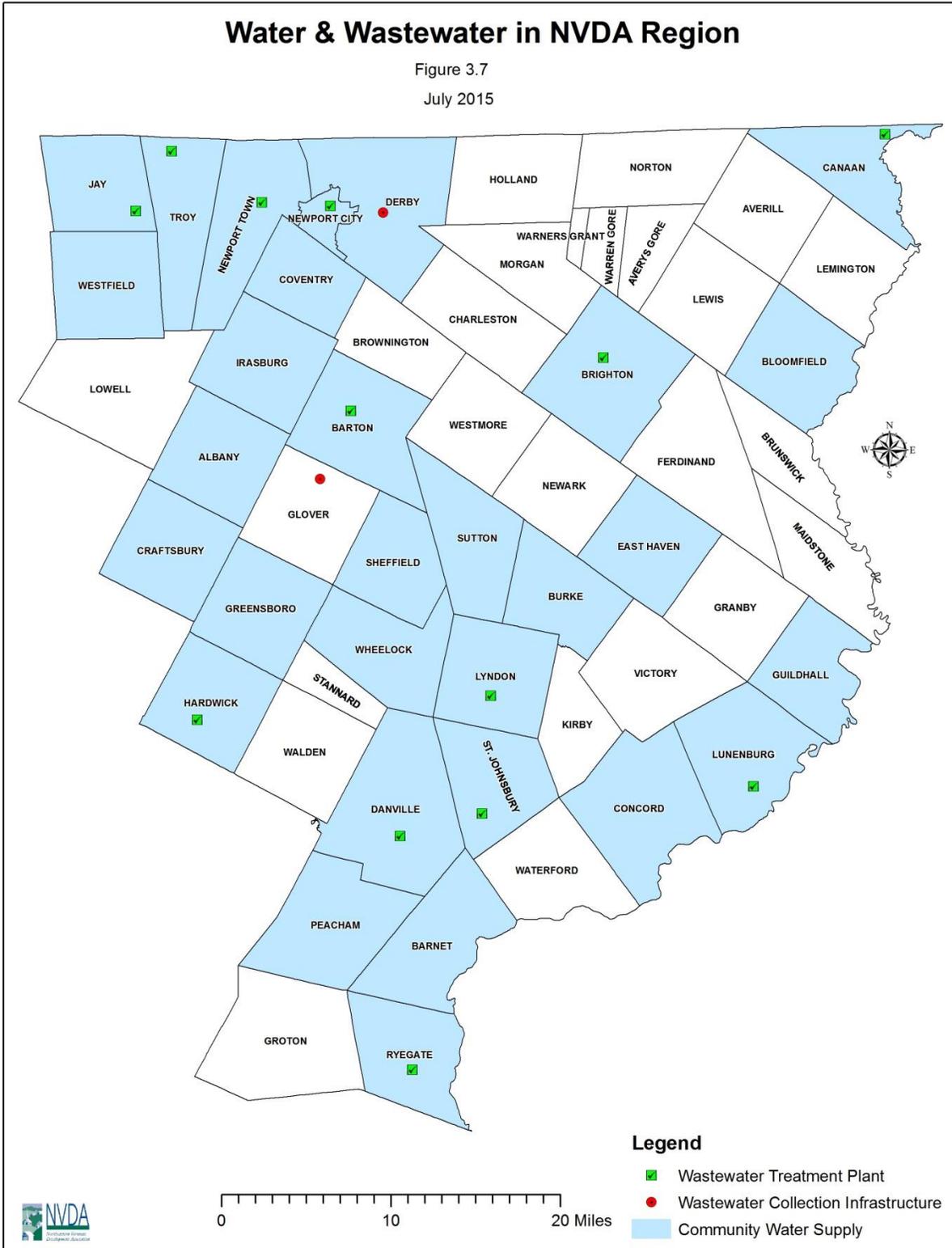
Public Water Issues

Many public water systems in the Northeast Kingdom do not have metering, and that is an issue that communities are beginning to address. The Towns of Hardwick’s water system serves a population of 1,900 including residential and commercial customers. In 2014 the Town updated its water ordinance to address issues such as customer responsibility for preventing water loss through leakage of corroding pipes. By updating water ordinances and installing metering, issues of water loss through leakage or irresponsible usage can be curtailed, and water system managers have a better understanding of water use by different types of commercial operations.

Another issue that Towns can address through a water/sewer ordinance is allocations. For example, the Town of Derby has an ordinance that levies a fee for holding a water and or sewer allocation, discouraging property developers from holding on to allocations without using them for extended periods of time.

Water & Wastewater in NVDA Region

Figure 3.7
July 2015



Capacity

The permitted maximum daily demand of a public water system is noted on the operating permit issued by the State Drinking Water and Groundwater Protection Division. The aspects of a system that determine the permitted maximum daily demand include well yield, treatment capacity, and storage capacity.

While the maximum permitted demand as a measure of gallons per day is established by the state-issued operating permit, the determination of reserve capacity of a system is not as easily established, particularly for older water systems. While actual gallon-per-day water usage can be compared to maximum permitted demand, this does not necessarily determine reserve capacity of a system, since actual usage from all connections may be below potential usage based on allocation. The Vermont Water Supply Rule is in the process of being revised to provide a more accurate means of determining the reserve capacity of a water system.

The current water supply rule specifies that public community water systems be designed to meet a projected future demand, and requires that when a water system, expecting future growth, reaches 90% of capacity of a treatment or pumping system it begin planning for additional capacity.

Management

The Capacity Development Program in the Drinking Water and Groundwater Protection Division of the State DEC deals with long range plans for water systems, asset management plans, water audits and reviews of budgets and user rates. The “Capacity” of a water system is measured not only by well yield, storage capacity and treatment capacity (which would be the technical capabilities of a water system) but also managerial and financial capabilities. The State's strategy to ensure water quality and supply is to provide resources and education to water system owners/operators so that their systems will be able to comply with all state and federal rules.

The Vermont Rural Water Association (VRWA) is a non-profit that provides technical and managerial assistance to water and wastewater systems in Vermont. Since 1982, VRWA has helped many system members in the Northeast Kingdom provide safe, affordable drinking water to their communities. VRWA conducts the majority of continuing education training for water and wastewater operators in the NEK on system operations and maintenance. Some recent projects include:

- Ongoing assistance in Gilman and Lunenburg to help achieve long term sustainability of their drinking water and sewer systems
- Partnering with state agencies to help determine potential sources of nitrate contamination in Sutton
- Leak detection and water line location in Lyndonville, North Troy and Bloomfield
- Calibration flow check for the Derby Line wastewater collection system
- Source water protection planning activities for Greensboro Fire District 1 and Greensboro Bend drinking water systems

VRWA has also provided many other onsite system services and training classes in the Northeast Kingdom, including:

- Water treatment and distribution system troubleshooting
- Flushing program development and implementation
- Advice regarding sanitary survey response
- Smoke testing and sewer camera work

- Sampling plans for distribution system monitoring (Total Coliform Bacteria, Lead & Copper, Disinfection By-Products)
- Sludge profiling and long-term planning for sludge removal
- Board training on budget development and capital improvement planning
- Location and mapping of water and wastewater system assets
- Loan and priority list application assistance
- Operations and Maintenance (O&M) Manuals

For public water systems that have reached or may be nearing their system's physical capacity, strategies can be implemented to reduce water consumption. Some of these are billing customers based on metered water use; repairing leaks in the system; and structuring billing rate schedules so that heavier users pay more. The creation of individual community water systems for residential subdivisions has drawbacks because of ongoing management issues. The consolidation of the management of water systems is encouraged. Even if geographically separate, systems can share billing or management to increase efficiency. This also enables a more efficient and cost-effective process system monitoring, to ensure water quality is maintained.

System funding and Development: The most common problem facing towns or communities having, or seeking, a public water supply system is obtaining the funds to acquire or upgrade facilities. Problems that have occurred in community water systems in the Northeast Kingdom include lack of reserve capacity, aging equipment, and contamination of water supplies due to inadequate control over development within the source protection area.

It is important to note that centralized water systems allow more residents to share the high costs of acquisition and maintenance. Public water supply systems are also generally easier to maintain and protect than individual supplies in more densely populated areas. Extensions to existing, public community water systems greatly affect the location, density, type, and future pattern of development within a community. Therefore, considerable public discussion should occur regarding proposals for water main extensions. The state has a revolving loan program that provides assistance to communities seeking to develop capacity in their water system.

Vermont Act 250

Criteria 2 and 3 of Vermont Act 250 deal with the issue of permitting for water supplies:

- (a) Before granting a permit, the board or district commission shall find that the subdivision or development...
 - (2) Does have sufficient water available for the reasonably foreseeable needs of the subdivision or development.
 - (3) Will not cause an unreasonable burden on an existing water supply, if one is to be utilized.
- [10 V.S.A. Section 6086 (a)(2) and (3)]

GOALS AND STRATEGIES FOR WATER SUPPLY

WATER SUPPLY GOALS

- Water supplies and water systems will not be contaminated, depleted, or degraded
- There will be sufficient quantities of water to meet existing and future residential, agricultural, commercial, industrial and recreational needs.

- Public investments will be made in utility facilities, services, and lands to support existing and future development within town centers, villages, or other designated and planned growth areas. Expansion of systems will not facilitate sprawl or strip development.
- Effective, efficient, and accessible public services will be promoted.

WATER SUPPLY STRATEGIES

- Support local proposals to upgrade existing water supply systems.
- Support water conservation measures to reduce the demand for water and protect water supplies.
- Discourage development in Source Protection Areas, identified groundwater recharge areas, or other areas where water supplies are likely to be adversely impacted.
- Assist interested communities to identify, map, and plan for the protection of surface and groundwater resources.
- Assist towns and communities with the preparation of capital improvement plans and budgets to complement local plans and this plan.
- Assist municipalities seeking to share services and infrastructure with neighboring municipalities in order to reduce costs and increase efficiency

VII. WASTEWATER, SEWAGE & STORMWATER MANAGEMENT

The treatment of wastewater is necessary to remove solids, destroy pathogens, and remove pollutants. Municipal sewage, domestic sewage, and industrial wastewater are the types of wastewater typically treated. Wastewater is either treated centrally by a municipal wastewater treatment facility, or by a decentralized "on-site" system, typically a septic tank with leach field.

On-Site Wastewater Systems

For our region, on-site systems (i.e. traditional septic systems) are by far the most common for wastewater treatment. Poor siting, installation, or maintenance of on-site systems often contributes to their failure and can result in human health risks through the contamination of public surface or ground water supplies. Maintaining and repairing on-site systems is important to prevent the deterioration of ground and surface water quality, and has associated costs far lower than those for purifying contaminated water supplies.

The Agency of Natural Resources, Department of Conservation Wastewater System and Potable Water Supply Rules were last updated in 2007. The rules "apply to the subdivision of land, the construction, modification, or change in use of a building or structure, the creation or modification of a campground, and the construction, modification, replacement and operation of their associated potable water supplies and wastewater disposal systems." The rules regulate soil-based disposal systems with design flows of less than 6,500 gallons per day, and sewerage connections of any size. They also regulate potable water supplies that are not subject to regulation under the Vermont Water Supply Rule as public water supplies.

The Rules primary purposes are:

1. To protect human health and the environment;
2. To prevent the creation of health hazards or unsanitary conditions;
3. To ensure the availability of an adequate supply of potable water;
4. To ensure that there is adequate effluent dispersal and drainage for the proper functioning of wastewater systems.

Public Wastewater Facilities

Wastewater Treatment Facilities are regulated by the State Agency of Natural Resources, Department of Environmental Conservation, Watershed Management Division. Such facilities are required to be operated by certified individuals that meet particular requirements for experience and knowledge, as outlined in the Wastewater Treatment Facility Operator Certification Rule. The Rule was updated and became effective September 25, 2014, replacing the October 1985 version.

Domestic wastewater treatment facilities have five classification levels. Class 1 facilities have simplified treatment processes (i.e. pH adjustment only) with low design flows. Class 5 facilities are more complex and have design flows of greater than 5.0 MGD. Most of the Wastewater Treatment Facilities in the Northeast Kingdom are Class 1 or Class 2. The three largest systems -- in St. Johnsbury, Newport City, and Lyndonville -- are Class 3.

Industrial treatment facilities are classified in four categories; dairy, metal, paper and industrial. There are also three levels to each classification. Each level of classification is based on treatment process and design flow.

Municipal Wastewater Facilities:	Capacity in Million Gallons per Day (MGD)	Avg. Annual Flow (MGD)*	Percent of capacity used
Caledonia County			
Danville	0.06	0.0319	53%
Hardwick	0.371	0.1844	50%
Lyndonville	0.75	0.1572	21%
Ryegate (Town)	0.006	0.0040	67%
Ryegate Fire District #2	.0103	0.0039	38%
St. Johnsbury	1.6	0.7526	47%
Essex County			
Brighton (Island Pond)	0.15	0.0701	41%
Canaan	0.185	0.0943	51%
Lunenburg Fire District #2	0.076	0.0648	85%
Orleans County			
Barton	0.265	0.1590	60%
Newport (City)	1.3	0.6915	53%
Derby Center	0.15	Not provided	NA
Newport Town	0.0415	0.0179	43%
North Troy	0.11	0.0665	61%
Orleans	0.19	0.0561	30%
Troy / Jay	0.2	0.0758	38%
* June 1, 2014 – May 31, 2015 Notes: Ryegate F.D. #2 average flow does not include May 2015; St. Johnsbury does not include April 2015 in average; Derby Center Village has an allocation from the Newport City WWTF. Source: WWTF List dated July 2, 2015; data request, July 2015, VT Watershed Management Division, Wastewater Section			

Table 3.9 shows the municipal wastewater treatment facilities in the Northeast Kingdom region. It is noted that the Village of Derby Center and the Town of Glover both have allocations in systems maintained by other towns. Glover has sewer capacity in the Barton system, and Derby Center has an allocation in Newport City's system. The percentage of capacity that the annual average flow represents shows how much of the system's capacity is currently being used, but it does not reflect committed capacity. Therefore, a system that is only using 50% of its design capacity does not necessarily have 50% of its

capacity available for new development. The municipality that manages the system may have committed sewer capacity to an entity that is not fully using the allocation – for example, a residential developer may have secured an allocation for connections for a 10 lot subdivision, but the subdivision has not yet been built out. However, the annual average flow data does show which systems are using a high percentage of total capacity.

Funding

In the 1960s-1970s, federal funding typically paid up to 90% of the cost for public sewage treatment plants. Today, it is exceedingly difficult for small towns to finance new facilities due to the high per user cost associated with central sewage treatment projects, and reductions in federal funding. While centralized, municipal treatment facilities may be the preferred types of systems, the rural nature of our region makes it difficult and expensive to provide such facilities for towns without a sufficient population density. While there are funding programs through USDA Rural Development, the ongoing maintenance cost to the municipality also needs to be considered. Municipalities that encourage and plan for denser development would benefit by being able to share the costs of providing centralized wastewater facilities due to a higher number of residents being served by the system.

Sludge and Effluent Disposal

After wastewater is treated, there is the issue of sludge and effluent disposal. Sludge in the Northeast Kingdom is typically disposed of by land application, or it is de-watered and sent to a landfill. Shipping sludge to a landfill takes up valuable space. Incineration is not permitted in Vermont, but a few small communities may transport their sludge out of state for incineration. Effluent is what remains after solids have been removed from wastewater. Once wastewater has been treated, effluents are usually discharged to ground or surface waters. However, there are regulatory requirements that include testing for pH, residual chlorine, dissolved oxygen, suspended solids, bacteria, various metals, and organic compounds before discharge can occur. In communities with small wastewater systems, effluents may be discharged in a leach-field type of system similar to those used for on-site septic systems. Whether an on-site system or municipal wastewater treatment plant is used, the sludge and effluent are treated similarly. In our region, private haulers currently manage the septage generated by septic tanks from on-site facilities in municipalities without wastewater treatment facilities. Although septage and biosolids are byproducts of wastewater treatment, these wastes are categorized as "Solid Wastes" in Vermont, and are regulated by the Vermont Solid Waste Management Rules: (<http://www.anr.state.vt.us/dec/wastediv/solid/documents/SWRule.final.pdf>)

Stormwater

An important issue related to water supply and wastewater is storm water. When it rains, or snow melts, the resulting "stormwater" is absorbed into the ground or it becomes "runoff" and flows over the land to a nearby lake, stream, or estuary. Stormwater runoff from vegetated land is typically low, since most rain or snow filters into the ground or is lost to evaporation. Stormwater runoff increases as the percentage of impervious surface cover increases (e.g., paved streets, parking lots, and rooftops), since the land's ability to absorb water is restricted. In addition to washing pollutants into our surface waters, improperly managed stormwater runoff can result in soil erosion and flooding. Stormwater recharges the groundwater supply, and proper management helps to reduce flooding and surface water contamination.

The Vermont Agency of Natural Resources, Department of Environmental Conservation, Watershed Management Division, provides information on permits needed for stormwater discharges at certain thresholds. Detailed information on stormwater permit applications and fees can be found on the Watershed Management Division's website at http://www.watershedmanagement.vt.gov/stormwater/htm/sw_permits.htm.

An alternative to traditional stormwater infrastructure systems is known as "Green Stormwater Infrastructure" (GSI), which is defined as "systems and practices that restore and maintain natural hydrologic processes in order to reduce the volume and water quality impacts of the built environment while providing multiple societal benefits."

More information about GSI can be found on the aforementioned website of the Watershed Management Division.

Municipal wastewater systems that collect both sewage and stormwater in the same pipes are called combined sewer systems. During intense storms, the high flow of sewage and stormwater can overwhelm combined sewer systems. Many combined systems were therefore designed to release excess flow through overflow points, called combined sewer overflow (CSO) outfalls. Without these CSO outfalls, large storms could cause sewage and stormwater to backup into basements and streets.

Three municipal wastewater systems in the Northeast Kingdom have CSO outfalls: Barton, Newport City and St. Johnsbury.

In September 2016, the Vermont Department of Environmental Conservation adopted a Combined Sewer Overflow Rule, which requires the municipalities that still have CSOs to implement technology-based controls, and develop Long Term Control Plans to bring all CSOs into compliance with federal and state water quality standards.

The Rule acknowledges that financial capability is a significant factor in abating and controlling overflows and meeting water quality standards, and therefore recognizes alternatives to separation of stormwater and sewer lines. These alternatives include adding storage tanks or retention basins to hold overflow during storm events; expanding treatment plant capacity; adding screening and disinfection facilities for the overflow; and incorporating green stormwater infrastructure to reduce stormwater flow.

GOALS AND STRATEGIES FOR WASTEWATER, SEWAGE & STORMWATER MANAGEMENT

WASTEWATER, SEWAGE & STORMWATER MANAGEMENT GOALS

- The region's towns will have adequate wastewater treatment facilities with sufficient capacity to meet current needs and projected future development.
- Public investments in new or expanded facilities and services shall be in agreement with local plans, shall be directed toward town centers, villages, or other designated and planned growth areas, and shall support the revitalization of established centers.
- Municipalities will incorporate Green Stormwater Infrastructure in planning improvements to local road infrastructure and public facilities; and will incorporate them into land use regulations, as appropriate.

WASTEWATER, SEWAGE & STORMWATER MANAGEMENT STRATEGIES

- Support proposals to upgrade and improve existing wastewater treatment facilities.
- Encourage the proper disposal of hazardous materials, particularly household hazardous materials that are difficult to treat in secondary systems.
- Provide advice and technical assistance to communities and groups interested in developing community wastewater systems.
- Assist communities to interpret and abide by changes to state and federal laws regarding municipal and on-site wastewater systems and stormwater regulations.
- Conduct educational outreach to municipalities regarding the benefits of Green Stormwater Infrastructure.
- Assist communities with advanced planning activities for future upgrades and financing of local systems.

- Assist municipalities seeking to share services and infrastructure with neighboring municipalities in order to reduce costs and increase efficiency

VIII. SOLID WASTE MANAGEMENT

Municipal Solid Waste

Vermont statute [24 V.S.A. subsection 2202(a)] requires that all municipalities, either individually, or through a solid waste management district or inter-municipal association, adopt a Solid Waste Implementation Plan (SWIP) or Materials Management Plan (MMP). (The two terms are used interchangeably.) The plans need to conform with the State Materials Management Plan (MMP), which came into effect in June of 2014.

On average, Vermonters generate more than five pounds of waste each day¹. Although Act 78 in 1987 made significant strides in reducing waste, the annual diversion rate (the amount of waste kept out of landfills or incinerators) has stagnated at around 30% to 36% for more than a decade, with more than half of the waste stream consisting of materials that could be recycled, donated, or composted. Act 148 was signed into law to introduce sweeping changes to the way we manage wastes. The MMP supports the implementation of Act 148, as well as a variety of initiatives to support a new vision for waste management built on four principles:

- Prevent waste from being generated.
- Promote sustainable materials management, with a preference for highest and best use.
- Minimize reliance of waste disposal (landfilling and incineration).
- Conserve resources, minimize energy consumption, and reduce greenhouse gas (GHG) emissions and other adverse environmental impacts.

Act 148 has been phased in over a six-year timeframe to give municipalities, waste districts, and waste haulers an opportunity to better align their facilities and services in order to comply with the law.:

Date	Implementation Measure
July 1, 2014	<ul style="list-style-type: none"> • Transfer stations/Drop-off Facilities must accept residential recyclables at no separate charge. • Food scrap generators of 104 tons/year (2 tons/week) must divert material to any certified facility within 20 miles
July 1, 2015	<ul style="list-style-type: none"> • Statewide unit based pricing takes effect, requiring residential trash charges be based on volume or weight (also known as “pay as you throw”) • Recyclables are banned from the landfill • Transfer stations/Drop-off Facilities must accept leaf and yard debris. (Note: A variance has been granted to some transfer stations in the NEK Waste Management District for the duration of Materials Management Plan, which expires in November of 2020. • Haulers must offer residential recycling collection at no separate charge. (Note: the NEK Waste Management District applied for and received an exemption for this requirement.)

¹ Vermont Department of Environmental Conservation: Vermont Materials Management Program (2014, June 18)

	<ul style="list-style-type: none"> Public buildings must provide recycling containers alongside all trash containers in public spaces (exception for restrooms) Food scrap generators of 52 tons/year (1 ton/week) must divert material to any certified facility within 20 miles
July 1, 2016	<ul style="list-style-type: none"> Leaf, yard, and clean wood debris are banned from the landfill Haulers must offer leaf and yard debris collection Food scrap generators of 26 tons/year (1/2 ton/week) must divert material to any certified facility within 20 miles
July 1, 2017	<ul style="list-style-type: none"> Transfer stations/Drop-off Facilities must accept food scraps Haulers must offer food scrap collection. (Note: This deadline has been delayed to July 2018.) Food scrap generators of 18 tons/year (1/3 ton/week) must divert material to any certified facility within 20 miles
July 1, 2020	<ul style="list-style-type: none"> All food scraps are banned from the landfill, with no exception for distance of a certified facility

As the notations in the above table suggest, implementation of Act 148 has encountered some challenges.

- Cost:** A 2015 report to the Vermont legislature by the Solid Waste Infrastructure Advisory Committee surmises that Vermont’s existing infrastructure (composters, on-farm digesters, farm animal feed operations, and food rescue groups) possibly has the capacity to meet demand for handling organics diverted from the waste stream. However, nearly \$30 million in infrastructure expansion, upgrades, and investments will be required by 2020 statewide.² Massive infrastructure investments alone will not, however, ensure successful implementation. The effort will depend a concerted effort of public outreach and education, supported by a flexible and creative network of onsite and offsite waste management operations.
- Reduction of food waste:** Effectively banning food scraps from the landfill is intended to reduce food waste, a broader issue with far-ranging environmental, economic, and social issues. Generators of food waste, such as retailers and institutions, ultimately save on overhead and hauling costs, if they can systematically reduce waste through measures such as best-management practices and performance-based contracts with food service providers. This reduction has not been realized to date, and more outreach and technical assistance is needed.
- Hauling capacity:** Two food scrap haulers are doing brisk business in the NEK. (See section on Food Waste below.) However, not all solid waste haulers have the capacity or ability to equip their vehicles for safe and proper food scrap management. As amendments to Act 148 continue to be examined, it is important to remember that food scrap hauling has viable business models in New England. Technical and business assistance needs to be regularly available for entrepreneurs who wish to enter this important field.

Solid Waste Management Districts and Solid Waste Facilities

Solid waste services are provided for 44 towns in the NVDA region by the Northeast Kingdom Waste Management District (NEKWMD). Walden and Hardwick are part of the Central Vermont Solid Waste Management District, while Craftsbury is a member of the Lamoille Regional Solid Waste Management

² Solid Waste Infrastructure Advisory Committee. Report to the Vermont Legislature. (2015, February 4)

District. The remaining towns are not members of a Waste Management District and must maintain their own SWIPs. (See Table 3.10). Transfer stations, composting facilities, food scrap collection and yard and leaf facilities (including brush dumps) are shown on Figure 3.8. Detailed information, such as dates for collection of household hazardous waste are listed on the webpages of each waste management district serving towns in the Northeast Kingdom region.

Table 3.10 Solid Waste Management Plans in the NEK		
Municipality	District	SWIP
Craftsbury	Lamoille Solid Waste Management District (www.lrswmd.org)	Last amended September 2017 https://www.lrswmd.org/index.php/about/185-swip
Hardwick and Walden	Central Vermont Solid Waste Management District (www.cvswwmd.org)	Last amended October 2016: http://www.cvswwmd.org/our-plan.html
Barton	Independent	Last amended November 2015: Available from the Town of Barton web site https://sites.google.com/site/townofbarton/home
Burke	Independent	Last amended : http://www.burkevermont.org/documents.php
Canaan	Independent	Last amended December 2009: http://canaan-vt.org/images/swip_plan.pdf
Coventry	Independent	Last amended March 2016: http://www.coventryvt.org/solid-waste---recycling-.html
Lemington	Independent	
Lowell	Independent	Last amended 2015: http://www.townoflowell.org/recycling---solid-waste.html
Newport City	Independent	Last amended July 2015: http://newportvermont.org/website/news/solid-waste-implementation-plan-survey/
St. Johnsbury	Independent	Last amended: http://stjvt.com/index.php/recycling-info.html/#solidwaste
All remaining 44 towns	Northeast Kingdom Solid Waste Management District	Last amended September 2015: http://www.nekwmd.org/pdf/MMP.pdf

Landfills

The Coventry Landfill is the only permitted landfill in the region. This is a lined facility, privately owned and operated by New England Waste Services of Vermont, a subsidiary of Casella Waste Management. In 2014, the landfill was approved for expansion. In 2005, Washington Electric Coop (WEC) established a landfill gas-to-energy generation plant. With capacity expansions completed in 2007 and 2009, the landfill gas methane generator currently supplies about two-thirds of WEC's power supply, before the sale of renewal energy certificates. (See NVDA's Energy Chapter for more details.) Casella is currently exploring a variety of uses for waste heat from the generator. Earlier efforts to establish a diversified on-site greenhouse production operation were not successful, but potential uses are still being explored.

Act 78 of 1987 resulted in the closure of a number of older, unlined landfills. The Solid Waste Management Rules, effective March 15, 2012, contains post-closure monitoring requirements for landfills. The Vermont Natural Resources Atlas (<http://anrmaps.vermont.gov/websites/anra/>) provides data on the locations of closed landfills and their status, under the "Waste Management" layer.

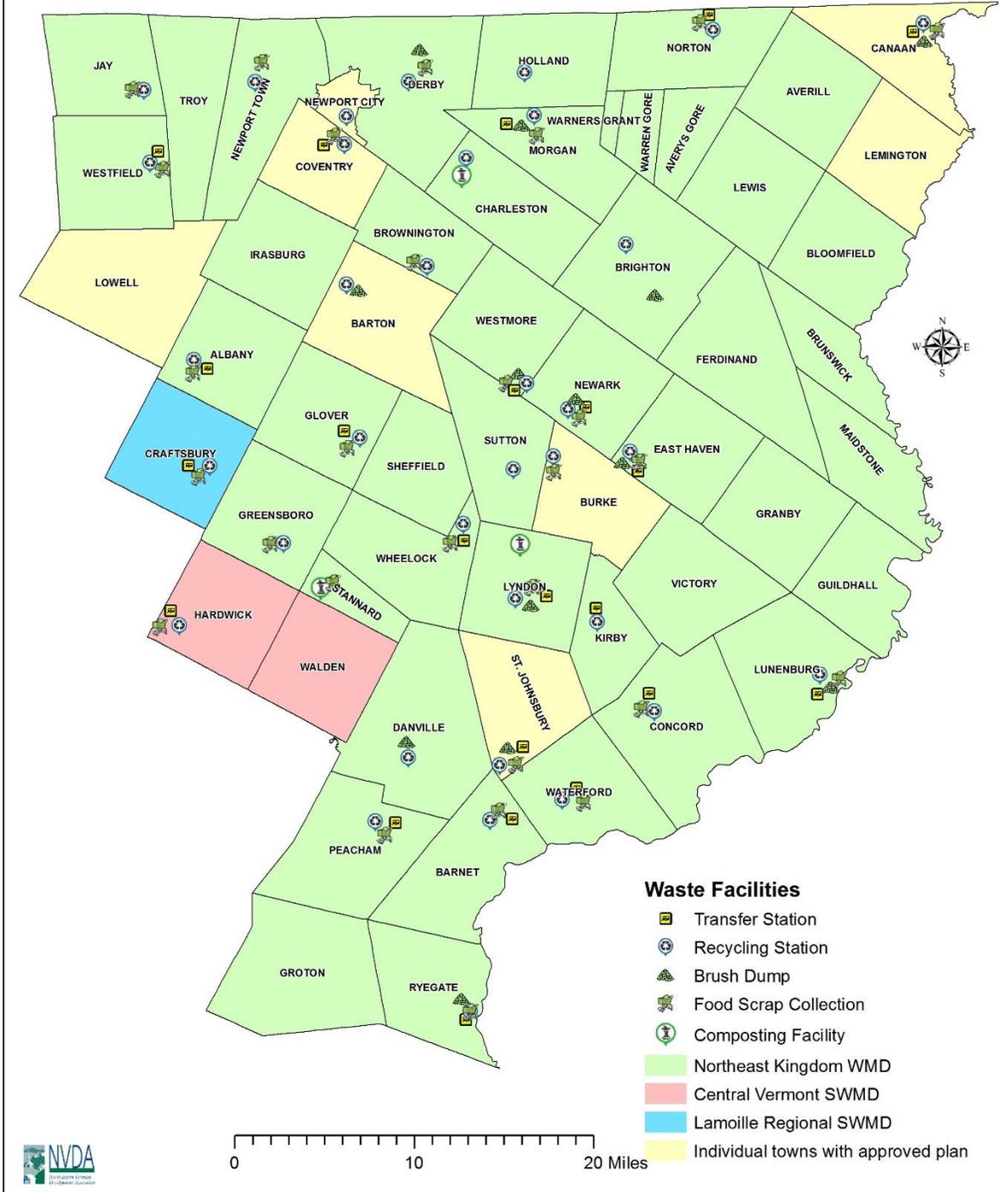
Leaf and Yard Residuals

According to the Vermont 2013 Waste Composition Study, leaf and yard residuals account for only about 3% of the landfill. What is not managed onsite has relatively little market value, which limits the distance these wastes can be feasibly transported. The most likely uses for these materials are bulking agents for composting, animal bedding, or wood chips. (Some wastes, for example, ends up in the McNeil Woodchip plant.) Most NEK residents manage leaf and yard residuals on their property or haul to stump dumps. NEKWMD's Lyndon facility collected about six tons of leaf and yard waste in 2016. About 684 tons of wood waste were collected in various sites throughout the NEK, more than half of which was collected at Kingdom View Compost. More than 192 tons of "yard trimmings" (yard and leaf waste) were collected at various sites in 2016. The district also collected more than 50 tons of sawdust from Lyndon Furniture's Concord facility, which was used for composting.

NVDA Region: Solid Waste Management Districts

Figure 3.8

04/26/2018

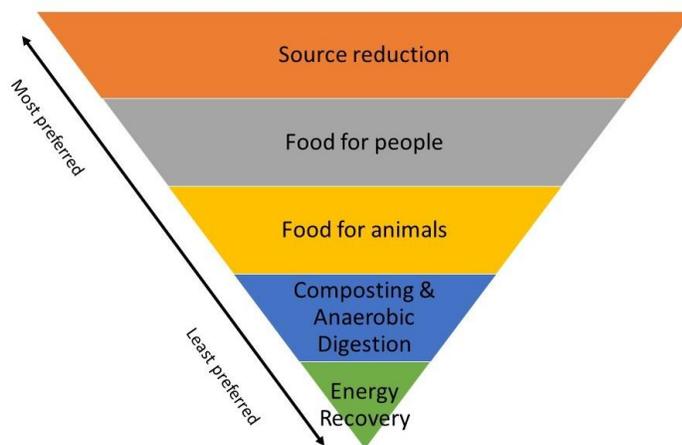


Food Waste

According to Vermont’s 2013 Waste Composition Study, food accounts for the largest share of organics in the waste stream. Food waste can occur at any point in the along the supply chain: Cosmetically challenged fruits and vegetables are left to rot in the field, food gets spoiled during shipping, retailers dispose of expired goods, and leftovers get scraped into the bin. What ends up in the landfill produces methane, which, as a greenhouse gas, is significantly more potent than CO₂ because of its ability to retain heat.

The MMP focuses on promoting “highest and best use” on materials and waste management, which means that we can no longer think of about the management of food materials from a purely post-consumer end-of-useful-life perspective. The Food Recovery Hierarchy (Figure 3.9) prioritizes strategies for managing food materials with the greatest benefit to our environment, society, and the economy.

Figure 3.9: Food Recovery Hierarchy



Source Reduction: *Waste less by changing the way we source, distribute, and use food.* For households, reducing waste might mean planning meals in advance and carefully disregarding “sell by” labels. For institutions, this might entail using software systems that weigh and track food use and waste, or entering performance-based contracts with food service providers. Schools may also establish “food sharing tables” where students can place whole, unopened, and uneaten food. The Vermont Department of Health offers some [guidelines](#) for doing this safely.

Food for People: *Redirect nutritious, edible food to populations likely to be food insecure.* Gleaning is the act of harvesting excess or unmarketable produce from a farm. Salvation Farms, a statewide nonprofit committed to gleaning Vermont’s agricultural surplus, estimates that 14.3 million pounds of Vermont-grown vegetables and berries are lost each year because produce is left in the field or goes unsold. Vermont Foodbank runs a statewide program that redistributes produce, and Northeast Kingdom farms contribute thousands of pounds to this program annually. Retailers, hotels, and restaurants must also find ways to manage food products that are no longer saleable. In 2015, the Vermont Food Bank reported a 25-30% increase in food donation and another 40% increase in 2016. Much of that increase could be attributed to fresh foods rather than canned goods.³ However, perishables continue to present more of a challenge than shelf-stable products. Although the Bill Emerson Good Samaritan Food Donation Act protects individuals and entities who donate unsaleable food from liability, our region’s rural and highly dispersed settlement pattern makes transporting donated perishables difficult. Some meal sites in the region are transporting donated food via the “Subaru network.” The [NEK Food Cycle Coalition](#), a task force of the NEK Food System, is currently exploring sustainable options for a distribution system that minimizes spoilage and carbon emissions.

Food for Animals: *Residuals and scraps can be used for farm animals to establish more sustainable and cost-effective agricultural practices.* Some residuals, like whey and spent brewer’s grain are being fed to pigs and are covered under the Vermont Commercial Feed Law, administered by Vermont Agency of Agriculture Food and Markets. There are some documented cases of pathogens being transferred to humans from pigs fed food scraps, and the VAAFM prohibits this practice among commercial producers. Feeding food scraps to chickens, however, is a time-tested practice that goes back to the days of the Great Depression and World

³ Vermont Dept. of Environmental Conservation: Vermont’s Universal Recycling Law Status Report, 2016 December.

War II, when resources were scarce. There are significant economic and environmental benefits, especially for small egg producers, whose feed would normally account for 70% of all production expense.⁴

Composting: *Redirect food scraps to build soil quality, sequester carbon, reduce runoff, and increase crop production.* When food scraps and organics decompose in a landfill, they release methane, mostly due to the lack of oxygen in the landfill. Even when the landfill methane is managed, diverting organics to aerobic digestion through composting is more effective in reducing emissions.⁵ The options range from backyard bins to the iconic “green cones,” to commercial-scale production. Currently there are two ANR-certified composting operations in the Northeast Kingdom: Dane Farm in Charleston, and Kingdom View Composting in Lyndon. The former site is currently inactive. Black Dirt Farm in Stannard and Cloud’s Path Farm are not composting facilities per se, but they provide commercial food scrap hauling in the region, drawing from a 200-mile radius. Some haulage is retained for feeding laying hens. In 2016, the NEKWMD has reported a 300% increase in food scrap drop-off.⁶ There are currently 21 facilities collecting food scraps in the NEKWMD.

Energy Recovery: *Convert food residuals to renewable energy.* In addition to the region’s landfill gas generation, there are opportunities to generate energy from food processing residuals. Waste oil from restaurants, for example, can be used to produce biofuel. Non-landfill methane generators primarily use cow manure, but it is possible to use “clean” food residuals, such as spent grains from brewing.

Hazardous Wastes

Household Hazardous Wastes (HHW) are the most prevalent of all hazardous wastes generated within the region. Despite their availability and relative ease-of-use for residential and commercial sources, the toxins in many of these products can pose serious health and environmental hazards (oil, batteries, cleaning solvents, insecticides, fluorescent bulbs, etc.). Therefore, the proper disposal of wastes, empty containers, and the unused portions of products is essential. Pouring them down the drain or sending them to the landfill are never an option. Towns and solid waste districts hold hazardous waste collection events every year, two per year at minimum (spring and fall) and many common household hazardous wastes can be disposed of at these events.

The Vermont Legislature established the Paint Product Stewardship program in 2014. Under this program, manufacturers are responsible for collecting and managing leftover architectural paint (both oil and latex) through a stewardship organization called PaintCare. This program will allow for free paint recycling or disposal at many locations throughout the region, such as paint retailers, recycling centers, hazardous waste facilities and collection events. It is funded by a small fee included at the point of sale of paint cans throughout the state.

In 2014 a bill was passed that requires primary (single-use) battery manufacturers to fund and manage a take-back and recycling program on behalf of consumers. The Primary Battery Stewardship Law (Act 139) prohibits battery producers from selling batteries in Vermont unless they participate in a stewardship plan that offers free collection and recycling. Many of the sites in the Northeast Kingdom are recycling centers, but a few retailers have collection sites as well. To find locations in the region, visit <https://www.call2recycle.org/locator/>

(See the Land Use chapter of this Plan for a discussion of Brownfields)

⁴ Black Dirt Farm. Feeding Food Scraps to Laying Hens in an Active Composting System, March 2017.

⁵ Paul Hawken. Drawdown: The Most Comprehensive Plan Ever to Proposed to Reverse Global Warming. Penguin 2017.

⁶ Vermont Dept. of Environmental Conservation. Vermont’s University Recycling Law Status Report.

Other Solid Waste Management Procedures

The Vermont Agency of Natural Resources, Waste Management Division currently has twenty one procedures in effect which address various aspects of solid waste management, from the disposal of dead animals to the disposal of clogged septic stone. These procedures can be found at:

<http://www.anr.state.vt.us/dec/wastediv/solid/procedures.htm>

GOALS AND STRATEGIES FOR SOLID WASTE MANAGEMENT

SOLID WASTE MANAGEMENT GOALS

- Municipal and regional solid waste disposal systems shall be cost-effective, environmentally sound, and promote reduction, reuse, and recycling, and will support the State-wide goal of reducing the disposal rate of Municipal Solid Waste.
- Increase solid waste diversion rates to 50% by the year 2020.
- Hazardous wastes shall be disposed at facilities permitted by the Agency of Natural Resources to ensure proper handling.
- Support efforts to reduce food waste by half by the year 2030.

SOLID WASTE MANAGEMENT STRATEGIES

- Assist member towns and solid waste management districts in the implementation of solid waste management plans.
- Encourage communities to meet the waste management and recycling goals established by the Northeast Kingdom Waste Management District and municipal waste management plans.
- Support public education to promote efforts to reduce and properly manage waste.
- Promote opportunities for schools and institutions to reduce food waste through best management practices and performance-based contracts.
- Provide technical assistance to entrepreneurs who are interested in food scrap hauling and composting-related businesses.
- Assist municipalities to adopt illegal dumping and burning ordinances.
- Encourage communities to create or expand local recycling facilities.
- Assist communities in sustainable reclamation of brownfields in the region.
- Support efforts to aggregate and distribute gleaned agriculture products.
- Support efforts to efficiently aggregate and distribute recovered food in a manner that minimizes spoilage and trucking miles.
- Support the expansion and viability of commercial composting operations.
- Help communities plan for and create municipal composting facilities, where feasible.
- Explore and facilitate the sustainable use of food residuals and other waste byproducts.