



2018 Chittenden County ECOS Plan

Supplement 2 – Regional Analysis
Adopted 6/20/2018

For a healthy,
inclusive, and
prosperous
community



This plan is the Regional Plan, Metropolitan Transportation Plan, and Comprehensive Economic Development Strategy in one.

**This plan can be found online at:
www.ecosproject.com/plan**

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2018 Chittenden County ECOS Plan

SUPPLEMENT 2 - REGIONAL ANALYSIS

INTRODUCTION

This Chapter describes the goals that have been developed through ECOS and the indicator data that shows us how we are doing relative to achieving our goals. Key issues/trends/insights are summarized for each of 17 topics. At the end of this Supplement is a summary of the conclusions drawn from the data, the form of 31 high-priority concerns.

This Supplement and these topics are grouped according to the four Broad Goals as follows and as shown in more detail on the following pages:

Demographics

Natural Systems

1. Ecological Systems (Habitats, Water Quality, Air Quality)
2. Scenic and Recreational Resources
3. Climate Change

Social Community

4. Education, Knowledge and Skills
5. Health
6. Public Safety and Criminal Justice
7. Social Connectedness
8. Arts, Culture and Recreation
9. Civic Engagement and Governance

Economic Infrastructure

10. Economy
11. Household Financial Security
12. Working Lands

Built Environment

13. Land Use
14. Housing
15. Transportation
16. Infrastructure
17. Energy

INDICATORS

CCRPC relies on 100+ indicators to monitor and build on successes, bring new information to the community and continue to work on areas that need improvement. Commonly referred to as the ECOS indicators, these data are contained both here in the ECOS Plan as well as online in a scorecard. The data indicators found in this Plan mostly represent historical trends and the ECOS Scorecard contains data that is updated annually. Click here to [view](#) the ECOS Scorecard. The table below is an index of the indicators and indicates whether they can be found in the Plan or on the Scorecard. The indicators found on the ECOS Scorecard are linked to the scorecard. Click on a scorecard indicator to view the data.

Indicator	Location
Regional Context: Demographics	
Projected Population Change in Chittenden County, 1960-2050	Supplement 2
Household and Employment Forecast for Chittenden County	Supplement 2
Population Growth Rate Compared to VT and New England, 1990-2010	Scorecard
Percent of Residents Born in Vermont in Chittenden County and Vermont, 1960-2010	Supplement 2
Percent of Residents Under 18, Percent of Residents Over Age 65, Median Age in Chittenden County, 1960-2010	Supplement 2
Percent of Total Households that are Single Person Household in Chittenden County and Vermont, Average Household Size, 1960-2010	Supplement 2
Percentage of Non-White Households in Each Municipality	Supplement 2
Percentage of Households in Each Municipality Where Language Other Than English Spoken	Supplement 2
Percent of Residents Who Are Non-White or Hispanic in Chittenden County, Vermont and the U.S., 1960 - 2010	Supplement 2
Percent Change in Population by Race, Chittenden County, 2000 - 2010	Supplement 2
Disability status of Chittenden County residents (relative to VT and US), 201	Supplement 2
Total Population, Chittenden County, 2007-2016	Scorecard
Average Household Size, 2007-2016	Scorecard
Median Age, Chittenden County, 2007-2016	Scorecard
Percent of the Population Age 19 and Under- Chittenden County, 2005-2016	Scorecard
Percent of Population Age 20 to 24 -Chittenden County, 2005-2016	Scorecard
Percent of Population Age 25 to 64-Chittenden County, 2005-2016	Scorecard
Percent of Population Age 65 and older- Chittenden County, 2005-2016	Scorecard
Percent of Chittenden County Residents Born in VT, 2007-2016	Scorecard

Percent of Single Person Households in Occupied Units- Chittenden County, 2007-2016	Scorecard
Percent of Population Age 5 and Older Speaking a Language Other than English at Home-Chittenden County, 2007-2016	Scorecard
Percent of the Population that is Non-White and Hispanic-Chittenden County, 2007-2016	Scorecard
Natural Systems: Ecological Systems	
Chittenden County Land Cover Losses (vegetated, cultivated, wetlands); 2001,2006	Supplement 2
Acreages of Wildlife Habitat Lost to Development, 2006,2011	Scorecard
Phosphorus Level Concentrations, 2007	Supplement 2
Percent of Impaired Stream Miles, 2012	Scorecard
Phosphorus Load to Lake Champlain from Vermont, 2001-2010	Scorecard
Percent of Impervious Surface by Watershed, 2008	Scorecard
Ozone, 2000-2016	Scorecard
Particulate Matter, 2002-2016	Scorecard
Particulate Matter, 1995-2010	Supplement 2
Ozone, 1995-2010	Supplement 2
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Conserved Land, 2010,2015	Scorecard
Land Available for Recreation	Supplement 2
Percent of Towns with Zoning Standards Protecting Scenic Resources	Scorecard
Natural Systems: Climate Change	
Greenhouse Gas Emissions, 2010	Scorecard
Carbon Sequestration from Vegetated Landscapes, 2001	Scorecard
Major Disaster Declarations, 1963-2012	Supplement 2
Major Disaster Declarations,1997-2016	Scorecard
Heat Stress Related ER Visits, 2003-2015	Scorecard
Number of Confirmed Lyme Disease Cases Reported to be Exposed in Chittenden County, 2005-2016	Scorecard
Climate-Related Infectious Disease, 2003-2009	Supplement 2
Vermont Residents Discharged from Vermont, NH, NY, and MA Hospitals Hospital Visits for Primary Diagnosis of Lyme Disease: Years of Admission 2003-2009	Supplement 2

Social Community: Education, Knowledge, and Skills	
Percent of children entering kindergarten school ready according to developmental domains, Supervisory Union, Vermont	Supplement 2
Percent of Chittenden County's students scoring proficient or above on 2011-2012 state assessments	Supplement 2
Four-year, Five-year, and Six-year Drop Out Rates	Supplement 2
Percent of Population with a High School Diploma or Higher, VT, Chittenden County, 2011	Supplement 2
Percent of Population with a Bachelor's Degree or Higher VT, Chittenden County, 2011	Supplement 2
Number of Internship Grants from the State of Vermont Department of Labor offered in Chittenden County for FY2010	Supplement 2
Percent of Kindergartners Ready on the Ready for Kindergarten! Survey (R4K!S), Chittenden County, 20016-2017	Scorecard
Percent of All Chittenden County Students in Grade 11 considered proficient or above in Math on the Smarter Balanced Assessment, All Students, Free and Reduced Lunch, and Non-Free and Reduced Lunch 2015-2017	Scorecard
Percent of All Chittenden County Students in Grade 11 considered proficient or above in Science on the New England Common Assessment Program (NECAP) test, 2014-2017, All Students, Free and Reduced Lunch, and Non-Free and Reduced Lunch	Scorecard
Percent of All Chittenden County Students in Grade 3 considered proficient or above in Reading on the Smarter Balanced Assessment, 20015-2017, All Students, Free and Reduced Lunch, and Non-Free and Reduced Lunch	Scorecard
Percent of Chittenden County Students Proficient or Above in Math at Grade 11 on the Dynamic Learning Maps Alternate Assessment, 2016	Scorecard
Percent of Chittenden County Students Proficient or Above in Language Arts at Grade 11 on the Dynamic Learning Maps Alternate Assessment, 2016	Scorecard
6-Year Cohort Drop-Out Rate for All Chittenden County High Schools, 2010-2015	Scorecard
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Percent of regulated care and education programs (registered and licensed) of high quality (4 & 5 Stars level) in Chittenden County	Scorecard
Social Community: Health	
Percent of Population with Cardio Vascular Disease, Chittenden County, 2008-2010	Supplement 2
Percent of Population with Cancer, Chittenden County 2008-2010	Supplement 2
Percent of Adults who are Obese, All Adults, Low Income, Higher Income (2004-2016)	Scorecard
Percent of Adults who Smoke Cigarettes, All Adults, Low Income, Higher Income (2004-2016)	Scorecard
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Percent of Adults Who Binge Drink, All Adults, Adults 18-25, Adults 26+	Scorecard
Percent of Adults with Asthma, All Adults (2004-2016)	Scorecard
Percent of adults meeting physical activity guidelines, All Adults, Low Income, Higher Income (2004-2016)	Scorecard
Percent of Adults Who Report Using Marijuana in the Past 30 days, All Adults, Adults 18-25, Adults 26+	Scorecard
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Percent of adolescents in grades 9-12 who are obese, All adolescents, by Mother education	Scorecard
Percent of adolescents in grades 9-12 who smoke cigarettes, All adolescents, by Mother education	Scorecard
Percent of adolescents in grades 9-12 meeting physical activity guidelines, All adolescents, by Mother education	Scorecard
Percent of Youth (grades 9-12) who report using Alcohol in in the last 30 days, All Youth, by Mother education	Scorecard
Percent of Youth (Grades 9-12) who Report Using Marijuana in the Last 30 Days, All Youth, by Mother education	Scorecard
Social Community: Public Safety	
Violent Crime Rate per Capita	Scorecard
Incarceration rates by race compared to general population	Supplement 2
Property Crime rate per 1,000 Chittenden County Residents	Scorecard
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Number of Structures in Special Flood Hazard Areas and Fluvial Erosion Hazard Areas	Scorecard
Percent of Children (Age 6 mo-8 yrs) Immunized Against Influenza	Scorecard
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Percent of New Structures in Areas Planned for Growth, 1950 – 2010	Supplement 2
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Total New Units Built in Chittenden County	Scorecard
Percent of Residential Development in Areas Planned for Growth	Scorecard
Percent of Residential Development in the Center Planning Area	Scorecard
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Built Environment: Housing	
Percent of Owner Households Spending Over 30% of Income on Housing Expenses	Scorecard
Percent of Renter Households Spending Over 30% of Income on Housing Expenses	Scorecard
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County-wide Rental Apartment Vacancy Rate	Scorecard
Burlington and Winooski Rental Apartment Vacancy Rate (Metro)	Scorecard
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Homelessness	Scorecard
Inventory of Affordable Rental Properties	Scorecard
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Current Wastewater Capacity v. Capacity Needed for Growth Projections in Areas Planned for Growth	Supplement 2
Percent of Impervious Area Under Stormwater Management	Supplement 2
Percent of Impervious Area Covered by Municipal Separate Storm Sewer System	Supplement 2
Storm Water Management	Scorecard
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Waste Water Average Annual Flow	

Pounds per capita per day for Municipal Solid Waste	Scorecard
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Annual Natural Gas Consumption	Scorecard
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Vermont Insights	
Agency of Human Services Health & Well Being Profile	
Agency of Human Services Outcomes of Well-Being	
Chittenden County Opioid Alliance Scorecard	
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Community Energy Dashboard	

REGIONAL CONTEXT

Chittenden County is located in northwestern Vermont between Lake Champlain and the highest peaks of the Green Mountains (see Figure 1-1). The County's nearly 350,000 total acres have a rich diversity of landscapes: forests, farms, water bodies, small cities, suburban areas, and villages.

Founded in 1787, Chittenden County has about 156,000 residents living in 19 municipalities that range in size from 20 to almost 40,000 residents. The County is the heart of the Burlington – South Burlington Metropolitan Statistical Area (the economic engine of Vermont); home to the State's largest higher education institution, health care facility, and private sector employer; and nationally recognized as having an outstanding quality of life.

Unlike many rural regions which have experienced population decline in the past 30 years, Chittenden County is growing, and at a rate higher than the rest of Vermont, higher than the New England region, and higher than the U.S. as a whole. Indeed, residents who were born in Vermont now constitute only half the population of the state. And the influx is increasingly diverse: Chittenden County's diversity is growing at a higher rate than the rest of the state.

The challenges of a growing population and growing diversity are many, and will touch on every aspect of our quality of life. This ECOS Plan aims to address those challenges in a holistic, integrated way.

Information about the people in Chittenden County helps us to understand the nature of our community and how we are changing. It can help decision makers anticipate potential pressures on the wider social, economic and physical environments. Factors such as population growth (it is important to note that college students are counted by the Census and are therefore included in our population numbers), age, ethnicity, migration and household makeup are often key determinants of conditions across a whole range of issues affecting quality of life.

FIGURE 1 - REGIONAL OVERVIEW MAP



Regional Demographics at a Glance:

- Chittenden County contains 26% of the State's population
- Between 2010 and 2015, the State's population grew .01%, while Chittenden County's population grew 3%.
- The annual rate of population growth in both Chittenden County as well as the State has slowed over the past several years. While regional population growth (3% increase from

2010-2015) is still stronger than statewide growth (.01% increase from 2010-2015), it is lower than the national growth rate (4%). Though the region still has a population growth advantage compared to the state, it does not when compared to the rest of the country.

- Chittenden County has the highest percentage of New Americans in the state, and the percentage is growing—1/3 of all new county residents between 2006-2016 were born outside of the US. This group makes up 6.1% of the county's spending power and is strongly represented in key sectors like manufacturing and health care.

FIGURE 2 - PROJECTED POPULATION CHANGE IN CHITTENDEN COUNTY

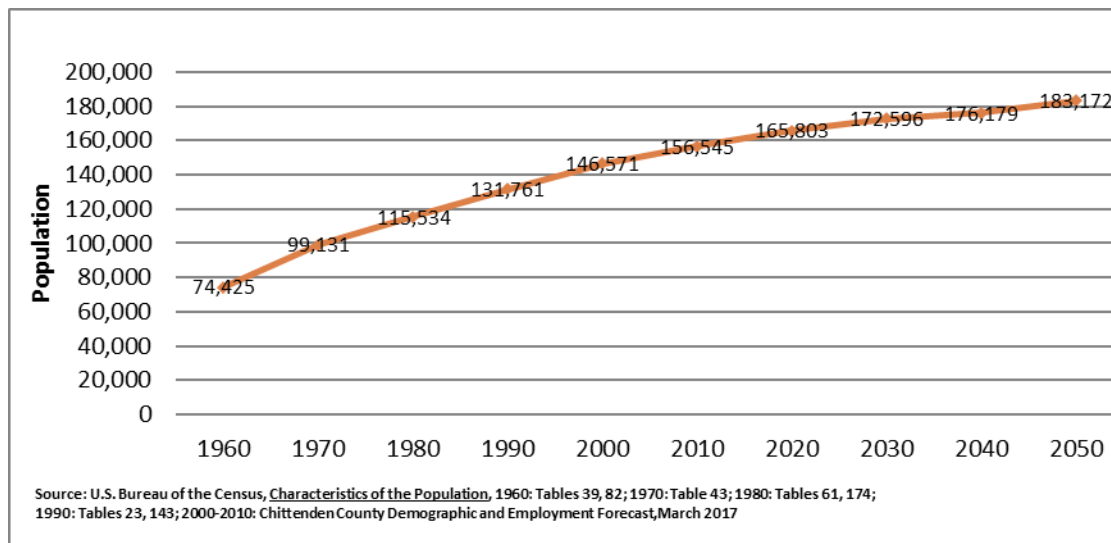
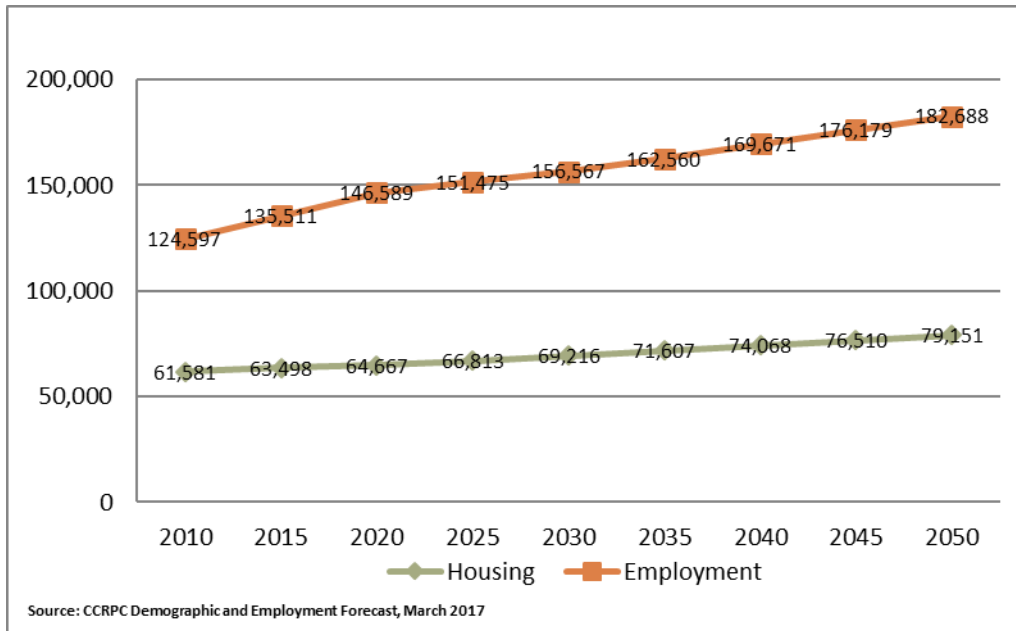
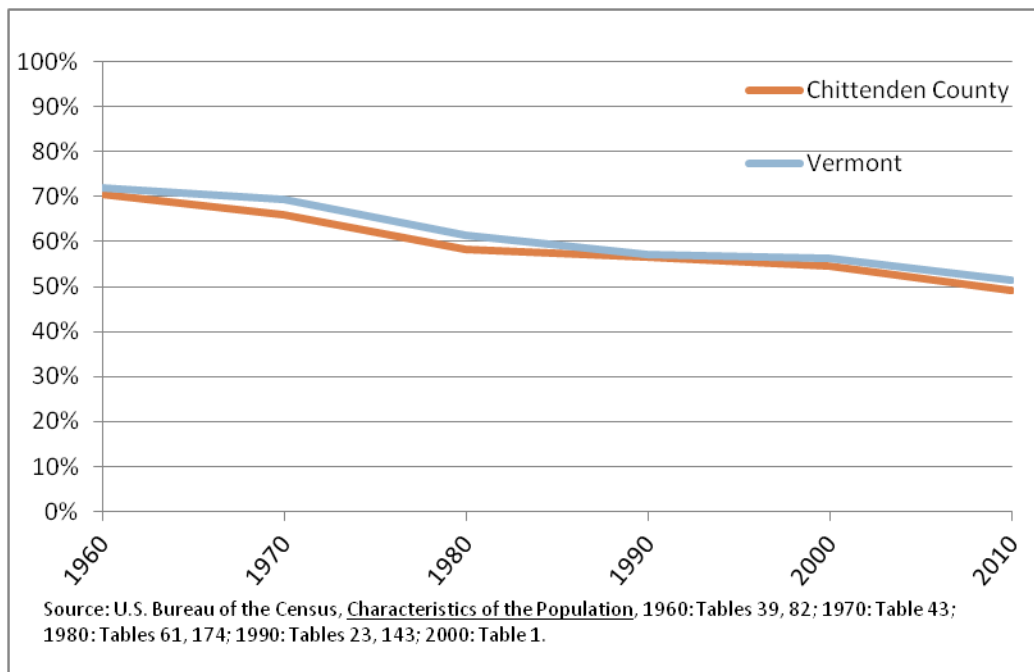
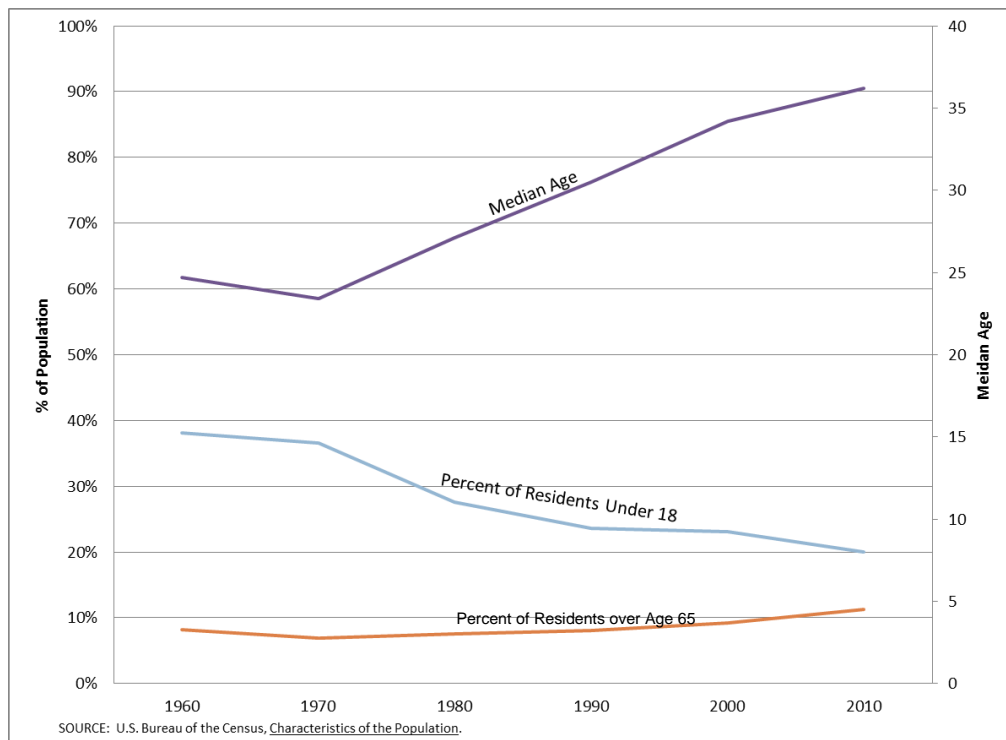


FIGURE 3 - HOUSEHOLD AND EMPLOYMENT FORECAST FOR CHITTENDEN COUNTY**FIGURE 4 - PERCENT OF RESIDENTS BORN IN VERMONT IN CHITTENDEN COUNTY AND VERMONT, 1960 - 2010**

■ Age

FIGURE 5 - PERCENT OF RESIDENTS UNDER 18, PERCENT OF RESIDENTS OVER AGE 65, 1960 - 2010, AND MEDIAN AGE IN CHITTENDEN COUNTY, 1960-2010



■ Families and households

FIGURE 6 - PERCENTAGE OF TOTAL HOUSEHOLDS THAT ARE SINGLE PERSON HOUSEHOLDS IN CHITTENDEN COUNTY AND VERMONT, 1960 - 2010, AND AVERAGE HOUSEHOLD SIZE IN CHITTENDEN COUNTY 1960 - 2010

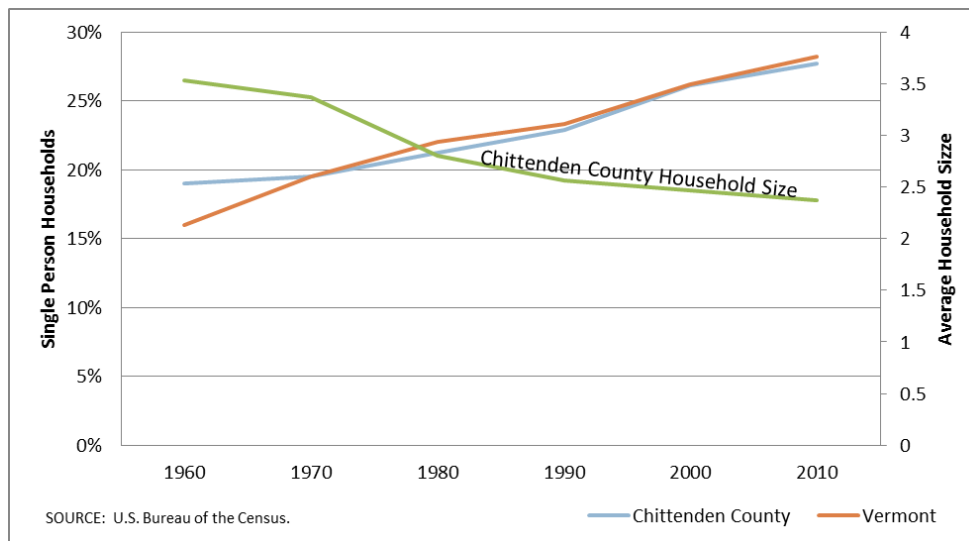
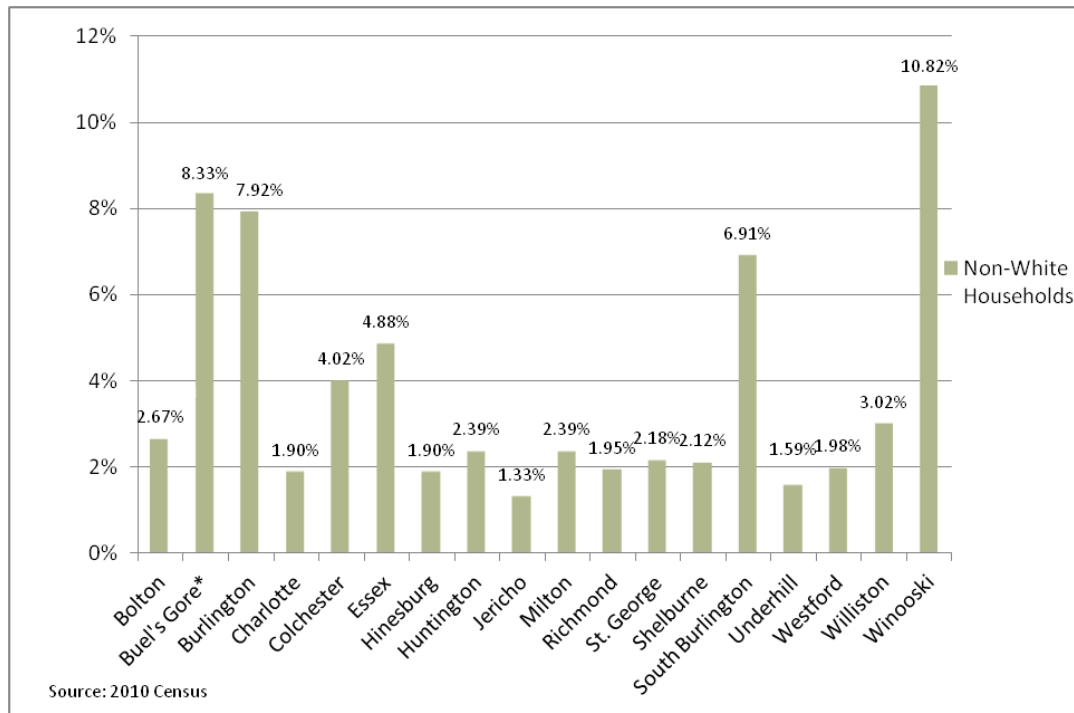
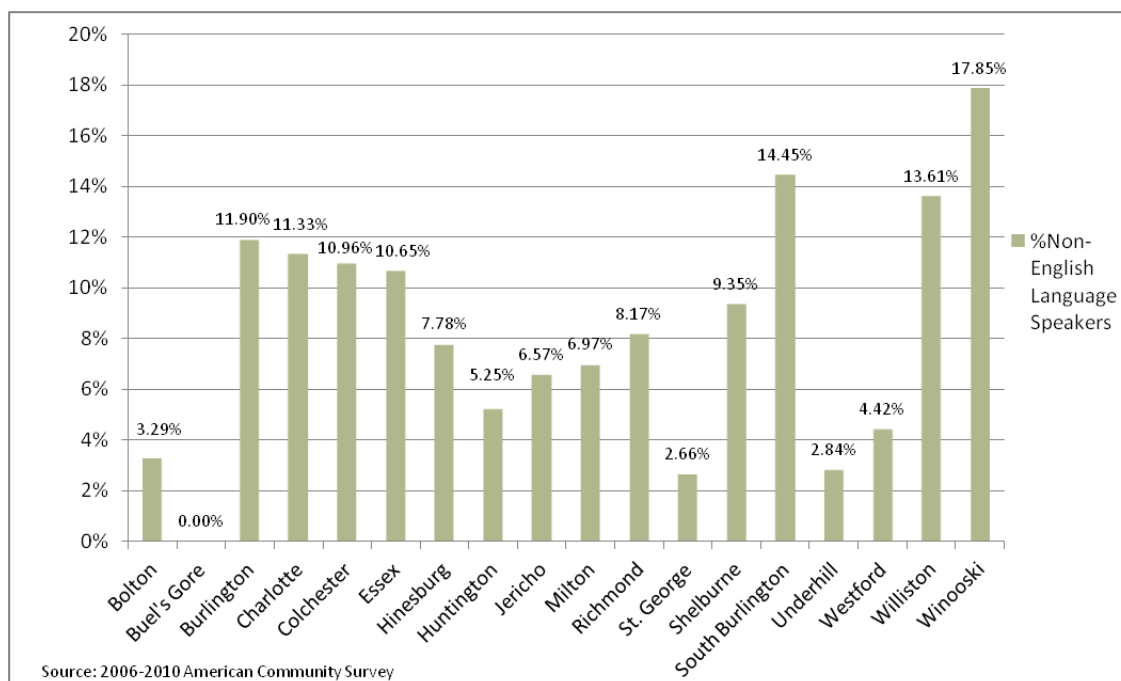


FIGURE 7 - PERCENTAGE OF NON-WHITE HOUSEHOLDS IN EACH MUNICIPALITY



*This percentage is high because there are very few households in Buel's Gore.

FIGURE 8 - PERCENTAGE OF HOUSEHOLDS IN EACH MUNICIPALITY WHERE LANGUAGE OTHER THAN ENGLISH SPOKEN



■ Race/Ethnicity

FIGURE 9 - PERCENT OF RESIDENTS WHO ARE NON-WHITE OR HISPANIC IN CHITTENDEN COUNTY, VERMONT AND THE U.S., 1960 - 2010

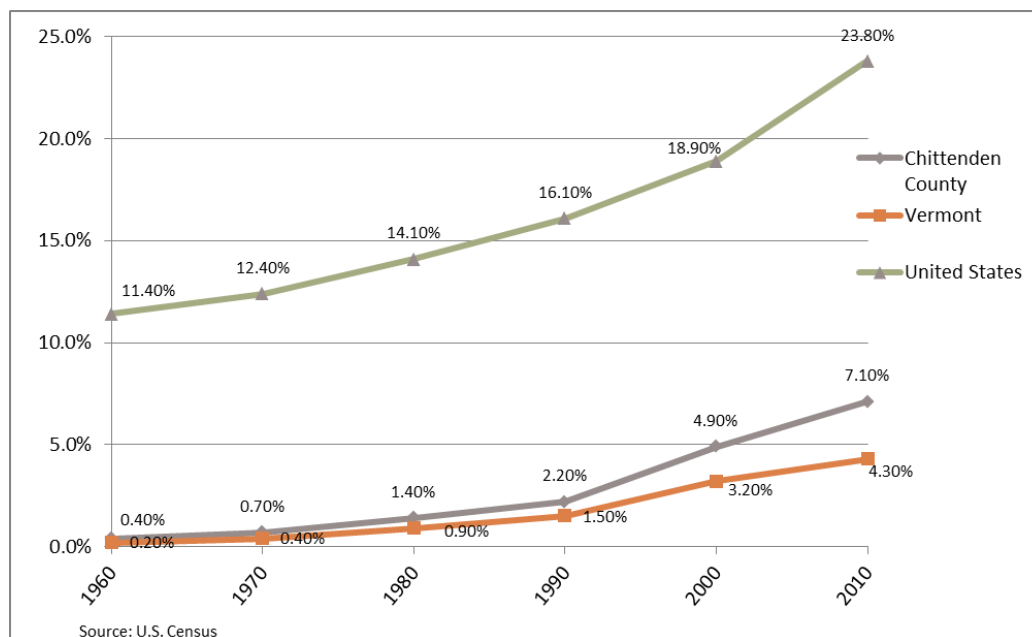
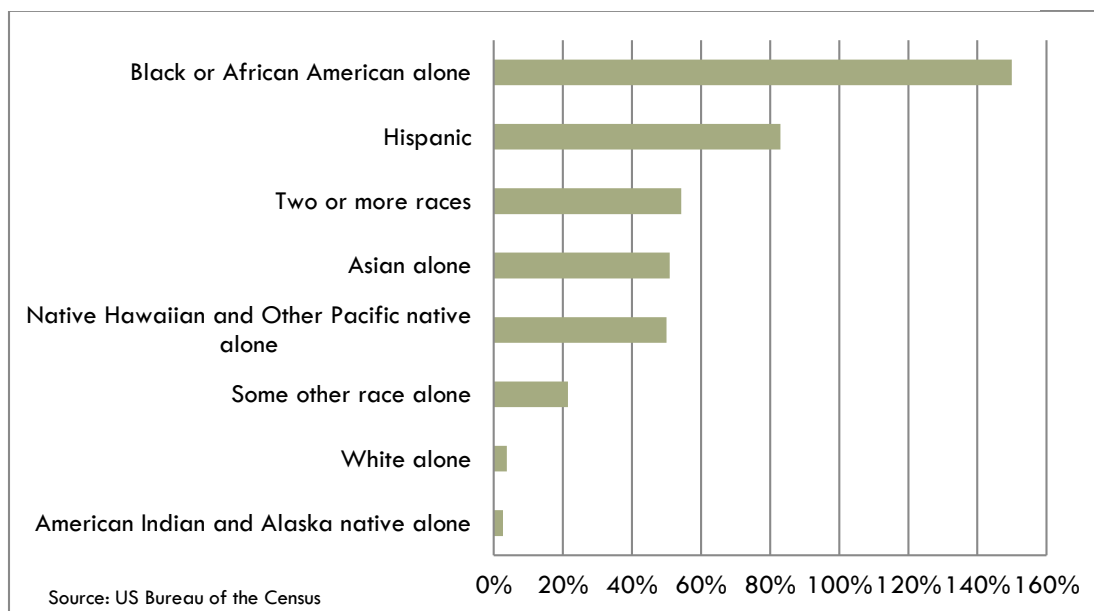


FIGURE 10 - PERCENT CHANGE IN POPULATION BY RACE, CHITTENDEN COUNTY, 2000 - 2010



- **Disabilities**
 - **Disability status of Chittenden County residents (relative to VT and US)**
About 14,000 people in Chittenden County were identified as having a disability in 2010. Income of people with disabilities is far below that of people without disabilities, reducing their ability to afford housing and further limiting their housing choices.

Additional Indicators can be found on the ECOS Scorecard.

Indicator	Location
Regional Context: Demographics	
<u>Population Growth Rate Compared to VT and New England, 1990-2010</u>	Scorecard
<u>Total Population, Chittenden County, 2007-2016</u>	Scorecard
<u>Average Household Size, 2007-2016</u>	Scorecard
<u>Median Age, Chittenden County, 2007-2016</u>	Scorecard
<u>Percent of the Population Age 19 and Under- Chittenden County, 2005-2016</u>	Scorecard
<u>Percent of Population Age 20 to 24 -Chittenden County, 2005-2016</u>	Scorecard
<u>Percent of Population Age 25 to 64-Chittenden County, 2005-2016</u>	Scorecard
<u>Percent of Population Age 65 and older- Chittenden County, 2005-2016</u>	Scorecard
<u>Percent of Chittenden County Residents Born in VT, 2007-2016</u>	Scorecard
<u>Percent of Single Person Households in Occupied Units- Chittenden County, 2007-2016</u>	Scorecard
<u>Percent of Population Age 5 and Older Speaking a Language Other than English at Home-Chittenden County, 2007-2016</u>	Scorecard
<u>Percent of the Population that is Non-White and Hispanic-Chittenden County, 2007-2016</u>	Scorecard

NATURAL SYSTEMS

Broad Goal: Design and maintain a strategically planned and managed green infrastructure network composed of natural areas, working lands, wildlife habitat, scenic views and air quality that help to conserve ecosystem values and functions (including climate change adaptation and mitigation), and provide associated benefits to our community.

INTRODUCTION: A sustainable community preserves natural systems in order to maintain quality of soil, air and water and because they offer a richness that nurtures the human spirit. Healthy landscapes are necessary to sustain the complex myriad of plant and animal species that share our habitat. We are dependent on the surrounding landscapes for many resources such as food, water and fuel; for recreational opportunities and aesthetic values; and for vital natural processes such as water retention and recycling, air cleansing, carbon sequestration, and nutrient cycling. Preservation of our natural systems can help guide new growth into existing developed areas. In addition, a network of healthy natural systems and green infrastructure can make very important contributions to the overall prosperity of the region.

As a result of our topography and historic development patterns the eastern side of Chittenden County contains large intact habitat blocks, while the western side does not; however, many important habitats exist throughout the entire County. Therefore, this plan calls for efforts to maintain the existing natural systems throughout the County, and minimize fragmentation of habitats and maintain wildlife corridors. The [*Conserving Vermont's Natural Heritage Guide*](#) (Vermont Fish and Wildlife Department and the Agency of Natural Resources, 2004) identifies the following seven mechanisms by which current development patterns degrade Vermont's natural heritage: 1. direct loss of diversity; 2. destruction of habitat; 3. habitat fragmentation; 4. disruption of movement, migration, and behavior; 5. introduction of invasive exotic species; 6. degradation of water quality and aquatic habitat; and 7. loss of public appreciation for the environment. Methods to combat or mitigate these mechanisms are crucial to the sustainability of the County as we continue to grow.

This section also touches on the local impacts of a changing climate. Our region's climate is already changing; warmer, wetter conditions are expected to increase this century ([*Chittenden County Climate Change Trends and Impacts*](#)). These changes will adversely impact forest and aquatic communities, water quantity and quality, public health, agriculture, winter sports businesses, and buildings and infrastructure in flood and fluvial erosion hazard areas. Curbing climate change will require planet-wide actions to reduce greenhouse gas emissions; and preparing locally so that we can be resilient in light of these changes is imperative.

This Plan uses a multidisciplinary, holistic 'ecological systems' approach to understanding our natural and built environment, in which we look at the complex relationships between living elements (such as vegetation and soil organisms) and nonliving elements (such as water and air) of a particular area to understand the whole ecosystem. In that same way, we must look beyond our municipal, county and state political boundaries to understand the impacts, both positive and negative, we have on each other. We need to collaborate with each other and adjust our actions in a measured fashion in support of ecosystem health.

1. ECOLOGICAL SYSTEMS

Ecological Systems Goal: Conserve, protect and improve the health of native species habitats, water quality and quantity, and air quality.

Key Issues/Trends/Insights

[Data for this section drawn from [Natural Systems Analysis Report](#) and [Lake Champlain Basin Program's State of the Lake Reports](#)]

- **Wildlife and Native Species** Vermont's forest cover was as low as 35% in the mid to late 1800's; but after major reforestation it is now 74%. However, for the first time in a century the State is experiencing an overall loss of forest cover. This is true in Chittenden County as well; the County sees fragmentation and loss of forest blocks and *habitat* connectors largely due to scattered residential development. While 86% of our growth has occurred in our areas planned for growth since 2011; we still experience incremental growth that breaks up the forests. The most significant change is the pattern of the forest cover and relative connectedness of forest blocks to each other and riparian areas. The Agency is seeing forest blocks in Chittenden county getting smaller and more isolated from other forest blocks, as well as surface water and riparian areas. Leaving isolated islands of habitat contributes to losses in biodiversity. Growth outside of planned areas has had a visible (and ecological) impact on the pattern of forests and forest cover. These trends speak to the broader concept of the pattern of forest cover versus focusing on core forest areas. Increasing land parceling and subsequent habitat conversion, lack of local regulations responsive to wildlife habitat concerns, and construction of transportation infrastructure (including roads and trails) continue to adversely impact forest and habitat integrity. In addition, acid deposition from air pollution, migration of invasive species including destructive insect species, and climate change continues to threaten native forest plant and animal habitat.
- **Water Quality** Vermont water bodies continue to face mounting pressures from unsustainable development, farm and forest activities. Cumulative impacts from these land use activities have degraded water quality, aquatic habitat and altered the stability of river corridors and lakeshores. Issues that predominate in the County include disappearing wetlands, increasing impervious surfaces, steady high pollutant loads (mainly from nonpoint sources such as unmanaged stormwater), that result in nutrient enrichment and sedimentation, as well as other impairments. In addition, aquatic nuisance species continue to enter our waterways, contributing to the degradation of both habitat and recreational opportunities. Climate change is expected to bring us more intense storms at a higher frequency, which will only exacerbate the problem. Support of water quality improvement has been an ongoing effort of the Vermont Agency of Natural Resources and since 2012 the following initiatives have come into effect or been updated: Shoreland Protection Act and Permit; Update of Lake Champlain Watershed Basin Plans - Lamoille and Northern Lake Champlain; Flood Hazard Area and River Corridor Protection Rule and Permit; Update of Stormwater Rules and Permits; and Designation of Sandbar Wetlands as a Class I Wetland.
- **River Corridors** *River corridor resilience* is also critical to the health of our ecological systems as well as protection of nearby infrastructure. Channelization of streams and rivers, reduction and alteration of natural floodplains, river corridor encroachment, stormwater runoff and reduction and elimination of vegetative buffers are practices that lead to river corridor instability causing excessive erosion of river channels, pollution and additional fluvial erosion hazards. Of the river miles assessed in Vermont, 74% have become confined to deeper, straighter channels and no longer have access to historic floodplains essential to stable streams and sustainable water quality management. River Corridor means the land area adjacent to a river that is required to accommodate the dimensions, slope, planform, and buffer of the naturally stable

channel and that is necessary for the natural maintenance or natural restoration of a dynamic equilibrium condition, as that term is defined in 10 V.S.A. §1422, and for minimization of fluvial erosion hazards. River Corridor maps are officially posted on the ANR Natural Resources Atlas. In the coming year the maps will be updated to represent field-based Phase 2 data which have been delineated for many Chittenden County communities. An FEH is essentially equivalent to a River Corridor Protection Area (RCPA). Both delineate the extent of the rivers meander belt, however the FEH areas are field-based data and more accurate than the current State mapped RCPAs. A River Corridor includes the meander belt *and* the area to maintain a riparian buffer (defined as 50 feet from the meander belt). These areas are mapped in the 2016 update of the *Chittenden County All Hazards Mitigation Plan* and associated municipal Annexes, and are officially posted on the ANR Natural Resources Atlas. River Corridor protection is a goal in statute for municipalities, regions and state agencies. Important incentives such as the Emergency Relief Assistance Fund (see the Public Safety, Criminal Justice & Hazard Mitigation Section in this Supplement for more information) are available to communities protecting river corridors.

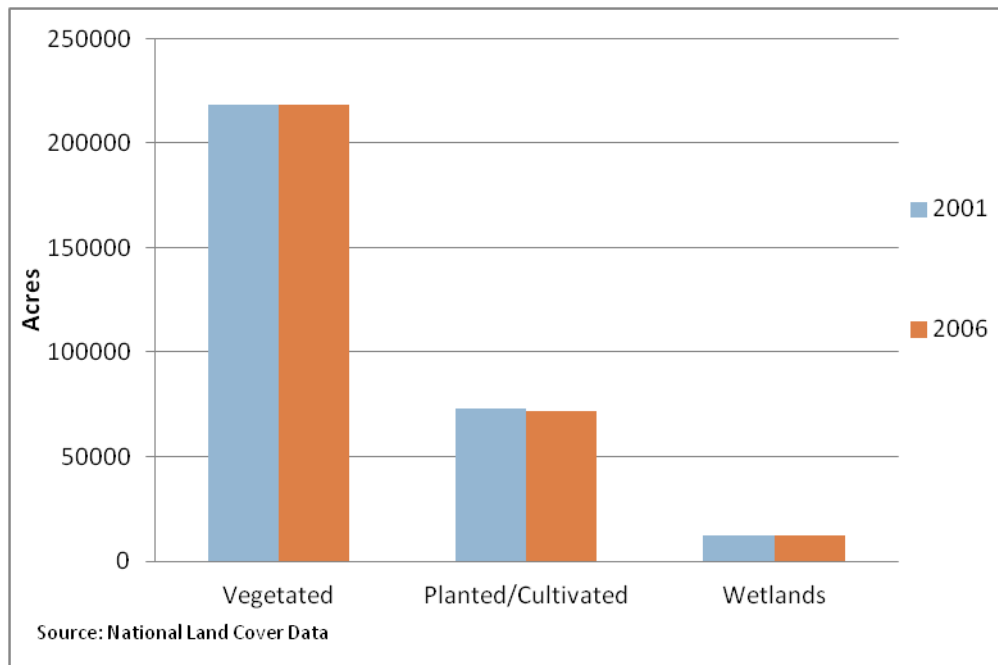
- **Groundwater** As of 2005, 22,120 residents of Chittenden County (almost 15% of the population) relied on *groundwater* sources for their drinking water (Source: USGS Water Use Compilation). Protection of groundwater resources from failing septic systems and petroleum spills/leaks is critical.
- **Regulations** *Local zoning lags behind town plans.* There is a disconnect between the vision for natural systems as expressed in Municipal Plans, and the Zoning Regulations that implement those plans. In addition, many zoning regulations have vague review standards and definitions, a situation that complicates enforcement and opens the town to due process legal challenges. Conversely, local bylaws protect the majority of Fluvial Erosion Hazard areas in the County with stream setbacks and floodplain regulations from new development. However, agriculture and forestry practices are exempt from local review and without State enforcement of accepted agricultural practices fluvial erosion hazard areas are subject to degradation.
- **Air Quality** *Outdoor air pollution* in significant concentrations can raise aesthetic and nuisance issues such as impairment of scenic visibility; unpleasant smoke or odors; and can also pose human health problems, especially for more sensitive populations like children, asthma sufferers, and the elderly. While Chittenden County's air quality meets current National Ambient Air Quality Standards (NAAQS), we are close to the limits for ground-level ozone and fine particulates. We are also subject to pollution from the mid-west that we cannot control. If the NAAQS are revised to be more stringent - or air pollutant levels increase - so that we exceed the NAAQS, additional and costly environmental regulations will apply to our region (Source: <http://dec.vermont.gov/air-quality>).
- **Climate Change Mitigation & Adaptation** – Plants remove carbon from the atmosphere and store it in biomass and soils – a process called carbon sequestration. Maintaining forests, wetlands, agricultural lands and vegetated spaces in developed areas is important for ensuring current and future carbon sequestration. Vegetated landscapes are also important for the natural absorption of stormwater, reducing runoff and the potential for flooding. By concentrating development we can protect vegetative cover throughout the County. Also, reducing fragmentation of forest blocks and riparian areas will help limit the effects of climate change on species. As species adjust their ranges, they will need to cross roads and less suitable habitats. Maintaining a connected network of lands and waters is the one of the most important climate change adaptation strategies.

Key Indicators

- **Chittenden County Land Cover Losses (Source: USGS 2001 and 2006 National Land Cover Data):**
 - .19 net acres of agricultural land and natural resource land lost annually to development per new resident between 2001 and 2006.

- 210,619 acres or 61% of the land are covered by forest.
- Between 2001-2006, 241 acres or .11% of barren land, deciduous forest, evergreen forest, mixed forest, shrub, grassland, woody wetlands, and emergent herbaceous wetlands were converted to development. These land cover categories are being used as a surrogate for wildlife habitat as there is currently a lack of a better, more accurate data source.
- In particular, 55 acres or .5% of wetlands were developed in Chittenden County.

FIGURE 11 - CHITTENDEN COUNTY LAND COVER LOSSES



- **Phosphorus level concentrations** in several areas of Lake Champlain have remained relatively steady since 2007; however the non-point loads are consistently above the target in the Main Lake and Mallets Bay. Non-point phosphorus loading from streams to the main section of Lake Champlain are recorded at 3.3 times the target of 51.3 metric tons, and to Mallets Bay almost twice the target of 25.4 metric tons. Though it is important to note that the Lamoille River drains to Mallets Bay and is located largely outside of Chittenden County. (Source: *State of the Lake and Ecosystem Indicators Report 2012*, Lake Champlain Basin Program).
- **Chittenden County's Air Quality is close to National Ambient Air Quality Standards (NAAQS) for ground-level ozone and fine particulate:**
 - Ozone air quality samples taken since 1995 consistently show the County being below (though often close to) National Standards.

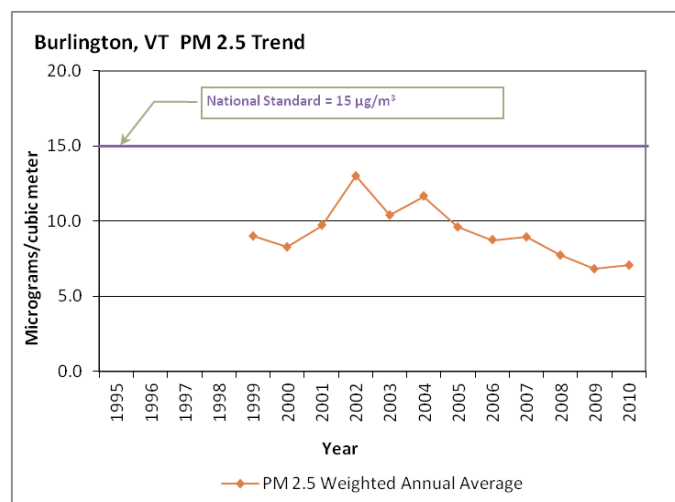


FIGURE 12 - OZONE TREND, BURLINGTON, VT

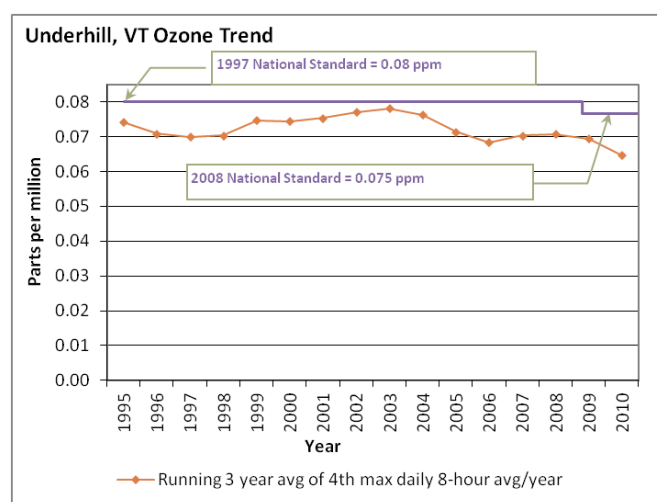


FIGURE 13 - OZONE TREND, UNDERHILL VT

Additional indicators can be found on the ECOS Scorecard.

Indicators	Location
Acreages of Wildlife Habitat Lost to Development, 2006,2011	Scorecard
Percent of Impaired Stream Miles, 2012	Scorecard
Phosphorus Load to Lake Champlain from Vermont, 2001-2010	Scorecard
Percent of Impervious Surface by Watershed, 2008	Scorecard
Ozone, 2000-2016	Scorecard
Particulate Matter, 2002-2016	Scorecard

2. SCENIC, RECREATIONAL, AND HISTORIC RESOURCES

Scenic and Recreational Resources Goal: Conserve, protect and improve valued scenic, recreational, and historic resources and opportunities.

Key Issues/Trends/Insights

[Data for this section drawn from [Natural Systems Analysis Report](#)]

- Chittenden County is rooted in its scenic, recreational, and historic resources. These provide residents a place to relax, play, gather, and learn about nature, conservation, and our heritage. They also provide important ecological functions including wildlife habitat, and water and air quality protection. These are supplemented by indoor and outdoor recreation facilities. In addition to the many recreational opportunities associated with Lake Champlain (swimming, boating, fishing, etc.), an extensive system of shared-use paths, on-road bike lanes, and off-road trails connect the County's recreational facilities and areas (this data can be found under the Natural Systems section of the online map located here: <http://maps.ccrpcvt.org/ChittendenCountyVT/>). In addition, municipalities are planning for new facilities and improvements to existing facilities to expand access and opportunities for recreation. See the CEDS Project list in Supplement 4 for cost estimates, funding sources and proposed timelines for six recreation related projects throughout the County.
- Scenic resources represent an important element of the region's landscape and contribute directly to sense of place, quality of life and economic vitality through tourism and by attracting new residents and businesses.
- Historic resources include buildings, structures, landscapes, and archeological site land and under water. There are over 4,400 designated historic sites in Chittenden County and over 80 designated historic districts (this data can be found under the Natural Systems section of the online map located here: <http://map.ccrpcvt.org/ChittendenCountyVT/>).
- The recreational value of our water bodies (swimming, fishing, boating, etc.) is critically dependent on water quality. E-coli and algal blooms lead to beach closures, while invasive species threaten our native fish populations. Events and encroachments such as these are exacerbated by the effects of climate change.
- As we work toward encouraging future development in areas planned for growth to maintain VT's historic settlement pattern of villages and urban centers, surrounded by rural countryside, **access** to valued scenic, recreation and historic resources should also be maintained and improved for all residents and visitors. In addition, accessible design standards should be incorporated into recreation facility projects.
- Eight of the County's municipalities (Milton, Colchester, Essex Junction, Winooski, Burlington, South Burlington, Shelburne and Charlotte) are member communities of the Lake Champlain Byway, a State-designated Scenic Byway that extends from Alburg in the Champlain Islands through Chittenden County on U.S. 7 and south into several towns in Addison County. Since 2002 these communities have secured competitive grants from the National Scenic Byway Program to improve the visitor experience by implementing projects such as wayfinding signage, interpretive panels, brochures, kiosks, and other amenities. In particular, the Byway focuses on improving interpretation and information about municipal and non-profit intrinsic resource sites such as parks, town forests, natural areas, trails and smaller museums.

- There is low compatibility between municipal plan recommendations for natural and scenic resources and the implementation of those recommendations through zoning bylaws and subdivision regulation. Further, there are often contradictory goals within municipal plans regarding natural and scenic preservation and new infrastructure for energy generation and transmission. Reconciliation of these is necessary to meet community visions and bring predictability to the development process.

Key Indicators

- **56,450 acres or 17% of Chittenden County's land area is available for recreation in the form of town & state parks, athletic fields, and natural areas.** Source: CCRPC

Additional Indicators can be found on the ECOS Scorecard.

Indicator	Location
Conserved Land, 2010,2015	Scorecard

3. CLIMATE CHANGE

Climate Change Goal: Reduce greenhouse gas emissions contributing to climate change and adapt to become more resilient to a changing climate.

Key Issues/Trends/Insights

[Data for this section drawn from [Chittenden County Climate Change Trends and Impacts](#) and the [Chittenden County Regional Climate Action Guide](#).]

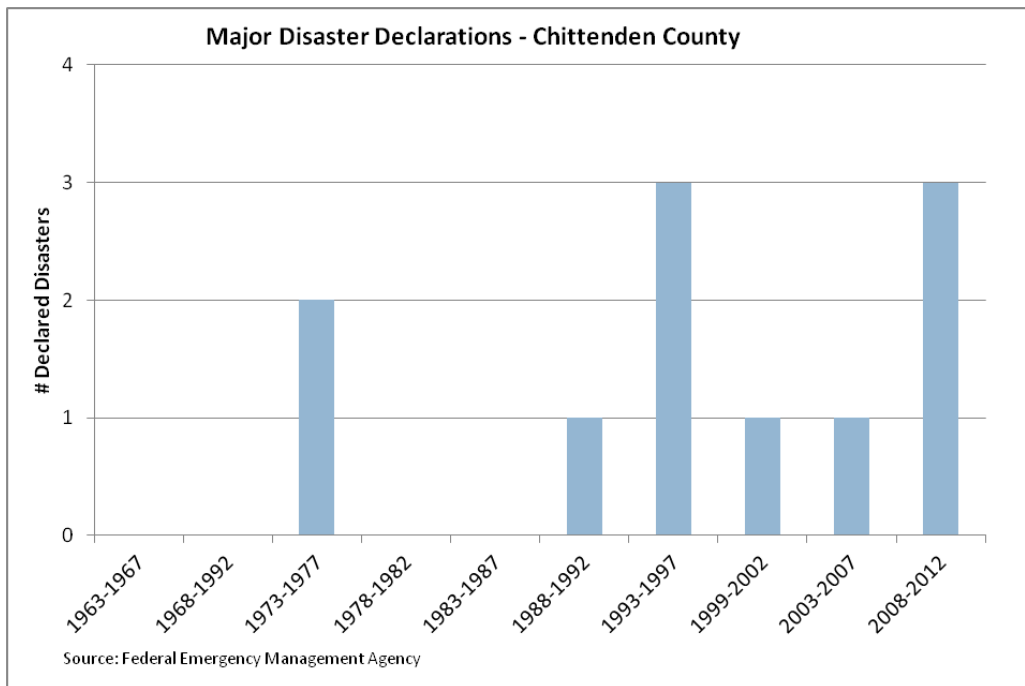
- Temperature and precipitation records for the latter half of the 20th century show that Chittenden County's climate has changed: winters became warmer and summers became hotter. Lake Champlain freezes over later and less frequently and the growing season lasts longer. Annual precipitation has increased, but more falls as rain instead of snow.
- Scientists overwhelmingly agree that changes in climate worldwide are a result of human activities, mainly the burning of fossil fuels. Climate model forecasts for the Northeast US predict that during this century temperatures will continue to increase, as will extreme heat days and heat waves. More precipitation and extreme precipitation events are expected to increase, although short-term summer droughts may also become more frequent.
- These current and predicted changes in climate have broad implications for our region.
 - Environmental Quality - Summer air quality will deteriorate, as warmer temperatures promote the formation of smog. More intense rainfall will increase storm water runoff and the potential for flooding. Increased rain and runoff will wash pollutants into our waterways, and warmer waters and nutrients will encourage growth of bacteria and blue-green algae.
 - Natural Communities - Cold-water aquatic species, such as brook trout, will struggle to survive in warmer waters and in competition with better-adapted species. Our forests will change: maple, beech and birch trees will gradually be replaced by oak and hickory trees that are better adapted to warmer, wetter conditions. Invasive species, like the hemlock wooly adelgid, will further affect change in forest composition.
 - Public Health - Warmer temperatures allow the spread of insect-borne diseases, such as West Nile virus and Lyme disease. Air pollution and higher pollen production will increase problems for people with allergies, chronic respiratory diseases and asthma. High temperatures and heat waves will increase the risk of heat stress for the elderly, very young children and other vulnerable populations.
 - Built Environment – Flooding will put homes, businesses and public infrastructure in flood-prone areas at risk. Flooding may impact the safety of the water supply; droughts will also threaten water supplies. Although warmer winters will require less fuel for heating, hotter summers will increase electricity demands for cooling.
 - Local Economy - Warmer temperatures will hurt maple sugar production. Farmers can expect declining yields for cool-weather crops and depressed milk production from heat-stressed dairy cows. Less-colorful foliage seasons will hurt fall tourism. Less predictable snow will jeopardize winter sports and recreation and compromise Vermont's image as a winter sports destination.
- We can respond to climate change in two different ways.
 - **Climate mitigation** strategies will reduce the region's contribution of greenhouse gases. Although Chittenden County may be a small part of global greenhouse gas emissions, it is important that Chittenden County do its part to help solve the problem. More specifically Chittenden County should do what we can to help the State reach the goals of reducing 50% of greenhouse gas emissions from the 1990 baseline by 2028 and 75% of greenhouse gas emissions from the 1990 baseline by 2050.

- **Climate adaptation** strategies help individuals, businesses and communities be able to withstand and bounce back from – or even take advantage of – the impacts of climate change.

Key Indicators

- **Major Disaster Declarations** - Major disaster declarations are made for natural events causing damage so severe that it is beyond the combined capabilities of state and local governments to respond.

FIGURE 14 - MAJOR DISASTER DECLARATIONS, CHITTENDEN COUNTY



- **Climate-Related Infectious Diseases.** Increased transmission of vector-borne diseases is a key supporting indicator associated with climate change. The Health Department tracks the number of new Lyme disease, West Nile virus (WNV) and Eastern Equine Encephalitis (EEE) cases each year. From 2003 to 2009, Chittenden County had one case of WNV and no cases of EEE. Data for Lyme disease are presented below.

➤ **Vermont Residents Discharged from Vermont, NH, NY, and MA Hospitals
Hospital Visits for Primary Diagnosis of Lyme Disease: Years of Admission 2003-2009**

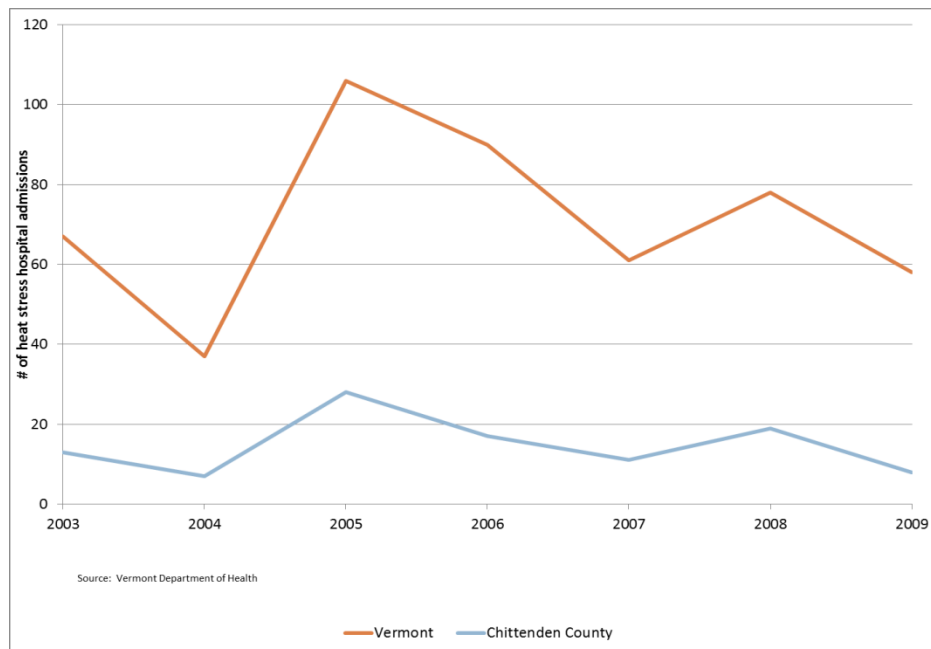
FIGURE 15 - NUMBER OF HOSPITAL VISITS FOR LYME DISEASE

Number of Hospital Visits*			
Year of Admission	Statewide	Chittenden County	
2003	17	6	35%
2004	17	**	
2005	49	6	12%
2006	113	11	10%
2007	52	**	
2008	100	9	9%
2009	82	**	

* all inpatient and outpatient visits, * Visits less than 6. Source: The Annual Vermont Uniform Hospital Discharge Data Sets (VUHDDS), inpatient and outpatient. VUHDDS does not include Emergency Department data prior to 2003. Data for 2010 is not available at this time.

Heat Stress Hospitalizations

FIGURE 4 - HEAT STRESS HOSPITALIZATIONS



Additional indicators can be found on the ECOS Scorecard.

Indicator	Location
<u>Greenhouse Gas Emissions, 2010</u>	Scorecard
<u>Carbon Sequestration from Vegetated Landscapes, 2001</u>	Scorecard
<u>Major Disaster Declarations, 1997-2016</u>	Scorecard
<u>Heat Stress Related ER Visits, 2003-2015</u>	Scorecard
<u>Number of Confirmed Lyme Disease Cases Reported to be Exposed in Chittenden County, 2005-2016</u>	Scorecard

SOCIAL COMMUNITY

Broad Goal: All community members have the skills, resources, and assurances needed to participate in the workforce and in family, civic, and cultural life within and among neighborhoods and in the larger community.

INTRODUCTION:

Our region's economic, social and intellectual well-being depends on the strength of its people. What is more integral to any municipal or regional plan than the people who live, work and play in the region? Just as we identify desired goals and benchmarks to measure progress for natural and physical capital, we need to do the same for social (civic engagement, social connectedness, arts and culture) and human capital (education, health, safe people). Similar to the rest of the country, Census data demonstrates that Chittenden County is aging, becoming more racially and ethnically diverse, and experiencing growing income inequality. To counter disparities that will inevitably grow, equity must be at the core of our plans for the future. Ensuring that all – especially low-income and people of color - can fully participate in all aspects of a community is essential to our long-term success. Equity is both a means to a healthy, resilient community and an end from which we all benefit.

Educational achievement is essential for effective participation in society and to maintain a region's economic prosperity. Increasingly, urban societies are becoming knowledge-based and urban economies require innovative solutions to meet market demands. People's ability to learn new skills and reskill during their working lives is important if they are to keep pace with rapidly changing work environments. Access to life-long learning opportunities is also related to people's need for self-fulfillment and self-determination.

The health of a population is inextricably linked to the design of the community in which it lives, works and recreates. All people of Chittenden County deserve the opportunity to make choices conducive to living a long, healthy life, regardless of their income, education, race, or ethnic background. Approaching community design from a public health perspective marks the reunification of two disciplines long separated by narrowly focused Euclidean planning. The design of a community can buttress certain behaviors while it undermines others, and impact social circumstances, access to healthcare, and environmental exposures. The determinants of health must be addressed from a holistic approach; no discipline cuts across these domains as broadly as community design. Investments in the region's human and social capital are investments in the future of the region's economic and social prosperity.

Another key to a vibrant, engaged community is access to arts, culture, and recreational opportunities. Both structured and unstructured recreational activities, especially outdoors, provide opportunity for physical activity, social development, and appreciation of the natural environment. In addition to enriching lives personally, arts and cultural experiences -- in the form of public events, performances, exhibitions and classes -- enhance the attractiveness of a community to employers looking to attract and retain a skilled and creative workforce.

The health and overall well-being of people significantly determines a region's resiliency and ability to create equitable, prosperous and sustainable communities. The concept of community is fundamental to people's overall quality of life and sense of belonging. Confident and connected communities support social and economic development in our cities. Strong communities have fewer social problems, are more adaptable in the face of change and when they do experience difficulty they have internal

resources to draw upon. Equity is a cross-cutting issue that impacts the quality of an entire region. There is no greater resource to invest in than a community's people, all of its people.

4. EDUCATION, KNOWLEDGE AND SKILLS

Education, Knowledge, and Skills Goal: All Chittenden County children and adults have the education, skills and opportunities necessary to meet their full economic and social potential and well-being.

Key Issues/Trends/Insights

[Data for this section drawn from [Education Analysis Report](#) and references as incorporated below.]

- Chittenden County requires a well-educated workforce and well-educated individuals to attract good employers and livable wage jobs, to engage in civic affairs and the arts, and to take responsibility for the welfare of ourselves, each other and the natural environment we cherish. Our region's economic, social and intellectual well-being depends on educational attainment through a continuum of accessible and affordable educational opportunities from the early years through adulthood.
- The first five years of life are critical to a child's lifelong development. Young children's earliest experiences and environments set the stage for future development and success in school and life. Children from families that are economically secure and have healthy relationships are more likely to get a good start in kindergarten and maintain that advantage as they progress through school. The larger the gap at school entry, the harder it is to close. (National School Readiness Indicators Initiative)
- Research shows that children who are not performing proficiently in reading by the end of third grade are at very high risk for poor long-term outcomes, such as dropping out of school, teen pregnancy and juvenile crime. (National School Readiness Indicators Initiative)
- While Vermont can boast of a solid K-12 system which benefits from strong community support, small class sizes and high graduation rates (2nd in nation), it ranks 48th in its college-going rate. (Nation's Report Card, 2009)
- Though the educational level of Chittenden County residents 25 and older with four-year bachelor's degree or higher exceeds state (32.6%) and national (27.5%) levels at 42%, of every 100 high school 9th graders, only 26 will complete a college program within 150% of normal time. (6 years for a 4-year degree and 3 years for a 2-year degree) (New England Board of Higher Education, 2006 data)
- Student achievement measures show clear performance gaps for low-income and students of color. If we are to remain an economically and socially viable community, all of our youth need the skills and education to participate as they are the future drivers of our region. A high quality public education can be the "great equalizer," ensuring the democratic ideal of equal opportunity. The Vermont PreK-16 Council and the Lake Champlain Regional Chamber of Commerce have identified goals to close the achievement gaps and create a seamless PreK-16 student-centered, performance-based learning system framed by rigorous standards and high expectations for all students, regardless of racial/ethnic background or socioeconomic status. The system will provide not just content learning but —21st century skills. These include (1) information and technology skills, (2) life and career skills, and (3) learning and innovation skills such as critical thinking, collaboration, and creativity. Ensuring for equity so that all members of our community can reach their fullest potential is assuring for a more inclusive, prosperous and sustainable region.

- We need to close the lingering achievement gaps and work to create a seamless PreK-16 education system framed by rigorous standards and high expectations for all students.
- About 45% of matriculated first-year students at the Community College of Vermont (CCV) are taking non-credit remedial classes in writing or mathematics. At other Vermont State Colleges, the number ranges from 5%-45%, with an overall average of 22% taking remedial courses. (VT PreK-16 Council, 2012)
- 38 of Vermont's 50 fastest-growing occupations — including six of the 10 fastest-growing jobs — require significant postsecondary education. (Vermont Business Roundtable)
- 30% of employers (largely within the skilled machine trades) report that they have training needs that are not met by local resources. (WDGT Chittenden Employer Survey, 2011)
- Childcare costs and availability are significant issues for the majority of Vermont parents who rely on out-of-home-care for their youngest children. According to the 2015 Building Bright Futures report, *How Are Vermont's Young Children and Families?*, child care costs for two-parent two-child families is over \$19,000 a year—more than the cost of full-time, in-state tuition at a Vermont State College. This equates to 28-40% of household income for two-parent two-child families with incomes between \$47,700 (200% federal poverty level) and the state median family income of \$82,047. Even if families can afford care, finding availability is challenging. The need is greater than current capacity to care for our region's children. In 2014, there were 8,668 children under age 5 in Chittenden County and 76% of families with all parents in the workforce. However, as of July 2014, Child Care Resource (CCR) reports there were 5,970 slots to serve children ages 5 and under. Childcare availability is especially lacking for parents that work the third shift or have non-traditional erratic hours, like farmers. Challenges for the child care providers include very low salaries. According to Let's Grow Kids the average annual income is only \$24,070. Vermont has established a Blue Ribbon Commission on Financing High Quality, Affordable Child Care to help understand and address these challenges. Addressing these challenges is imperative so that we can properly prepare our young children for school, and enable parents to work in a time when our workforce population is declining.
- Although some schools are seeing an increase in enrollment (So. Burlington being an example), the majority of schools in Chittenden County are facing declining enrollment. From the 2002-2003 school year to the 2011-2012 school year Chittenden County public schools experienced a decline in the ten year compounded annual growth rates (CAGR), 27% of Chittenden County schools experienced an increase in the ten year CAGR, and this figure was not available for 13% of the schools. NOTE: CAGR is used to measure enrollment growth or decline in Vermont. The formula looks at the first and last years' enrollment values and compares them over the number of years in the specified time frame to determine a rate of change. The CAGR is different from a percent change which does not consider the number of years over which a change occurs. There were 22,229 students enrolled in Chittenden County in the 2011-2012 school year, a decrease of 4.9% from the 23,387 students enrolled in the 2003-2004 school year. See the Vermont Department of Education's Public School Enrollment Report for the 2011-2012 School Year for more information. Regarding independent school enrollment, there were 1,778 students enrolled in independent K-12 schools in Chittenden County in the 2015-2016 school year.
- There has been a significant effort to further efficiency and consistency in the education system through voluntary unification of school governance structures. The VT Legislature passed Act 46 of 2015 which provided a number of voluntary options with associated incentives to unify (<http://education.vermont.gov/laws/2015/act-46>). Mount Mansfield Modified Union School District is

now the main board which oversees 8 schools as of July 2015 (Bolton, Richmond, Jericho and Underhill voters approved this consolidation in November 2014). Huntington residents also took a vote on this matter but it did not pass. Also residents from the towns of Essex, Essex Junction, and Westford voted to streamline their governance structure, forming one unified district to serve 10 schools in the three communities – will begin operation in July 2017 (<https://www.cctv.org/watch-tv/programs/education-bill-act-46>). These unifications reduce the number of school boards and aim to bring greater consistency across the curriculums – a direct implementation of ECOS Strategy 4. See the municipal and school capital plans for school facility improvement needs.

- There are currently 19 school governing bodies operating either as or under the 3 Supervisory Unions and 6 School Districts, 51 public schools, 18 independent schools (reported for SY16), and 6 colleges/universities in the County (see the ECOS Map Viewer for locations).

FIGURE 17 – NUMBER OF SCHOOL DISTRICTS OR UNIONS

School Districts or Unions	# of Governing Boards	# of Schools	Towns Served
Burlington School District	1 Board	10 Schools	Burlington
Chittenden Central Supervisory Union	4 Boards	7 Schools	Westford, Essex and Essex Junction
Essex Town Supervisory District	1 Board	3 Schools	Essex
Chittenden East Supervisory Union	2 Boards	9 Schools	Bolton, Buel's Gore, Huntington, Jericho, Richmond, Underhill
Chittenden South Supervisory Union	7 Boards	6 Schools	Charlotte, Hinesburg, Shelburne, St. George, Williston
Colchester School District	1 Board	5 Schools	Colchester
Milton School District	1 Board	3 Schools	Milton
South Burlington School District	1 Board	5 Schools	South Burlington
Winooski School District	1 Board	3 Schools	Winooski

- Library facilities are well distributed across the region, and residents benefit from reciprocal agreements among all of the libraries in the County with the exception of Burlington (an additional fee is charged for non-Burlington residents). Only three municipalities in the region do not have a library: Bolton, Buel's Gore and St. George. These communities do not have any current plans to build a library, and the residents use the libraries in surrounding communities. All libraries in the region offer high speed internet access. See Vermont Department of Libraries, Vermont Public Library Statistics for more information. Current library expansion and improvements are needed in Colchester, Jericho, Shelburne, and South Burlington as identified in the CEDS Project list (see the list in Supplement 4 – Comprehensive Economic Development Strategy for cost estimates, funding sources and proposed timelines for these projects).

Key Indicators

- % of children entering kindergarten school ready according to developmental domains
(Source: Statewide Assessment of Kindergarten Readiness across 5 domains - AHS, United Way)

FIGURE 18- SCHOOL READINESS ACCORDING TO DEVELOPMENTAL DOMAINS

	Year	Approaches to learning	Cognitive. Dev./General Knowledge	Communication	Socio-emotional Development	Health
State of Vermont	2009	66%	61%	81%	67%	n/a
Colchester (2007 data; 2009 not available)	2008	81%	64%	91%	67%	86%
Milton	2009	67%	73%	81%	77%	n/a
Chittenden East	2009	75%	67%	88%	77%	n/a
Chittenden Central	2009	62%	70%	84%	55%	n/a
Chittenden South	2009	75%	74%	90%	83%	n/a
Burlington	2009	70%	66%	82%	75%	n/a
South Burlington	2009	71%	61%	82%	70%	n/a
Winooski	2009	32%	50%	51%	49%	n/a
Essex Town	2009	70%	61%	86%	72%	n/a

Percent of Chittenden County's students scoring proficient or above on 2011-2012 state assessments

FIGURE 19 - STUDENT PROFICIENCY BY RACE

SUBJECT GRADE	READING		MATH		SCIENCE
	4	11	8	11	11
All Students	78%	76%	69%	43%	44%
Female	83%	83%	68%	42%	46%
Male	72%	69%	70%	44%	43%
Hispanic or Latino	85%	75%	68%	32%	42%
American Indian or Alaskan Native	*	*	*	*	*
Asian	65%	61%	59%	45%	40%
Black or African American	59%	33%	29%	7%	11%
Native Hawaiian or other Pacific Islander	*	*	*	*	*
White	80%	79%	72%	45%	46%
Not FRL	87%	84%	79%	51%	53%
FRL	57%	44%	39%	16%	14%
ELL	20%	9%	8%	7%	5%
Not ELL	80%	79%	72%	45%	46%

Based on 2011-2012 testing year. Reading and Math tests evaluate prior year's learning.

* = data suppressed because of an N<11

Source: VT Dept. of Education

- Cohort Drop Out Rates - % of students who do not complete high school

FIGURE 20 - COHORT DROP-OUT RATE

Cohort Drop Out Rates			
School	Four-year Drop Out Rate	Five-year Drop Out Rate	Six-year Drop Out Rate
Burlington Senior High School	13.0%	13.5%	9.0%
Champlain Valley UHS #15	7.2%	2.9%	1.8%
Colchester High School	6.9%	3.9%	6.5%
Essex High School	10.4%	6.8%	4.3%
Milton High School	9.9%	4.5%	5.0%
Mt. Mansfield US #17	2.9%	6.0%	5.8%
South Burlington High School	7.4%	4.6%	4.4%
Winooski High School	37.8%	29.0%	29.2%
Total	9.5%	7.1%	6.0%

Note: Cohort dropout rates track individual students who enrolled for the first time in ninth grade in 2008 for the four-year rate, 2007 for the five-year rate, and 2006 for the six-year rate. Students are considered dropouts if they left high school permanently at any time during the four-year, five-year, or six-year period prior to receiving a regular diploma, GED or other completion certificate. Source: VT Dept. of Education

- Highest level of education attained for those 25 and over.

FIGURE 21 - HIGHEST LEVEL OF EDUCATION ATTAINED (25+)

	Vermont	Chittenden County
Percent high school graduate or higher	91.3%	93.6%
Percent bachelor's degree or higher	34.0%	46.1%

Source: 2011 ACS 3-year

- # of internship grants from the State of Vermont Department of Labor offered in Chittenden County (7/1/09-6/30/10)

FIGURE 22- INTERNSHIP GRANTS FROM STATE DEPT. OF LABOR

**# of internship grants from the State of Vermont
Department of Labor offered in Chittenden County
FY period of 2010 (7/1/09-6/30/10)**

185 internship grants

93 secondary

92 post-secondary

Total of 7 programs

- Child Care Indicators: Building Bright Futures and Let's Grow Kids is working on developing county-specific data in coordination with several partners, including the Child Development Division and Vermont Insights. This data will be added to the ECOS Scorecard as they become available.

Additional indicators can be found on the ECOS Scorecard.

Indicator	Location
Percent of Kindergartners Ready on the Ready for Kindergarten! Survey (R4K!S), Chittenden County, 20016-2017	Scorecard
Percent of All Chittenden County Students in Grade 11 considered proficient or above in Math on the Smarter Balanced Assessment, All Students, Free and Reduced Lunch, and Non-Free and Reduced Lunch 2015-2017	Scorecard
Percent of All Chittenden County Students in Grade 11 considered proficient or above in Science on the New England Common Assessment Program (NECAP) test, 2014-2017, All Students, Free and Reduced Lunch, and Non-Free and Reduced Lunch	Scorecard
Percent of All Chittenden County Students in Grade 3 considered proficient or above in Reading on the Smarter Balanced Assessment, 20015-2017, All Students, Free and Reduced Lunch, and Non-Free and Reduced Lunch	Scorecard
Percent of Chittenden County Students Proficient or Above in Math at Grade 11 on the Dynamic Learning Maps Alternate Assessment, 2016	Scorecard
Percent of Chittenden County Students Proficient or Above in Language Arts at Grade 11 on the Dynamic Learning Maps Alternate Assessment, 2016	Scorecard
6-Year Cohort Drop-Out Rate for All Chittenden County High Schools, 2010-2015	Scorecard
Percent of Adults (25+) with High School Degree or Higher in Chittenden County, 2007-2016	Scorecard
Percent of Adults (25+) with Bachelor's Degree or Higher in Chittenden County, 2007-2016	Scorecard
Opportunity Index, 2011-2015	Scorecard
Number of regulated care and education programs (registered and licensed) in Chittenden County	Scorecard
Percent of regulated care and education programs (registered and licensed) of high quality (4 & 5 Stars level) in Chittenden County	Scorecard

5. HEALTH

Health Goal: All Chittenden County residents are healthy.

Key Issues/Trends/Insights

[Data for this section drawn from See [Public Health Analysis Report](#) and [Healthy Vermonters 2020](#)]

- Similar to national statistics, the leading causes of death in Chittenden County are cardiovascular disease (32%), followed by cancer (26%). Tobacco use, diet, physical inactivity, and excessive alcohol consumption are modifiable, behavioral risk factors associated with these diseases.
- Behaviors are the most important contributors to health outcomes. The healthcare system, with its successes and failings, receives a disproportionate amount of attention. While it is undeniable that all Chittenden County residents should have access to affordable healthcare, the healthcare system's impact on population health is nominal compared to behavior, genetics and social circumstances. On the other hand, the healthcare system exerts significant effect after chronic disease is manifest.
- Health begins in our families, in our schools and workplaces, in our playgrounds and parks, and in the air we breathe and the water we drink. The conditions in which we live and work have an enormous impact on our health. Behaviors can be influenced, supported, or undermined by community design. Community design can also impact social circumstances, healthcare, and environmental exposures. Chittenden County residents should have the opportunity to make the choices that allow them to live a long, healthy life, regardless of their income, education or ethnic background
- Community design can influence the overall well-being of a community by making healthy lifestyle choices easily available and accessible to all community members. Healthy Community Design links public health themes (such as physical activity, public safety, healthy food access, mental health, air and water quality, and social equity) with traditional planning concepts (such as land use, transportation, community facilities, parks, and open space). The overall health of a community is underpinned by the planning strategies employed in its design. Community design can positively impact population health by increasing physical activity, reducing injury, increasing access to healthy food, improving air and water quality, minimizing the impact of extreme weather events due to climate change, decreasing mental health stresses, strengthening the social fabric of a community, reducing exposure to tobacco and alcohol advertising, increasing smoke-free indoor and outdoor policies, and providing fair access to livelihood, education, and resources.
- Interventions at the community, policy, and systems levels are critical to achieving individual level behavior changes that will improve health.
- Tobacco use, poor nutrition, physical inactivity, and excessive alcohol consumption are the leading causes of death in that they are the factors underlying the disease labels traditionally used to present this metric. Community design elements that support eliminating tobacco use, increasing physical activity levels, improving nutrition, and decreasing excessive alcohol consumption are the priorities on which focus must be brought to bear. Research shows that healthy community design is associated with improvements in these health behaviors.
- There are significant differences in prevalence of cancer by age. A higher proportion of adults 65 years and older (15%) have ever had cancer compared to all other age groups. There are no other statistically significant differences by demographic characteristics.

- There are no statistically significant differences in prevalence of overweight or obesity by grade in school or race/ethnicity. However, compared to males, a significantly lower proportion of females are obese (5% vs. 11%) and a lower proportion are overweight (10% vs. 14%).
- Within Chittenden County, there are several identified populations who experience health disparities (i.e., people of color, low-income, homeless). These populations suffer disproportionately from poor health outcomes. For example, low income people who suffer with food insecurity are more likely to be obese. The distribution of the data supports the link between poor health outcomes and low socioeconomic status. It is material to note that while county-wide data for a specific indicator may not indicate a problem, that same indicator sorted by economic status or education level, may reveal a significant public health issue, in a particular community. For more information: <https://www.cdc.gov/tobacco/disparities/low-ses/index.htm>; and <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1732269/pdf/v057p00029.pdf>

Key Indicators

FIGURE 23 - PERCENT OF CARDIOVASCULAR DISEASE AND CANCER BY POPULATION

Chittenden County		
	Cardiovascular Disease	All Cancers
Adults*	5%	6%
Gender		
Male	7%	5%
Female	4%	7%
Age		
18-24	1%	--
25-34	0%	--
35-44	1%	2%
45-64	5%	6%
65+	19%	15%
Race/Ethnicity		
White, non-Hispanic	5%	5%
Racial-Ethnic Minority	7%	4%
Federal Poverty Level		
<250%	8%	6%
≥250%	4%	5%

* BRFSS 2008-2010; Age- adjusted to the U.S. 2000 population with the exception of All Cancers

Supporting Indicators

FIGURE 24- RISK BEHAVIORS IN ADULTS

	Adults
Overweight Prevalence	37%
Obesity Prevalence	20%
Poor Mental health	8%
Binge Drinking	18%
Smoking Prevalence	12%

Source: BRFSS 2008-2010; Age-adjusted to the U.S. 2000 population with the exception of All Cancers, ** YRBS 2011

- There are significant differences in smoking prevalence by age. A lower proportion of Vermonters 65 and older (5%) are current smokers compared to all other age groups. A higher proportion of adults 25-34 years old (18%) are current smokers compared to adults 45-64 years old (11%). Though a higher proportion of people of color (18%) are current smokers compared to white, non-Hispanic Vermonters (11%), this does not reach the level of statistical significance. There is a statistically significant difference in the proportion of Vermonters under 250% of the Federal Poverty Line (22%) who smoke compared to those above 250% (8%).
- There is significant difference in the prevalence of cardiovascular disease (CVD) by gender, age, and Federal Poverty Level. A higher proportion of males (7%) have CVD compared to females (4%). A higher proportion of adults 65 years and older (19%) have CVD compared to all other age groups. A higher proportion of adults living below 250% of the Federal Poverty Line (8%) have CVD compared to those above 250% (4%). There was no statistically significant difference by race/ethnicity.

Additional indicators can be found on the ECOS Scorecard

Indicator	Location
Percent of Adults who are Obese, All Adults, Low Income, Higher Income (2004-2016)	Scorecard
Percent of Adults who Smoke Cigarettes, All Adults, Low Income, Higher Income (2004-2016)	Scorecard
Percent of Adults Who Binge Drink, All Adults, Adults 18-25, Adults 26+	Scorecard
Percent of Adults with Asthma, All Adults (2004-2016)	Scorecard
Percent of adults meeting physical activity guidelines, All Adults, Low Income, Higher Income (2004-2016)	Scorecard
Percent of Adults Who Report Using Marijuana in the Past 30 days, All Adults, Adults 18-25, Adults 26+	Scorecard
Number of Medicaid Beneficiaries Treated for Opioid Abuse	Scorecard
Percent of regional (Champlain Valley) adults who report illicit use of drugs other than marijuana in the past 30 days, All Adults, Adults 18-25, Adults 26+	Scorecard
Percent of adults (Champlain Valley) who report non-medical use of pain relievers in the past year, All Adults, Adults 18-25, Adults 26	Scorecard

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Percent of adolescents in grades 9-12 who are obese, All adolescents, by Mother education	Scorecard
Percent of adolescents in grades 9-12 who smoke cigarettes, All adolescents, by Mother education	Scorecard
Percent of adolescents in grades 9-12 meeting physical activity guidelines, All adolescents, by Mother education	Scorecard
Percent of Youth (grades 9-12) who report using Alcohol in in the last 30 days, All Youth, by Mother education	Scorecard
Percent of Youth (Grades 9-12) who Report Using Marijuana in the Last 30 Days, All Youth, by Mother education	Scorecard

6. PUBLIC SAFETY, CRIMINAL JUSTICE & HAZARD MITIGATION

Public Safety, Criminal Justice Goal: Improve the safety of the public including the loss of life and property from natural and manmade hazards.

Key Issues/Trends/Insights

[Data for this section drawn from [2011 Chittenden County Multi-Jurisdictional All Hazards Mitigation Plan](#). This Plan was updated in 2016 and can be found [here](#). More information can be found on the [Flood Ready Vermont](#) website.]

- Feeling safe and secure in our homes, communities and urban areas is key to overall health in the community. Safety and perceptions of safety feature highly in people's view of their living environment, their sense of well-being and quality of life. As urban areas grow, the need for safe social and physical environments, where people are able to participate fully in their communities, becomes an increasing challenge.
- The cost of emergency response and multiple law enforcement agencies is a challenge to municipalities.
- The lack of volunteers for volunteer fire departments is causing concerns about the ability and timeliness of response and is resulting in the need to hire firefighters.
- As identified by the 2011 *Chittenden County Multi-Jurisdictional All Hazards Mitigation Plan (AHMP)*, the highest ranked county-wide hazards are severe winter storm, flooding, telecommunications failure, power loss, major transportation incident, fluvial erosion and epidemic. Three of the top hazards are natural hazards, three are technological hazards, and one is a societal hazard.
- Flooding and fluvial erosion can damage or destroy homes, businesses and transportation infrastructure. In Chittenden County there are 866 structures (1.5% of total County structures) in flood-prone locations as identified in detail in the AHMP and municipal Annexes. Chittenden County experienced damage from five FEMA-Declared Natural Disasters between 2010 and 2014 (severe storm, flood, tropical storm), more declarations than occurred in the four previous 5-year periods. Additional data, including non-declared events, will be updated in the 2016 AHMP.
- Winter storms, flooding, transportation incidents and epidemics can cause human injury, illnesses and even death.
- Winter storms, telecommunications failure, power loss and transportation incidents can cause serious disruption of public safety services.
- Flooding, fluvial erosion and possibly epidemics may be made worse by projected climate changes. While Incident Command System training has continuously been offered throughout the state, post-Irene analysis has shown that previous ICS training was positively correlated with increased ability to respond to the challenges posed by Irene. This increase was due to the ability to organize a unified command structure within the town and work more efficiently.
- Emergency Management Planning of all types needs to be kept up to date to best be able to respond, recover, and mitigate disasters. These plans include Local Emergency Operations Plans (LEOP) for each municipality, implementing improvement plans from exercises, and hazard mitigation plans.
- The State has incentivized flood resilience planning through the Emergency Relief and Assistance Funds (ERAF) program. There are a number of steps a municipality can take to improve the local match requirement for FEMA post-disaster relief funds. Generally, in the event of a Federal-disaster declaration FEMA covers 75% of the cost of "Public Assistance" projects,

typically repairs to roads and culverts and debris cleanup. The remaining 25% must be matched by the State and municipal government. Four requirements are needed for the State to provide half of that requirement, 12.5% match assistance. As of early 2016, nearly all of Chittenden County's municipalities have met these four benchmarks as follows:

- adopt Local Emergency Operation Plans annually – 18 or 95% of Chittenden County municipalities have adopted these.
 - adopt the Town Road and Bridge Standards that meet or exceed the VTrans 2013 standards – 18 or 95% of Chittenden County municipalities have adopted these; Bolton is considering adoption of these standards.
 - participate in the National Flood Insurance Program – 17 or 89% of Chittenden County municipalities participate. St. George is considering adoption in FY17 while Buel's Gore has no mapped floodplain; and
 - adopt a FEMA-approved Local Hazard Mitigation Plan – 19 or 100% of Chittenden County municipalities have an adopted Plan.
- There is an opportunity for the State to provide 17.5% of the FEMA post-disaster relief funds match, if the municipality protects river corridors. Currently 14 of our municipalities have received early adopter recognition for river corridor protection due to having strong municipal water quality buffers and floodplain regulations. This early adopter status will end two years after the river corridor maps are updated. Municipalities will need to adopt more stringent standards in order to be eligible for the 17.5% match. Municipalities will have two years to adopt these new protections, once the State incorporates the more accurate Fluvial Erosion Hazard areas into the published River Corridor map. There are two options: receive FEMA's Community Rating System (CRS) designation and prohibit structures in Flood Hazard Areas; or Adopt River Corridor (with the 50' buffer) or River Corridor Protection Area (without the 50' buffer) regulations for streams draining over 2 square miles, and a setback of 50' from top of bank for streams draining under 2 square miles that cannot be waived, and Fluvial Erosion Hazard protections. As of April 2016 Colchester is the only municipality with CRS designation. Hinesburg and Jericho have FEH overlay regulations although these may need refinements prior to the two year limit, and Westford is considering River Corridor regulations.
 - Transportation safety is discussed in Supplement 5.

Key Indicators

- **Incarceration rates by race compared to general population** (Source: Dept. of Corrections). “The largest proportion of both male and female inmates were prosecuted in the largest District Court (Chittenden county) with the fewest inmates from the smallest counties. But on a per capita basis, Chittenden was close to average in its use of incarceration bed space; only Bennington (176%) significantly exceeded expectations for use of prison/jail based on its population” (Source: DOC Fact and Figures FY2011, Page 38). “Although the residents of Vermont are predominantly characterized by race as “white”, on a per capita basis, the utilization of DOC services by “black” residents is about 7 times higher for incarceration and 2.5 times higher utilization of DOC services by “black” residents for field supervision. Native Americans and Asians use DOC resources at about half the rate of “whites”” (Source: DOC Fact and Figures FY2011, Page 38).

Additional Indicators can be found on the ECOS Scorecard.

Indicator	Location
Violent Crime Rate per Capita	Scorecard
Property Crime rate per 1,000 Chittenden County Residents	Scorecard
Emergency Service Calls	Scorecard
Fire Calls	Scorecard
Number of Structures in Special Flood Hazard Areas and Fluvial Erosion Hazard Areas	Scorecard
Percent of Children (Age 6 mo-8 yrs.) Immunized Against Influenza	Scorecard
Percent of Adults (65+) Immunized Against Influenza	Scorecard
Number of Vehicle Crashes Per Million Annual Vehicle Miles Traveled	Scorecard
Number of reported vehicle crashes involving bicycles or pedestrians	Scorecard

7. SOCIAL CONNECTEDNESS

Social Connectedness Goal: Increase opportunities for people of all backgrounds to engage in the multicultural social fabric and activities of the community.

Key Issues/Trends/Insights

[Data in this section is drawn from references as indicated below. The data for the Key Indicators need to be developed through primary data collection, and is therefore not yet available for this Plan.]

- Social connectedness provides an indication of community strength and resiliency. The concept of community is fundamental to people's overall quality of life and sense of belonging. Informal networks and how people connect with others are important for strong communities and social cohesion. Confident and connected communities suffer less social problems, are adaptable to challenges, and support social and economic development. There are major health, economic and environmental benefits in developing opportunities for and participation in social interactions, recreation and leisure, arts and cultural activities.
- Resident attachment describes the emotional connection residents feel towards a geographic community. Research conducted by the Knight Foundation and Gallup discovered that the main drivers that influence attachment to a place are how accepting a community is of diversity, its wealth of social offerings, and its aesthetics. A correlation was also discovered that tied stronger resident attachment to better local economic growth (GDP). (Knight Foundation, <http://www.soulofthecommunity.org/>)
- Social connectedness has been identified as a social determinant for individuals' health and well-being. Individuals who experience disenfranchisement and social exclusion suffer greater risk of depression, illness and addiction. (Minnesota Dept. of Health)
- While Chittenden County continually ranks high for its quality of life, there are segments of our community who persistently suffer exclusion, or are at risk of suffering disenfranchisement. Underrepresented communities (low-income, people of color, foreign born, seniors, youth) have identified barriers such as lack of reliable transportation, the inability to meet one's basic needs due to low incomes, discrimination, and exclusion from governance as significant threats to their quality of life and sense of well-being. In addition, people of color, New Americans and English language learners have identified cultural and structural racism, xenophobia, and exclusion from social networks, education, and governance as the greatest threats to their quality of life. (ECOS' outreach efforts, 2011-12; Legacy Project outreach, 2010-12; Plan BTV outreach, 2012)

Key Indicators

- **Index of Dissimilarity** - Neighborhoods differ in their racial composition. The Index of Dissimilarity is a measure of the evenness with which two groups are distributed across neighborhoods (or census tracts). It helps to answer the following questions: are racial groups evenly distributed throughout neighborhoods, or are some racial groups concentrated more in certain neighborhoods? The Census divides areas into census tracts that contain on average, about 4,000 residents. A score of 0 corresponds to even distribution across census tracts, while a score of 100 represents total segregation. Values between 30 and 60 indicate moderate segregation. According to the DRAFT Chittenden County Fair Housing and Equity Assessment (FHEA), the Hispanic, Black, and Asian

populations are low to moderately integrated (the Draft FHEA can be found here: www.ecosproject.com/analysis).

Additional indicators can be found on the ECOS Scorecard.

Indicator	Location
Number of trips provided by the Special Services Transportation Agency	Scorecard

8. ARTS, CULTURE AND RECREATION

Arts, Culture and Recreation Goal: Increase access to, and participation in, arts, culture and recreational opportunities.

Key Issues/Trends/Insights

[Data in this section drawn from the [Vermont Arts Council](#)]

- This section looks at both attendance at artistic and recreational programs and events in the community, as well as active participation in creative endeavors.
- There is a diminishing amount of time in school dedicated to arts and recreation; after school programs are picking up the slack, but are not accessible to all (for a variety of reasons).
- Arts, culture and recreation are a major contributor to the overall quality of life of residents and visitors, and are a key factor in attracting businesses who see arts, culture and recreational opportunities as key elements to attracting and retaining a talented workforce.
- Participation in arts, culture and recreation activities by both residents and visitors contributes to a strong sense of shared community, as well as the economic vitality of the community.
- Attention needs to be paid to developing programs and events that attract and engage residents from diverse backgrounds, ages and income levels.
- Use of arts in education is a critical pedagogical tool for developing critical thinking skills, do better at math and science, develop insights on cultural diversity and the human experience, and build self-esteem through self-expression.
- In order to increase participation in arts, culture and recreational activities by underserved populations, organizations need to remove barriers to participation (including transportation, costs, and cultural differences).
- As the needs and interests of residents change, the nature and uses of our parks are evolving as well. This is particularly evident as new comers to the community bring cultural traditions of recreation with them, and seek appropriate venues.

Key Indicators

- 66% of the Chittenden County population resides within 1/2 mile of parks or publicly accessible natural areas in urban areas and 1 mile in rural areas. (Source: Park, Open Space: CCRPC, Population, U.S. Census (2010))

9. CIVIC ENGAGEMENT

Civic Engagement Goal: People from diverse backgrounds feel that they have a say in political and non-political decisions that affect their lives, neighborhoods and communities.

Key Issues/Trends/Insights

- Civic engagement consists of political and nonpolitical activities that help identify and address community concerns. Being able to participate in, express views and influence decisions that affect one's life, neighborhood and community are essential for a true democracy. Effective civil and political systems allow our communities to be governed in a way that promotes justice and fairness and supports people's quality of life.
- Enabling democratic local decision making is one of the key purposes of local government and is also important in promoting the social, economic, environmental and cultural wellbeing of communities. Vermont and Chittenden County have a long held tradition of "local rule." Sometimes this supports to maintain local traditions and pride; and sometimes it is an impediment to collaboration and integrating new ideas.
- The population in our area is becoming increasingly ethnically diverse. For example, at least 56 languages (other than English) are spoken by students in Burlington (Burlington School District 2010-11 Annual Report, pg. 3). It is important that we understand how our institutions and processes need to evolve in order to remove barriers that limit people's ability to exercise their civic rights and decision making.
- New Americans, U.S born people of color, and low-income participants shared that their unfamiliarity with how local democratic systems work deters them from participating, though they'd like to. And when they are occasionally outreached to participate in a program, it feels as if it is just part of a regulatory requirement or grant opportunity, and not for the intention of truly incorporating their input. (ECOS' outreach efforts, 2011-12; Legacy Project outreach, 2010-12; Plan BTV outreach, 2012)
- Youth and adults of diverse cultural backgrounds do not feel that they are involved in decisions that affect their lives, neighborhoods and communities and therefore feel that they cannot participate and fully give back and improve the community's well-being.

Key Indicators

- % of students who spend 3+ hours/week volunteering

FIGURE 25 - PERCENT OF STUDENTS WHO SPEND 3+ HOURS/WEEK VOLUNTEERING

Year	2001	2003	2005	2007	2009	2011
Percent	13.0%	12.0%	12.0%	12.0%	12.0%	13.0%

Source: 2011 Youth Risk Behavior Survey, Dept. of Health

Additional indicators can be found on the ECOS Scorecard.

Indicators	Locations
Percent of Eligible Voters that Voted in General Elections	Scorecard
Percent of Students Who Feel Valued by the Community	Scorecard

ECONOMIC INFRASTRUCTURE

Broad Goal: Build the region's capacity for shared and sustainable improvements in the economic wellbeing of the community through support of both locally and globally competitive initiatives.

INTRODUCTION: There is a direct relationship between a region's economic prosperity and the ability of residents to thrive. When businesses prosper, they are more able to pay higher wages, and to support their communities through community initiatives like volunteering. When residents earn higher wages, they have a greater ability to purchase needed items and lead a healthy lifestyle. In general, this leads to greater social connectedness, educational advancement and increased life expectancy.

Chittenden County maintains strong economic advantages, and remains the largest player in Vermont's economy. Over the past several decades, the County's share of population, GDP, jobs and income, among other factors, has increased. The county includes the largest urban area in the state and the largest for-profit employer in the state, but also significant agricultural, recreational and open space areas. This mix of uses results in a character cherished by its residents and appealing to prospective residents.

However, some disquieting trends need to be acknowledged in Chittenden County. Goods-producing sectors are dropping in economic output and employment. The rate of population growth has declined and that is likely to continue into the future. The population continues to age, and the workforce will shrink because of that. Though unemployment is currently very low, workforce participation is also decreasing. This may mean that businesses will struggle to grow due to a lack of skilled workers.

This section of the ECOS Plan looks at three goals related to our economy: Economy, Household Financial Security, and Working Lands. Under each of these goals, a quick review of key issues and trends including a short list of selected indicators is presented.

Our economy is typically looked at in terms of farm and non-farm employment. Therefore, this section includes an Economy section that looks at our non-farm employment and jobs and the opportunities for employment outside of agriculture. The Working Lands section focuses on agriculture's impact on the economy and on land use. The Household Financial Security section looks at the impact of the county's economy on our residents' ability to lead healthy and fulfilled lives.

For more detailed data on these topics, as well as strategies and actions that address these issues, please see Supplement 4 – Comprehensive Economic Development Strategy.

10. ECONOMY

Economy Goal: Retain and support existing employers and job growth, grow target sector employers and entrepreneurs, and work to attract a greater diversity of employers and employees.

Key Issues/Trends/Insights

[Data in this section drawn from [Economic Base Analysis](#), and the [Economic Competitive Assessment Analysis Reports](#), and Supplement 4 - CEDS]

- Chittenden County is the most populous county in Vermont, and makes up a significant portion of the state's economy. Since the 2007 recession, the Burlington/South Burlington New England City and Town Area (NECTA) area has recovered lost jobs (total nonfarm). The State of Vermont without this area has not recovered. There is a great sense of responsibility to keep the economic engine growing in this region. However, costs of living and doing business continue to restrict our potential: housing affordability, electric rates, and lack of population growth create challenges across industry sectors.
- Chittenden County is home to 27% of the State's private businesses. Chittenden County provided 36% of state income tax revenues in 2015 (an increase from 35% in 2012).
- Chittenden County provided 24.9 % of sales tax revenue in Vermont in 2016 (a drop from 32% in 2012). Thirty percent of the State's retail sales occurred in the County (2012) and in 2016, the Department of Taxes reports show that five of the six highest retail sales tax collections occurred in Chittenden County (Williston – #1; Colchester – #2, South Burlington – #3; Burlington – #4; and Essex - #6).
- Between 2012 and 2016, Chittenden County's employment base has remained concentrated within government employment and five private industry sectors: healthcare and social assistance; retail trade; manufacturing; accommodation and food service; and professional, scientific and technical services. The proportion of jobs in the five private sectors has dropped from 71% of total employment in the County in 2012 to 54% in 2016. The proportion of the workforce working for a governmental agency remained at 16% between 2012 and 2016.
- The largest employers in Chittenden County are the University of Vermont Medical Center and the University of Vermont. While there has been concern that our large employers are not in the private sector, these institutions are an advantage to Chittenden County, and the economy is not overly reliant on them. Both are net dollar importers and are highly stable.
- Services-providing industries have become a larger portion of the economy since 2010. In 2010, private goods-producing industries were 19.7% of the economy, and private services-providing industries were 65.9% of the economy. In 2015, the industries made up 15.2% and 69.3% of the economy respectively. Although several of this plan's target sectors are in goods-producing industries, there is significant diversity among service providing industries, and they include target sectors like higher education and health care and wellness.
- Growth in total nominal wages has risen off its sharp decline in 2009, and average wages were 11.4% higher in 2016 than they were in 2010. However, manufacturing, one of the sectors with the highest average wages in Chittenden County, has seen wages decrease by 2% since 2009. Wages and incomes tend to be higher in Chittenden County than the rest of the state. Median household income was in 2016 \$67,997 versus \$56,990 for the State. However, it should be

noted that average wages may be deceptive—even within highly-paid sectors of the economy, there may be significant disparities in pay.

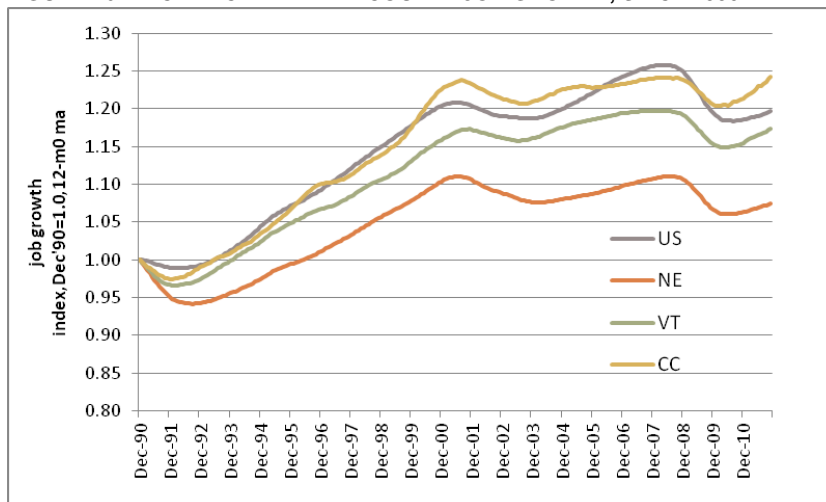
- Employment in technology and technology-related fields is growing and becoming a key part of Vermont's economy. Twenty-five percent of Vermont's jobs are either in tech industries, or are tech jobs in other industries. These jobs pay 63% more than the average wage in Vermont, and each tech job creates two additional jobs.
- As of 2016, most permitted industrial parks are approaching full build out. However, there is still land available in industrially zoned areas. Having adequate industrial space is as much about having a wide variety of spaces as it is vacant square footage. GBIC reports that most industrial operations have very specific requirements for what size and configuration of space they need to begin or expand their business. If the right kind of space is not available in the county, GBIC has found that some companies choose to expand elsewhere rather than reconfigure or build new space in Chittenden County. However, because there is still land available in industrially zoned areas, and the ECOS Plan calls for reuse of previously developed land, and development of land that is already served by existing infrastructure, this plan does not recommend expanding the amount of land zoned for industrial space. GBIC plans to conduct a longevity analysis (Action 1C) to determine when new industrial space is needed. If a need becomes clear in the future, this issue will be revisited in the next CEDS.
- The County's higher education infrastructure is excellent, although almost 30% of employers participating in the Employer Survey indicated that they have training needs that are not being met by local resources. Interviewed manufacturers emphasized the strong need for local training programs in machining and other skilled occupations to support their growth and sustainability. New initiatives like Vermont Technical College's Manufacturing Lab in Williston may help meet these needs. Ensuring that workforce training programs are providing an adequate number of skilled manufacturing workers is also a key component of the State Workforce Development System Report of Findings and Recommendations.
- Vermont Agency of Education data show that roughly 40% of graduating high school seniors do not go on to further education (industry recognized credentials, certificates, or two and four-year degrees) once they leave school. This often means they have limited ability to engage in the workforce, and disproportionately suffer from negative social, economic, and health outcomes. GBIC has estimated that in 2017 there were 12,000 Vermonters between the ages of 19 and 25 years old who have fallen out of the employment and unemployment system.
- Unemployment in Chittenden County is low. In August 2017, unemployment in Chittenden County was 2.5%, compared to the Vermont rate of 3.0% and US rate of 4.5%. However, Vermont's percentage of "underutilized" workers is 6.3%, much higher than the unemployment rate. Workers who are unemployed, involuntarily part time, or marginally attached fall into this category.
- In the decade between 2012-2022, solid growth is predicted in jobs for Vermont. Over the ten-year period it is predicted that there will be 115,306 new job openings, with 29% being due to growth in employment, and 71% openings being due to having to replace retired workers. In broad terms, Vermonters are leaving the workforce because of retirement, personal choice related to economic conditions, or are experiencing barriers to employment.
- Chittenden County is a mix of urban, suburban and rural areas, with an essential rural character that polling has consistently shown is important to many residents. Protection of both the rural and downtown/village character must be reflected in economic development efforts. There is

significant economic impact of downtowns and village centers - dense, livable areas create places where workers can live close to their jobs and where a diversity of businesses can thrive. This creates a sense of community and a sense of place that is valuable for the county's quality of life; as well as limiting the excessive operation and maintenance costs of expanding infrastructure beyond these areas.

- The County is blessed with a highly desirable quality of life. The notable exception is the affordability of housing, which was both rated the lowest quality of life factor in the Employers Survey (can be found in the Analysis Reports referenced above) as well as being the most commonly observed weakness of the area in interviews of employers
- The County is generally well-served with utilities and telecommunications services necessary to support economic development. The weakest part of the County's utilities and telecommunications system is the quality and costs of telecommunications, in particular cell phone service in our rural areas. Though almost all Chittenden County households are served by broadband internet, faster internet is an important utility for many of the region's key sectors, and for employees who work at home (5.6% of the county's workforce in 2016). Increased access to broadband internet also helps to minimize the "Digital Divide," increasing employment and social opportunities for older residents, New Americans and others without high rates of internet access.
- Continued and increased attention must be paid to providing services to existing businesses and entrepreneurs in Chittenden County. Organizations such as the Vermont Center for Emerging Technologies, Exelerate Essex and the HinesburgHUB co-working space are key to the region. Encouraging the creation and growth of small, "home-grown" businesses is key to diversifying the economy, increasing resilience to changes in large employers, and investing in future employment as companies grow.
- Addiction and poverty are acute economic issues faced by too many Vermonters. With our demographics continuing to trend older, we risk losing a significant population of workforce participation with diminishing social outcomes.

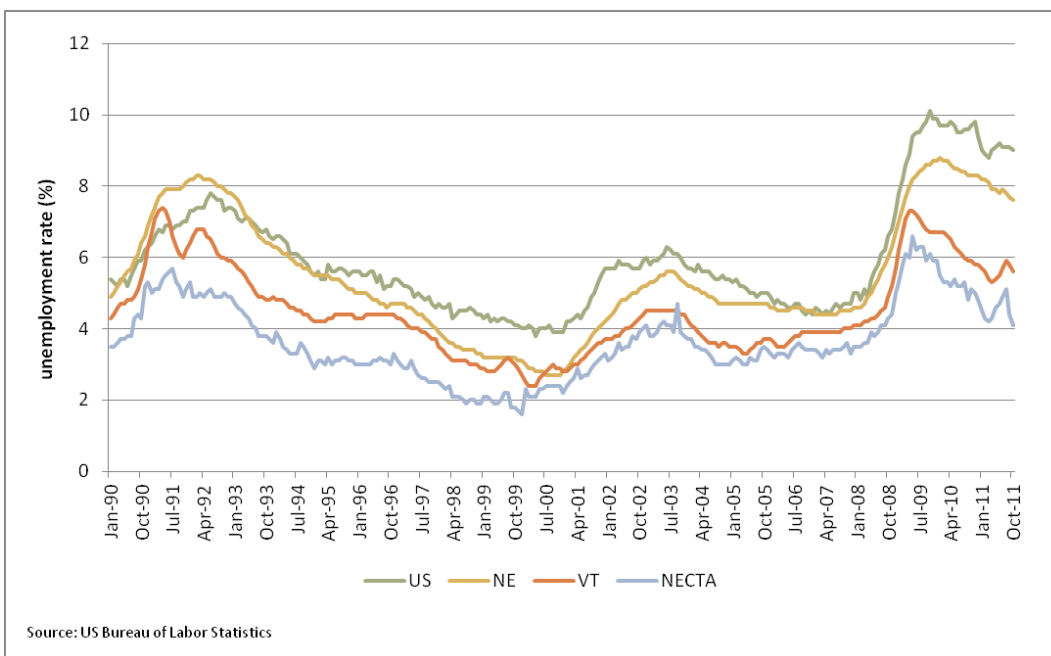
Key Indicators

- **Recent Chittenden County job growth** has been stronger than the U.S., New England and Vermont.

FIGURE 26- RECENT CHITTENDEN COUNTY JOB GROWTH, SINCE 1990

Source: US Bureau of Labor Statistics

- **The unemployment rate in the greater Burlington area (Burlington New England City and Town Area (NECTA)) has declined faster than the New England and US rates over the past two years.**

FIGURE 27 – UNEMPLOYMENT RATES IN THE GREATER BURLINGTON AREA

Additional indicators can be found on the ECOS Scorecard.

Indicator	Location
Total (Covered) Employment-Chittenden County	Scorecard
Total Number of Businesses	Scorecard
Unemployment Rate, Chittenden County, VT, New England, US (2004-2016)	Scorecard
Average Wages by Industry Sector	Scorecard
Employment by Place of Residence (Total Labor Force) in Chittenden County	Scorecard

11. HOUSEHOLD FINANCIAL SECURITY

Household Financial Security Goal: Improve the financial security of households.

INTRODUCTION: Levels of income and wealth are key determinants of individual or family wellbeing. Economic standard of living involves a complex combination of factors such as income, living costs, and household size and composition.

Key Issues/Trends/Insights

[Data in this section drawn from [Housing Analysis Report](#)]

- Income inequality is increasing in Vermont. Between 1979 and 2007, average income in Vermont has grown by 42.4%, with the top 1% of income earners seeing an increase of 217% and the bottom 99% seeing an increase of 27.8%. This follows a national trend that has been occurring since the 1980's. As of 2013, the top 1% of income earners in Vermont earn 16.1x the income of the bottom 99%, and in the Burlington-South Burlington MSA, the ratio is 17.1x. While Vermont and Chittenden County have lower levels of income inequality than the country—the average ratio for the United States is 20.1x—this trend is still concerning.
- Vermont's Basic Needs Budget determines the hourly rate a worker would need to make to pay for their "basic needs," ranging from food and housing to childcare and insurance. This rate is known as the "livable wage," and it is calculated differently depending on household size/makeup and rural or urban location. For full time workers, the Vermont minimum wage is only 74% of the average living wage. However, this varies significantly by household composition and location. For example, the Vermont minimum wage is only 43% of the living wage for two working parents with two children in an urban area, and only 25% of the living wage for a single parent with two children in an urban area.
- In 2016, lower income Vermonters reported higher rates of depressive disorders, poor mental health and chronic conditions, such as obesity, asthma, heart disease, stroke and diabetes. While data on addiction were not available broken down by income, some substance uses, such as using marijuana or tobacco, were higher among adults with lower incomes. Data from 2013 showed similar trends in Chittenden County.
- Lack of financial resources can also cause food insecurity. For example, in Chittenden County, 29% of students are eligible for free or reduced priced school meals. Food insecurity is also linked to obesity, as "unhealthy," high calorie foods tend to be cheaper in terms of "calories per dollar" compared to "healthy" food like fresh produce.
- Lower income households are more likely to experience housing insecurity. For a more detailed discussion of housing costs in Chittenden County, please see the Housing section of this supplement (Section 14).

Key Indicators

Additional indicators can be found on the ECOS Scorecard.

Indicators	Location
Median Household Income, Chittenden County, VT., US	Scorecard
Median Household Income by Race	Scorecard

Percentage of Families whose Income in the Last 12 months is Below Poverty Level, Chittenden County, VT, US	Scorecard
Housing + Transportation Costs for Median Income Family	Scorecard

12. WORKING LANDS & LAND BASED INDUSTRIES

Working Lands Goal: Support the growth and vitality of working farms and managed forests; and sustainably manage sand and gravel extraction operations.

Key Issues/Trends/Insights

[Data for this section drawn from [Natural Systems Analysis Report](#); Farm to Plate Annual Reporting; [Informing Land Use Planning and Forestland Conservation Through Subdivision and Parcelization Trend Information](#) – Vermont Natural Resources Council, September 2010; [The Action Plan of the VT Working Landscape Partnership](#); [Vermont Wood Fuel Supply Study](#) – Biomass Energy Resource Center, 2010]

- Working lands and resource extraction industries are critical components of a self-reliant and diverse economy, making a region less vulnerable to market crises. Local food and fuel production is preferred since the transportation to import these products consumes tremendous amounts of energy and generates pollution. In addition, when food is imported from far-away places, nutrient value is reduced during the transport time.
- Meeting Vermont's goal of obtaining 90% of energy from renewable sources by 2050 may necessitate an increase in biomass used for advanced wood heating, district heat and electricity production. The McNeil Generating Station in Burlington is the region's largest user of biomass for energy generation. Most of the wood fueling the McNeil Station in Burlington comes from within 60 miles of the station and is a byproduct of other forestry operations. At full load, approximately 76 tons of wood chips are consumed per hour (about 30 cords). This far exceeds Chittenden County's abilities to produce biomass. A study conducted in 2010 showed that even if Chittenden County's entire annual wood harvest was put towards the McNeil Station, and all non-constrained forest land were harvested at a comparable rate, the McNeil Station could only run for 57 days on wood from Chittenden County. Large amounts of available wood can be found in other parts of Vermont, and neighboring counties in New Hampshire, Massachusetts and New York. Chittenden County may continue to rely on sustainably harvested forest products from both inside and outside the county to meet its biomass needs.
- Working lands and resource extraction industries are economically viable within the constraints of our natural landscape. Sustainably managed farmland and forest land means less developed land, fewer impervious surfaces, and thus a greater presence of the natural ecosystem's features and functions. Conversely, high quality food and productive forests are dependent upon clean water and clean, nutrient-rich soils. It is imperative that we maintain high quality water and soils for healthy and viable food and forest product industries. Working lands are also a significant contributor to our economy. The harvest and manufacturing of forest products is a \$1.4 billion annual industry in the state. The challenge is to plan and manage future growth, including economic development, so that it sustains and enhances these economic resources. A major challenge to forest and farm businesses is the value of the land in these industries versus the value of the land for development. Often when these industries are no longer economically viable, the land is sold and developed, resulting in forest fragmentation and increased parceling of land. The number of parcels has gone up, while their size has gone down, diminishing their economic viability and the ecological services they provide. This situation has far-reaching potential consequences for the future of Vermont's local economies, including tourism.
- Markets for forest products are necessary to ensure that landowners can afford to hold and manage their forest land (Vermont Forest Resource Plan, page 57). Unfortunately, the Vermont forest products industry is in slow and unheralded decline which has resulted in dramatic reductions in wood processing and manufacturing (Action Plan of the Vermont Working Landscape Partnership, page 14)). In the face of increasing gas prices and international trade,

the importance of local products and processing cannot be overstated. Markets for forest products are often influenced on regional scales beyond the county level, though support of opportunities to develop and take advantage of markets must occur at the local scale.

- In recent decades, farm enterprises in the County have been employing new forms of business ownership, engaging in non-farm employment, limiting the size of farm operations to control the growth of farm production expenses, producing different types of farm products, producing more farm-related products, and engaging in more direct sales to consumers. These trends present a new set of challenges for farmers and communities, including access to markets and access to affordable land. Difficulties acquiring the proper equipment, or accessing to a certified processing facility are also a common problem for some new farmers. We will need to adjust our regulations and programs to ensure that we are not unnecessarily prohibiting agricultural enterprises from diversifying as well as continue efforts to ensure that agricultural enterprises remain economically viable. It is not just about growing more or different things – it is also about creating higher value products from what is grown. An example is helping dairy farms by increasing production of yogurt, ice cream, artisanal cheeses, and other dairy based products.
- Chittenden County contains two major zones of bedrock geology: Sedimentary Zone – Rocks formed by the deposit of sediment, located predominantly in the lowlands between Lake Champlain and the uplands on the eastern side of the County; and Metamorphosed Zone – Rocks formed by metamorphic processes located predominantly in the uplands on the eastern side of the County. No major geologic threats (such as major active fault lines, seismic disturbances, areas prone to sinkholes or subsidence) or opportunities (such as major deposits of valuable minerals) exist in the County. In Chittenden County, the extraction of sand, stone and gravel are currently commercially viable. These resources play an important role in our land development practices and economy. While it is important to manage the environmental impacts of these operations, it is also important to manage these finite resources because a reduction of these locally available products will likely have an impact on construction costs. These nonrenewable resources are used to produce building materials (such as concrete and railroad ballast), to use as landscaping materials, and to build and maintain public and private roads and buildings. Chittenden County contained 3 primary producing construction sand and gravel areas, and a total of 10 producing mines within those areas ([Vermont Geological Survey/U.S. Geological Survey, 2010-2011](#) and [USGS Mineral Resource Data System, 2015](#)).

Key Indicators

- **The number of farms has increased, while the acreage of farmland has decreased.**

FIGURE 28 - NUMBER OF FARMS OF DIFFERENT SIZES IN CHITTENDEN COUNTY, 1987 - 2007

Farm Size (Acres)	1987	1997	2007	1987 to 2007 Change	
				Number	Percent
1,000 or More	7	10	11	4	57.14%
500 to 999	44	23	25	-19	-43.18%
180 to 499	140	123	203	63	45.00%
50 to 179	134	137	178	44	32.84%
10 to 49	99	123	143	44	44.44%
Under 10	28	40	81	53	189.29%
Total	452	456	641	189	41.81%

SOURCE: U.S. Census of Agriculture, 1987, 1997 and 2007.

Regional Analysis

- The average **property taxes per acre** for farms in Chittenden County increased 82 percent (adjusted for inflation) from 1987 to 2007, from \$18.60 to \$33.86. (Source: U.S. Census of Agriculture)
- The **net farm income per acre for farms** in Chittenden County increased from \$102.49 in 2002 (adjusted for inflation) to \$110.17 in 2007 (compared with Vermont's increase from \$93.93 to \$129.20). However the income trends vary depending on the product: there were decreases in the value of "dairy, cattle and calves" and "all other farm products" and increases (in some cases dramatic) in the value of other types of farm products (farm income from products made on the farm such as cheese or for services provided on the farm such as farm equipment repair). (Source: U.S. Census of Agriculture)
- **.19 net acres of agricultural and natural resource land lost annually to development per new Resident** (Source: National Land Cover Data, 2006, U.S. Census Population 2001-2006)

Additional indicators can be found on the ECOS Scorecard.

Indicators	Location
Total Number of Farms	Scorecard
Number of Forested Acres Enrolled in the Current Use Program	Scorecard
Number of Agricultural Acres enrolled in the Current Use Program	Scorecard
Acres Devoted to Crops	Scorecard

BUILT ENVIRONMENT

Broad Goal: Make public and private investments in the built environment to minimize environmental impact, maximize financial efficiency, optimize social equity and benefits, and improve public health.

INTRODUCTION: The built environment of the County comprises of the physical buildings combined with supporting infrastructure necessary for travel, water, waste and energy for living, working, and playing. Strategic investments to Chittenden County’s built environment and development centers are necessary for promoting a high quality of life that is hinged on economic development, affordability, and environmental stewardship. Significant regional investments in housing, sidewalks, transit, cultural and recreational resources can increase livability and make homes and businesses in our centers the key to sustainable growth.

Other vital infrastructure updates that support livability in these centers include sewer capacity, energy systems, and water supply investments that are necessary to accommodate new residents and employers. Renewable energy sources for buildings and alternatives to driving need to be planned to reduce the use of fossil fuels and decrease carbon emissions.

This section focuses on the promotion of higher density, mixed use development in Center, Metro, Suburban, Enterprise, and Village Planning Areas – while de-emphasizing development outside of these areas. These actions would result in reduced energy for transportation and land use by promoting increased carpooling, pedestrian/bicycle travel, availability of transit, reduction in vehicle miles traveled, and the need for smaller homes that maximize efficiency. Consolidating households and employers in these Planning Areas also allows for investing in a more efficient infrastructure. A description of the Planning Areas can be found in Supplement 4.

13. LAND USE

Land Use Pattern Goal: Encourage future growth in the Center, Metro, Enterprise, Suburban, and Village Planning Areas to maintain Vermont's historic settlement pattern and respect working and natural landscapes.

Key Issues/Trends/Insights

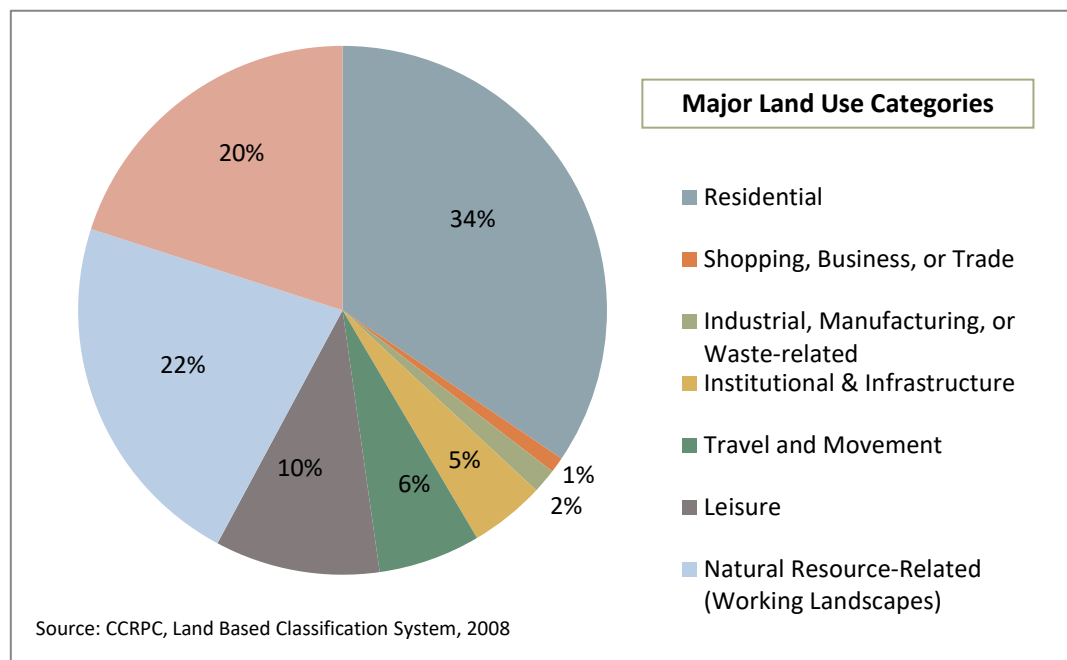
[Data from this section drawn from [Historic Development and Future Land Use/ Transportation Analysis Report](#)]

- Over the past 60 years development trends, zoning regulations, and consumer preference have shifted growth away from the metropolitan areas around Burlington, to more suburban and rural locales. This shift has resulted in scattered development at low densities that consume large amounts of land, high infrastructure costs, with little opportunity for social interactions, and less ability to walk to services. Since 2011, the region has seen at least 80% of new housing built in the areas planned for growth which are the center, metro, suburban, and village planning areas. This land use pattern reduces energy for transportation and land use because homes are located near jobs and services which promotes increased opportunities for carpooling, pedestrian/bicycle travel, availability of transit, and reduction in vehicle miles traveled.
- Overall, Chittenden County is moving in the right direction of developing and implementing policies that encourage more growth in these areas. As of 2012, Chittenden County includes 10 Villages, 2 Downtowns, 2 Growth Centers, 2 New Town Centers, and 1 New Neighborhood that are part of the State Designation Program that promotes smart growth principles. Recent studies and surveys indicate that households are choosing to live in areas with shorter commute times, nearby shops and services, and more transit options. This growing demand indicates that the small lot and attached accessible housing stock may be in short supply.
- Forest and agricultural land fragmentation and increased parceling have meant that the number of parcels in rural areas has increased while their size has decreased, diminishing their economic viability, scenic, and the ecological services they provide.
- Future land-based opportunities for farming and forest-based products, recreation and tourism may become more limited as suitable open land becomes less available. This possibility has far reaching consequences for the future of Vermont's local and tourism economies.
- There are over 4,400 designated historic sites in Chittenden County (over 2,500 in Burlington alone) and over 80 designated historic districts (see historic resources map here: <http://maps.ccrpcvt.org/ChittendenCountyVT/>).
- A sustainable society operates without contributing new contaminants to the environment, but also cleans up old contaminants and returns those lands into productive use. Contamination impairs the environment, poses risks to human health, and discourages productive use or reuse of the property. Of 702 Chittenden County sites with reported contamination, 476 (68%) have completed corrective action (VT DEC Waste Management Identification Database).

Key Indicators

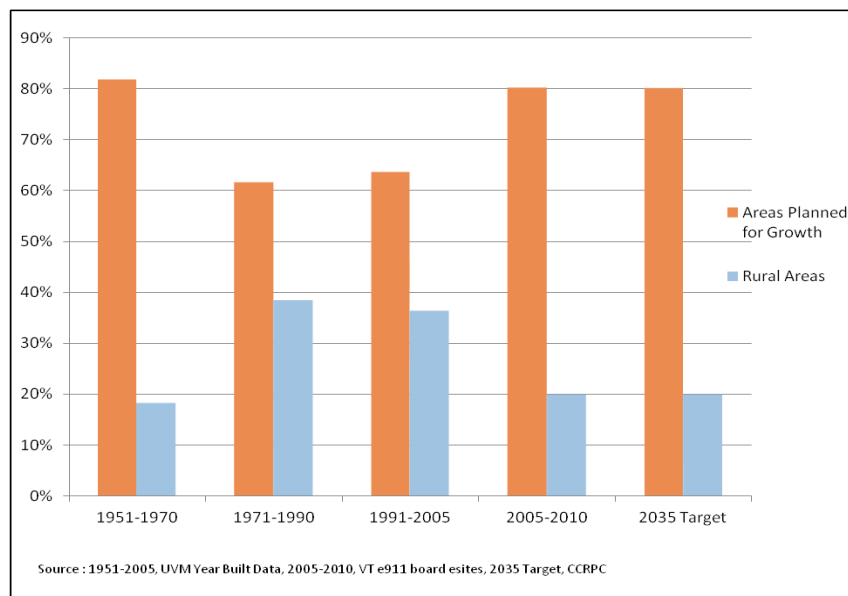
➤ % of Acres in Major Land Use Categories, Chittenden County 2008

FIGURE 29 – LAND USE CATEGORIES BY PERCENTAGE



➤ Percent of New Structures in Areas Planned for Growth: 1950 – 2010

FIGURE 30 - PERCENT OF NEW STRUCTURES IN AREAS PLANNED FOR GROWTH, 1950 - 2010



Note regarding Figure 30: The best available data at the time of this report related to e911 structures. Going forward, CCRPC seeks to regularly track dwelling units and the non-residential square footage in the Areas Planned for Growth to better represent the development that is occurring in the County.

- **75% of private property investment is going into the Areas Planned for Growth and 25% in the Rural Planning Area** (Source: CCRPC from parcel and grand list data).

Additional indicators can be found on the ECOS Scorecard.

Indicators	Location
Density by Planning Areas, 2010	Scorecard
Total New Units Built in Chittenden County	Scorecard
Percent of Residential Development in Areas Planned for Growth	Scorecard
Percent of Residential Development in the Center Planning Area	Scorecard
Commercial and Industrial Development in Areas Planned for Growth	Scorecard

14. HOUSING

Housing Goal: Increase the opportunities for safe, decent, energy efficient, affordable, accessible and fair housing for all types of households in all neighborhoods.

Key Issues/Trends/Insights

[Data for this section drawn from [Housing Analysis Report Analysis Report](#). Another reference that is currently under development is the [Fair Housing Equity Assessment](#).]

- Adequate and affordable housing is central to a sustainable community. A healthy community is made up of households with a variety of incomes and affordable housing is needed to satisfy residents' wide range of needs. Lack of affordable housing contributes to many social stresses, including homelessness. Housing diversity supports the workforce and helps ensure that residents of all ages are continuously present in the community.
- The financial burden of paying a mortgage, homeowner's insurance, property taxes, utility expenses and other housing fees is unaffordable when these costs consume more than 30% of the household's income. Further, paying more than half of income on housing expenses creates a severe strain on a household's budget. These households are at much higher risk of foreclosure, eviction, homelessness, and frequent moving—all of which harm residents and the community. Approximately 4,000 owner households and 6,000 renter households living in Chittenden County pay more than half of their incomes for housing expenses. Cost burdens are highest for the lowest income residents, especially those living on fixed incomes or public assistance and those working at low-wage jobs.
- Approximately 500 people in Chittenden County were homeless during the January 2011 one-night count, clearly demonstrating gaps in the access to the types of housing options and services that could have kept these people housed.
- Some Chittenden County residents do not have equal access to housing opportunities. Members of the County's growing population of non-White residents, residents with disabilities, and single-parent families are more likely to experience poverty and less likely to become homeowners than other types of households. Insufficient housing options for all residents, regardless of their race, disability status, or membership in other protected classes, help prevent those residents from reaching their potential as contributing community members.
- Nearly 60% of the County's housing stock was built before 1980—when lead-based paint was widely used, when most home insulating/heating/energy technology was inefficient, and when building and accessibility codes did not yet accommodate all types of residents. (Note: Lead was banned from paint in 1978.).
- More than 11% of Chittenden County residents commute 25 or more miles to work—with potential adverse effects on both the health of the driver and the environment. In addition, with the exception of some neighborhoods in Burlington and Winooski and a few other Census blocks in the County, the vast majority of the County's working residents pay more than 45% of their income for the combined cost of housing and transportation.
- The County's population is expected to continue growing, albeit at a slower pace than in the past decade. Between 2010 and 2015, demand for additional owner homes is likely to be lower than prior levels of home building in the County. However, demand for renter homes is predicted to increase. Tools to ensure adequate housing supply for renters include renovation and

conversion of existing buildings as well as new construction. Looking further out roughly 4,000 additional housing units (rental and ownership combined) will be needed from 2010 to 2020.

- There are many needs for permanent supportive housing in the County, including housing for those transitioning out of a correctional facility. There are 69 beds in Chittenden County Transitional Housing Programs (FY2016 Department of Corrections). While this is certainly meeting a need, these are not permanent housing solutions, and not all inmates are able to transition to these houses. The statewide inmate population held in a correctional facility beyond their mandated sentence due to a lack of housing decreased by half between 2015 to 2016. However, as of February 2016, approximately 120 people statewide (28 in Chittenden County) remain in a correctional facility for this reason. Finding housing that will work for those that remain has proven challenging, due to the circumstances and needs of those inmates. For example, some of them previously violated rules in transitional housing locations.

Key Indicators

Additional indicators can be found on the ECOS Scorecard.

Indicators	Location
Percent of Owner Households Spending Over 30% of Income on Housing Expenses	Scorecard
Percent of Renter Households Spending Over 30% of Income on Housing Expenses	Scorecard
Months of inventory for condos	Scorecard
Months of inventory for single-family homes	Scorecard
County-wide Rental Apartment Vacancy Rate	Scorecard
Burlington and Winooski Rental Apartment Vacancy Rate (Metro)	Scorecard
Rental Apartment Vacancy Rate rest of Chittenden County (Non-Metro)	Scorecard
Homelessness	Scorecard
Inventory of Affordable Rental Properties	Scorecard
Inventory of Affordable Rental Units	Scorecard

15. TRANSPORTATION

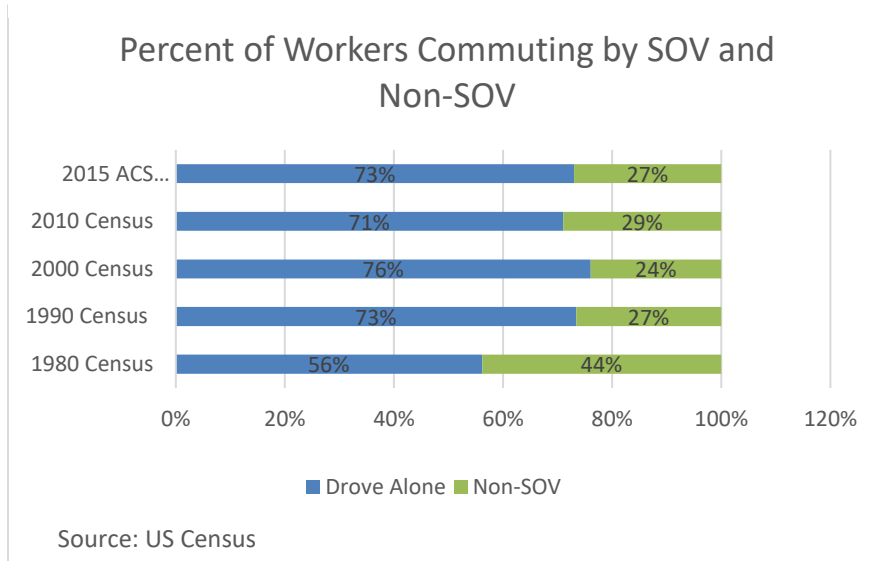
Transportation Goal: Provide accessible, safe, efficient, interconnected, secure, equitable and sustainable mobility choices for our region's businesses, residents and visitors.

Key Issues/Trends/Insights

The CCRPC advocates for the concentration of at least 80% of future growth in 15% of Chittenden County's land area. Low-density development in rural areas will raise Vehicle Miles Traveled (VMT), increase traffic congestion and contribute to more harmful air pollutants and greenhouse gases. Directing transportation investments to serve mobility and accessibility in compact settlements will result in a more cost-effective and efficient transportation system.

In Chittenden County, our rate of driving alone to work increased from 56% in 1980 to 73% according to the latest 5-year American Community Survey average. On the other hand, VMT per person has been on a downward trend. From 2007 to 2014, VMT per capita declined from 27 daily miles driven to 25. However, since 2014, it has increased slightly to 25.3 daily miles driven, probably due to significantly

FIGURE 31 PERCENT OF WORKERS COMMUTING BY SOV AND NON-SOV



lower fuel prices in the past few years. Increases in VMT also had a negative effect on transit ridership. Continued increases in VMT could increase congestion and traffic delays on our highways and have negative impacts on economic development, the environment and human health.

Even though low fuel prices have a number of negative impacts on transportation behavior and choices, we should be cognizant that as fuel prices rise, rural and low-income residents are disproportionately impacted by

increases in household transportation costs.

It is imperative that we continue to support efforts to reduce VMT per capita and single-occupancy vehicle (SOV) travel. More robust investment in transit, walking/biking, carsharing and ridesharing, and other Transportation Demand Management (TDM) measures could reduce VMT, traffic delays and congestion and the use of single-occupancy vehicles; enhance the economic well-being of our residents, businesses and visitors; reduce social isolation and improve public health. The lack of safe and convenient alternatives to automobile travel disproportionately affects vulnerable populations.

Some population segments – youth, the elderly, low-income, minorities and new Americans– lack access to viable public and private transportation options. The lack of safe, reliable, and complete connections within the transportation system and between transport modes reduces access to

employment, and social, economic, and recreation opportunities; and limits access to basic needs by means other than a personal vehicle.

There is a significant link between transportation choices and public health. The degree to which individuals in a community are physically active is directly dependent on transportation opportunities, infrastructure, and community design. Walkable communities with safe and contiguous infrastructure to support active transportation and a robust transit network, generally encourage physical activity and have a lower dependency on automobiles. The health benefits of physical activity and its role in reducing risk for chronic disease has a cross-cutting societal impact.

According to the 2017 VTrans Public Transit Route Performance Report, over half of all public transit trips in Vermont occur in Chittenden County. While access to public transit has improved in the greater Burlington area, some suburban and most rural populations lack access to transit. Implementing the recommendations from Green Mountain Transit's NextGen Transit Plan will improve the service levels, route directness and service convenience on their urban network.

The overall condition of the arterial highways in Chittenden County has improved significantly since 2013. In 2013, over 50% of Chittenden County arterials were rated poor or worse in terms of roadway condition. Today, that figure has dropped to just under 28%. While roadway conditions have improved, there is still a concern that transportation funding is overly reliant on the state and federal gas taxes, which are decreasing in value as inflation lowers purchasing power and revenues decline due to improved vehicle fuel efficiency and a growing number of electric and hybrid vehicles. The prospect of less funding to maintain our existing system and invest in new transportation improvements is a disconcerting trend that has not been adequately addressed at the federal or state level.

The MTP must be fiscally constrained to the funding anticipated for investment in the planning horizon through 2050. The following table outlines the funds anticipated to be available to address transportation needs in Chittenden County through 2050.

FIGURE 32 FUTURE TRANSPORTATION FUNDING ESTIMATES

Future Funding Estimates (Federal, State and Local Funds)	Cost in Millions (2016\$)
Total Available Funding for Transportation System	\$1,744.72
Funding to Paving, Bridge and Transit Operations and Maintenance	\$1,221.30
Cost of 2017 Transportation Improvement Program (TIP) Construction Projects	\$102.75
Total Available New Funding to address new transportation needs excluding TIP	\$420.67
Estimated Cost of Anticipated New Projects (the sum of all items on the MTP Project List excluding TIP Projects)	\$422.43

KEY INDICATORS

Additional indicators can be found on the ECOS Scorecard.

Indicators	Location
Drive Alone to Work	Scorecard
Daily Vehicle Miles Traveled Per Person	Scorecard
Walking/Biking Infrastructure	Scorecard
Sustainable Funding, System Preservation by Fiscal Year	Scorecard
CarShare VT Membership	Scorecard
Electric Vehicle Registrations	Scorecard
GMT Ridership per Fiscal Year	Scorecard
FHWA Performance Management Program/Measures	Supplement 5
Number of Vehicle Crashes Per Million Annual Vehicle Miles Traveled	Scorecard
Number of reported vehicle crashes involving bicycles or pedestrians	Scorecard
Number of trips provided by the Special Services Transportation Agency	Scorecard

16. INFRASTRUCTURE & FACILITIES

Infrastructure & Facilities Goal: Ensure adequate infrastructure and facilities (i.e. water supply, wastewater treatment, stormwater treatment, broadband coverage and solid waste recovery and recycling) to support areas planned for growth while conserving resources.

Key Issues/Trends/Insights

[Data for this section and more information can be found in the: the Ecological Systems section of this Supplement for water quality; [Broadband Action Plan](#); Stormwater websites: rethinkrunoff.org/ and <https://www.ccrpcvt.org/our-work/environment-natural-resources/water-quality/>; and other sources listed below.]

- The majority of the residents in the County get their drinking water from Lake Champlain, via two utilities: the Champlain Water District and the City of Burlington's DPW Water Division. Both Champlain Water District and the City of Burlington's DPW Water Division utilities have received Phase III Director's Awards from the USEPA's Partnership for Safe Water Program; and Champlain Water District was the first in the United States to receive the Phase IV Excellence in Water Treatment Award in 1999, and is one of 11 in the US to presently maintain this award status following required annual reviews. In addition, Richmond, Hinesburg, Underhill and Jericho have smaller public water supply utilities – some of which are facing capacity and water quality challenges (Hinesburg for example).
- Currently, there are 12 municipal wastewater treatment plants in the County; together they have a treatment capacity of 21 million gallons per day (MGD) (Source: State of Vermont Wastewater Management Division). As of 2010, CCRPC estimated an aggregate reserve capacity of 9 MGD (this does not account for unconnected committed capacity and capacity limitations of individual facilities.). The estimated future demand for wastewater capacity in 2035 is 7 MGD. While these figures indicate that there is sufficient sewage treatment capacity to absorb anticipated growth in housing and employment county-wide, this does not account for location specific limitations. Colchester, Essex Junction, Huntington, Hinesburg, Westford, and Williston were among the municipalities in need of more wastewater capacity.
- Management of our storm water is critically important to maintaining and improving water quality throughout the County. Stormwater treatment is challenging in both urban and rural areas of the County for a variety of reasons: existing urban areas need to retrofit old infrastructure, financing new infrastructure in areas planned for growth when development is incremental, and impacts from agriculture and forestry practices that don't follow best management practices. Stormwater is managed at a variety of levels including EPA's National Pollutant Discharge Elimination System (NPDES) permits; VT's discharge permits; and some municipalities have additional stormwater regulations and programs. VT's discharge permits are structured to address site level development for projects over 1 acre of disturbance; therefore, incremental and cumulative impact of development is not addressed through this program. The municipalities are facing the challenges of dealing with the cumulative impact – and most are regulating stormwater through local regulations. In addition, nine municipalities and three public entities are subject to MS4 permitting (a NPDES program) in Chittenden County: Burlington, Colchester, Essex, Essex Junction, Milton, Shelburne, South Burlington, Williston, Winooski, Burlington International Airport, UVM and VTrans. A new MS4 permit was issued by the State in December 2012. There are two additional requirements: each permittee/municipality must develop and implement a Flow Restoration Plan (FRP) for the stormwater impaired waters within their jurisdiction (current estimates for restoration of individual impaired streams ranges in

the millions); and each permittee/municipality must now pay for the annual operation of stream flow gauges (formally funded by the State/UVM/USGS).

- Information technology is integral to fulfilling the economic needs of residents and businesses in the region. Telecommunications is the communication of information through various media. The ECOS Competitive Assessment Analysis Report identifies quality and costs of telecommunications services as the weakest utility infrastructure based on the Employer Survey. As of December 2011, broadband technology was widely available in Chittenden County. Approximately 99% of Chittenden County residents and 99.5% of non-residential structures (analysis included commercial, industrial, municipal structures) had access to Broadband defined as 768 kbps download/200 kbps upload speeds. However, in 2015 the Federal Communications Commission has increased the benchmark definition of broadband internet service to 25 Mbps (megabits a second) download and 3 Mbps upload. While a coverage analysis has not been completed under this new definition it is very likely that Chittenden County no longer has such extensive coverage. It is imperative to ensure that we are on par with other urban areas in the realm of number of service providers, service tiers, and affordability as the technology is constantly improving and we must keep up.
- A sustainable society minimizes the amount and toxicity of the waste it generates, reuses materials, recycles, and composts. The Chittenden Solid Waste District (CSWD) is responsible for the management of solid waste in Chittenden County. The system in the County is a combination of public, private, and public/private programs. CSWD has established a range of programs and facilities to manage waste through reduction, diversion, and proper disposal. CSWD also has identified the need for a regional landfill site (See the CEDS Project list in Supplement 4 for cost estimates, funding sources and proposed timeline for six CSWD landfill/waste transfer station design and construction projects). The tons of municipal solid waste generated in Chittenden County that are landfilled or incinerated have been increasing over the last 5 years, while the amount of construction and demolition debris landfilled or incinerated has significantly decreased. The amount of materials recycled or composted has increased. It is estimated that 38% of the municipal solid waste sent to the landfill is comprised of recyclable materials and 24% is comprised of organic materials that could be composted (Source: CSWD Estimate of the Components of Solid Waste Disposed for FY 2016). A State law passed in 2012 (Act 148) bans disposal of certain recyclables (effective July 1, 2015), yard debris and clean wood (effective July 1, 2016), and food scraps (phased in over time and completely in 2020) from disposal. Residents and businesses in CSWD have been required to separate yard debris and recyclables from waste destined for disposal since 1993 and clean wood since 2015. CSWD has also banned non-asbestos asphalt shingles, unpainted/unstained plywood, and unpainted/unstained oriented strand board from disposal (2016). The additional bans on food scraps and construction materials are having a significant impact on waste diversion in Chittenden County; however, continued education and new strategies will be needed to maximize use of diversion programs.
- As can be seen on the ECOS Map Viewer, there are the following government/administrative facilities in the County: 13 police stations, 21 post offices, 2 courthouses, 18 municipal offices, 27 fire/rescue stations, and 1 state correctional facility.
- Larger municipalities such as Burlington, Winooski, Colchester, Essex, Essex Junction, Milton, Shelburne, South Burlington and Williston have a variety of government and school facilities, and provide a wide range of municipal services such as planning and zoning, recreation, highways, libraries, water, sewer, fire, rescue and police. In contrast, small rural municipalities such as Bolton, Buel's Gore, and St. George support only a few part-time employees such as a municipal clerk and road foreman, and often contract for other services. Municipal government in the remaining communities commonly consist of a few full-time employees such as a municipal clerk, an administrative aide for the selectboard and a highway foreman and small

crew, supplemented by part-time or seasonal employees for activities such as recreation programs or the municipal library.

- This variation is particularly apparent in regard to Emergency Services. Almost every municipality has a locally-based fire department (with the exception of Buel's Gore and St. George), half have police departments, and fewer have their own emergency medical services. Many of the smaller municipalities receive primary police services from the Vermont State Police (VSP) on an "as-needed" basis, but must "rent" traffic enforcement services from the Chittenden County Sheriff's office, the VSP or neighboring communities. Many of the municipalities have reciprocal agreements for assistance in fire and rescue services. The majority of these fire and rescue departments rely on volunteers; and recruitment and retention of these volunteers is a challenge. For more information see the Public Safety, Criminal Justice & Hazard Mitigation section in this Supplement, the All Hazard Mitigation Plan and Annexes and the Local Emergency Operations Plans for each municipality (particularly Section 5.2 provides the specific services, volunteers and personnel for each operation). Discussions around consolidation of some municipal services, such as dispatch, continue in an effort to achieve greater efficiency. As an example of creative solutions, Essex and Essex Junction have consolidated a number of services since July 2013. Specifically, in accordance with the 2015 Town of Essex Annual Report: a shared manager has successfully administered both Town and Village municipalities, a joint stormwater policy committee has been appointed and begun planning Town and Village stormwater permit activity, one tax bill now exists for the Village taxpayers, one Town-wide collection system has been successfully implemented, the Senior Center has been consolidated, and a plan is underway to create a consolidated finance and administrative service delivery system.
- Chittenden County's community hospital is the University of Vermont Medical Center, also Vermont's only academic medical center, serving in this role for patients from across the state and the upper northeast corner of New York. The UVM Medical Center provides a full range of tertiary-level inpatient and outpatient services, provides primary care services at 10 Vermont locations, operates the region's only Level I Trauma Center, and is home to the University of Vermont Children's Hospital. As some of the inpatient facilities are 50 to 70 years old, the Medical Center has a Master Facilities Plan to address the long-term health needs of our region, focusing on single rooms for inpatients and more space for providers and the equipment they need to provide high quality health care, while striving for LEED certification for healthy and efficient building design. The UVM Medical Center continues to focus on becoming fully permitted to construct a new inpatient building with 128 replacement beds on the main campus. They are looking at all older primary care sites to ensure they are adequately sized and equipped to meet all of their patients' needs. The UVM Medical Center is not currently planning changes to other outpatient facilities. Other health care facilities in Chittenden County include 53 primary care sites; the Community Health Centers of Burlington (the local Federally Qualified Health Center, or FQHC); Howard Center (the local designated agency that provides mental health, developmental, and substance abuse services); two home health agencies (Visiting Nurse Association of Chittenden and Grand Isle Counties and Bayada Home Health Care); 6 Nursing Homes; 13 residential care homes; and 4 assisted living facilities.
- The shift in our demographics is important when analyzing what facilities and services are needed. According to the 2015-2020 Chittenden County Housing Needs Assessment (Bowen National Research) between 2015 and 2020, the number of households between the ages of 65 and 74 will increase the most, adding 1,085 households during this time. Overall, Chittenden County will add a projected 3,345 households age 55 and older between 2015 and 2020." Also, according to the State of Vermont Population Projections – 2010 to 2030 (VT Agency of Commerce and Community Development August 2013) we are expecting a significant population increase in all age cohorts 60 years old and older. In 2010, 17% of the Chittenden County population was 60 years old and older. According to these projections, this age cohort

will grow to 23% of the population in 2020; and 28% of the population in 2030. Changes in specific age cohorts is shown here:

FIGURE 33 CHITTENDEN COUNTY POPULATION PROJECTIONS FOR 60 YEARS AND OLDER

Chittenden County Population Projections for 60 Years Old and Older									
Age	2010 Census	2020 Low Projection	% Change of '10-'20 Growth	2030 Low Projection	% Change of '10-'30 Growth	2020 High Projection	% Change of '10-'20 Growth	2030 High Projection	% Change of '10-'30 Growth
60-64	8,220	10,872	32.26%	8,901	8.28%	10,909	32.71%	8,922	8.54%
65-69	5,609	8,910	58.85%	9,578	70.76%	9,115	62.51%	9,732	73.51%
70-74	3,823	6,812	78.18%	9,143	139.16%	7,379	93.02%	9,925	159.61%
75-79	3,099	4,505	45.37%	7,247	133.85%	4,805	55.05%	7,904	155.05%
80-84	2,563	2,851	11.24%	5,133	100.27%	3,006	17.28%	5,870	129.03%
85+	2,591	3,484	34.47%	4,881	88.38%	3,452	33.23%	5,090	96.45%

Source: VT Agency of Commerce and Community Development, August 2013

Note: During the 1990s (High Projection), the national economy was generally healthier than during the 2000s (Low Projection) and Vermont saw greater rates of net in-migration. As a result, the High Projection using 1990s migration rates generally, show higher populations than the Low Projection using the migration rates of the 2000s.

- Not only is this a major demographic change, the needs of people within these age cohorts have changed with greater desire on aging in place and emphasis on providing home based care. While the State has had some success in addressing these needs, there is a long way to go and the demand is expected to increase. Expansion of the Vermont Respite House and use of technology in medical services (i.e. the Visiting Nursing Association of Vermont has tele-monitors to conduct daily in-home check-ins with patients remotely) are two examples of how Vermont is responding to these growing and changing needs. Also, the State has shown progress in the Choices for Care program and are currently serving those that qualify in the highest needs category (long-term care program that assists with care and support for older Vermonters and people with physical disabilities whether they are at home, an enhanced residential care setting, or a nursing facility. Participants in Choices for Care must qualify for Level II nursing home placement and meet financial eligibility criteria). However, the Visiting Nurses Association (VNA) has a significant number of clients who are clinically eligible for the highest needs Choices for Care program but don't qualify because their Medicaid eligibility has not yet been established. The VNA considers this delay a major factor in preventing them from serving a vulnerable population. In addition, VNA is currently experiencing a waiting list of over 250 people for the Moderate Needs (homemaking services) and their ability to serve the people on this list is limited by a lack of funding.

Key Indicators

- **Current Wastewater Capacity v. Capacity Needed for Growth Projections in Areas Planned for Growth** Source: ANR and CCRPC Municipal Growth Projections. Chittenden County has the capacity to treat an additional 7 million gallons per day of wastewater. In 2035, it is estimated that the anticipated demand will be 7 MGD which is adequate capacity to accommodate 80% of the future development within the various sewer service areas.

However, capacity varies for each treatment plant and some facilities may have a narrow margin of additional capacity.

- **16.9% of impervious area is under storm water management through operational stormwater permits countywide.** Source: ANR VTDEC Stormwater Permit database, ANR's 2008 NDVI Impervious Surface Layer.
- **52% of the impervious area in Chittenden County is covered by the Municipal Separate Storm Sewer System Permit (MS4).** Source: MS4 Boundary, ANR's 2008 Impervious Surface Layer.

Additional indicators can be found on the ECOS Scorecard.

Indicators	Location
Storm Water Management	Scorecard
Drinking Water Capacity And Reserve for Large Water Utilities	
Waste Water Average Annual Flow	Scorecard
Pounds per capita per day for Municipal Solid Waste	Scorecard
Pounds per capita per day for Construction Debris	Scorecard

17. ENERGY

Energy Goal: Move Chittenden County's energy system toward a cleaner, more efficient and renewable system that benefits health, economic development, and the local/global climate by working towards the State's Comprehensive Energy Plan goals.

The goals of the 2016 Vermont Comprehensive Energy Plan are to:

- Weatherize 80,000 Vermont homes by 2020
 - Intermediate goal of 60,000 homes by 2017
- Get 90% of Vermont's energy from renewable sources by 2050
 - Intermediate goal of 25% of energy from renewable sources by 2025, including 10% of transportation energy
 - Intermediate goal of 40% of energy from renewable sources by 2035
- Reduce total Vermont energy consumption by more than 1/3 by 2050
 - Intermediate goal of 15% reduction by 2025

To meet state energy goals, the region is planning for a major shift away from fossil fuels in the transportation and heating sector to renewable sources of energy, efficiency in all sectors, and an increase in state renewable energy generators.

Key Issues/Trends/Insights

[Data for this section drawn from: Energy Analysis, Targets & Methodology in Supplement 6 of this Plan, [Energy Analysis Report](#) and associated appendices and [Climate Change Trends and Impacts Report](#)].

Efficiency and Conservation

- Chittenden County has a long history of electrical and natural gas energy efficiency programs, dating back to 1990, which have provided significant energy savings and economic benefits to the state and County. These programs along with improvements in federal standards have led to a reduction in per household and per employee energy consumption of electricity and natural gas. Reduction in energy consumption directly results in a reduction in energy bills. Following the Home Performance with ENERGY STAR® guidelines and building/renovating to the State's Building Energy Code are two programs which assist Vermonters with reducing energy consumption from heating and electricity in homes and businesses. See Indicators for data on efficiency gains.
- The State of Vermont's goal to weatherize 80,000 Vermont homes by 2020 and 60,000 homes by 2017 is optimistic. Progress on weatherization has been low despite programs such as the State of Vermont's Heat Saver Loan Program. According to the LEAP analysis Chittenden County would need to weatherize 14% of homes by 2025 and 70% of homes by 2050.
- Electric efficiency programs have always worked to reduce the region's overall load. As demand for electricity increases and renewables continue to become part of our energy supply managing demand is vital to maintaining grid health. Smart Grid technology coupled with education, behavior change, price signaling (e.g. time of use rates), and load control technologies can help reduce peak demand and defer substation upgrades which can result in substantial cost saving.

- While efficiency programs targeting electricity and natural gas have been largely successful in the commercial and residential sectors, there is an urgent need to fund and develop similar programs for non-regulated thermal fuels and for the transportation sector, as well as for multi-family rental properties where the tenant pays the utility bills. The more widespread adoption of electric vehicles should reduce the total energy consumption in the County, due to better efficiency (an EV gets the equivalent of 100 miles/gallon). To prepare for widespread adoption of electric vehicles, charging infrastructure should be developed, including the availability of at-home charging infrastructure. In addition, policies and pricing structures to encourage off peak charging need to be considered to mitigate grid constraints.
- It is necessary to shift the heating sector away from fossil fuel use. Promoting cold climate heat pumps (powered by a renewable electric grid), in addition to sustainably harvested wood, biogas and geothermal heating systems, will be key to meeting this goal. Because of current low natural gas prices, customers are not likely to save money by replacing existing natural gas heating systems with cold climate heat pumps. However, this may change as fuel prices fluctuate. Installing cold climate heat pumps as the primary fuel source in new buildings will help the region meet its goal of shifting the heating sector away from fossil fuels.
- Vermont Gas Systems is currently working to deploy renewable natural gas in their service territory. The economic viability of renewable natural gas, its impacts on climate change, and its classification as a “renewable” resource should be analyzed in future updates to this plan.
- There is a need for focused study to determine solutions for vermiculite removal as it relates to weatherization, in particular low-income weatherization. Vermiculite was used as an insulator for decades (1960-1990) and was mined with asbestos. Thus, any home with vermiculite is assumed to be contaminated.

Transition to Renewable Energy

- In analyzing Chittenden County’s ability to meet the 90% renewable energy by 2050 goal the Long-Range Energy Alternatives (LEAP) model was utilized to understand the type and amount of fuel needed to meet the State’s energy goals. It is important to note that Chittenden County’s LEAP scenario reflects 87% renewable by 2050. Although the level of renewability is not 90%, the ECOS Plan is deemed to be consistent with the State energy goals because the policy statements within this plan are aligned with the framework for advancing state energy goals and Chittenden County is well suited to move in the right direction. See Supplement 6 for more information on LEAP.
- The LEAP model shows a significant reduction in natural gas as one scenario to achieve the ambitious 90% renewable energy by 2050 goal in Chittenden County. This scenario will be challenging because of the region’s current reliance on natural gas for heating in significant portions of Chittenden County, recent and planned service area expansions, and the relatively low cost of the fuel source. The natural gas infrastructure in Chittenden County also represents a significant investment on the part of utility companies, and much of the County’s dense residential and commercial growth is dependent on this fuel. Therefore, fulfillment of this scenario requires aggressive weatherization of the region’s building stock, switching to heat pumps and other renewable heating technologies. The shift to renewable energy sources for heating will also require the involvement of private-sector energy developers, regional and state-wide utilities, and individual energy users; as well as changes to state energy policy implementation. Despite challenges related to natural gas, CCRPC will work to the best of our ability to meet the 90x2050 goal via the actions discussed in Strategy 2.
- A transition to renewable energy will require electrifying the heating and transportation sectors and by generating more electricity from renewable sources to power these sectors. Chittenden County, perhaps more so than other regions of the State, can achieve great benefits from its density and infill development goals. For example, this land use pattern can lay the ground work

for a switch to electric vehicles, carpooling, transit ridership, walking/biking and a smaller energy footprint per household. Dense population centers make distributed generation easier, because energy can be produced near significant numbers of customers. Finally, the county's dense land use pattern may allow for innovative energy solutions, such as district heating and microgrids. Switching home heating away from fossil fuels is a key strategy for meeting our energy goals. Cold climate heat pumps, which use heat from the outside air to heat a home, and biomass systems, such as pellet stoves, are home heating alternatives that do not use fossil fuels.

- Chittenden County citizens, businesses, and industries spent about \$669 million on energy in 2015 (25% of Vermont's total). Much of this money leaves the County and state immediately. This outflow of energy dollars acts as a drain on the local economy.
- The price of energy is forecasted to continue increasing in the future, which will result in an additional burden on the County's residents and businesses, unless energy consumption can be reduced.
- Fossil fuel combustion increases the atmospheric concentration of carbon dioxide and other greenhouse gases, which are the causes of global climate change. Climate change will have profound impacts on the environment, public health, infrastructure, and economy of Chittenden County.
- Vermont, and the County, relies heavily on gasoline and diesel for transportation. Gasoline consumption has increased as more residents drive to and from work, and run errands.
- Chittenden County is home to an international airport and a National Guard base, therefore the transportation fuel consumption in the County not only includes gasoline, diesel, and compressed natural gas, but also aviation gasoline and jet fuel. It is important to note fuel use in the aviation sector was removed from CCRPC's LEAP analysis and modeling of future energy use, as this is a sector the region will have little influence over.
- As we transition to more renewables, grid resilience is valued by both residents and business, especially because Vermont's climate makes us vulnerable to grid outages. When storage is coupled with distributed energy generation it can provide a source of backup power and also offer the potential to minimize loads at peak times, thereby reducing energy costs.
- A Vermont statute passed in 2015, Act 56 requires Vermont's Electric Utilities to be 55% renewable by 2017, 75% by 2032, and 90% by 2050. Also as part of Act 56, electric utilities need to work with customers to reduce fossil fuel and decrease carbon emissions from transportation and thermal heating by offering new innovative programs and services to their customers. Shifting from fossil fuels to an ever-increasing renewable energy resource will drive down carbon emissions. The electric utilities subject to Act 56 are offering innovative products and services to meet the statute and deliver innovation. These electric utilities offer a host of services and programs that encourage strategic electrification to reduce fossil fuel use.
- Vermont Gas Systems is currently working to deploy renewable natural gas in their service territory. The economic viability of renewable natural gas, its impacts on climate change, and its classification as a renewable resource will be monitored.

Renewable Energy Generation

- Chittenden County has many non-fossil fuel based, renewable energy production sites owned by utilities, private parties, and municipalities. Reliable, cost effective, and environmentally sustainable energy availability is critical to support the economy and natural resources of Chittenden County.
- Vermont's rural nature offers challenges for the transmission and distribution of energy. It is important to maintain and develop an energy production, transmission, and distribution infrastructure in Chittenden County that is efficient, reliable, cost-effective, and environmentally responsible. Current energy distribution projects include: Extension of 3-phase power in south

Hinesburg along VT116 by Green Mountain Power; and Extension of natural gas service to St. George village center; and Burlington is hoping to advance a district heating system using McNeil's waste heat for distribution to the down town core, among other venues. See the CEDS Project list in Supplement 4 for cost estimates, funding sources and proposed timelines for these projects.

- The cost of electricity is related to the distance it travels. When electricity is transmitted over long distances, a significant amount of electricity is lost. Improving line efficiency or encouraging distributed generation (such as locally sited small scale renewable projects) reduces losses and could result in more cost-effective rates.
- Every three years, Vermont Systems Planning Committee (VSPC) launches a process to update and identify constrained areas and reliability needs for the electric transmission grid. Chittenden County has areas identified as needing improvement. An adequate distribution grid that is able to accommodate the planned increase in electricity use and reduces energy loss is necessary to meet the goals of this section.
- CCRPC has undergone a process to look at areas suitable for solar and wind energy generation to determine our ability to meet the 90% renewable by 2050 goal. See the key indicators below for an analysis of existing generation and future generation possibilities.
- In 2016, the Vermont Legislature Enacted Act 174 to improve energy planning and give town and regional plans greater weight or "substantial deference" in Public Service Board proceedings. The effects of "substantial deference" have yet to be tested in PSB proceedings.

Key Indicators

Additional indicators can be found on the ECOS Scorecard.

Indicators	Location
Annual Natural Gas Consumption	Scorecard
Annual Electricity Consumption	Scorecard
Percent of Electricity Saved	Scorecard
Renewable Energy Capacity Sited in Chittenden County	Scorecard

See Supplement 6 for the complete Act 174 Energy Planning Analysis and Targets

Recent Accolades and Concerns for the Future

Accolades

As we look to the future, Vermont, Chittenden County, and Burlington have gained a national reputation for our high quality of life. These can be summarized by looking at some of the accolades that we have received over the past few years. The 2013 ECOS Plan contained a list of awards won between 2008-2012. Below are awards won since then.¹

- 2017 – State Well-Being Rankings, Tied for #1 (Gallup)
- 2017 - Second Best State to Grow old in (24/7 Wall St)
- 2017 and 2015 - Best State for Working Mothers (WalletHub)
- 2017 - 2nd in Progress towards Renewable Energy (Union of Concerned Scientists)
- 2017 - 10th Best State Overall (U.S. News & World Report)
- 2017 and 2015 – Colchester Named One of the Best Places to Live (Money Magazine)
- 2016 - 2nd Healthiest State for Women, Children, and Infants (United Health Foundation)
- 2015 - Top 5 States for Start-up Activity (The Kauffman Foundation)
- 2015 - America's Top 10 Sportiest States (Retale)
- 2015 - The 10 Best Places to Live Now (Mens Journal) 2015
- 2015 - Burlington Named #9 Most Innovative Tech Hub in the U.S. (NerdWallet)
- 2014 - The Happiest and Healthiest Cities in America (BusinessInsider.com)
- 2014 - The 15 Hottest American Cities For 2015 (MSN.com)
- 2014 - 5 best college towns in the USA you'll be interested in moving to (Examiner.com)
- 2014 - 10 College Towns We'd Actually Want to Visit as Adults (Huffington Post)
- 2014 - Shelburne Museum named as "America's best small-town museums" (Travel + Leisure)
- 2014 - America's 10 capitals of education (Urbanful.org)
- 2014 - Burlington "16 Great Places to Live in America" (Outside Magazine)
- 2014 - Top Ten for Clean Tech (Clean Edge, Inc.)
- 2014 - "Best State in America for Healthy Kids" (Washington Post)
- 2014 - Burlington "America's Most Romantic Towns" #7 (Travel + Leisure)
- 2014 - "One of the Most Promising Tech Hubs to Watch" (Techie.com)
- 2014 - "100 Best Places to Raise a Family" #1 (Men's Health)
- 2013 - "One of the 10 Best Small Cities for Retirement" (AARP)
- 2013 - "America's Best College Town" #1 (Travel + Leisure)
- 2013 - "Best Cities for Men" #6 (Men's Health)
- 2013 - "10 Great Places to Live" #2 (Kiplinger's Personal Finance)
- 2013 - "Top 10 Foodie Cities: A Second Helping" #10 (Livability)
- 2013 - "Top 100 Integrated Health Systems to Know" (Becker's Hospital Review)

These accolades reflect many of the positive things we see in our community and our neighbors. They highlight many of the reasons why so many of us love this community and want to keep seeing it improve for ourselves and future generations.

¹ Sourced from Hickock and Boardman Realty - <https://www.hickokandboardman.com/moving-to-vermont/vermont-accolades.html>

Concerns

While we celebrate the positive aspects of our community, we also owe it to our children and their children to look to the future and work on addressing problems and aspire to do better. There are many questions that we heard from our community reflecting real concerns for the future. These questions include:

- Will my children and their children:
 - Be able to find good paying jobs here?
 - Be able to afford a home here?
 - Enjoy a cleaner Lake Champlain, streams, and rivers?
 - Breathe cleaner air?
 - See and use our rural landscape, farms, and mountains?
 - Have more transportation options?
 - Have to drive twice as far and long to get to their jobs?
 - Want to live in this community?
 - Be part of an equitable community?
 - Retain our small town neighborliness?
 - Be healthier?
 - Be better educated and successful?

These questions reflect many of the concerns that were identified in developing Chapter 2. These concerns require improvement to realize our goals. These are not prioritized, but rather follow the outline of the topics as discussed in Chapter 2 above. We should all understand that these concerns are based on today's assessment of trends rooted in our current values and will change over time; either as we improve in certain areas or as our values shift over the generations. The current concerns are grouped by broad goal area below.

Natural Systems

1. Habitat Loss - We are experiencing a loss of habitat quality and quantity due to roads, invasive species and development patterns.
2. Unstable Rivers - River corridors are unstable due to alterations and encroachments leaving us susceptible to costly damage from flood events
3. Non-point Source Water Pollution - While we have addressed point sources of pollution, non-point sources are still contributing pollutants to our water bodies.
4. Climate Change - Climate change is a global phenomenon with local impacts. Our region's climate is already changing; warmer, wetter conditions are expected to increase this century. These changes will adversely impact forest and aquatic communities, water quantity and quality, public health, agriculture, winter sports businesses, and buildings and infrastructure in flood and fluvial erosion hazard areas.
5. Greenhouse Gas (GHG) Emissions - Chittenden County emits 1,177,000 metric tons of greenhouse gases (measured as carbon dioxide equivalents). Fossil fuel consumption for transportation and heating accounts for almost 88% of our emitted greenhouse gases.
6. Climate Health Impacts - We can expect hotter summers that increase the frequency and severity of heat-stress illness and vector-borne diseases (such as Lyme disease, West Nile virus and Eastern Equine Encephalitis).

Social Community

7. Tobacco Use and Substance abuse - Rates of tobacco use have decreased from 20% in 1999 to 13% in 2008. Despite this significant decrease, exposure to second-hand smoke is high among youth and adults. Rates of substance abuse are increasing; meanwhile access to mental health services is inadequate.
8. Obesity - The prevalence of obesity is uniformly high across economic groups and has increased dramatically over the last 20 years.
9. Emergency Preparedness – Improvements need to be made in the areas of emergency planning, training, and operations centers.
10. K-12 proficiency - Improvements need to be made pre-K-12 to increase proficiency in reading, writing, math and science.
11. Workforce Development – We must support and expand existing programs to address labor pool and training gaps. We must also design a specific approach to assist current workforce education and training partners to assure that the required skill sets and workplace readiness skills are widely available to business.
12. Inclusion – There is a concern that members of underrepresented communities are not well connected and involved with governmental decisions. This includes the concern about their knowledge of the different government processes.
13. Disparities - Disparities in educational results, health, incarceration, and income exist for people of color and low income populations.
14. Aging – There is a general concern that we focus on and address the aging of our community and what that means for us in the future.

Economic Infrastructure

15. Job Opportunities – We need to keep encouraging our existing and new employers to grow so that our children have employment opportunities here and do not have to leave to find work.
16. Manufacturing Diversity - Our manufacturing sector lacks diversity leaving us susceptible to changes.
17. Industrial Sites - There is a lack of industrial sites to accommodate future economic growth.
18. STEM - We have a strong innovation economy, but increasing the labor force skills in science, technology, engineering and technology (STEM) remains a high need.
19. Housing Cost - Decreasing the cost of housing would help in attracting workers to our region.
20. Working Lands Loss- Sustaining our working lands is a challenge because there is greater monetary value in developing land than maintaining it as a farm or productive forest; in addition some local products are undervalued (i.e. milk, saw timber).

Built Environment

21. Sprawl - Over the last 60 years development trends, zoning regulations, and consumer preference have shifted growth away from metropolitan areas around Burlington to more suburban and rural locales resulting in large amounts of land consumed and high infrastructure costs. This trend seems to have reversed since 2005 and we need to stay on this new course.
22. Lack of Rental Housing – An increase of 1,000 rental housing units is needed in the County by 2015 to maintain a conservative vacancy rate of 1.4%. We will not reach that number based on

currently approved developments. In addition, a healthier vacancy rate may be much higher to increase housing choices and lower rents, while maintaining a vibrant economy. This would result in a need much greater than 1,000 rental units by 2015. However, this must be balanced by a viable market – developers will build more units when most of the existing units are occupied.

23. Affordable Homes - An increase of 1,000 homeownership units in the County priced under \$300,000 is needed by 2015 to increase housing choices and lower costs. This need could be met through existing permitted developments; however many are not being built due to challenges with condominium financing. For the same reason as mentioned above, the 1,000 units is based on a conservative vacancy rate figure.
24. Maintenance of Existing Housing – There is a need to adequately maintain existing housing stock to preserve it as a viable option for the future.
25. Supportive Housing - There is a need to increase the number of units of permanent supportive housing throughout the County in addition to Burlington. Supportive housing is a combination of housing and services intended as a cost-effective way to help people live more stable, productive lives. Supportive housing is widely believed to work well for those who face the most complex challenges—individuals and families who have very low incomes and/or disabilities, and/or may suffer from substance abuse, addiction or alcoholism, mental illness, HIV/AIDS, or other serious challenges to a successful life.
26. From mid-2014 through the beginning of 2016, fuel prices declined significantly and have likely contributed to increases in VMT and a reduction in transit ridership. Continued increases in VMT could increase congestion and traffic delays on our highways and have negative impacts on economic development, the environment and human health.
27. When fuel prices rise, rural and low-income residents are disproportionately impacted by increases in household transportation costs.
28. The lack of safe and convenient alternatives to automobile travel disproportionately affects vulnerable populations. Some population segments – youth, the elderly, low-income, minorities and new Americans— lack access to viable public and private transportation options. The lack of safe, reliable, and complete connections within the transportation system and between transport modes reduces access to employment, and social, economic, and recreation opportunities; and limits access to basic needs by means other than a personal vehicle. In addition, there is a significant link between transportation choices and public health. The degree to which individuals in a community are physically active is directly dependent on transportation opportunities, infrastructure and community design. Walkable communities with safe and contiguous infrastructure to support active transportation and a robust transit network, generally encourage physical activity and have a lower dependency on automobiles. The health benefits of physical activity and its role in reducing risk for chronic disease has a cross-cutting societal impact.
29. While roadway conditions in the county have improved since 2013, there is still a concern that transportation funding is overly reliant on the state and federal gas taxes, which are decreasing in value as inflation lowers purchasing power and revenues decline due to improved vehicle fuel efficiency and a growing number of electric and hybrid vehicles.
30. Meeting Vermont's State Energy Goals – Vermont has set ambitious goals to reduce total energy consumption across all sectors (heating, electricity and transportation) by 15% by 2025, and by more than 1/3 by 2050 and to obtain 90% of energy from renewable sources by 2050.

Currently the region relies on natural gas for heating in significant portions of Chittenden County, and has recent and planned service area expansions. Shifting from that non-renewable fuel will require complex changes at all government levels, businesses, utilities and individual consumers.

31. Water and Wastewater– In order for municipalities to implement their plans for future growth in their urban or village improved water and wastewater services (both on-site, community systems, and sewer) are often necessary, including financial assistance. Colchester, Essex Junction, Huntington, Hinesburg, Westford, and Williston were among the municipalities raising this concern.
32. Stormwater Investments – Municipalities are committed to making improvements in storm water quality, but are concerned about the costs and how to pay for them.

We are at a time of choice. Do we allow things to keep going the way they are? Do we take steps to achieve the best future possible?

See the main section of the ECOS Plan for strategies and actions to address these concerns.