

Identifying Planning Solutions for the Connecticut River Migration System of New Hampshire and Vermont



Part III - Best Practices, Solutions, and Planning

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Introduction

The Study Area

The study area for this project includes 53 politically distinct communities covering 2,449 square miles and consisting of approximately 164,400 residents (U.S. Census Bureau, 2019). The regional population density is 67 people per square mile, ranging from 2.72 people per square mile in Lemington, VT to a maximum of 350 people per square mile in Brattleboro, VT.



Map Acquired from Connecticut River Joint Commission

Background

Climate change projections indicate that New Hampshire and Vermont may possess higher climate resiliency than other regions of the country, based strongly on its temperate climate and inland location. For an in-depth assessment of the projected climate risk and resilience of each county within the study area, refer to Table 1 and Table 2 ([Appendix A](#)). According to a National Geographic publication, “51% of Americans under the age of 45 say climate change has influenced their decision about where to live” (Borunda, 2021). As more people experience the effects of climate change, it is reasonable to hypothesize that climate change will become one of the prominent criteria influencing decisions about where to live, potentially changing or shifting pre-existing migratory patterns.

Our research of migratory systems in New Hampshire, Vermont, and the Connecticut River area, revealed that Vermont is experiencing a decline in population as people leave for jobs and higher pay. Seniors are becoming the largest population demographic in Vermont. Nearly half of the in-migration in Vermont is from international immigrants. Domestic in-migration often consists of people coming to the state with higher degrees and larger incomes than the established population, creating tensions within communities.

New Hampshire, on the other hand, is experiencing an increase in population from in-migration, largely from people relocating to the metropolitan areas of Hillsborough, Rockingham, and Strafford Counties. In the study area, the greatest increase in population is in Lebanon where a 7.1 percent increase in population occurred over the past 10 years. Over the course of the 2020 Coronavirus pandemic, the population of Lebanon increased an additional 1.1% from 2019, ranking it as the seventh quickest growing community in the country (Kolko et al, 2021). While COVID-specific immigration largely consists of middle-older age individuals, those generally migrating to New Hampshire are often younger than the established population. The top reasons reported for migrating to New Hampshire include family, employment, natural environment, culture and lifestyle, quality of life, taxes, and the economy (Johnson and Bundschuh, 2020). The top reasons for out-migration from Vermont include job opportunities, higher

wages, and a desire for more culturally diverse communities (Morse and Geller, 2015). Overall, the Connecticut River area is experiencing similar patterns described at the state level, in which communities on the Vermont side of the river are decreasing and communities on the New Hampshire side of the river are increasing in size. Refer to Tables 3 and 4 ([Appendix A](#)).

The research did not reveal factors influencing migration at the town, city, or county scale. There may be unique circumstances in some municipalities that are influencing migration that warrant further research. Population, school enrollment, and housing trends were evaluated as potential indicators of migratory patterns. School enrollment may be a reliable source of data once the nuances in the numbers are investigated further and better understood. When assessing housing trends as an indicator, it is important to keep in mind that in places like New Hampshire, where building permits are used to calculate growth in homes, often more building permits are issued than structures completed. Additionally, in Vermont, the Vermont Housing Finance Agency (VHFA) predicts growth in some counties that are currently showing rates of population decline. How can these contradictions be explained? One way to account for the nuances and inconsistencies in short-term housing indicators is to compare additional indicators, such as vacancy rates. In all circumstances, using population data and other indicators for identifying migratory trends should be considered over longer periods of time for more accurate results.

There is evidence and stories of migratory impacts from COVID-19. Articles published highlight a greater interest in real estate and high amenity resort areas of Vermont and New Hampshire throughout the pandemic. In time, IRS migration data may offer valuable insight on the inflow and outflow patterns for this period and beyond, as demonstrated in the first report of this series, *Assessing the Migration System of New Hampshire and Vermont's Connecticut River Valley: Part I - Migration Trends, Evidence, and Indicators*.

Researching the potential impacts from population growth and development revealed that watershed health and freshwater aquatic ecosystems are strongly influenced by terrestrial environments

and climate conditions that affect the hydrological cycle. Terrestrial impacts from development and urbanization include fragmentation and sprawl, increased impervious surface, runoff, and flooding, loss of biodiversity and forests, disruption of nutrient cycles and weakened climate resiliency. Watershed and aquatic ecosystem impacts include a disrupted hydrological cycle, loss of biodiversity and aquatic habitat, degraded water quality, loss of recreational opportunity, and water scarcity.

A study on the impacts of recent growth and development in the Upper Merrimack River Watershed revealed that climate change is expected to be the most significant driver of water-related impairments (Samal et al., 2017). Impacts to climate and aquatic conditions are expected to be modest until the mid-century. Water supply shortfalls are influenced by population and land cover more than by climate. Land use and cover change can exacerbate or dampen the effects of climate change and growth.

The growth rate of a region significantly impacts social capital as well. A 1998 study found that a consistent growth rate of tourism in a Vermont community aided increases in social capital and community assets. Rapid growth, however, weakened these same components. The growth rate also predicted the impact of second home construction. The size of the area, its capacity to support growth, and the size of new developments all predicted community cohesion, with the most substantial of each of these factors leading to the weakest community capital, potentially due to increased competition for resources. Furthermore, residents in fast-growing tourism communities are most likely to worry about negative impacts of development (Park et al., 2019).

As the populations and demographics of the region change as a result of migration, it is expected that the quantity and type of social services demanded by the population will also change. While the rhetoric of “long-term residents” versus “new residents” being at odds with one another persists in social conversations, research actually shows that the length of residence in a region has very little effect on the public desires of residents. A person’s public desires are more impacted by their degree of involvement in a community than their length of residence. Residents with more community engagement tend to have a stronger desire for investment in social services, regardless of how long they’ve been a member of the

community. Other dominant factors influencing public desire are the growth rate of the community and disparities in equity such as wealth gaps, inconsistent costs of living, and the state of relations between residents of different races.

A key disparity affecting both public desire and social systems in the region is gentrification. Within the last decade, affinity migrants from some of the most expensive urban housing markets are relocating to rural communities in New England, the Mountain West, and the Great Lakes regions. As a result, these communities are experiencing an overburdening demand for economic and cultural resources spurred by widening gaps in social disparities. In these instances, many low-income residents are forced to leave the communities they call home. Those who choose to stay are likely to experience weakened social capital and resilience. Gentrification also impacts school districts, leading to student displacement that weakens student success and socioeconomic segregation in which the funding gap between schools greatly widens. (Golding, 2015; Nelson, 2010). In looking at the social systems most impacted by migration, we highlighted significant changes in housing needs, transportation services, and relocation services, the latter of which is unique to in-migration and consists of services such as job assistance and document processing.

Planning for Migration

This report is intended to serve as a working report to outline a series of short term and long term planning recommendations to accommodate migratory growth within New Hampshire and Vermont's Connecticut River. In the interest of increasing regional resilience, the following suggestions combine the values of biophilia, blue-green infrastructure, Smart Growth, and the equitable receiving practices outlined by Welcoming America and other organizations. Our hope is to provide adequate solutions to accommodate the formation of equitable migration to the region, creating sustainable receiving communities in line with the American Planning Association's Standards for Sustaining Places. These standards are to harbor a livable built environment, harmony with nature, a resilient economy, interwoven equity, healthy communities, and responsible regionalism (Angus et al., 2020).

This last standard, responsible regionalism, speaks to the formation of region-specific solutions. While it is pertinent for federal, state, and local governments to cooperate in enacting bold action to plan for both climate change and disturbance migration, this report will focus primarily at the regional level of planning, where stakeholders possess the greatest influence. Regional planning allows for collaboration between municipalities, sharing of resources, resilience through redundancy, and watershed level planning (Angus et al., 2020). Through such planning, this report aims to assist in the creation of resilient communities throughout The Connecticut River towns.

Resilient Communities

The concept of “community resilience” has become more prominent in journals, government policy and planning objectives, and mainstream media related to climate change, the pandemic, social justice, and urban planning. Many definitions of community resilience emphasize the need for a community to quickly rebound or “bounce back” from climate related shocks and stresses, essentially meaning a return to normalcy. However, the standard norm that existed before the disturbance likely included systems that perpetuated oppression, socio-economic inequity, and ecological damage.

This report adopts a concept of community resilience that aligns with Davoudi et al. (2013) and recognizes the interdependence of human and ecological systems. Community resilience is demonstrated by “the ability of complex social-ecological systems to change, adapt, or transform in response to stresses and strains” (Davoudi et al., 2013). As a response to uncertainty, community resilience is a process that aims to “bounce forward” by moving toward more desirable outcomes than previously existed.

Community resilience can be achieved through the pursuit of building capacity and creativity for transformation at various scales through cultivating awareness, preparedness, flexibility, resourcefulness, and cooperation (Davoudi et al., 2013). Brears (2020) author of *Blue and Green Cities* identifies characteristics of community resilience that are similar and include adaptive planning, being reflective, iterative, inclusive, integrated, robust, redundant, flexible, and resourceful (Brears, 2018). A resilient community responds to the vulnerability of its people, infrastructure, and climate risk. The process of

identifying actions to be taken to enhance resilience is called “resilience planning”. Planning should be community-driven, centered on social justice and equity, and bring together people from multiple stakeholder groups to imagine a better future for all people. It involves investigating potential scenarios and impacts, and developing responses like climate adaptation that can be taken over the short-term and long-term horizon to create more resilient outcomes (Brears, 2018). Resilience planning should empower a community to bounce forward from disruption. This outcome should be transformative and create a more vibrant, ecological, sustainable, and equitable community for all people than previously existed.

The following proposals are aimed at municipalities and regional planning boards of New Hampshire and Vermont’s Connecticut River. Planners within the broader context of New England and from similar rural temperate climates may also find this report offers relevant solutions. Each proposal draws from one or more of four integrative planning frameworks, outlined in the following section.

Integrative Frameworks

We identified five planning frameworks to guide us in identifying short-term and long-term integrative solutions. Below is an introduction to each:

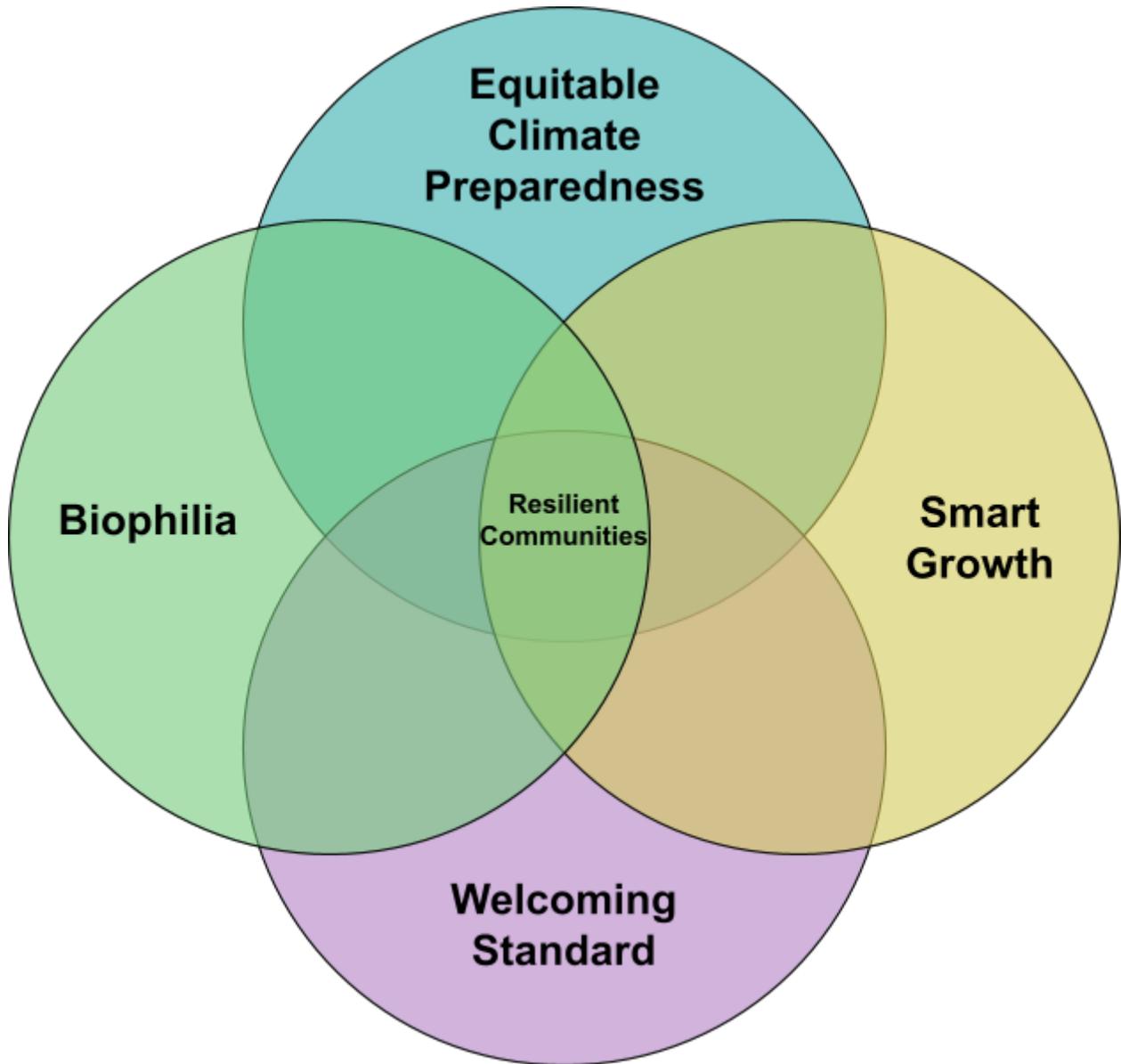


Figure 1 - Integrative Frameworks (Sylvia and Corvus, 2021).

Biophilia

Biophilia is a term denoting human connection to and love for natural systems. In planning, biophilia is the act of creatively integrating blue and green spaces into the built environment, with an emphasis on restoring and protecting natural systems and ecosystem services, bringing residents closer to nature, and making it a part of their everyday multisensory experience (Russo and Cirella, 2017). The 14 biophilic principles offer an essential tool in rural land use planning to prevent social and environmental problems that have arisen in cities, suburbs, and other maladaptive landscapes ([Appendix B](#)).

Emerging examples of biophilic practices integrate blue-green infrastructure (BGI) solutions such as green roofs and facades, water catchment designs, river and riparian buffer restoration, food and edible landscapes, trees and forests, greenways and urban trails, wildlife corridors, parks, and nature areas (Beatley, 2016). These BGI solutions seek to mimic natural systems and aesthetics, a design type defined as “biomimicry.” The benefits of integrating biophilic practices into the built environment include improved biodiversity, air quality, stormwater management and flood control, increased food production, reduced Urban Heat Island effect, reduced use of vehicles, improved pollutant absorption, and pollution reduction. Biophilic development can lead to a reduction of stress, depression and anxiety, enhanced productivity, immunity, and faster healing from illness. It can also improve social resilience and increase property values and the activity of residents (Russo and Cirella, 2017).

A City Embodies Biophilia When Each Year:

- 1) Green space and tree cover increases in area.
- 2) Natural and human-created habitats are healed with native species.
- 3) The quantity of native species increases as residents identify new species and re-discover species previously eradicated.
- 4) The participation of citizen scientists increases.
- 5) Over 50 percent of community members can recognize ten or more native species.

Blue-Green Infrastructure

Blue-Green Infrastructure (BGI) is a planned network of integrated natural, ecological, and man-made systems which act as the innovative solutions to accomplish Biophilia. BGI reduces the need for additional grey infrastructure to address rapid and unplanned urban growth that has led to urban sprawl, water pollution, and environmental degradation (Brears, 2018). BGI improves the management of water resources, enhances ecosystem services and biodiversity, and increases resilience to climate change and urban development. BGI employs natural processes to improve the quality of water and manage the quantity of water by restoring the hydrologic functions in an urban landscape (Brears, 2018). Components of BGI deliver a variety of benefits and can contain stormwater detention and retention basins, bioretention basins and swales, rain gardens, riparian buffers, restored waterways, and constructed wetlands. It can also include green building features like green and blue roofs, downspouts and rain barrels, and rainwater harvesting. There are a variety of best practices available for capturing and infiltrating stormwater from roads and other modes of transportation.

Overall, BGI is less capital intensive than conventional grey infrastructure projects and it can reduce water treatment costs. BGI solutions support the goals of multiple policy areas and broader commitments to biophilic design, sustainability, and resilient communities (Brears, 2018). Although the initial costs of creating blue and green spaces can seem high, the long-term maintenance costs are far lower than that of traditional grey infrastructure. Capital costs for BGI can be reduced by integrating installments with other projects, installing large projects (economies of scale), utilizing incentive programs, and quantify maintenance costs according to area serviced, rather than simply area maintained (ie. sub-watershed scale accounting) (Stormwater Report, 2015). Additionally, the enormous environmental, aesthetic, and social value of biophilic urbanism has the potential to significantly outweigh installation costs. Few investments in gray infrastructure can outperform or outsustain investments in nature (Beatley, 2016).

Smart Growth

Aimed at safeguarding the health of developed and undeveloped communities, Smart Growth offers a planning framework based on 10 principles of sustainable development. Developed by the Environmental Protection Agency and based on the experiences of Smart Growth communities across the country, the following principles lay the groundwork for designing a livable, efficient and, resilient community:

- Mix land uses.
- Take advantage of compact building design.
- Create a range of housing opportunities and choices.
- Create walkable neighborhoods.
- Foster distinctive, attractive communities with a strong sense of place.
- Preserve open space, farmland, natural beauty, and critical environmental areas.
- Strengthen and direct development towards existing communities.
- Provide a variety of transportation choices.
- Make development decisions predictable, fair, and cost effective.
- Encourage community and stakeholder collaboration in development decisions (EPA, 2020).

Welcoming Standard

[Welcoming America](#) is a non-profit non-partisan organization that recognizes communities are changing, and that shifting demographics can create challenges and tensions for all residents. The Welcoming model employs a local approach and fosters a culture and environment for all residents to participate fully in social, civic, and economic activities in the receiving community. The Welcoming Standard and Certified Welcome programs provide a roadmap to support communities in becoming more inclusive and enabling smart cohesive local policies, programs, and partnerships that recognize shared values and capabilities of residents and new immigrants to create equitable outcomes.

The four core strategies for increasing impact and sustainability of a welcoming community include engaging longer-term residents; set goals, monitor impact, and adjust as needed; design for equity and inclusion; and implement in partnership. At this time, one in eight Americans lives in a Welcoming Community and this model is beginning to scale globally as a result of its positive results. The Welcoming Standard is organized into seven main themes that contribute to building a welcoming community:

- Government
- Leadership
- Equitable Access
- Civic Engagement
- Connected Communities
- Education
- Economic Development
- Safe Communities

Equitable, Community-Driven Climate Preparedness Planning

Everyone is affected by climate change, but not all people are affected equally. “People of color, immigrants, refugees, and lower-income populations experience increased exposure and sensitivity to climate hazards and a reduced capacity to adapt” (Yuen et al., 2017). As local governments, agencies, and communities plan for climate change, an inclusive, community-centered planning strategy empowers traditionally marginalized people most affected by climate change to shape decisions on climate preparedness and resilience. This process can be transformative and conducted while also creating policies that address the root causes of social inequity.

[The guide](#) introduces models to advance social equity and provides planners with an overview of the framework and examples of equitable climate resilience solutions. The quality and characteristics of implementing this framework consist of identifying inequities, engaging with communities most affected, nurturing democracy, civic engagement, and transparent governance, supporting an integrated whole systems multi-stakeholder approach, and fostering sustainability. Equity should be interwoven throughout the processes, as shown in Figure 10, to create equitable outcomes. Although this guide does not specifically address disturbance migration, the framework can be applied to a broad range of community planning challenges.

Figure 10 - Equity Objectives

Procedural	<ul style="list-style-type: none"> ● Create processes that are transparent, fair, and inclusive in developing and implementing any program, plan, or policy ● Ensure that all people are treated openly and fairly ● Increase the civic engagement opportunities of communities that are disproportionately impacted by climate change
Distributional	<ul style="list-style-type: none"> ● Fairly distribute resources, benefits, and burdens ● Prioritize resources for communities that experience the greatest inequities, disproportionate impacts, and have the greatest unmet needs
Structural	<ul style="list-style-type: none"> ● Make a commitment to correct past harms and prevent future unintended consequences ● Address the underlying structural and institutional systems that are the root causes of social and racial inequities

Note: This graphic is from Yuen et al., 2017

Solution Planning Themes

The planning strategy for this report aims to weaken negative consequences of amenity migration and to proactively aid equitable migration to and sustenance of the current communities of The Connecticut River Valley. The growth rate of a region often correlates with whether migration to a region is planned or unplanned. Counties typified by recreation, amenity, and retirement are the fastest growing non-metropolitan regions, growing at double the rate of manufacturing, farming, and mining-centric regions. As such, the majority of communities within The Connecticut River Valley are predisposed to rapid, unplanned growth.

The following section highlights methods to combat, and where possible, prevent this trend. Through proactive planning, communities can manage the growth rate and forms of community development, in-migration, and transformation. The growth-rate of a region influences choices in relocation, public attitudes, resource accessibility, and controlled placement of a growing population. When the growth-rate is controlled through proactive planning, development can be targeted to produce more resilient outcomes, such as conversion of brownfields to housing, safeguarding valuable watersheds and viewsheds, and intentionally making accommodations for marginalized in-migrants (Park, 2019).

In determining where to implement the following planning solutions, we prioritize investing in communities with high social vulnerability, historical marginalization, and limited local government capacities. Social vulnerability is measured through indicators of income, racial demographics, and long-term underinvestment (Martín and Williams, 2021). Such prioritization is reflected throughout each planning theme and informs our suitability criteria for determining growth designations ([Appendix D](#)). For a case study exemplification incorporating the major frameworks and solutions outlined in this report, refer to [Appendix C](#), which offers two examples of communities voluntarily transforming into climate havens. On the following pages, we outline individual recommendations according to planning categories and growth designations, with additional external resources hyperlinked throughout the report.

Watershed Health

Water Resources

- Individual jurisdictions cannot adequately address protecting watershed hydrologic systems and functions. Promote water resource management at the watershed level and for the establishment of water quality standards, stormwater regulations, wastewater treatment, water conservation, and drought planning because watersheds extend beyond political boundaries.
- Encourage the protection of the watersheds, water resources, riparian areas, and floodplains through the application of adaptive management techniques, such as riparian buffers, which counter the effects of a changing climate, population and development, and extreme weather events.

Flood Hazard Mitigation



The Connecticut River area is expected to experience an increase in precipitation intensity and likelihood of flooding events. The changing weather coupled with potential scenarios of disturbance migration and development could lead to a significantly larger number of people that are exposed and vulnerable to flooding.

- Eliminate any policies or regulations that encourage (intentionally or unintentionally) the development or redevelopment in areas at risk of flooding.
- Adopt regulations that prohibit development in the 500-year (0.2 percent annual chance) floodplain and prohibit any adverse impacts to the floodplain (Drane et al., 2020).
- Expand the number of communities in the FEMA Community Rating System. Brattleboro is the only community in the Connecticut River area that is rated in the National Flood Insurance

Program. This program gives communities credit for efforts that go beyond the minimum standards by reducing flood premiums from 5% to 45%. There are 19 different activities that fall into four categories including public outreach, mapping and regulations, flood damage reduction, and flood preparedness.

- Utilize [VT's Emergency Relief and Assistance Fund \(ERAF\)](#) for flood-related expenses
- While concurrently promoting redevelopment and infill of urban areas, take advantage of any opportunities to buyout, relocate, demolish, or improve the resilience of the built environment located in floodplains, areas that have experienced flooding, and areas at risk of future flooding.
- “Advocate for adequate federal and state funding to build to higher flood resiliency standards or to relocate structures based on reasonable assumptions about current costs” (Drane et al., 2020).
- Proactively partner with federal and local agencies and institutions to identify and map areas where flooding has been experienced and where the projected future flood zones (50 years from now) will be due to climate change and development scenarios (Drane et al., 2020). Support efforts to avoid development and utilize these areas for multifunctional community benefits like drainage protection, wildlife movement, community recreation, and tourism (Angus et al., 2020).
- Extend floodplain and riparian buffer protections to areas that will accommodate flooding over time. Restore wetlands and riparian buffers to increase flood capacity and accommodate future flooding.

Stormwater Management

- Consider developing regulation to limit impervious surfaces and adopt financial fees for impervious surfaces with incentives for infiltration and performance-based stormwater management to achieve BGI and other resilience and sustainability based goals.
- Model and design for stormwater management using current data and trends.

- Promote the use of green infrastructure, nature-based solutions, and low-impact development (LID) for the design and management of stormwater through the adoption of financial incentives, fees, adoption of codes, and ordinances. These approaches utilize decentralized stormwater systems and mimic natural systems and their processes to capture, treat, store, and infiltrate stormwater runoff preventing nutrient overloading, erosion and sedimentation, flooding, and warming.
- As part of the larger integrated BGI network, develop guidelines and requirements for new and existing streets to require bicycle and pedestrian mobility, green infrastructure, and nature-based components. Retrofitting existing streets with green infrastructure will improve stormwater management, wildlife passage, air quality, and reduce urban heat island effects (Angus et al., 2020).
- Reduce development on steep slopes (slopes with a grade of 15 percent or greater) because it contributes to runoff, erosion, and sedimentation. Reduce development on steep slopes through the application of zoning schemes. The *NH Innovative Land Use Planning Techniques* (2008) provides model language and guidance for a steep slopes protection ordinance.
- Consider adopting non-fiscal tools to spread awareness and adoption of BGI. These tools can include learning alliances, education, technology standards, awards and recognitions, leading by example, fast tracking project reviews, and piloting projects to showcase a variety of acceptable practices (Brears, 2018).

Water Scarcity

- Support water conservation (through the lens of equity and equitable outcomes) in all planning and development processes to reduce greenhouse gas emissions and maintain adequate water supplies for human use and natural ecosystems.

- Promote water conservation by establishing programs for the collection and reuse of rainwater, xeriscaping and use of native and naturalized drought resistant species, establishing restrictions on water use for landscaping and during periods of drought, and incentivizing the use and provisioning of water efficient fixtures (compliant with EPA’s WaterSense, if feasible).
- Explore the federal [WaterSMART](#) program and opportunities for funding to increase water efficiency and supply, and to modernize existing infrastructure to prevent water scarcity and conflict.

Low Density Land Use

Wildlife Habitat and Biodiversity Management

Wildlife and wildlife habitat provide important and beneficial ecological services. They buffer streams, sequester carbon, and filter contaminants. Working with a broad stakeholder group, identify and conserve a suite of habitats and biodiversity to protect important ecosystem services, the culture, and the character of the area. The use of spatial tools will be particularly helpful with this research, analysis, and discourse.

- Prioritize infill and redevelopment and transit and pedestrian oriented design to preserve wildlife habitat, accessible open spaces, urban forests, and farmland by countering urban sprawl and land disturbance.
- Evaluate the adoption of environmental characteristic zoning to protect, restore, and reconnect sensitive environmental ecosystems and their services. Environmental characteristics may include high-value natural ecosystems, aquifers, wetlands, unfragmented forest blocks and soils, wildlife corridors, ridgelines, viewsheds, carbon sinks, and other specific types of habitat.
- Consider adopting bird friendly design and dark sky outdoor lighting standards in enhanced building codes and zoning schemes as tools for promoting biophilic practices (Russo and Cirella, 2017).

- Enhance urban biodiversity and the accessibility of green spaces by adopting the principles of biophilic design ([Appendix B](#)). Incorporate native and naturalized vegetation suited for climate change.
- Identify areas of invasive species and prioritize control efforts. Plan for controls that maximize the use of natural and nonpolluting techniques to protect human health and the health of forests and ecosystems.
- Work with multiple agencies and institutions to study and identify terrestrial and aquatic natural resources, their complex interrelationships, and the potential movement corridors for climate adaptation. Focus conservation efforts on protecting natural resources, habitats, and the movement corridors necessary for long-term survival working with the public and private sectors.

Agricultural Conservation/ Working Lands Economy

The Connecticut River Valley has a long history based in a working lands economy of forestry and agriculture. Prior to colonization, indigenous communities, such as the Abenaki, cultivated crops in the rich agricultural soil of the floodplains. To this day, the aesthetic and culture of a working lands economy is one of the top drivers for young people moving back to the region. Conserving agricultural land in the region is a keystone to retaining youth, safeguarding history, and ensuring food security (Angus et al., 2020).

- Enact and support agricultural policy that serves to increase economic productivity, food security, and climate mitigating farming practices, such as subsidies for regenerative farming and increasing funding for land protection (Angus et al., 2020; Foster et al., 2017; Shupe, 2021).
- Increase funding for the Working Lands Enterprise Fund (Vermont) and similar initiatives to safeguard economic viability of a working lands economy (Shupe, 2021).
- Invest in housing and conservation boards, such as VHCB, to reduce sprawl and protect development on agricultural lands and intact forests (Shupe, 2021).

- Use spatial analysis tools to identify and preserve soils designated as “prime farmland soils.”
- Conserve lands for sustainable forestry practices, which provide carbon sequestration, reforestation, forest preservation, and low-impact land management (Angus et al., 2020).

Public Land Use

Public space, including parks, sidewalks, trails, streets, paths, forests, and parking areas, all offer opportunities for connection to the setting and community in which people live. As such, they are an important asset in determining the sense of place, connectivity, and accessibility of a region. Public spaces enable people to socialize outside of their typical circles, allowing for community cohesion and sharing of culture. This informal face-to-face interaction amongst individuals from different backgrounds increases trust, interdependence, and cooperation more so than any other interaction (Ross et al., 2019). The key to this success is to design public spaces that serve diverse interests, rather than perpetuating “anglo-normativity,” that holds “white-centric” park preferences as the goal and fails to design for equitable access (Jokisch et al., 2019).

- Design public networks, such as greenways, to connect green spaces in compact communities (parks) to open spaces (forests, trails) in surrounding rural regions. Such networks create carbon sinks and stormwater retention, improve accessibility and quality of life, and enrich culture (Angus et al., 2020).
- Mainstream public space design decisions in accordance with a regional green infrastructure plan
- Create an inventory of public spaces at a regional level to aid in connectivity and BGI planning
- Engage a diverse public in tactile planning of open spaces to diversify the types of public spaces (Ross et al., 2019).

Combating Gentrification

With affinity migration often comes rural gentrification. Gentrified rural counties are more apt to experience home value segregation and, eventually, a homogenization of higher property values and a widening wealth gap. Due to the more limited housing supply typical of rural communities, gentrification is magnified by quicker price increases, and thus, outpricing of current residents. Gentrification not only increases cost of living, but also shifts the community culture. Within the last decade, affinity migrants from some of the most expensive urban housing markets are relocating to rural communities in New England, the Mountain West, and the Great Lakes regions. As a result, these communities are experiencing an overburdening demand for economic and cultural resources spurred by widening gaps in social disparities. In these instances, many low-income residents are forced to leave the communities they call home. Those who choose to stay are likely to experience weakened social capital and resilience. Gentrification also impacts school districts, leading to student displacement that weakens student success and socioeconomic segregation in which the funding gap between schools greatly widens. (Golding, 2015; Nelson, 2010). Rural gentrification in New England is compounded by the effects of climate gentrification. In regions where landscapes and climates are preferable for climate security, property values and housing demand are increasing. In particular, regions with more temperate climates, distance from the coast, and resilience to flooding are seen as the most preferable (Keenan, 2018).

In order to combat the externalities of in-migration on marginalized communities, planners must safeguard affordability and accessibility (Golding, 2015).

- Build capacity within marginalized communities by offering protections and assistance for cultural capital, under-resourced markets, and minority-owned businesses (Ross et al., 2019).
- Account for externalities of affinity migration through the imposition of wealth taxes such as resource consumption and land ownership-based tax structures (Ross et al., 2019).

- Implement rent control to limit the ceiling for rent within an affordable range of the regions minimum wage.
- Lease land in the form of community land trusts for utilization as affordable housing stock. Land trusts are non-profit, community organizations which own and lease the land to residents whose homes are built in the area (Greenstein and Sungu-Eryilmaz, 2005).
- Offer consistent and dependable public transportation options to reduce transportation cost-burdens.
- Enact housing policies and cost-of-living protections prior-to or early-into the gentrification process in order to reduce inequities and prevent displacement (Golding, 2015).
- Create state, regional, and municipal incentives for affordable housing development, as federal programs prove inadequate in combating rural gentrification (Golding, 2015).

Compact Centers - Villages and Downtowns

Vermont identifies five designations of compact centers: village centers, downtowns, new downtowns, neighborhood development areas, and growth centers (Vermont Agency of Commerce and Community Development, 2018). Each of these designations guides the development of community infrastructure around the principles of Smart Growth while also striving to maintain Vermont’s rich culture. The following recommendations in this section are intended to meet the standards of these designations and to guide the development of accessible social services and community.

Infill Development

Expanding community capacity does not always mean there is a demand for new infrastructure. One way to increase capacity while reducing demands on space and capital costs is to prioritize infill development. Infill development identifies vacant buildings and unoccupied land within compact centers and prioritizes growth in these underutilized spaces. By focusing on infill, capital development costs are

reduced by building capacity in areas already deemed most accessible, along transportation corridors, and in existing communities.

- Look into opportunities within the federal brownfield program. Redeveloping brownfield sites is lower impact than developing new greenfield sites (Angus et al., 2020).
- Prioritize infill near already existing public and active transportation sites in order to reduce sprawl and capital costs and increase accessibility (Mount Ascutney Regional Commission et al., 2021).
- Offer tax credits for redevelopment in compact centers, as proposed by Governor Scott (Shupe, 2021).
- Rehabilitate contaminated properties for redevelopment (Shupe, 2021).

Zoning

Zoning regulations which segregate development by use (ie. commercial, residential, industrial) are the most prevalent in the region. Such zoning regulations often limit sizing of homes, impose lot-size requirements, and prohibit multi-family units in certain zones. These practices restrict accessibility for lower-income residents and those living in multi-generational homes as the minimum lot-size requirements are outside of their price-range and may not allow for multi-unit housing.. This restriction limits access to neighborhoods and opportunities for targeted communities, particularly communities of color, who most often reside in multi-generational homes. As a result, marginalized communities are often consigning to areas with higher exposure to air, water, and noise pollution typical of high-density, low-investment community centers (“Ross et al., 2019; NHCEH, 2020). Some communities, such as Keene, are moving towards form-based zoning, allowing for mixed-use development, such as residential and commercial, to exist in the same area. Form-based zoning prioritizes the aesthetic, or form, of development rather than the use. This flexibility aids in the formation of compact communities, avoids

sprawl, and reduces demand on transportation infrastructure, all of which safeguards habitat and watershed health.

- Transition to Mixed Use Zoning to allow for accessibility and walkability between residences, services, employment opportunities, and public spaces. This reduces transportation costs for residents as well as regional carbon emissions and demand for transportation infrastructure (Angus et al., 2020).
- Enact Form-Based Codes to create flexibility in use patterns while prioritizing specific characteristics of development within an area (ex. building height restrictions) (Angus et al., 2020).
- Plan for open space and public spaces integrated amongst mixed-use private development, increasing accessibility to the outdoors and congregational areas (Angus et al., 2020).
- Eliminate minimum lot size restrictions as these policies exclude by race and income and proliferate NIMBYism (not-in-my-backyard) mentality, in which residents oppose development and in-migration to their particular community, though support it elsewhere (NHCEH, 2020). Rather than restricting lot size, safeguard environmental health through enacting minimum green-space and blue-space requirements in alignment with biophilic principles.

Housing

Sixty-percent of the unsheltered homeless population in New Hampshire and Vermont live outside of large urban centers. This demonstrates that homelessness in rural communities of the region is a significant issue without adequate services and housing initiatives. This trend is reflected at a national scale. Marginalized populations, such as disaster migrants, often require temporary housing and/or relocation services offered in a community-specific manner. Inequitable growth in wages by sector exacerbates housing insecurity. In the region, job opportunities in low paying jobs are increasing while

job opportunities in high paying jobs are decreasing. This results in strained housing costs. (NHCEH, 2020).

- Develop a master plan that breaks down housing needs within the general population according to specific identified needs such as that of the elderly, low-income, accessibility impaired, and homeless populations (Angus et al., 2020).
- Increase the minimum amount of affordable housing required in a community in order to reduce cost-of living for renters, who are more prone to being cost-burdened than homeowners (Mount Ascutney Regional Commission et al., 2021).
- Institute rent-control legislation to prevent inflation of housing and rental prices, which serve to protect and sustain the affordable housing market within a reasonable cost-of-living (Allbee et al, 2015).
- Diversify rental options to include apartments, small homes, multi-unit dwellings, etc. (Mount Ascutney Regional Commission et al., 2021).
- Increase accessibility requirements for new housing options and rehabilitate older homes to accommodate the aging population in the region as well as those requiring accessibility accommodations. (Mount Ascutney Regional Commission et al., 2021).
- Create local and regional housing task forces to draft and push for legislation aimed at addressing housing shortages and inequities. Ensure diverse representation of community members on such task forces (NHCEH, 2020; Angus et al., 2020).
- Provide incentives for affordable housing development (NHCEH, 2020).
- Develop training and procedures grounded in equity for zoning and planning boards (NHCEH, 2020).
- Embed energy-efficient and resilient housing standards in affordable housing requirements to ensure equitable access to affordable and sustainable living.

- Ensure development of affordable housing in compact communities at an equal rate as the development of market-rate housing (Angus et al., 2020).
- Locate affordable housing near transportation routes and community hubs to increase accessibility and affordability (Angus et al., 2020).
- Utilize tools to protect current supply and infrastructure of rental and affordable housing stocks. For instance, allow for the purchase of and refinancing of rental properties with expiring subsidies and inhibit conversion of rental units to private ownership (Ross et al., 2019).
- Create programs to combat the impact of new development on greenfields (Ross et al., 2019).
- Provide incentives to promote small-lot single family, and multi-family development (Ross et al., 2019).
- Eliminate restrictions on accessory dwelling units such as “in-law apartments,” which are ad-on apartments attached to single-family units (Ross et al., 2019).
- Increase stock of emergency shelters and transitional housing in the form of [by-right development](#) legislation, which prioritizes high-density and multi-family housing development through the implementation of zoning and regulations (Ross et al., 2019).

Transportation

Faced with long commutes, low investment in transportation infrastructure, low-wages, and inadequate access to public and active transportation infrastructure, rural residents encounter extreme transportation cost-burdens. The cost of inadequate transportation infrastructure impacts the economic, social, and cultural capital of a community. With limited transportation options, community members experience difficulty in accessing social services, community, and employment opportunities (Blanton et al., 2019). Communities greatest impacted by mobility restraints are low-income communities, people of color, people with disabilities, those with lower education, seniors, and youth (Ross et al., 2019).

- Invest in multimodal transportation options within and between compact centers (Blanton et al., 2019)
- Prioritize infrastructure designs that ensure safety for all modalities, especially those utilizing active transportation (Blanton et al., 2019).
- Base infrastructure investments and decisions on projections for near-future demand for parking, charging stations, public transportation routes, etc. (Blanton et al., 2019).
- Invest in active transportation infrastructure as it improves safety, health, and economic well being (Blanton et al., 2019).
- Create a toolkit for designing green and complete streets. An example is in [Appendix E](#) (Angus et al., 2020).
- Create guidelines for new and existing streets to require bike lanes, pedestrian-first access, and green infrastructure solutions (Angus et al., 2020).
- Integrate BGI into road design to manage stormwater, aid wildlife crossings, reduce urban heat effects, and increase longevity of transportation infrastructure (Angus et al., 2020).
- Look into paratransit, demand-response, park-and-ride, and ride sharing programs to determine which combinations of transportation options best serve the region (Blanton et al., 2019).
- Avoid construction of new roads as these significantly affect sense of place, environmental health, and economic burden through urban sprawl and habitat destruction. Instead, focus on retrofitting existing infrastructure (Blanton et al., 2019).
- Design mixed-use compact centers close to public transportation, increasing walkability and reducing demands for roads, private vehicle use, and urban sprawl (Angus et al., 2020).
- Provide economic incentives for businesses locating close to public transportation and compact centers (Angus et al., 2020).

- Eliminate minimum parking requirements for new and existing developments. Impart maximum parking limits and parking fees to account for the externalities of private-vehicle ownership (Angus et al., 2020).
- Invest in hybrid and electric public transportation upfront to avoid repetitive costs of transitioning in the near future (Angus et al., 2020).
- Plan transportation networks and public transit routes around regions with high job-opportunities
- Utilize state protocols to assess active transportation assets already available (Mount Ascutney Regional Commission et al., 2021).

Public Desire and Cultural Capital

In considering how public relations and desires will change with changing demographics of the region, it is important to assess the current tensions and diversity of public desires in the region, as well as the history of prioritizing affluent white desires while destroying other cultural preferences. In addition to cultural capital, the rate of growth has a significant impact on social capital as well. A 1998 study found that a consistent growth rate of tourism in a Vermont community aided increases in social capital and community assets. Rapid growth, however, weakened these same components.

The growth rate also predicted the impact of second home construction. The size of the area, its capacity to support growth, and the size of new developments all predicted community cohesion, with the most substantial of each of these factors leading to the weakest community capital, potentially due to increased competition for resources. Furthermore, residents in fast-growing tourism communities are most likely to worry about negative impacts of development (Park et al., 2019). Through preservation of cultural capital that represents a diverse local populace, planners can gain public trust, support, and engagement (Ross et al., 2019).

- Proactively plan for in-migration in order to prioritize and plan for a preferable growth rate. Undesirable and rapid growth are most prevalent in the absence of proactive planning.

- Invest in preservation of diverse regional heritage sites that offer interactive, teaching components beyond minimal signage. Seventy-eight percent of domestic vacationers engage in cultural and heritage activities (Ross et al., 2019).
- Infill, adapt, and rehabilitate historic buildings to allow for community engagement and continual integration of historic community structures. Allow for the preservation of buildings and diversification of use through form-based coding (Ross et al., 2019).
- Offer state and local tax credits for rehabilitation and reuse of historic buildings (Ross et al., 2019).

Co-planning with Indigenous Communities

Migration into the region will result in increased development of indigenous land and sacred spaces of which the entire region consists. With an increased regional population, each migrating with unique worldviews and subsequent effects on the regional culture, impacts on indigenous sense of place, along with all sense of place, can be expected. Losing indigenous space and knowledge is a tragedy for all, weakening cultural heritage and increasing injustice. In order to preserve the rich cultural heritage of the region, resilience planning should include the expert leadership of local indigenous communities and efforts of all co-conspirators for indigenous preservation and celebration. As we plan for in-migration now, we must also be aware of the long history of unethical migration and colonization of the region, refusing to repeat historic patterns of abuse and power (Dion, 2020).

- Require accurate school curriculum of historic and current native rights, roles, and issues in the region. Offer adult education and community engagement to correct historically inaccurate education, opening opportunities for understanding of native values and cross-cultural relationship building (Native Hope, n.d.).
- Listen to and uplift native leadership in regards to regional issues and solutions of land, climate, community, family, etc.

- Meet native demands for repatriation of sacred objects and lands as well as other forms of transitional justice (Native Hope, n.d.).
- Engage in co-planning with local indigenous communities.
- Led by indigenous communities, identify sacred land and meet indigenous demands of land rights and protections.

Inclusion of Black History

The region along the Connecticut River consists primarily of white residents. New Hampshire and Vermont are characterized by a predominantly white population. As of 2010, 97 percent of Vermont's population identified as White (Bose, 2018). This is largely due to the early white colonization of New England, followed by slavery, interpersonal, and systemic racism that significantly reduces black property ownership in New Hampshire and Vermont. Black history in the north is only recently being discovered and shared as an accurate component of the region's history. Despite cultural rhetoric depicting New England as a historically white homogeneous community, black populations have resided in the state since the beginning of slavery in the United States (Vawter and Vawter, 2016).

This "rural whiteness", as a 2006 study by Vanderbeck suggests, is highlighted as a means to attract affluent tourists to the region. This capitalization of white supremacy marketing serves to attract more of an already prevalent demographic (Bose, 2015). As an effect, when people of color (POC) migrate to the region, they are met with a starkly homogeneous population. This homogeneity coupled with the overarching prevalence of white supremacy in America results in a social "othering" of POC identities. Refugees from Somalia, Sudan, and other parts of Africa are perceived as both black and muslim, receiving stereotypes attributed to both labels. African migrants and Black Americans report mistreatment by social services such as racial profiling by police and discrimination in school systems, as reported across Vermont (Bose, 2015).

- Identify and uplift the voices of regional black experts and leaders to design interactive memorials and historic installations of black history, such as:
 - The centrally located statue of Ms. Wilson in Milford, NH which depicts the history of the first published black author in America (Vawter and Vawter, 2016).
 - The black history trail designed along a re-discovered black burying ground in Portsmouth, NH.

Receiving Communities/Climate Havens

With the exception of extreme disasters, determining the cause of a current migration is often impossible. Most often, the interconnected nature of climate, economic, and social shifts inhibit the identification of a primary influencer for migration. Rather than attempting to discern the exact cause of current migration, we are developing recommendations to complement in-migration of all causes. This includes, although is not limited to, climate migration, pandemic migration, political refuge, and economic influences. The following recommendations are applicable to communities identifying as both climate havens and receiving communities and seek to aid in proactive equitable migration and relocation, focusing not only on who is currently migrating, but rather offering solutions to include populations currently and historically left out of community development in this region.

Rural communities choosing to act as receiving communities or climate havens often benefit from an influx of young residents amidst trends of aging long-term residents (Hilligoss, 2017). Climate havens spur the need for receiving services such as temporary housing, real estate locators, moving and storage services, and government and NGOs to process relocation documents (Clement, 2017). Rural climate havens in particular require additional transitional services which are more commonly found in urban environments (Bose, 2015). Refer to the Case Study on Cazenovia, New York in [Appendix C](#) for how a rural community near Syracuse (considered a climate haven) can prepare for becoming a receiving community.

Equitable communities aim for, “just and fair inclusion into a society in which all can participate, prosper, and reach their full potential. Unlocking the promise of the nation by unleashing the promise in us all” (Ross et al., 2019). The non-profit Welcoming America provides a host of support services to receiving communities to foster an inclusive environment that welcomes immigrants and refugees by helping them to become prosperous, to feel valued, and to be recognized as vital contributors to a shared future.

- Integrate equity into all planning processes, decisions, designs, and investments
- Acknowledge and rectify the historic and current discrimination of People of Color (POC), LGBTQIA+, women, and persons with disabilities through acts of transitional justice (Ross et al., 2019).
- Foster a relationship with Welcoming America to learn more about the welcoming network, certified welcoming standard, and the rural welcoming initiative (for communities with less than 50,000 people). Although this organization is focused on international immigration and refugees, it offers resources and best practices for fostering inclusion, equity, and the experience of shared values and benefits for communities that are receiving migrants.
- Facilitate discourse with a broad stakeholder group in the Connecticut River area to discuss the Welcoming America programs, the potential for joining their initiatives, and creating a commitment to welcoming migrants relocating as a result of complex factors and coming to the area with a range of needs, human capital, and resources.
- Form regional and municipal minority business projects to aid in guiding in-migrants with local regulations and networking opportunities relevant to small business owners (Hilligoss, 2017).
- Provide legal services to immigrant and marginalized business owners and employees to aid in economic development. Legal services include business technical support and education, immigration services, holistic pro bono services, and longitudinal evaluation and outcome analysis (Hilligoss, 2017).

To continue to understand how migration systems are changing in the Connecticut River area in response to climate change:

- Partner with local universities that specialize in population, migration and demographic research and experts like Cheryl Morse and Pable Bose at the University of Vermont and Kenneth Johnson at the University of New Hampshire to research the effects of climate change on migratory systems in Vermont and New Hampshire.
- Partner with institutions to continue gathering, maintaining, and analyzing indicator data and trends related to population, migration inflows and outflows, vacancy rates, and school enrollment.
- Organize an interdisciplinary group of community members, agencies, and academia to assess public desire and preferences for ecosystem services based on scenarios of climate change, population growth and development, and projected ecosystem service responses to help plan and prioritize conservation efforts similar to the studies on participatory processes in the Upper Merrimack River Watershed.
- Build public-private partnerships between government, NGO, and private enterprises to fill gaps in social services. Collaborate to ensure effective redundancy and avoid working against one another (Hilligoss, 2017).
- Engage in-migrants in the process of community building, leadership, and service providing in order to allow for agency, self-determination, and employment opportunities (Hilligoss, 2017).
- Utilize place-based approaches to solutions, always thinking, planning, and acting out of responsible regionalism (Hilligoss, 2017).
- Create a regional advisory panel on racial equity, moving to a more place-based approach and level of power as opposed to traditional state-level panels.

- Design receiving communities as a “hub and spoke” model in which compact-density climate havens are surrounded by smaller receiving communities. This design creates an interconnected network of communities, maintains social and cultural ties between communities, disperses population growth across several locations, offers redundancy in services, and capitalizes on existing infrastructure rather than maladaptive sprawl (Bose, 2018).
- Assess current capacities of communities to welcome and meet the needs of in-migrants. Identify social service assets, gaps, and size accommodations (Bose, 2015).
- Work with existing and form new resettlement agencies in designated receiving communities (Bose, 2015).
- When possible, plan ahead to instate appropriate social services such as schools, healthcare, employers, and housing for in-migrants based on projects for who is coming and when (Bose, 2015).

Climate Preparedness

In a Boston based study, surveyors found that all racial groups identify global warming as a high priority issue. Across all racial groups, respondents felt that climate action requires policy changes at federal and state levels, with local and state governments initiating the actions. Climate action initiatives which received the greatest support across all racial categories were transportation improvement, flooding buffers, state funding for community projects, and wind energy subsequently. Approximately 75 percent agree that climate change will lead to exacerbated conditions and health concerns (Martínez et al., 2020).

In order to serve as a resilient climate haven for the long-term, the Connecticut River towns must act to mitigate climate change, and where necessary, adapt infrastructure and services. Such resilience consists of mitigation, adaptation, and emergency response/recovery. Mitigation seeks to reduce the impact and occurrence of hazards. Adaptation serves to alter existing infrastructure and environments to better suit changing conditions. Response and recovery work to respond aggressively and efficiently to already occurring disasters. All three of these pillars are imperative in the construction and preservation of

resilient communities (Drane et al., 2020). This section focuses on recommendations to guide the region in long-term resiliency as a climate haven for current and future residents:

- Advocate for and participate in the development of interdisciplinary hazard mitigation, climate adaptation, and resilience planning processes and incorporate these actions and considerations into all state, local, and community comprehensive planning. Consider potential disturbance migration scenarios that may affect the area over the next 20, 40, and 60 years (Drane et al., 2020).
- Create and share municipal hazard mitigation plans for each community in the region, as in accordance with Vermont and New Hampshire requirements.
- Integrate hazard mitigation plans into comprehensive plans to mainstream actions and planning (Drane et al., 2020).

The following are initiatives that can be included in comprehensive planning and implemented proactively in congruence with a hazard mitigation plan to build resilience into the local system:

Hazard Zones

Hazard zones are regions identified as prone to disasters such as extreme snow impact, flooding, hurricanes, heatwaves, drought, and avalanches. Each of these disasters are worsening due to the exponential influence of climate change. In order to mitigate adverse impacts to social, environmental, and economic well being, proactive measures should be instituted to reduce exposure to such events (Angus et al., 2020).

- Identify hazard zones, particularly flood zones, for current and future climatic conditions.
- Implement building restrictions on new developments in hazard zones to reduce infrastructure and community exposure to hazards.

- Update existing flood hazard zones to reflect climate change projects and enact planning and legislation in accordance with such projections.
- Base development standards and building requirements on future climate scenarios.
- Regularly update zones based on most recent data and projections.

Climate and Environmental Justice

The U.S. Environmental Protection Agency defines environmental justice as the “fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation and enforcement of environmental laws, regulations and policies” (Ross et al., 2019). Historically and continuously, marginalized communities such as communities of color and low-income earners experience the greatest exposure to environmental pollution and disaster (Ross et al., 2019). In designing The Connecticut River to be prepared for climate change and resiliency, communities must interweave equity and transitional justice throughout all phases and scopes of planning and implementation.

- Identify which communities are most vulnerable, marginalized, and/or targeted by institutional inequities. This includes intersections of income, race, ethnicity, age, physical abilities, chronic health conditions, transportation access, and language communication (Angus et al., 2020).
- Prioritize vulnerable populations in emergency and evacuation planning and responses. Utilize methods of communication and warning that serve multiple languages and sensory needs. Identify transportation for those without reliable transportation and/or physical access requirements (Ross et al., 2019).
- Develop resiliency plans focused on equitable access to services such as electrical supply, public drinking water, pollution mitigation, noise control, and emergency services (Ross et al., 2019).
- Utilize [Executive Order 12898](#), a federal standard for environmental justice, to ensure avoidance of disproportionate exposure to development and disaster impacts (Ross et al., 2019).

- Involve marginalized communities in co-planning to allow for shared lived-experiences and self-determining solutions (Ross et al., 2019).
- Ensure equal participation in co-planning by homeowners and renters to ensure equitable decision making representative of the housing stock (Martin and Williams, 2021).
- **Utilize accessible and diverse engagement strategies.** Traditional large-scale engagement tools such as town halls and hearings fail to attract large numbers and diverse participants, particularly disengaging marginalized communities (Martin and Williams, 2021). To increase engagement and accessibility, utilize a diverse array of engagement strategies which lower barriers to attendance. Some examples include hosting participatory planning sessions at existing community events, centers, community kitchens, and popular third spaces. Reach out to diverse organizations and ask them what formats work best for them. Then do it.

Limitations and Recommendations

This report and associated research was undertaken by two white graduate students at Antioch University New England (AUNE) and as such was lacking in diversity and representation for some of the topics reported. The overall project was completed in a semester which limited the depth and scope of research and our ability to identify and understand historic and current indicators and trends relating to disturbance migration and the potential impacts on socio-ecological systems when coupled with climate change risk. Since there was limited research available on this area and in general for rural communities, the research did not follow a specific methodology. Generally, research focused on the potential impacts of greatest concern to the Connecticut River Joint Commissions and AUNE partnership which guided our focus to topics like watershed health, fragmentation, social justice, housing and transportation, and not food and energy systems which may be of equal importance in creating Resilient Communities.

Due to these limitations, many areas of future research exist to expand this work. Moving forward, we recommend engaging with indigenous communities and POC in future research endeavors relating to the trends and effects of disturbance migration and in further research and planning for community resilience. Food and energy systems although largely overlooked in this report, are critical to developing community resilience and sustainability. Understanding the circumstances of poverty and marginalization, the lack of affordable and healthy foods, and food insecurity are issues that are likely to be exacerbated by climate change and population growth. In addition, innovative sustainable decentralized wastewater solutions were not investigated for this report. We recommend further researching this topic and investigating the intersection of disruption migration and shifting to clean energy, changes in energy needs and demands, and ensuring equitable access to clean energy warrants further research as well.

Conclusion

Communities must now begin the work of facilitating discussions and ensuring proactive and diverse community involvement in determining which planning solutions best fit the needs of the region and the unique municipalities within. Through the implementation of an interdisciplinary approach to community driven action for community resilience, The Connecticut River Valley can safeguard holistic and inclusive regional migration. Current and projected trends show that migration to the region is inevitable. New Hampshire and Vermont have an opportunity to shape this change and how it manifests in these communities to formulate well designed, resilient, welcoming communities.

Planners must commit to interventions, policies, and incentives designed to close equity gaps rather than create maladaptive outcomes in the future. As a nascent field, planners need to be courageous and vulnerable enough to admit when a system isn't the right solution. As community members and change agents, everyone must be willing to determine “best practices,” admit when they fail, and courageously redefine new guidelines. For now, the hope is that this resource serves as a solid foundation to initiate this process in towns located along the Connecticut River in New Hampshire and Vermont.

Appendices

Appendix A - Tables

Table 1 - Climate Risk from Compounding Factors by County

County	State	Subcommittee	Heat	Wet Bulb	Farm Crop Yields	Sea Level Rise	Very Large Fires	Economic Climate Damage
Coos	NH	Headwaters	3	2	1	1	1	3
Essex	VT	Headwaters	3	2	1	1	1	1
Grafton	NH	Riverbend	3	2	1	1	1	4
Caledonia	VT	Riverbend	3	4	1	1	1	2
Orange	VT	Riverbend	3	2	1	1	1	1
Windsor	VT	Uppervalley	3	4	1	1	1	3
Sullivan	NH	Mount Ascutney	3	4	1	1	1	4
Windham	VT	Mount Ascutney	3	4	1	1	1	3
Cheshire	NH	Wantastiquet	3	4	1	1	1	4

Note. This table is adapted from Shaw et al. 2020 data.

Indicator Descriptions

Heat (0-26): Weeks per year above 95 degrees Fahrenheit

Wet Bulb (0-70): Days with wet bulb temperatures

Farm Crop Yield (-20-92): Percent decline in yields

Sea Level Rise (0-25): Percentage of property below high tide

Very Large Fires (0.01-2.45): Average number of very large fires per year

Economic Climate Damage (-0.05-59): Climate damage as a percent of GDP

Table 2 - EPA Climate Resilience Screening Index Scores by County

County	State	Subcommittee	Risk	Governance	Built Environment	Natural Environment	Society	CRSI Score
Coos	NH	Headwaters	0.112	0.922	0.536	0.549	0.64	17.43
Essex	VT	Headwaters	0.074	0.78	0.327	0.56	0.468	12.33
Grafton	NH	Riverbend	0.129	0.905	0.785	0.468	0.571	17.56
Caledonia	VT	Riverbend	0.115	0.942	0.401	0.396	0.815	13.74
Orange	VT	Riverbend	0.14	0.961	0.4	0.351	0.689	8.895
Windsor	VT	Upper Valley	0.188	0.915	0.558	0.367	0.651	8.435
Sullivan	NH	Mount Ascutney	0.12	0.92	0.363	0.379	0.594	8.2
Windham	VT	Mount Ascutney	0.104	0.932	0.467	0.364	0.638	12.74
Cheshire	NH	Wantastiquet	0.108	0.856	0.457	0.4	0.574	10.98
National Average			0.2288	0.5876	0.3932	0.4136	0.5156	4.2125

Note. The information in this table is adapted from Summers et al. 2017.

Indicator Descriptions

Risk: A product of exposure and probability of a hazard occurrence from acute climate events and natural geological and additional technological hazards and the vulnerabilities associated with the exposure.

Governance: Formal and informal coordination between, across, and beyond different sectors of public administration. The indicators are community preparedness, personal preparedness, and natural resource conservation.

Society: Human aspects of a community except for the built environment represented by demographics, economic diversity, health characteristics, labor and trade services, safety and security, social cohesion, social services, and socio-economics indicators.

Built Environment: Man-made surroundings, ranging from buildings and greenspaces to neighborhoods and cities. The indicators are community, transportation, and utility infrastructure, housing characteristics, and vacant structures.

Natural Environment: Encompasses all living and nonliving things, occurring naturally. The indicators are Extent of Ecosystem Types and Condition.

Table 3 - New Hampshire Population and School Enrollment 10-Year Change

Towns	County	Population Density Per Sq. Mi.	2019 Population	10-Yr Population Change (%)	2019 School Enrollment	10-Yr Enrollment Change (%)
Pittsburg	Coos	3	888	2.2	80	-37.0
Clarksville	Coos	4	278	4.9	ND	ND
Stewartstown	Coos	22	1,040	3.6	66	-20.5
Colebrook	Coos	57	2,323	1.0	337	-20.3
Columbia	Coos	13	779	2.9	ND	ND
Stratford	Coos	10	768	2.9	57	-47.7
Northumberland	Coos	61	2,251	-1.6	338	-10.1
Lancaster	Coos	69	3,542	1.0	407	-6.7
Dalton	Coos	35	1,001	2.2	ND	ND
Littleton	Grafton	110	5,939	0.2	660	-18.6
Monroe	Grafton	34	813	3.2	90	25.0
Bath	Grafton	29	1,114	3.4	77	30.5
Haverhill	Grafton	89	4,663	-0.7	681	-11.3
Piermont	Grafton	20	790	0.0	68	0.0
Orford	Grafton	26	1,258	1.7	201	ND
Lyme	Grafton	31	1,729	0.8	198	2.1
Hanover	Grafton	229	11,502	2.1	589	17.8
Lebanon	Grafton	341	14,079	7.1	1648	-4.6
Plainfield	Sullivan	46	2,443	3.3	223	-10.8
Cornish	Sullivan	39	1,654	0.9	104	-25.2
Claremont	Sullivan	301	13,246	-0.8	1753	-11.4
Charlestown	Sullivan	135	5,154	0.8	393	2.3
Walpole	Cheshire	105	3,863	3.5	245	0.0
Westmoreland	Cheshire	47	1,748	-6.7	135	104.5
Chesterfield	Cheshire	78	3,705	2.8	290	-12.7
Hinsdale	Cheshire	179	4,058	0.3	531	-15.8
Total			90,628	1.7	9,171	-9

Note. The information in this table is adapted from the New Hampshire OSI, 2020 and the New Hampshire Department of Education, n.d.

Table 4 - Vermont Population and School Enrollment 10-Year Change

Towns	County	Population Density Per Sq. Mi.	2019 Population	10-Yr Population Change (%)	2019 School Enrollment	10-Yr Enrollment Change (%)
Canaan	Essex	28	921	-5.2	197	-7.1
Lemington	Essex	3	96	-7.7	ND	ND
Bloomfield	Essex	6	235	6.3	ND	ND
Brunswick	Essex	4	102	-8.9	ND	ND
Maidstone	Essex	6	195	-6.3	ND	ND
Guildhall	Essex	8	248	-5.0	ND	ND
Lunenburg	Essex	29	1,326	1.8	144	15.2
Concord	Essex	23	1,211	-1.9	117	-47.8
Waterford	Caledonia	31	1,246	-2.7	155	-8.8
Barnet	Caledonia	37	1,632	-4.4	191	4.9
Ryegate	Caledonia	30	1,101	-6.2	405	-7.5
Newbury	Orange	33	2,151	-2.9	144	21.0
Bradford	Orange	90	2,701	-3.4	287	31.7
Fairlee	Orange	46	980	0.3	168	-13.4
Thetford	Orange	57	2,531	-2.2	249	23.9
Norwich	Windsor	76	3,409	-0.1	318	7.8
Hartford	Windsor	208	9,556	-4.0	1,529	-3.2
Hartland	Windsor	78	3,507	3.4	285	-3.4
Windsor	Windsor	167	3,298	-7.2	563	-4.9
Weathersfield	Windsor	62	2,736	-3.2	226	9.2
Springfield	Windsor	180	8,908	-5.0	1,213	5.2
Rockingham	Windham	118	4,981	-5.7	565	-40.9
Westminster	Windham	64	2,970	-6.5	215	-1.4
Putney	Windham	92	2,456	-9.1	192	-5.0
Dummerston	Windham	57	1,744	-6.4	165	3.8
Brattleboro	Windham	350	11,332	-5.9	1,950	-4.1
Vernon	Windham	110	2,196	-0.5	194	18.3
Total			73,769	-4.1	9,472	-4.7

Note. The information in this table is adapted from the Vermont Department of Health, 2020 and State of Vermont Agency of Education, n.d.

Appendix B - Terrapin's 14 Patterns of Biophilic Design

1. **Visual Connection with Nature:** A view to elements of nature, living systems, and natural processes
2. **Nonvisual Connection with Nature:** Auditory, haptic, olfactory, or gustatory stimuli that engender a deliberate and positive reference to nature, living systems, or natural processes
3. **Non-rhythmic Sensory Stimuli:** Stochastic and ephemeral connections with nature that may be analyzed but may not be predicted
4. **Thermal & Airflow Variability:** Subtle changes in air temperature, relative humidity, airflow across the skin, and surface temperatures that mimic natural environments
5. **Presence of Water:** A condition that enhances the sensual experience of a place
6. **Dynamic and Diffuse Light:** Leveraging varying intensities of light and shadow that change over time to create conditions that occur in nature
7. **Connection with Natural Systems:** Awareness of natural processes, especially seasonal and temporal changes characteristic of a healthy ecosystem
8. **Biomorphic Forms and Patterns:** Symbolic references to contoured, patterned, textured, or numerical arrangements that persist in nature
9. **Material Connection with Nature:** Material and elements from nature that through minimal processing reflect the local ecology or geology to create a distinct sense of place
10. **Complexity and Order:** Rich sensory information that adheres to a spatial hierarchy similar to those encountered in nature
11. **Prospect:** An unimpeded view over a distance for surveillance and planning
12. **Refuge:** A place for withdrawal, from environmental conditions or the main flow of activity, in which the individual is protected from behind and overhead
13. **Mystery:** The promise of more information through partially obscured views or other sensory devices that entice the individual to travel deeper into the environment
14. **Risk/Peril:** An identifiable threat coupled with a reliable safeguard (Browning et al., 2014).

Appendix C - Case Studies from Rural Receiving Communities and Climate Havens

Case Study: Cazenovia Welcomes Refugees in Cazenovia, New York

According to Hilligross (2017) of the non-profit Welcoming America, refugees come to the United States searching for safety and then the opportunity to become part of thriving communities. While some refugees settle in cities, others find themselves in smaller communities. In rural communities, the established population is often older than the newcomers, with newcomers contributing to the revitalization and vibrancy of an aging community. Based on analysis performed by Welcoming America, common successful strategies used by rural communities to create a safe, inclusive, and prosperous environment for refugees include building partnerships, engaging refugees in community building, focusing on positive messaging and communications, and utilizing a place-based approach.

The New York town of Cazenovia, situated at a similar latitude to our study area, has a population of 3,000 and is a remarkable case study for demonstrating the four welcoming strategies to create refugee inclusion and shared benefits.

The Importance of Building Partnerships

In 2017, the non-profit Cazenovia Welcomes Refugees (CWR) was established as a response to the global refugee crisis. A collaborative community-based initiative with diverse partnerships, the organization boasts representation from education, government, faith communities, non-profit groups, refugee resettlement organizations, civic organizations, businesses, and private citizens through a partnership with the Center for New Americans program of Interfaith Works in Syracuse (Cazenovia Welcomes Refugees, n.d.). The work of CWR directly supports newly resettled refugees and engages long-term residents to create a welcoming place for refugees to live, work, and go to school (Cazenovia Welcomes Refugees, n.d.).

Engaging Refugees in Community Building

Refugees come to the United States with unique lived experiences, knowledge, skills, and talents. Engaging refugees is critical to establishing successful projects and programs best suited to support

refugee communities. The non-profit engages with area refugees to inform further dialogue and planning. In 2019, an event featured Mr. Salat Ali, a former refugee from Somalia that graduated from Cazenovia College.

Focusing on Positive Messaging and Communications

CWR engages in positive messaging and communications with the community through their website and scheduled events aimed to foster dialogue, to bring awareness to the global refugee crisis and the difficult realities that refugees face when they come to America, and to create a safe space for refugees to share their stories and culture. The organization hosts an annual “Extending the Table” fundraiser that celebrates global friendship and local hospitality and has featured Syracuse-area refugee and immigrant chefs who prepared menus of food from their homelands in Burma, Egypt, Pakistan, Vietnam, Syria, and Palestine (Hilligross, 2017).

Utilizing a Place-Based Approach

Place-based work is described as work that “brings together residents in their local environment to address community needs by harnessing the vision, resources, and opportunities of community members” Hilligross (2017). Place-based work is done from ground up. It is people centered and long-term. CWR demonstrates place-based work by collaborating with and engaging unlikely partners, by creating volunteer opportunities, and by harnessing the unique capital of the community to facilitate housing, employment, school, and health care opportunities for refugees (Hilligross, 2017).

Case Study: Cincinnati, Ohio Resilience Planning for a Climate Haven

Cincinnati, Ohio is a city of approximately 300,000 that has declined significantly from its peak population in 1950 due to a decline in manufacturing (Malo, 2019). Across Hamilton County, where Cincinnati is located, there are approximately 40,000 vacant housing units (Malo, 2019). There is a desire in the City for it to return to a former state of economic vitality, reminiscent of its industrial past. The City has also become aware that it may be a climate haven. Moody's Investor Service ranked the state of Ohio third on the list of states that are the least threatened by climate change (Cincinnati Green Plan, 2018). Migration systems demonstrate there are existing pathways from places greatly at risk from climate change impacts such as the southeast. In 2005, in the aftermath of Hurricane Katrina, Ohio received migrants from the Louisiana and Florida area (Malo, 2019).

Today, Cincinnati prepares to be a climate haven, committing to leveraging its climate resilience to attract new businesses and residents. The mayoral office commits to developing a welcoming, sustainable, equitable, and resilient city. The updated Green Cincinnati Plan (2018) provides a vision and a roadmap to guide this transformation. The city has engaged a broad group of stakeholders and conducted outreach with community residents in more than one language to foster an inclusive process for creating the plan, goals, and recommendations.

The city of Cincinnati identified eight key focus areas that are critical to becoming a sustainable, equitable, and resilient city. The key focus areas are the Built Environment, Education & Outreach, Energy, Transportation, Food, Natural Systems, Waste, and Resilience. The city is committed to a three-pronged approach: leading by example, building support and partnerships, and measuring performance. For each recommendation, the keys to an equitable outcome are identified. The city of Cincinnati's approach aligns with the four integrative frameworks utilized for this report. The following pages outline examples of how the city's commitments align with these frameworks.

Equitable Climate-Preparedness

Two of the three resilience goals are to improve disproportionate climate impacts experienced by marginalized groups. The first is a 50 percent decrease in childhood asthma-related hospital admissions in target neighborhoods and to reduce disparities between neighborhoods. The second goal is to prevent any increase in storm or heat related fatalities (Cincinnati Green Plan, 2018).

Typically, the annual death rate from weather conditions is three times higher for Black people than White. One recommendation of the Cincinnati Green Plan (CGP) includes developing an Environmental Justice program that identifies communities that are disproportionately burdened by pollution such as hazardous waste and to take steps to reduce or eliminate those burdens (Cincinnati Green Plan, 2018). The city also intends to create neighborhood vulnerability assessments and a heat-island map. Although the Cincinnati Green Plan (CGP) demonstrates a commitment to climate equity through its preparedness planning, it is not readily apparent if the approach to climate preparedness and resilience is community driven? This may be an area for further research and continual improvement.

Smart Growth

Smart growth is an approach to development that encourages a mix of building uses and types, diverse housing and transportation, and infill to prevent urban sprawl and environmental degradation. The CGP demonstrates a commitment to smart growth through its Built Environment and Transportation goals. These goals include increasing neighborhood density and diversity of incomes, increasing the amount and connectivity of alternative modes of transportation, and to disincentive parking lots and dedicate these spaces to grow food and to adding green spaces.

Biophilia and Green Blue Infrastructure

Mounting evidence shows that humans are happier, healthier, and more productive when we have nature nearby (Beatley, 2016). There is also mounting economic evidence that shows incorporating nature into urban environments has significant benefits and financial returns. The CGP embraces aspects of biophilia evidenced by commitments to ensure all residents have access to 30 percent tree canopy and to a

park or outdoor recreation site within a 10-minute walk. In accordance with blue green infrastructure practices, the city intends to increase wetlands to mitigate against flooding and flood damage, to increase the practice of low impact design, and to increase the amount of storm water holding capacity using green infrastructure and natural systems (Cincinnati Green Plan, 2018).

Welcoming Standard

The city convened with Hispanic communities to engage in resilience planning. The community shared the need for improved bus routes to Hispanic communities, creating a Spanish language communication tree to alert people in the event of a disaster or emergency, and to support the development of immigrant-run green businesses. Suggestions also included tapping into existing skills and strengths of the Hispanic community in areas like food cultivation and construction that can be utilized to implement resilience initiatives (Cincinnati Green Plan, 2018). The CGP includes a goal to develop multilingual communication networks for disseminating disaster and emergency risks and recommendations.

Although not explicitly addressed in the CGP, the Cincinnati Compass was established in 2016. The Cincinnati Compass is a nonprofit that is a collaboration between government, university, and over 60 community partner organizations that believe immigrants are essential contributors to a healthy economy and a vibrant community (Cincinnati Compass, n.d.). Cincinnati Compass is part of a larger Midwest network called the Welcoming Economies Global Network (WE Network). The NE Network became part of the Welcoming America nonprofit in 2014 and it aims to make the Midwest a destination for people from around the globe.

Cincinnati has identified itself as a climate haven and is leveraging its future climate and risk as a means of drawing people to the area and to transitioning to a sustainable, equitable, and resilient city. Cincinnati is embracing a holistic approach to Community Resilience planning as is evident through the commitments of the CGP and to being a welcoming city for migrants with a focus on refugees and immigrants. For additional examples of CGP goals and recommendations, refer to Table 1

Table 1 Cincinnati Green Plan Goals and Recommendations

Focus Areas	Goals	Recommendations	
Built Environment	Decrease Household Energy Burden by 10%	Create a Sustainability District	
	Make all city facilities, operations, and fleets carbon neutral by 2025	Encourage population density and transit-oriented development in appropriate locations through zoning and incentives.	
	Increase Percentage of City Streets Meeting Complete Streets Requirements (1% each year)	Improve City facilities by investing in energy efficiency	
			Encourage development of high-performance buildings
			Incorporate complete street principles in all new roadway and rehabilitation projects
			Target multi-family properties for energy efficiency improvements
			Require all new City facilities to be LEED Silver certified or better
			Develop a plan to return vacant buildings to productive use
		Require/incentivize Low Impact Development for new developments and infrastructure	
		Plan to phase out HVAC systems using R-22	

Education & Outreach	Register 100 organizations in a green business/neighborhood Certification Program	Install solar panels on Cincinnati Public Schools facilities	
	Establish \$1M in a green fund to advance sustainability initiatives	Outreach to multi-family buildings to educate residents of sustainability programs and benefits.	
	Increase by 10% the number of city residents that can name actions they are doing to promote sustainability	Create a "Green Cincinnati Fund" to finance sustainability initiatives.	
		Develop a Green Business/Neighborhood Certification Program	
		Expand workforce development opportunities, with an emphasis on students and low-income residents, through a City-University-Corporate Partnership for Education and Training	
		Create branding and communication strategy for Cincinnati sustainability efforts	
		Identify partners to lobby state government on sustainability issues	
		Build partnerships with existing business incubators to include sustainability training	
Expand environmental education and experiences for CPS students and others			
Energy	100% Renewable Energy for City Government by 2035	Increase outreach to and participation of industrial customers in renewable energy and energy efficiency projects	

	Triple Energy Renewable Generation for Residents and businesses	Expand programs to increase energy efficiency and solar energy generation for the private market (i.e. Solarize, PACE financing)
	Reduce Energy Consumption 2% annually	Increase renewable energy generation for use by City Government
		Improve access to financing for energy efficiency and renewable energy, especially for low-income households
		Implement mandatory energy benchmarking ordinance
		Purchase renewable energy credits (RECs) for City operations
		100% LED Streetlights
		Increase battery storage capacity
Promote State policies that encourage energy efficiency and renewable energy		
Food	100% of Residents Have Convenient Access to Healthy, Affordable Foods	Encourage individuals and companies to prevent, recover, and recycle wasted food
	Reduce Food Waste 20% by 2025	Promote understanding of the impact of dietary choices and benefits of a plant-based diet
	Triple Acreage of Urban Food Production	Create policies and support programs that encourage urban agriculture
	Double the Number of Residents Consuming Local Foods	Increase the public and private land used for local food production

	Double the Number of People Eating Plant Based Diets	Encourage the development and utilization of food hubs, and increase the distribution and processing of locally, sustainably produced foods
		Support and expand programs that make healthful foods more affordable for vulnerable populations
		Encourage and support development of local food system entrepreneurs to increase production and distribution of locally produced foods
		Support strategies for ensuring food security in ALL communities throughout Cincinnati
		Encourage purchasing of healthy, sustainable foods by major institutions
Natural Systems	Attain 100% of US EPA National Ambient Air Quality Standards	Implement water loss control program to reduce water loss due to leakage
	Increase City-Wide Tree Canopy Coverage to at Least 40%, Ensure all Residential Neighborhoods have Access to 30%	Increase tree canopy and access to greenspace
	Meet EPA Recreational Water Quality Criteria in 90% of waterways, 90% of the time	Create and expand wetlands
	Have a Park Outdoor Recreation Site Within a 10-minute walk of Every Resident	Develop a carbon offset program to fund tree planting efforts
		Decrease the acreage of mowed grass and replace with bushes and trees

		Increase the amount of storm water holding capacity using green infrastructure and natural systems
		Develop an Air Quality Action Plan
		Conduct Biodiversity assessment for Cincinnati
Resilience	50% Decrease in Child Asthma-Related Hospital Admissions in Target Neighborhoods. Reduce Disparities between Neighborhoods	Launch campaign to reduce childhood asthma rates in Cincinnati
	No increase in storm or heat related fatalities	Develop multilingual communication network for disseminating risks and recommendations in the event of emergency (i.e. Rave Alert)
	No Increase in Storm Remediation Costs	Conduct a Neighborhood Vulnerability Assessment
		Climate Haven – Leverage climate resilience to attract new business and residents
		Encourage onsite stormwater retention and infiltration and discourage runoff by restructuring sewer and/or stormwater fee
		Conduct an Urban Heat Island Assessment
		Implement renewable backup power systems for areas of refuge and emergency facilities (911 center, recreation centers, hospitals)
		Educate the public to reduce harms from intense storms and heat waves

		Require occupied residential rental units to have one air-conditioned room
		Continue to develop and expand Metropolitan Sewer District's smart sewer SCADA system
		The City should develop an Environmental Justice program that identifies communities that are disproportionately burdened by pollution (and hazardous wastes), and acts to reduce or eliminate those burdens
Transportation	Decrease the Consumption of Fossil Fuels by 20%.	Prepare for the adoption of autonomous vehicles, starting with a pilot project
	Increase Passenger Miles Travelled Via Public Transit by 25% by 2035.	Encourage the use of electric vehicles through City programs that incentivize EV ownership and infrastructure
	Double Lane Miles of Bike Infrastructure	Pursue car sharing service in Cincinnati as an equitable mobility solution
		Green the Fleet: Improve the fuel efficiency of the City's Fleet
		Encourage corporate sponsorship of transit passes and infrastructure to encourage employee bus and bikeshare ridership
		Improve neighborhood walkability, by improving sidewalk connectivity and pedestrian safety, especially in low-income neighborhoods
		Enforcement & legislative support for bike & pedestrian safety

		Enhance public transit and increase transit funding
		Increase connectivity and cohesion within multimodal transportation options
		Create a transit link between Downtown and Uptown
		Implement and update 2010 Cincinnati Bike Plan and Cincinnati Riding or Walking Network (CROWN) Plan
		Continue to support Red Bike (bike share) as an equitable mobility solution
Waste	Zero Waste by 2035.	Incentivize recycling and increase cost of trash generation to encourage diversion from landfill
	Decrease (Residential) Tonnage to Landfill by 20%.	Divert organics from the landfill
	Increase Participation in City Curbside Recycling Programs by 5% For Residential and 20% for Commercial	Attract credible manufacturers that make products from recycled materials to increase the types of materials that can be accepted in curbside recycling program
		Advertising and outreach to improve recycling rates - spending \$1/household/month - Focus efforts on currently lower performing communities
		Create recycling and reuse outlets to recycle items that cannot be accepted by the curbside program
		Implement a special event recycling program. Require recycling at any events that require a City permit
		Install public recycling receptacles in neighborhood business districts

		Implementation of a fee or ban to discourage use of single-use bags
		Improve recycling and waste reduction in City facilities
		Conduct waste audit to understand the changing composition of our waste stream

Note: This table is adapted from Cincinnati Green Plan, 2018.

Appendix D - Suitability Criteria

The above report outlines planning recommendations for three categories of designated growth areas. These growth areas, inspired by the Vermont State community designations and adapted to include migration-specific considerations, include Low-Density Rural, Compact Centers, and Receiving Communities/Climate Havens. In order to identify which regions and communities of The Connecticut River Valley are best suited for each of these designations, we identified two sets of suitability criteria intended to inform a spatial suitability model to be run in ArcGIS or similar programs. The first set of criteria identifies preferable criteria for compact centers and receiving communities. The key difference between compact communities and receiving communities being degree of social services, with receiving communities containing the highest degree of social services. The second set of criteria identifies regions best suited for low-density rural communities, with a focus on conserving and expanding the working-lands economy of agriculture and forestry. These criteria are intended to act as an aid in conducting the [suitability modeling workflow](#), as outlined by ArcOnline.

Criteria 1: Compact Centers and Receiving Communities/Climate Havens

Goal	Ideal Criteria
Infill of existing Infrastructure	Brownfields, Empty Lots, Vacant Buildings, Public Utilities (under-capacity), Previously Disturbed Land
Existing Social Services	Medical, Social, Food Assistance, Senior Services, Public Transport
Compact	Building Density
Job Opportunities	Diversity of Jobs Available
Affordability	Low Rent Rates, Low Cost of Living
Accessibility	Multi-modal, Public Transport
Mixed Land Use	Proximity from one land use type to another
Population Equilibrium	Decreasing Population (most ideal), Level Population (ideal)

Layer 2: Low-Density Rural Growth

Goal	Ideal Criteria
Habitat Continuity	Contiguous Forest
Watershed Protection - Runoff	Low Impervious Surface
Watershed Protection - Buffer	(specific distance) from shore
Flood Protection	Outside of 500-yr floodplain
Agricultural Preservation	Not on Ag Land Not on Prime Ag Soil
Erosion Control	Not on steep slopes - greater than or equal to 15%
Sacred Indigenous Land	Not on Sacred Land
Aesthetic Preservation	Not in ideal viewsheds
Historic Preservation	Proximity to historical and cultural resources
Not in Existing Conserved Land	Outside of Conserved Land

Appendix E - Resources for Planners

Agriculture

[Black farmers seek to put down new roots in New England - The Boston Globe](#)

Blue-Green Infrastructure

[Banking on Green \(nacto.org\)](#)

[The Real Cost of Green Infrastructure \(wef.org\)](#)

[Stormwater Report \(wef.org\)](#)

[Water Environment Federation](#)

Brownfields

[Brownfields and Land Revitalization in Region 1 | Brownfields | US EPA](#)

[Brownfields Program | Department of Environmental Conservation \(vermont.gov\)](#)

Case Studies

[Examples of Smart Growth Communities and Projects | Smart Growth](#)

[Smart Growth Self-Assessment for Rural Communities: Madison County | Smart Growth | US EPA](#)

Climate Resilience

[Climate Smart Certification Report \(ny.gov\)](#)

[Smart Policies for a Changing Climate](#)

Displacement

[IDMC | GRID 2020 | Global Report on Internal Displacement 2020](#)

[The United-States Climate Change Relocation Plan](#)

Flood Resilience

[Flood Ready Vermont](#)

Grants

[Brownfields Initiative | Agency of Commerce and Community Development \(vermont.gov\)](#)

[EPA Smart Growth Grants and Other Funding | Smart Growth](#)

Housing

[Community Land Trusts | Lincoln Institute of Land Policy](#)

[The Housing Affordability Toolkit \(nmhc.org\)](#)

[Housing Policy Guide \(planning.org\)](#)

[Inclusionary Housing - Resources for Inclusionary Zoning Programs, Policies and Practice](#)

[Preserving, Protecting and Expanding Affordable Housing \(kresge.org\)](#)

[When Nowhere Becomes Somewhere: Gentrification in Rural Communities \(uky.edu\)](#)

Indigenous Affairs

[New Hampshire Commission on Native American Affairs](#)

[History and Culture: Indian Religious Freedom Act - 1978 - Northern Plains Reservation Aid](#)

[Indigenous New Hampshire](#)

[Vermont Commission on Native American Affairs](#)

Land Use

[Conserving Vermont's Natural Heritage](#)

[Innovative Land Use \(NHDES\)](#)

[Neighborhood Development | Leadership in Energy & Environmental Design](#)

[Putting Smart Growth to Work in Rural Communities | Smart Growth | US EPA](#)

[Rural Design Guide](#)

[Smart Growth Self-Assessment for Rural Communities | Smart Growth | US EPA](#)

[Farmlands and Communities - Broadening the Vision for New England \(wildlandsandwoodlands.org\)](#)

Regional Standards and Designations

[Energy Standards Overview](#)

[State Designation Manual](#)

[State Designation Benefits Overview](#)

[TRORC.org](#)

Glossary

Adaptive Management - A systematic and evolving process for improving the effectiveness of natural resources management by learning from experience and utilising current knowledge and data to inform further decision-making over time (Brears, 2018).

Affinity Migration - Occurs by populations with ample resources who proactively move out of a non-ideal living environment (Bose, 2018).

Afforestation - Planting trees in new areas (Angus et al., 2020).

Climate Haven - There is no standard definition for this term. It generally refers to a place that is considered a haven to people migrating due to climate change.

Disturbance Migration - Disturbance migration results in both affinity migration and forced migration (Bose, 2018).

Eutrophic - Relates to water resource's trophic state. If the water resource is eutrophic, it has high nutrients and generally sees high plant or phytoplankton growth (DEC, n.d.).

Forced Migration - occurs without planning, often in response to an acute disturbance such as a natural disaster or political danger, and is undergone in order to survive a potentially mortal threat (Bose, 2018).

Green Streets - "Green streets incorporate nature-based solutions and green infrastructure elements such as trees and vegetation that help connect and integrate the natural and built environments while reducing urban heat island and other climate-related impacts" (Angus et al., 2020).

Mesotrophic - is a water resource with a trophic state that falls somewhere in between eutrophic and oligotrophic (DEC, n.d.).

Oligotrophic - is a water resource that has low nutrient concentrations and generally low plant growth (DEC, n.d.).

Biophilia - The innately emotional affiliation of human beings to other living organisms (Beatley, 2016).

Blue-Green Infrastructure - “A planned network of natural and semi-natural areas that utilise natural processes to improve water quality and manage water quantity by restoring the hydrological function of the urban landscape and managing stormwater” (Brears, 2018).

Receiving Communities - The communities where immigrants settle.

Resilience - The capacity of a system to absorb, utilize, and even benefit from perturbations. and changes, and thrive without a qualitative change in the system’s structure (Beatley, 2016).

Urban Heat Island - “The urban heat island effect is a measurable increase in ambient urban air temperatures resulting primarily from the replacement of vegetation with buildings, roads, and other heat-absorbing infrastructure. The heat island effect can result in significant temperature differences between rural and urban areas” (EPA, 2009).

Abbreviations/Acronyms

CGP - Cincinnati Green Plan

CRJC - Connecticut River Joint Commissions

CRSI - Climate Risk Screening Index

DHHS - Department of Health and Human Services

GDP - Gross Domestic Product

NHDHHS - New Hampshire Department of Health and Human Services

SLR - Sea Level Rise

UMRW - Upper Merrimack River Watershed

USGS - United States Geological Survey

VHFA - Vermont Housing Finance Agency

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