

Sullivan County Resiliency Plan

# Resilient Sullivan



Department  
of State



# ACKNOWLEDGEMENTS

## **Sullivan County Legislature**

Matt McPhillips, District 1  
Nadia Rajs, Chair, District 2  
Brian McPhillips, District 3  
Nicholas Salomone Jr., District 4  
Catherine Scott, District 5  
Luis Alvarez, District 6  
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Terry Blosser-Bernardo, District 9

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Town of Callicoon  
Town of Cohecton  
Town of Delaware  
Town of Fallsburg  
Town of Forestburgh  
Town of Fremont  
Town of Highland  
Town of Liberty  
Town of Lumberland  
Town of Mamakating  
Town of Neversink  
Town of Rockland  
Town of Thompson  
Town of Tusten  
Village of Bloomingburg  
Village of Jeffersonville  
Village of Liberty  
Village of Monticello  
Village of Woodridge  
Village of Wurtsboro

## **Resilient Sullivan Advisory Committee**

Non-Profit Organizations  
Catskill Mountainkeeper  
Delaware Highlands Conservancy  
Friends of the Upper Delaware  
Sullivan 180

## **County Agencies**

Sullivan County Soil and Water  
Conservation District  
Cornell Cooperative Extension  
Sullivan County

## **Sullivan County Chamber of Commerce**

Sullivan County Industrial  
Development Agency  
Sullivan County Partnership for  
Economic Development  
Sullivan County Visitors Association  
Utility  
New York State Electric and Gas  
(NYSEG)

## **Sullivan County Personnel**

Joshua Potosek, County Manager

SC Division of Planning, Community  
Development and Environmental  
Management  
Heather Brown, Commissioner

SC Division of Public Works  
Ed McAndrew, Commissioner

SC Division of Community Services/  
Workforce Development Board  
Laura Quigley, Commissioner

SC Division of Public Safety  
Scott Schulte, Commissioner

SC Division of Health and Human  
Services  
John Liddle, Commissioner

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**Department  
of State**



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(MUD) Workshop

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**METROPOLITAN  
URBAN  
DESIGN  
WORKSHOP**

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With:  
Urbanomics  
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# FOREWORD

Resilience has become an umbrella term for the planning and design strategies needed to help communities meet the economic, social, and environmental challenges of the future. Climate change and the increasing frequency of extreme weather events associated with it are the challenges most associated with the concept of resiliency and generally take a prominent position in any resiliency plan. However, resilience can be applied to the broad array of community concerns typically addressed in a comprehensive plan. In developing its own resiliency plan, it has been Sullivan County's intent that the Plan address the economic, social, and environmental resilience of its communities.

Sullivan County embarked on the development of Resilient Sullivan in 2022. Throughout this process we have gained a new understanding of the unique assets of Sullivan County, how far we've come, and how we can meet the challenges of the 21st century. With the steady guidance of our consultant, Metropolitan Urban Design Workshop and their project team, Resilient Sullivan has developed as a living document that will evolve over the coming years, while providing a strong framework for current leaders to reference as they guide our communities and navigate the challenges ahead.

Building a resiliency plan for the County has required a clear-eyed analysis of current strengths and challenges, and a deep recognition of the connections between environmental, economic and community well-being as we identify immediate needs and long-term strategies for stability across five broad topic areas: Housing; Farming and Farmland; Natural Resources; Food, Jobs, Health & Services; and Utilities – including emergency services, telecommunications, and looming near-term challenges like waste management and ensuring water quality. The recommendations in the plan build upon current efforts and introduce innovative new strategies for deeper collaborations between government agencies and with our dedicated community partners.

The process has reflected an intense love of this place we call home – from the generous participation of the Advisory Committee members to the information and suggestions received from County residents through community meetings and online tools designed to collect public comment. To all who participated in this process, thank you for your time, your commitment and your thoughtfulness.

And finally, Sullivan County extends its gratitude to the New York State Department of State, which provided the funding under Title 3 of the Environmental Protection Fund to create this plan, as well as a team of dedicated individuals to assist us in this process.

Warmest regards,



Heather Brown, Commissioner  
Sullivan County Division of Planning, Community Development &  
Environmental Management







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# Chapter 1

## Introduction

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## INTRODUCTION

Ranging from the Delaware River in the South and West to the Catskill Mountains in the North and the Bashakill Wetlands in the east, Sullivan County has been granted natural bounty unique in New York State. Throughout its history, Sullivan County has been renowned for this natural wealth, and has long been a destination for weekenders, tourists, and seasonal residents alike. These resources also benefit the permanent residents of Sullivan County and the surrounding region, cleaning the air and water, providing a canvas for reflection and recreation, and supporting the local economy.

While the effects of the global pandemic and recession are still felt in Sullivan County, the county has entered a new era of optimism and growth as exemplified by the groundswell of new residents and businesses arriving in the county. This plan represents a commitment to protect the existing strengths of Sullivan County, while harnessing the opportunities presented by new growth.

Today, Sullivan County is faced with an emerging set of threats and challenges related to climate change, public health, technology, and population growth. By positioning the county to address these challenges, Sullivan County can accommodate growth while maintaining its unique character, carving a path towards a prosperous and sustainable future.

## PURPOSE

The Sullivan County Resiliency Plan seeks to prepare Sullivan County to address emerging challenges facing the county by focusing on resiliency from the perspective of the economy, the community, and the environment. **Economic resiliency** describes the ability of the county's economy to withstand financial, social, environmental, and physical challenges to ensure a sustainable livelihood and opportunities for residents of Sullivan County. **Community resiliency** describes the ability of the county to ensure the health and well-being of all its residents, including and especially for vulnerable populations. In an era of increasing extreme weather risks and vulnerabilities, **environmental resiliency** describes the ability of man-made and natural systems to withstand environmental challenges such as climate change and severe weather events.

Over the last 30 years, gradual environmental change and the resulting increase in frequency and severity of extreme weather events has led to the development of chronic issues challenging Sullivan County, including aging infrastructure, frequent power outages, and increasing floods and extreme weather events. Seven of the 21 municipalities in Sullivan County have reported an increased frequency and intensity of floods in the last 5 – 10 years, with heavier cloudburst events leading to previously unprecedented flood patterns. Increased frequency of utilities and telecommunications outages would be catastrophic for communities as well as the prominent healthcare industry.

On the other hand, examining Sullivan County's resources through the lens of resiliency highlights the existing strengths and myriad opportunities that the County can embrace in the face of resiliency challenges. From the County's fertile soils, high water quality and spectacular natural landscapes to the county's dedication to the preservation of the ecological and social character, Sullivan County can take up the mantle in providing resources within a domestic and regional context.



## VISION AND GOALS

Five goals and supporting strategies determined over several interviews, working sessions, and engagement with County Staff, not-for-profit organizations active in the County, Municipal Leaders, Civic Leaders, and residents and workers in Sullivan County, set the roadmap for the County's Resilience over the coming decade. These goals include:

- **Ensure housing availability and affordability by supporting strategic growth in Sullivan County that avoids sprawl and promotes safe, walkable communities.**

Sullivan County needs more housing options at affordable rates to support economic growth. However, it also needs to take steps to avoid sprawl and inefficient land use which strains infrastructure and threatens natural resources. This goal discusses strategies for compact and targeted growth that can bolster housing stock while also protecting natural resources and providing housing options for residents.

- **Ensure the economic viability of farmland conservation by supporting farmland owners, and agriculture and associated activities.**

Small farms in Sullivan County provide many benefits, including economic diversity, open space, and food access. This goal discusses strategies to ensure that small farms and farm owners can address challenges such as, invasive species, real estate pressure, lack of economies of scale, and a need for succession planning, and protect their existing farmland into the future.

- **Improve access to healthy food, healthcare, jobs, and emergency services.**

Given the County's low population densities and "spread-out" development pattern, access to food, healthcare, jobs, and emergency services is primarily through automobiles. This significantly impacts the quality of life of residents without cars and the means to travel large distances for basic conveniences. In addition, vulnerable (and low-income) populations residing in areas that frequently get affected by road blockages related to flooding, downed trees, and aging infrastructure also find it challenging to access jobs and basic needs during such incidence.

- **Recognize and protect the role of natural infrastructure both as an economic driver and ecological resource in Sullivan County.**

Largely made up of forests, wetlands, lakes, and open space, Sullivan County's natural landscape functions as an integrated infrastructure system providing essential ecological services to residents including filtering air and water, supporting agriculture and tourism industries, and sustaining biodiversity and natural beauty, among others. However, in recent years, extreme weather incidences, real estate pressures resulting in forest fragmentation, and invasive species threaten to disrupt these important ecological resources. Strategies supporting this goal highlight recommendations and best practices to protect and enhance Sullivan County's natural resources and systems.

- **Ensure access to quality and reliable electrical, telecommunications, and internet utilities throughout the County, and prepare for emerging challenges by modernizing both water and solid waste infrastructure.**

In light of changing weather patterns, population growth, and water and waste management infrastructures being overburdened, it is imperative to address the reliability of essential utilities such as electricity, telecommunications, and internet in Sullivan County. The strategies aim to create access and enhance utilities to meet emerging challenges and foster sustainable growth and revitalization within the County.



## PLANNING PROCESS

The Sullivan County Resiliency Plan is the culmination of work by people from across multiple sectors, council boundaries and community groups, coming together to consider a shared question: what can we do to protect and improve the lives of Sullivan County residents, now and in the future? This plan has been developed with the support of New York State Department of State, in collaboration with a consultant team led by MUD Workshop. The planning team engaged both an advisory committee and the community at large through a series of interviews, meetings, workshops, and digital tools to understand existing conditions and to prioritize the current issues and challenges facing the County. The team then developed a series of distinct, yet connected, actions that will help make Sullivan County a viable, sustainable, livable and prosperous County, long into the future. This document will be adopted by the Sullivan County Legislature to help guide future decision making processes as the County addresses the challenges of the future.

## USING THE PLAN

Resilient Sullivan considers five topics that impact quality of life and resiliency in Sullivan County: Land Use & Zoning, Socioeconomic Characteristics and Economy, Natural and Ecological Resources, Infrastructure Systems, Transportation. The plan then analyzes each topic from the perspectives of environmental, community and economic resiliency. This analysis informs strategies and recommendations that foreground preemptive actions, crisis preparedness, and foresight in decision-making. For example, parameters for new locations of development were created based on environmental risk analysis and the existing built environment characteristics specific to municipalities. The Plan also highlights Sullivan County's existing strengths and assesses the valuable contributions they make to the resiliency of the county in the face of environmental, community and economic challenges.

As part of Resilient Sullivan, additional resources beyond the Resiliency Plan document are available, including an interactive website, that will serve as continued platforms to keep residents and stakeholders up to date on the progress of resiliency strategies projects.



# Chapter 2

## Community Engagement

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## OVERVIEW

Over a fourteen-month period from October 2022 to November 2023 Sullivan County and the consultant team engaged with members of the public in a series of advisory committee meetings, workshops, stakeholder interviews, and conversations to develop and shape a vision for the County's environmental, community and economic resilience.

The outreach strategy was developed to provide an overview of the methods and tools, communication dissemination, and timeline for all stakeholder and community events and meetings. During these engagements, participants had the opportunity to review and define the vision, goals, and strategies for the Sullivan County Resiliency Plan.

The engagement strategy was conceived and designed with the following goals and objectives:

- Work with the County and members of the Advisory Committee, to develop and shape a County-wide resiliency plan and its implementation pathway.
  - Directly reach out to County residents through existing County-wide engagements and gather their input on developing a cohesive vision for the County's future in resilience.
  - Develop tools and technologies for conducting engagement in an efficient manner, while respecting the needs and capacities of the County and Advisory Committee members.
  - Solicit feedback from County Agency leads on key climate risks and alternative scenarios with impactful, nimble, and targeted communication.
  - Increase awareness of and knowledge around extreme weather events.
  - Build a shared digital repository of educational materials that can guide resiliency, planning, and development efforts in each municipality.
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## OUTREACH STRATEGY

The Resilient Sullivan outreach strategy outlined multi-tiered engagement, timeline, communication methods and engagement techniques to gather feedback from County agencies, public, private, civic, and not-for-profit organization, and residents. The engagement techniques ranged from one-on-one interviews focusing on specific topics / organizations, presentations at community events, working sessions with the Advisory Committee, and a robust digital platform with community resources, an interactive mapping tool, visioning board and other resources, for a wider reach.

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## ADVISORY COMMITTEE

The Advisory Committee (AC), comprised of representatives from municipalities, County agencies, and public, private, civic, and not-for-profit organizations, were a part of the core project team guiding the development of the Resiliency Plan. AC meetings and workshops provided the setting to identify and address the impacts of extreme climate events, forge partnerships between different communities, and brainstorm ways to make the delivery of public services more resilient. To engage the AC, the consultant team hosted a series of meetings/workshops and conduct one-on-one interviews to better understand the individual needs of each AC member and the communities they represent.

### Kick-Off Meeting

The kick-off meeting held on September 29th, 2022, was the first in the series of AC meetings and workshops. The County introduced the project and outlined the goals of the Sullivan County Resiliency Plan. Following this, the consultant team



presented the work-plan, outreach strategies, and an overview of existing studies, setting the stage for workshop activity to prioritize resiliency plan objectives and discuss key takeaways from existing studies.

The kick-off workshop activities featured two online brainstorming exercises: one focused on resiliency priorities across environmental, economic, and social aspects, while the other examined the impact of extreme weather events on each of the municipalities. Main takeaways included concerns about culvert maintenance, the impact of development on natural resources, heat-related issues affecting tourism and public health, challenges with water temperature affecting the fly-fishing industry, and electricity infrastructure readiness for future demands.

### Advisory Committee Meeting 2

The second AC meeting was held on May 17th, 2023. The meeting aimed to provide project updates, introduce the Resilient Sullivan initiative's vision and goals across various sectors like housing, farms, infrastructure, transportation, and utilities, followed by an interactive visioning workshop to gather input.

The vision wall exercise highlighted key themes including the need for more housing to accommodate workers, support for farms supplying produce at farmer's markets, concerns about the frequency of flooding, and discussions on real estate pressure and infrastructure development.

### Advisory Committee Meeting 3

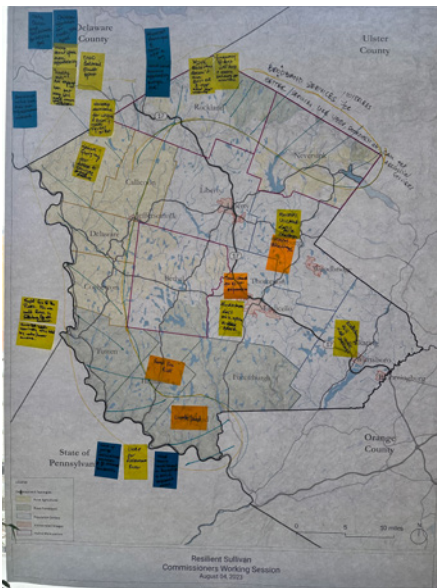
The final AC meeting was held on October 26th, 2023. The goal of the meeting was to present recommendations and key strategies, facilitate a working session for feedback on the digital vision board, and discuss next steps in refining draft recommendations for the Resiliency Plan. AC members had the opportunity to provide input, which consultants incorporated into the final draft recommendations.

The feedback on the overarching goals covered several key areas. For housing, concerns were raised about the need for smart development, affordable housing, and addressing homelessness. Farming discussions focused on apprenticeships, housing needs for farmers, and farmland conservation. Food, jobs, health, and services were highlighted, emphasizing the critical need for funding and addressing transit deserts. Natural resources discussions included funding opportunities,

Sprouting Dreams Farm Site Visit I  
MUD Workshop







Notes from the Commissioners Working Session

updating mitigation plans, and prioritizing areas for protection. In terms of utilities, water infrastructure and the transition to electric vehicles, were top priorities.

## ONE-ON-ONE INTERVIEWS

The consultant team conducted over 16 interviews with civic leaders, municipal leaders, not-for-profit organizations, and for-profit organizations. These interviews provided key insights into opportunities, issues and system deficiencies in addressing these issues.

## FARM VISIT

The consultant team went on a farm visit and spoke to various farmers, government, and community-based groups over the course of two days from August 3-4th, 2023. The team toured Sprouting Dreams Farm with Co-owner Eugene Thalmann on his 12-acre vegetable and microgreens farm in Liberty. Additionally, the team visited the Cornell Cooperative Extension located in Liberty and spoke to Agriculture Production Program Manager Michelle Proscia to learn about the research initiatives and programs they run in Sullivan County. The team also went on a walking and driving tour of the Village of Monticello with members of the Sullivan County government to learn about the growth of Broadway Street in Monticello. The team then drove through Jeffersonville to see and learn more about the flood mitigation plan and new development in Liberty.

## WORKING SESSION WITH COUNTY LEADERS

A working session with Sullivan County Commissioner's was held on August 4th, 2024. The purpose of this meeting was to discuss and refine the vision and goals through a mapping workshop that asked about priority locations, development opportunities, and strategies that can support funding and partnerships in the County.

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## DIGITAL ENGAGEMENT

### Resilient Sullivan Website

The Resilient Sullivan website – [www.resilientsullivan.com](http://www.resilientsullivan.com) – was a resource for community members to learn about and engage in the planning process and development of the Resiliency Plan. The website provided information on resiliency, draft project deliverables for feedback, engagement tools, and ways to provide feedback outside of planned engagements.

### Digital Mapping Tool

An interactive mapping tool featured on the Resilient Sullivan website facilitated engagement from participants, encouraging them to interact with a map of Sullivan County and its 21 municipalities. Through methods such as photo uploads, written descriptions, voting, and discussions, community members shared their observations and experiences regarding economic, environmental, and social resilience. By pinpointing locations affected by challenges such as flooding, invasive species, infrastructure issues, and development, participants provided valuable insights to inform the county's resilience planning efforts.

## Municipal Resources



## KEY STAKEHOLDERS

### Towns

- Town of Bethel
- Town of Callicoon
- Town of Cohecton
- Town of Delaware
- Town of Fallsburg
- Town of Forestburgh
- Town of Fremont
- Town of Highland
- Town of Liberty
- Town of Lumberland
- Town of Mamakating
- Town of Neversink
- Town of Rockland
- Town of Thompson
- Town of Tusten

### Villages

- Village of Bloomingburg
- Village of Jeffersonville
- Village of Liberty
- Village of Monticello
- Village of Woodridge
- Village of Wurtsboro

### Agencies and Organizations

- SC Visitors Association
- SC Chamber of Commerce
- SC Partnership for Economic Development
- Cornell Cooperative Extension
- Soil and Water Conservation District
- Sullivan Renaissance
- Sullivan 180
- Delaware Highlands Conservancy
- NYSEG
- SC IDA
- Friends of the Upper Delaware
- Catskill Mountain Keeper

The consultant team prepared a repository of key information including socio-economic characteristics, housing, land use, employment, extreme weather incidence, etc., for each municipality. This information was packaged into “municipal fact sheets” which included land cover maps for each municipality. Communities could use these fact sheets to access information about the areas they lived and worked in, and use it as a baseline to provide additional feedback.

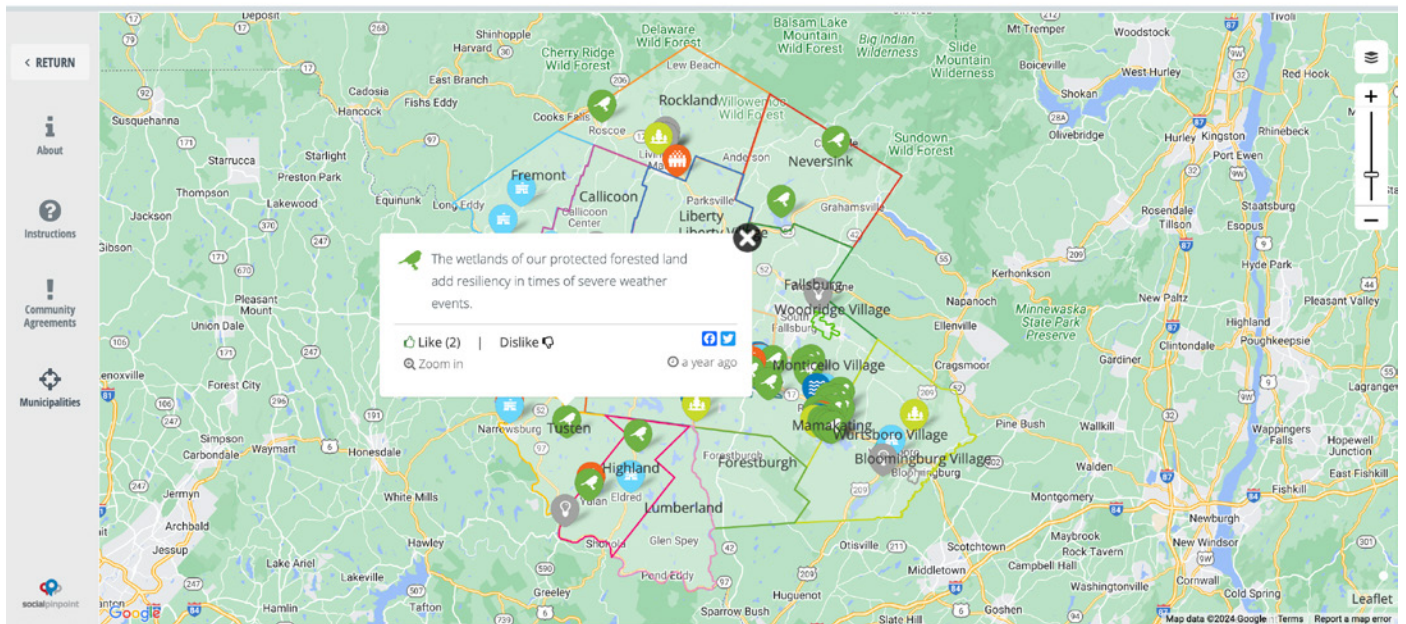
### Digital Visioning Board

During the project’s initial stages, an interactive Ideas Wall was available on the Resilient Sullivan website to collaboratively shape the project’s vision and goals. The tool allowed participants to share their insights and ideas regarding the project’s goal to address housing, farming and farmland, natural resources and infrastructure, food, jobs, and services, and utilities. Through interactive comments and pins on the virtual vision wall, participants engaged with the vision for economic, environmental, and social resilience in Sullivan County, while also suggesting additional priorities or strategies.



Municipal Fact Sheets on Resilient Sullivan website





Screenshot of Digital Mapping Tool



# Chapter 3

## Existing Plans and Studies

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# Sullivan County Hazard Mitigation Plan (2020)

## 1/ HAZARDS

The “Hazards” section presents Sullivan County’s hazards of concern, with hazards of highest concern being ice jams and associated flooding, and hazards of medium concern being wind, hurricane, tornado, and snow storm. Sullivan County faces serious flooding challenges, with priority areas including Beaverkill/Willowenec, Callicoon Creek Watershed, Ten Mile River/East Branch of Ten Mile River/Beaver Brook, Bashakill/Pine Kill/Shawagunk Kill, NYC Watershed/Neversink River, and Mongaup River. In terms of ice storms, interviews reveal that ice storms occur during the early and late periods of winter, leading to downed trees and power outage as well as road infrastructure issues. There are financial challenges due to the rising cost of salt, with ice storms requiring two to three times the amount salt compared to snowstorms.

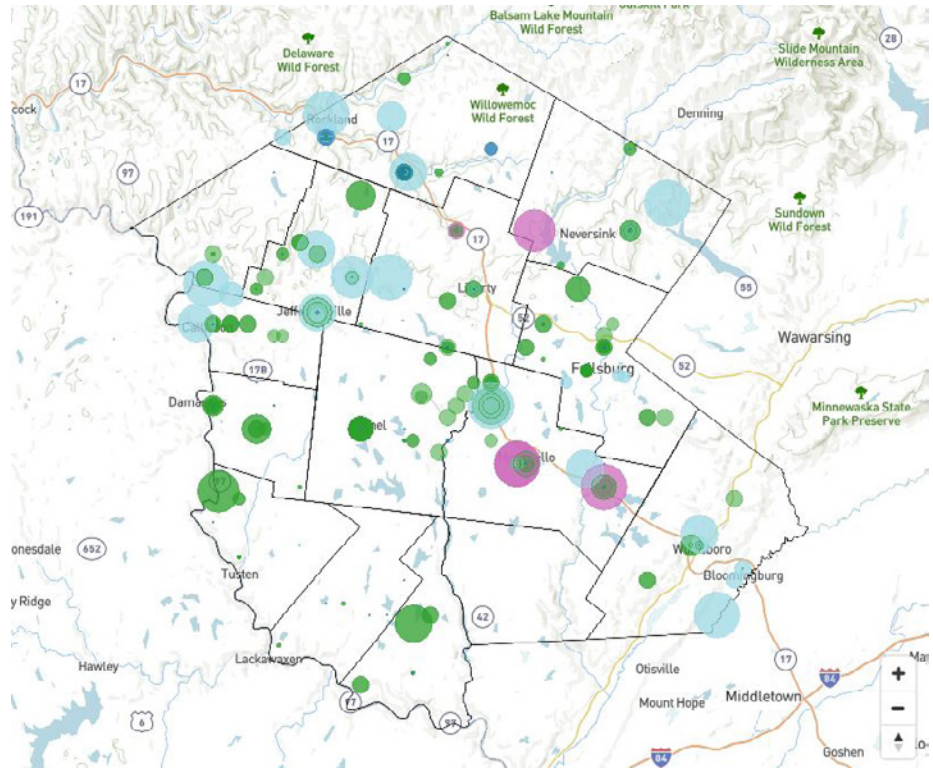
Climate change has led to greater frequency and severity of natural hazards. Seven municipalities have reported an increased frequency and intensity of floods in the last 5 – 10 years, with heavier cloudburst events leading to previous unprecedented flood patterns. The Town of Bethel reported an increasing frequency of wind events. 5 municipalities reported an increase in frequency and magnitude of ice storm events corresponding to a notable decrease in snowstorm events. The “Hazards” section also contains specific impacts of different hazards across each municipality.

## 2/ RISK

The “Risk” section documents County-wide vulnerabilities, most of which fall into flooding categories, such as flood-prone transportation infrastructure and structures. The section approaches vulnerability analysis through the topics of Social Vulnerability, Built Environment, Critical Infrastructure, Natural Environment, and Problem Areas. Overall, valley settlement patterns across the County, high poverty rates, critical infrastructure at risk, frequently compromised road, telecommunications, and electricity infrastructure, and lack of emergency notification system all contributed to heightened risk. The HMP provides a Capabilities Table documenting the tools and resources available to County communities to minimize hazard impacts and a Proposed Actions sorted by municipalities and Countywide projects.



Since 2012, Sullivan County has reduced risks by completing a range of road and stream projects and large-scale mitigation projects, such as removing structures from floodplains. Many municipalities also noted improved vegetation maintenance by regional utilities provider companies. On the other hand, ice storms have increased seasonal risks on road infrastructure and the increase in seasonal populations is taxing the capacity of all critical infrastructure. There is a Problems Statement table that documents each municipality's priority challenges in terms of natural hazards. The "Risk" section concludes with highly detailed documentation of NFIP problem areas and a list of high hazard dams.



Sullivan County hazard events 1996 - 2018

### 3/ PLANNING PROCESS

The HMP Planning Process began with a local orientation and was guided by planning teams including the Core Planning Group, Steering Committee, and Jurisdictional (municipal) Teams. The process was defined by milestones, which are required steps in the Hazard Mitigation Planning Process, including, for example, team meetings and public workshop identification of vulnerabilities, capabilities, and critical facilities, completing risk assessments, and reviewing drafts of the HMP. Governing entities represented include Federal/State/County agencies, Regional entities such as neighboring counties and municipalities, as well as the fifteen (15) towns and six (6) villages of Sullivan County. Local resources used to inform the HMP revision include technical data as well as existing reports and studies including municipal HMPs, codes, comprehensive plans, and stormwater management plans.

The Public Engagement process was characterized in-person Strategy Meetings for municipal engagement, virtual interview, public participation press releases, and information dissemination on digital platforms. The HMP also delineates a Plan Maintenance Process, in which the County is responsible for monitoring progress, documentation, and evaluating the efficacy of the Plan. There would be an annual plan review process coinciding with the annual FEMA HMA grant application deadline. For continued public engagement, the County has provided a website where the community can leave comments that would be incorporated into plan updates. HMP updates would follow a five-year cycle.

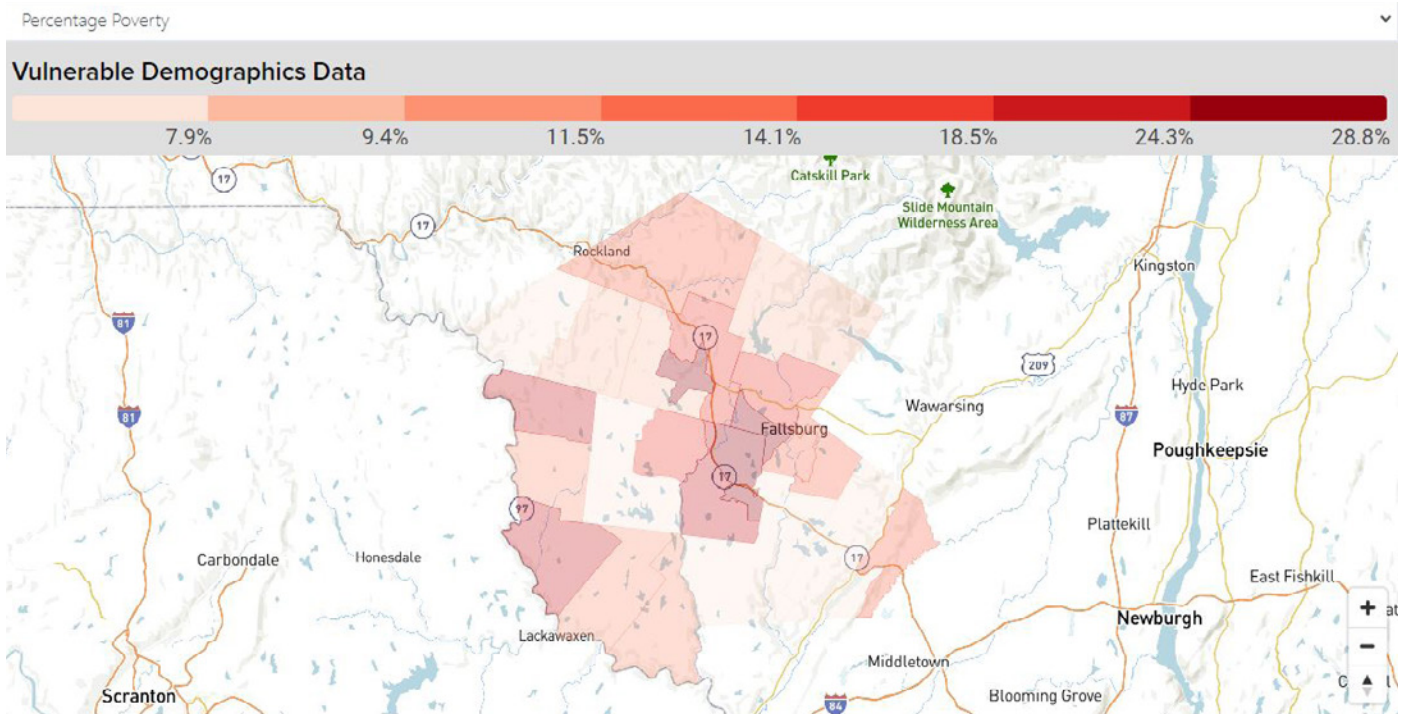


#### 4/ STRATEGIES IN THE PLAN

The "Strategies" section focuses on Goals and Objectives, Implementation Actions, and Emergency Response planning in response to the hazards faced by Sullivan County. The HMP establishes five main goals: 1) Coordinate a Comprehensive Countywide Mitigation Program 2) Protect life and Property 3) Increase awareness 4) Preserve or Restore Natural Systems 5) Build Stronger. In general, these five goals cover topics including improving transportation, reducing flooding vulnerability, environmental preservation, reducing impact on critical facilities, increasing public support for hazard mitigation flooding.

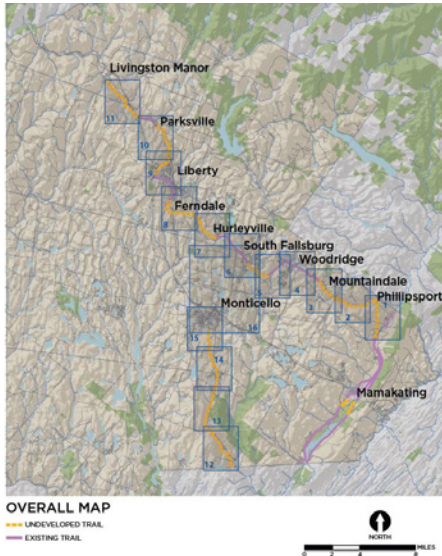
#### 5/ IMPLEMENTATION

The Implementation sub-section provides particular, place-based actions located in the County 21 municipalities. These actions focus on floodings impacts on structures, transportation infrastructure (bridges and road segments), and waterways, as well as severe wind events' impacts on power outages and property damage. Examples of specific actions include upgrading the Rt 141 / Rt 55 culvert in Bethel, acquiring emergency generators for critical facilities in Highland, and replacing Stone Arch Bridge in Tusten. The section concludes with emergency response strategies for temporary housing and relocation, evacuation procedures and routes, and shelter locations.



Sullivan County vulnerable demographics data mapped by municipality

# O&W Rail Trail Feasibility Study (2019)



15 proposed sections of the Sullivan O&W Rail Trail.

## OVERVIEW

This feasibility study envisions the O&W Trail as a continuous recreational trail that will attract visitors and link to businesses and amenities in 9 hamlets and 2 villages, maximizing the value of main street economic development, streetscape and community renewal projects in its host towns and villages, and provide health and quality of life benefits to residents and visitors. The study provides trail assessment and preferred alignment, design guidelines, branding and marketing strategy, maintenance plan, phasing plan, costing, and engineering recommendations for specific locations along the trail.

## 1/ TRAIL ASSESSMENT

The former O&W Railroad corridor traversing Sullivan County is located in southeastern New York, ~60 miles northwest of New York City. The area is also known as the “Foothills of the Catskills.” The Sullivan O&W Rail Trail study area is bound by the Upper Delaware River to the west and the Catskill Mountains to the east. Sullivan County is home to lakes, rivers, mountains, and woodlands for residents and visitors alike to enjoy and explore. Existing sections of the Sullivan O&W Rail Trail are programmed for hikers, runners, and bicyclists.

Fieldwork and existing conditions analysis determined a total of 15 sections of the trail, which include both existing and proposed sections. There are two continuous trails proposed, the main trail is comprised of Section 1 through Section 11 with existing trails connect by proposed sections, while the shorter Monticello Spur position consists of Section 12 to Section 15 and is entirely undeveloped or under construction at the time of the report. Each section documents key junctures of trail sections and their maintenance conditions. Key junctures include road crossings, bridges, municipal boundaries, and trailheads, that can be improved for alignment.

## 2/ PUBLIC OUTREACH

For this plan, an advisory committee was formed and under their guidance, the consultant held a property owners meeting, multiple public community forums, and a branding and logo charrette, reached out to property owners adjacent to the trail, and facilitated a public survey. The advisory committee, composed of stakeholders and County officials, helped guide the following aspects of the trail: safety, nodes of public interest, health benefits, user vs. restrictions, and maintenance strategy. Community meetings addressed the intended outcomes of the plan, potential benefits of the project, project timeline, map reviews, alternative alignments options, trail branding, and design guidelines.

Respondents to public surveys revealed that they would only use the trail for health/exercise and recreation, rather than commute. The majority of these potential users (69%) would use the trail for walking, followed by bicycling (19%) and running (8%). Main concerns include lack of public information on trail, connections, destinations, and services such as restrooms and water fountains. Other concerns include trail user’s behavior, signage, trail surface condition, and waste management.



Section 6 of the Sullivan O&W Rail Trail, Neversink to South Fallsburg, with proposed and existing sections

## 3/ PREFERRED TRAIL ALIGNMENTS

The Sullivan County O&W Rail Trail connects a series of trail sections for much of its current route. Presently there are 25 miles of developed trail, but these segments are disconnected and in varying conditions. Alignment improvements for key junctures identified in Chapter 2 Trail Assessments of each trail section include changing pedestrian crossings, expanding parking lots, and adjusting on-road alignment.



Most of the proposed trail is off-road, from the Upper Delaware River and Hudson Canal Linear Park Trailhead in Wurtsboro to Main Street in Livingston Manor. As much as possible, the trail follows the historic O&W Rail corridor or other off-road infrastructure and features. It is recommended that all off road segments are widened to 10' to 12' with 2' shoulders. The Monticello spur, running from the Port Jervis, Orange County to the Village of Monticello, is separate from the main Sullivan O&W Rail Trail. This short trail is suitable for equestrian use, as the proposed alignment is mostly off-road and reaches more rural portions of the County where are a greater concentration of experienced equestrians.

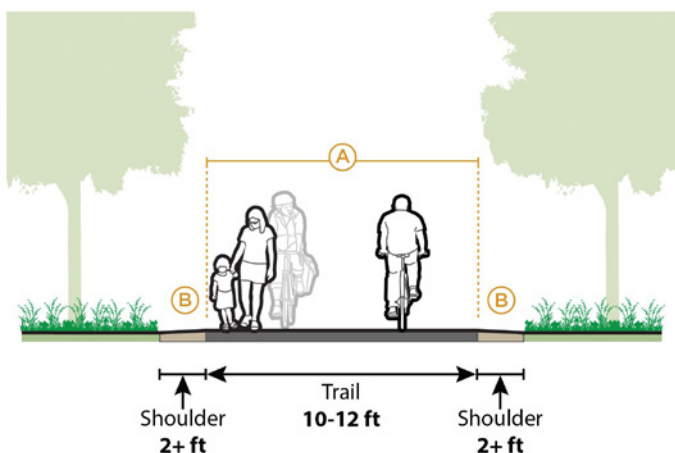
Where off-road options are not possible, the Sullivan O&W Rail Trail will follow roadways via bicycle design strategies to maximize safety and user comfort, based on roadway type and conditions. Bike lanes, shared lanes, side paths, shoulders, and low volume local roads will be proposed where relevant.

#### 4/ TRAIL DESIGN GUIDELINES, COSTING, AND ENGINEERING

Design guidelines, adapted from the Empire State Trail, are based on user profiles and physical environment conditions to determine trail dimensions, surface material, planted buffers, signage and wayfinding elements, and accessibility measures. General design considerations for trail segments include:

- Shared use paths are generally 10 to 12 feet with 2 feet shoulders on each side.
- Shared use paths near utility corridors and water
- Surface materials: stone dust, pavement, and natural surfaces (bare earth, wood chip, or boardwalk trails).
- Trail edge definitions, vegetative screening
- Bridges
- Road crossing types
- On-road facilities – walking and biking roadways, shared roadways, paved shoulders with buffer areas, bike lanes
- Trailheads

General dimensions of shared use trails



Selecting the most suitable facilities (bike lane, sidewalks, street geometry, etc.) for on-road portions of the trail can be based on the following characteristics:

1. Proper area type for roadway segments, based on Functional Classification Maps and character of the urban fabric.
2. Prevailing daily traffic volume and travel speed on the existing roadway, and location of the facility type(s) indicated by those key variables on the facility selection chart.
3. The need and desire for consistency with connecting trail segments. This may result in selection of a higher-order facility than implied by the facility selection chart.
4. Implementation feasibility of the preferred facility type, and selection of the highest quality feasible facility type possible.

Trail improvements costs for each implicated municipality are also included. The engineering chapter covers considerations for bridges, outlooks, flooding, open space, and trail heads.

## 5/ TRAIL BRANDING, OPERATIONS, AND MAINTENANCE

Trail branding provides branding assets, such as logos, fonts, and colors, and guidelines on how to use them. Branding was informed by visual preference exercises performed by a focus group as part of public outreach. Several typologies of trail signs (trail sign family) were also proposed to orient motorists, cyclists, and pedestrians at key junctures of the O&W Trail. In addition, the chapter provides an overview of trail maintenance guidelines that cover topics from planting management, trail surface maintenance, post-extreme weather event tasks, drainage structure, and winter maintenance.

## 6/ BUILD-OUT SEQUENCING

The O&W Trail build-out plan prioritizes segments based on parameters including general connectivity, equity, safety, and constructibility, as well as land acquisitions that would make a continuous trail possible. More specific selection parameters encompass existing conditions of railbed and trail, ownership, barriers to connectivity, demographics being served, potential for connection to existing segments, safety and accessibility for all users, and historical and/or cultural significance. Priority segments comprise the Mountindale segment upgrades, the Alta Lake segment, on-road connections for the Livingston Manor segment (on-road connection), Liberty Rail Trail segment upgrade, a Neversink on-road connection, and Little Beaver Kill Spur.

	Preferred
	Consider
	Requires Review
	Not Recommended

Facilities selection chart for on-road trails based on road speed limits

Posted Speed	AADT	Shared Roadway	Sidewalk	Marked Shared Roadway	Signed Shared Roadway	Shoulder Bikeway	On Street Bike Lane	Buffered Bike Lane	Separated Bike Lane	Side Path
<b>2 or 4 Lane road, shoulder less than 4 feet</b>										
<30	<400									
	>400 to 2000									
	>2000 to 10000									
	>10000 to 25000									
	>25000									
>30 to 55	<400									
	>400 to 2000									
	>2000 to 10000									
	>10000 to 25000									
	>25000									
>55	<400									
	>400 to 2000									
	>2000 to 10000									
	>10000 to 25000									
	>25000									
<b>2 or 4 Lane road, shoulder 4 feet wide or more</b>										
<30	<400									
	>400 to 2000									
	>2000 to 10000									
	>10000 to 25000									
	>25000									
>30 to 55	<400									
	>400 to 2000									
	>2000 to 10000									
	>10000 to 25000									
	>25000									
>55	<400									
	>400 to 2000									
	>2000 to 10000									
	>10000 to 25000									
	>25000									



# Coordinated Transportation Services Plan (2015)

## OVERVIEW

The primary focus of the Coordinated Transportation Plan is to identify opportunities for improving efficiency and reducing waste within the existing transportation system and address unmet transportation needs for communities throughout Sullivan County. The Plan outlines target demographics, areas with the greatest need, community input regarding needs and demands, existing transportation services, service gaps and duplications, coordination strategies, alternative service options, and the implementation plan. The services described in this plan place a high priority on developing transit service that will provide access to employment while also improve access to other services such as medical facilities and retail. The Vision for Transportation is as follows:

“Develop a coordinated transportation system that meets transportation needs of residents and visitors to Sullivan County and provides access to employment, medical facilities, education, shopping, and recreation.”

This current transportation plan does not include any analysis pertaining to climate or resilience, which can be significantly expanded.

## EXISTING CONDITIONS INVENTORY

### 1) Community Conditions

Key transit-dependent populations in Sullivan County include older adults above age 65 (14.8% of SC population), low-income persons (concentrated in south-central and central Monticello, as well as central Liberty), persons with ambulatory disabilities (9% of SC population), zero-vehicle households (9.6% of SC households), and youth ages 10 – 19 (13.6% of SC population).

As of 2013, the top three sectors are Education/Health/Social Services (~26.1% of all SC employment), Retail Trade (11.2%), Construction (9.4%), and Arts/Entertainment/Recreation/Accommodation and Food Services (9.1%).

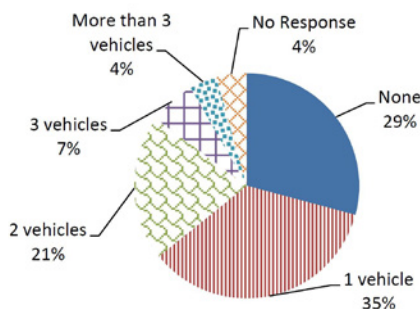
The unemployment rate was 8.7%, which was slightly higher than the NYS unemployment rate of 7.7%. Major employers are generally located in close proximity to Route 17 and Route 52, and include Catskill Regional Medical Center, Walmart Supercenter, Monticello Casino and Raceway, and Sullivan County Community College.

On a daily basis, a total of 4,078 workers commutes from surrounding counties to Sullivan County for employment, while 6,455 residents leave the County for employment. The majority of the workforce drives alone to work (77.1%) and carpooling (10.1) is the next most common mode of transportation to work. Only 2% of employees use public transportation for work commuting.

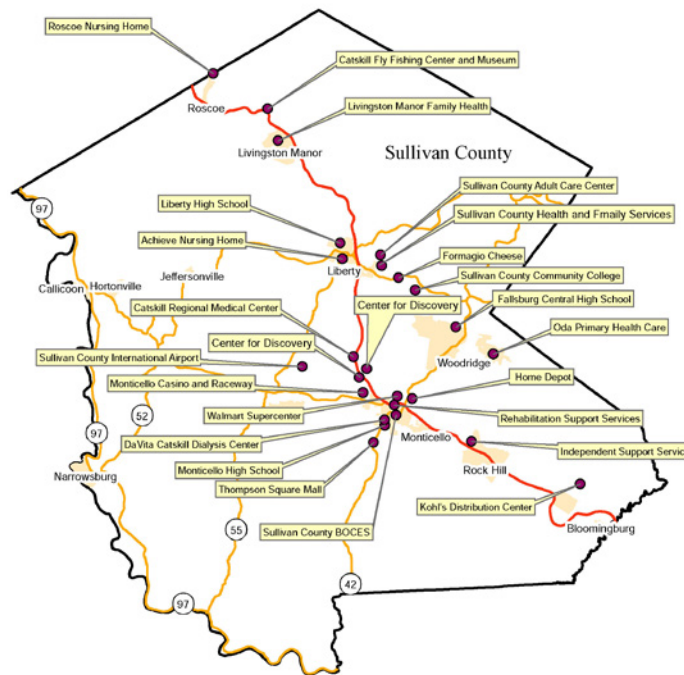
### 2) Existing Transportation Resources

In Sullivan County, public transportation services are provided by public agencies local not-for-profits, such as County agencies, health centers, community centers, employment centers, youth clubs, and religious organizations. In general, there are few transportation services that are available to the general public. The County Division Public Works provides a public route-deviation bus service, Sullivan County Transportation, that also contracts demand-response service for other County agencies. Sullivan County Transportation also operates two general public routes that provide limited service, respectively offering single round-trip runs once a week. Other institutions typically operate a small fleet of their own vehicles or contract out to private transportation services. Private transportation services include ShortLine Bus, school bus operators, taxicab services, and Medicaid/medical transportation service providers.

**Figure IV-4**  
**Working Vehicles in a Household**



Number of vehicles in the households of Sullivan County survey respondents



### 3) Community Input

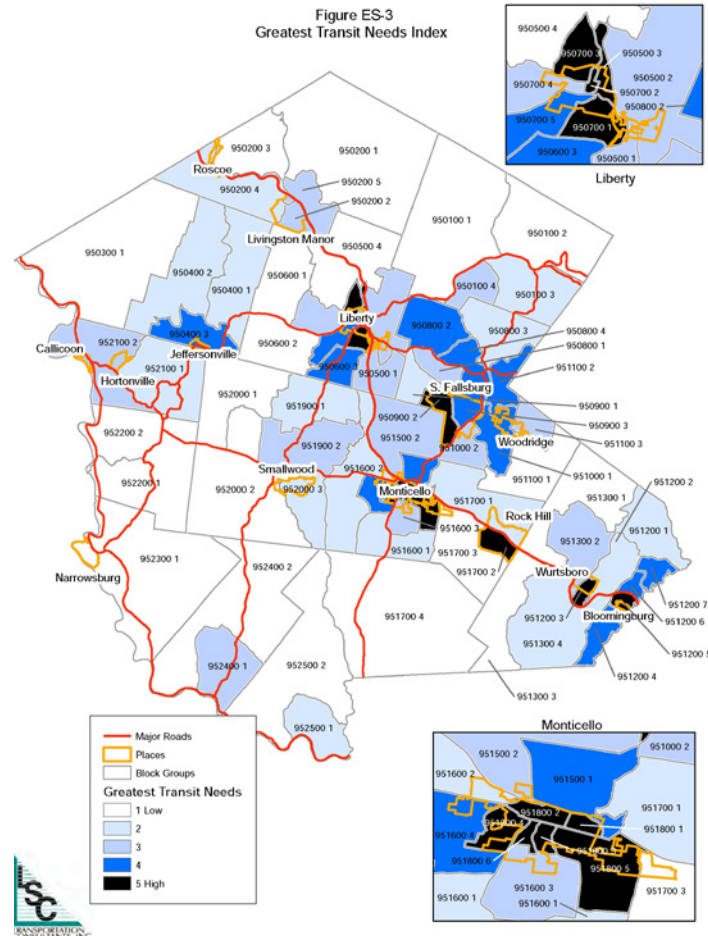
Community surveys revealed that 27% of survey participants did not have a valid driver's license, 29% of households have no working vehicles, and 27% of respondents reported that they have a family member with health concerns that limit their travel. The majority of respondents (71%) believes there is a need for more general public transit, while 14% report that there is a need for more public transit that serves only low-income persons, the elderly, and persons with disabilities. Stakeholder interviews clarified key issues, incentives to increase transit usage, local need, level of community support, while focus groups homed in on employers, disability needs, seniors, and the tourism industry. Senior and disability focus groups revealed that transportation services are infrequent and inflexible in scheduling. The tourism focus highlighted the need for better transit connections to Metro North and New Jersey Transit services and the lack of regional transportation options for Western Sullivan County. There is also general recognition of transportation challenges due the County's rural nature characterized by low density, varying topography, and road networks that are difficult to maintain.

## NEEDS ANALYSIS

### 1) Transit Needs and Demands

Areas with greatest transit needs are located in Liberty, S. Fallsburg, Monticello, Rock Hill, Wurtsboro, and Bloomingburg. Many Sullivan County residents are not able to find or maintain employment due to lack of transportation. As a result, the reliability of the workforce has been an issue in attracting new employers. Other transportation needs include regional trips to Pennsylvania and New Jersey, providing service for people on Medicare and Medicaid, meeting shift times for employees, providing transportation for seniors and people with disabilities, etc.. Overall, less than 10 percent of the need is being met by public transit and human service agencies. There is a gap of 90 percent of need that is not being met, while a reasonable benchmark would be meeting at least 50 percent of the need. As of 2015, a mode split analysis estimates commuter demand in terms of daily transit trips for Sullivan County residents to be 270 daily transit trips within the County, 108 trips to Orange County, 29 trips to New York County, 21 trips to Ulster County, and 17 trips to Dutchess County.





## 2) Service Gaps and Duplications

Service gaps in Sullivan County's transportation services include geographic, service type, and temporal gaps. Geographic gaps are due to the lack of general public transit services in remote areas outside Monticello, Liberty, and Fallsburg. However, the two shuttle bus routes in place at the time of the study only operated once daily respectively within limited hours. There are significant service types gaps in Sullivan County, as the ShortLine Bus is the only service that operates on all weekdays. In addition, seniors and persons with disabilities who do not participate in community services lack transportation throughout the County. ShortLine Bus fares are not affordable for low-income families, with a one-way trip from Monticello to Liberty costing \$4.00. Temporal gaps in County transportation are due to extremely limited operation hours of general public service routes as well as long gaps between ShortLine Bus trips. As a result, there is a lack of transportation for: 1) access to employment opportunities 2) flexible transportation options of seniors 3) access to education opportunities 4) access to employment adjacent counties 5) recreational and social activities 6) medical care for anyone outside specific health programs.

In many cases, agencies and institutions are duplicating services by serving the same areas and destinations. Several public transit and human service agencies also have overlapping scheduling of trips, vehicle maintenance routines, driver and driver training, vehicle insurance, and reporting and billing processes. Beyond these duplications in service, there may be underutilized services that present opportunities for further coordination of transportation services.

## COORDINATION STRATEGIES AND SERVICE RECOMMENDATIONS

### 1) Coordination Strategies and Service Options

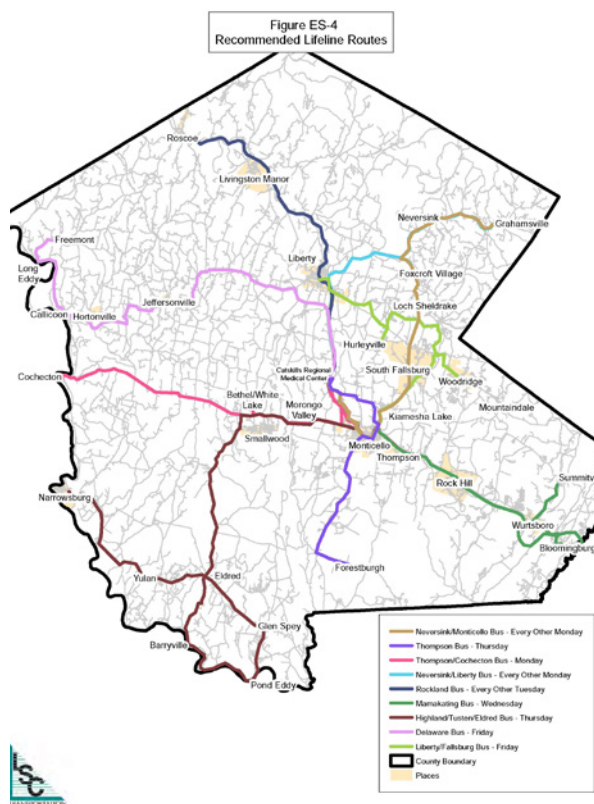
To fill transportation service gaps, the County can provide additional and improved service options for general public access and especially for communities with the greatest transit needs. For example, lifeline routes can become more flexible in facilitating shopping trips for elderly persons and expand to serve other Lifeline services such as medical trips. Fixed route services can be contracted out to serve communities with greatest transit needs in Monticello, South Fallsburg, Liberty, Livingston Manor, Roscoe, Rock Hill, and Wurtsboro. To fulfill employment commuting needs, the County can establish weekday commuter routes as well vanpool programs to reach workplace within Sullivan County as well as Ulster and Orange Counties. To supply transportation options for smaller, rural communities, subsidized taxis can be provided where bus services are no cost-effective.

In terms of coordination strategies, Sullivan County can consider consolidating services operated by County government, consolidating human services transportation under one operator, establishing a County Transportation Coordinator as well as a Mobility Manager. To actualize these strategies, the County can leverage available funding and use these available funds as local match for Federal Transit Administration funding.

### 2) Service and Implementation Strategies Recommended in the Plan

The implementation plan has a total of three phases, in which Phase 1 focuses on consolidating County transportation programs into a single program, Phase 2 expands upon the programs established during Phase 1, and Phase 3 seeks to improve service over the course of six to ten years. Phase 1, to be completed by 2017, would entail consolidating County transportation program, coordinating human services transportation, and creating a marketing program. Phase 2, to be carried about 2017 – 2019, requires creating a Mobility Manager position at the County level. Phase 3, from 2019 to 2022, seeks to further consolidate human services transportation and improve commuter routes, fixed-route services, and regional services.

Recommended Lifeline Routes in Sullivan County, 2015





# Local Waterfront Revitalization Program (2015)

## Upper Delaware River: Making the Connections

### OVERVIEW

The 2015 Upper Delaware River LWRP provides a roadmap and SWOT analysis for economic development and tourism, river access, and arts, history, and culture in order to brand and strategically enhance the Upper Delaware River. The LWRP sets goals in increasing river access, infrastructure improvements, enhancing branding and marketing, and fostering the economic strength of hamlets, villages, and cities along the Upper Delaware River. The LWRP also recommends potential capital projects and more integrated regional efforts supporting the river.



View to the Upper Delaware River

### 1/ ECONOMIC DEVELOPMENT AND TOURISM

As of 2015, despite general economic challenges and frequent flooding, tourism surrounding the Upper Delaware River is performing well. The two primary challenges for the tourism sector are lack of lodging and accommodations and a short tourism season, while some secondary challenges include lack of the following: visual access, local community buy-in for National Park designation, non-automobile travel options, cohesive branding, and restroom and trash facilities. The river also offers myriad opportunities and assets including active outdoor recreation for all ages, the health benefits associated with outdoor activities, fishing, birdwatching, spiritual retreats, and engaging with nature conservation efforts.

The LWRP makes recommendations to bolster the tourism sector including branding and marketing, improving infrastructure and services, expanding the market and season, and fostering and uplifting hamlets, villages, and cities along the Upper Delaware River. Key infrastructure and services along the river that require improvement range from internet and cell phone services to transportation and resources for outdoor activities. To expand the tourism season and market, Sullivan County can promote the hunting and fishing industry, formalize eco- and heritage tourism, facilitate longer seasons for kayaking, and increase cultural events and retreat programs. Fostering economic strength of municipalities, from the City of Port Jervis to the Village of Hancock and every community in between, can entail pooling resources together from these communities to expand advertising budgets and revitalize main streets.

### 2/ RIVER ACCESS

Access to the Upper Delaware River can be improved both visually and physically. Visual access to the river is challenged by a limited number viewsheds spaced far apart, uninviting roadside pull-offs, and some poorly maintained access points. However, there are many opportunities to improve on these viewsheds, including improving existing and introducing additional outlooks, increasing visual access points, providing wayfinding signage, and implementing physical improvements. Physical access is currently compromised by inconspicuous public access points, private ownership of riparian land, and subprime physical condition of access points. These challenges can be addressed by connecting riparian paths to regional trails, ensuring ADA access in current projects, realizing a proposed kayaking park, and collaborating with Pike County to address conditions on both sides of the river.



Swimming in the Bashakill River

### 3/ ARTS, CULTURAL AND HISTORIC RESOURCES

The Upper Delaware River corridor is rich with arts, cultural, and historic resources, but these assets are not well-known due to challenges in marketing and coordination. The vibrant local arts and historical institutions and historic landscape are obscured by a lack of staffing, programming, outdoor venues, and capital improvements. In response, the LWRP recommends incorporating art in the natural landscape, promoting historical tours, building upon “locally made” campaigns, and improving signage for cultural, arts, and historic resources.

### 4/ PROTECTING RESOURCES

This chapter provides an overview on protecting the Upper Delaware River’s natural resources by addressing climate change impacts, flooding, invasive species, erosion, and water quality. There are also ownership challenges associated with the fragmentation of large swaths of riparian land due to high maintenance costs. Delaware Highlands Conservancy and other land trust organizations in the region are helping landowners acquire easements, coordinate with state planning, and maintain land in perpetuity if they wish. Another land conservation and maintenance method would be allowing National Park Service to own more land so they can introduce additional amenities and river access on this land.

### 5/ EXISTING PROJECTS AND REGIONAL EFFORTS

There are many organizations whose efforts focus on or comprise the Upper Delaware River corridor including the Coalition for the Delaware River Watershed, Sullivan County Visitors Association, and Watershed Agriculture Council. These organizations run a range of initiatives and projects can be coordinated for to maximize support for economic and environmental initiatives for the Upper Delaware River. The LWRP also recommends ongoing and potential projects that will help the Upper Delaware River emphasize its gateways and sense of place. Preserving and upgrading portions of the D&H Canal, repurposing a historic fort as a visitor center, increasing access points and signage to align with regional water trails, and waterfront parks and esplanades are all capital projects that can help the river corridor attract tourism. Online platforms specializing in documenting hiking trails and their connections to local businesses, can be effective in promoting a multifaceted tourism ecosystem.



Cochection Train Station



# Site Designs for Six River Access Points (2015)

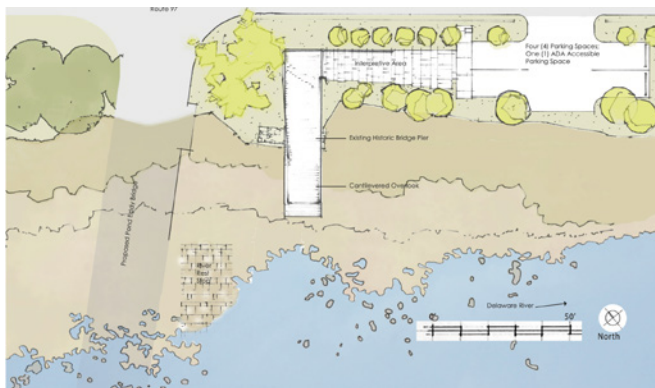
## OVERVIEW

This document provides site designs for 6 river access points respectively located in the 6 municipalities along the Upper Delaware River: Long Eddy, Callicoon, Skinners Falls, Ten Mile River, Highland, and Pond Eddy. Public engagement was performed by the Sullivan County Division of Planning in collaboration with the project consultants, Environmental Planning and Design. The study first documents existing conditions of the six sites including use, existing signage and amenities, site character and access. In response to existing conditions, the study proposes a kit of programming and site amenities to be selectively deployed on the 6 sites including bike racks, canoe racks, barrier screen, comfort stations, and more. Probable development costs were also calculated for each site. The study identifies the landowners for the parcels within which the access points are located and recommends further stakeholder coordination and consolidated service as well as visual elements.

Overall recommendations that pertain to resiliency include eradicating invasive plant species, restoring native plants, encourage ecological succession of forests, establishing environmental conversation protocols, utilizing sustainable local materials, and replacing parking hardscapes with permeable materials.



Pond Eddy Access Point Existing Conditions Analysis



Pond Eddy Proposed Site Concept Plan

## 1/ LONG EDDY

Located in the Town of Fremont, the Long Eddy access point is used for canoe and fishing access. Primary challenges of this access point include a narrow entry, lack of parking, a nearby railroad, and conflicting adjacent land uses (small manufacturing plant and residential). Long Eddy is a section of the upper Delaware River with riffles and Class I and II rapids for kayakers. The short-term site design formalizes vehicular access and ADA parking space with a path providing universal access to the existing launch sites. The long-term concept design assumes the acquisition of an adjacent lot for increasing parking capacity.

## 2/ CALLICOON

The Callicoon access point is located in the Town of Delaware, at the junction of Callicoon Creek and Delaware River. Existing uses include kayak/canoe launching as well as trailer access and bathrooms. There are several retail opportunities and commercial developments located in the surrounding hamlets of Callicoon, Hortonville, and Kohlertown, but the retail is still largely defined by an agricultural landscape. Proposed design for the site re-establishes previous site amenities that can be removed in event of flooding.

## 3/ SKINNERS FALLS

Located in the Town of Cohecton, the Skinners Falls access point is in close proximity to four communities, several retail opportunities and cultural institutions, and Skinner's Falls Rapids, featuring Class II rapids. This access point is extremely popular with residents, who come to the river to enjoy tubing, sunbathing, and other water activities. Proposed site designs include enhanced amenities, a permanent ranger station, a picnic and pavilions area, increased parking capacity, and enhanced ADA access.

## 4/ TEN MILE RIVER

The Ten Mile River access point is located in the Town of Tusten, a municipality very much defined by its proximity to the Upper Delaware River, which provides economic vitality and recreational amenities. The Town attracts many second homeowners and visitors. Currently, the Ten Mile River access point provides boat launching, fishing, and swimming activities. Concept designs for the Ten Mile River access point focus on enhanced amenities and ADA access in collaboration with National Park Service.

## 5/ HIGHLAND

Home to the Highland access point, the Town of Highland has historically experienced boom-bust cycles caused by over-extraction of natural resources such as timber. The extraordinary natural landscapes have attracted tourism and second home ownership, and provides robust habitats for a variety of flora and fauna. There are a number of businesses in the nearby hamlet of Barryville that support river users. Currently this access point has high quality shoreline that accommodates fishing and boat launching. The site concept plan proposes introducing a pathway in the large parking area and modifying the trail to the river to provide ADA access.



Ten Mile River  
View of road to river access point

## 6/ POND EDDY

The Pond Eddy access point, located in Lumberland, is currently an informal access point that lacks parking. It is located immediately upstream from the Pond Eddy Bridge, which is composed of an unsignalized three-way intersection. There are several boat rental services in Lumberland, but only one public access point to the River. The moderate steep slopes of the site make access to the river challenging. The site concept design proposes an overlook by repurposing the abutment for the existing bridge, a river rest stop, and trails leading down to the river.

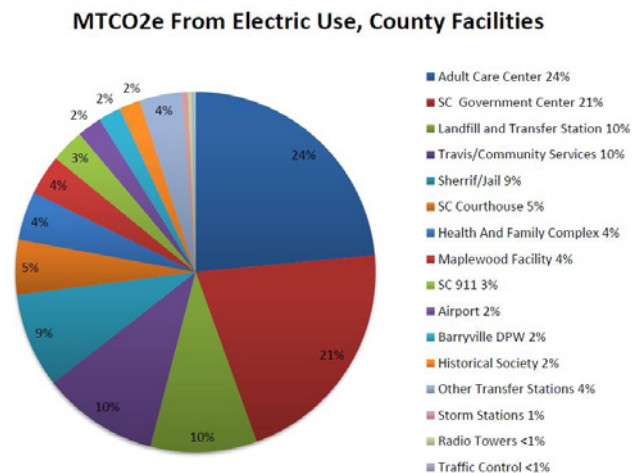


# Sullivan County Climate Action Plan (2014)

## OVERVIEW

The 2014 Sullivan County Climate Action Plan examines the County's carbon footprint, establishes targets and initiatives for reduction of GHG emissions throughout County operations, and addresses climate challenges beyond GHG emissions via recommendations and implementation strategies. More specifically, the CAP sets goals, lists action items, provides policy recommendations, proposes pilot projects, and puts forth an implementation plan for reducing GHG emissions in County operations. The CAP engages quantitative analysis methods to calculate GHG emissions for County and Community operations. The CAP approaches these strategies through the subjects of Energy, Transportation, Materials Management, Land and Water Use, Public Health, and Emergency Planning.

Distribution of GHG emissions from electric use in County facilities, 2014



## SULLIVAN COUNTY ACTIONS TO DATE

From 2005 to 2014, Sullivan County hit many milestones moving the County towards climate-oriented growth. SC adopted a number of resolutions including the 2007 Green Vision Statement (Resolution 429-07), establishing an Office of Sustainable Energy in 2008 (Resolution 343-08), and taking the Climate Communities Pledge in 2010 (Resolution 53-10). SC has also installed several physical projects including photovoltaic systems at the Mobility Management Center in Bethel and the County's Public Health campus in Liberty. In 2011, Sullivan Alliance for Sustainable Development (SASD) led an assessment and energy audit of the County's buildings, facilities, and operations as well as a County-wide information campaign for home energy edits and retrofits through NYSEDA. In March 2022, the County published an updated Climate Action Plan, reporting on success in reducing GHG emissions from government operations, most notably through extensive energy retrofits of County facilities and the sourcing of electricity from significant renewable energy resources both on-site and off-site.

## 1/ ENERGY

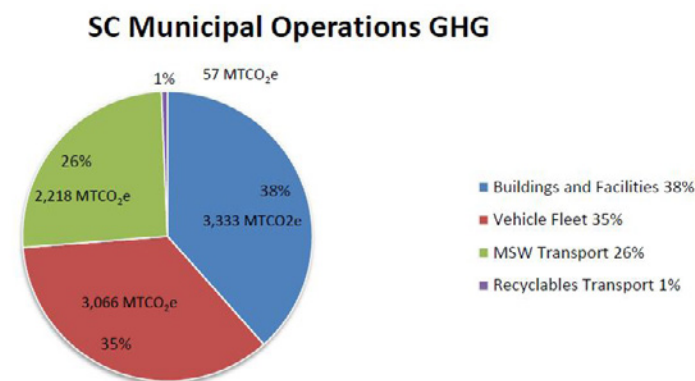
As of 2014, 38% of County operations GHGs are attributed to County-owned buildings and facilities, of which 49% is generated from energy used to power and condition workspaces, traffic signaling on County roads, operating radio towers, waste transfer stations, and County parks. The other 51% is generated by fossil fuel heating activities. Most County buildings were constructed in the era predating energy conservation construction codes, as result, buildings are currently extremely inefficient, but have great potential in realizing energy savings through extensive energy retrofits, such as deep energy retrofits (DER).

The Energy chapter sets two goals for conserving County building energy use: 1) Reduce building energy use and GHG emissions through energy efficiency measures by fifty percent (50%) by 2020; 2) Use life cycle cost accounting to capture GHG reduction and energy cost savings. The County has in fact achieved its 50% energy well before 2020, which is a fantastic precedent for other emissions targets to follow. The chapter also recommends pilot projects including biodiesel or biomass heating, creating a Community Energy District in Liberty, and LED lighting change-out at Government Center.

## 2/ TRANSPORTATION

The County fleet of gas and diesel fueled vehicles account for 35% of total GHG emissions from County operations. 59% of these GHGs come from diesel fuel-power heavy equipment (road crew graders and dozers, snow removal equipment), while the remaining 41% originates from gasoline-powered smaller fleet vehicles. In response, the County proposes three goals to reduce GHGs produced by the County fleet: 1) Reduce fuel use by 50% through right-sized, energy efficient vehicles and the phase-in of hybrid and electric vehicles 2) Encourage fuel conserving driving habits and carpooling for County employees 3) Through the County's Comprehensive Coordinated Transportation Plan, encourage conversion to hybrid and all-electric vehicles by transportation providers operating under County contracts.

GHG emissions of Sullivan County municipal operations, 2014



## 3/ MATERIALS MANAGEMENT

The County will focus on Procurement, Use, "Disposal", and Next Life in Materials Management, as well as engaging with life cycle analysis to reveal the direct and indirect real costs of items purchased. The fuel burned to transport solid waste to Seneca Meadows Landfill in Water, NY contributes to 26% of the County's GHG emissions. As such, the County also aims to reduce waste-producing practices, engage with more cognizant purchasing decisions, and digitize documents management and land use records. The overarching goals for achieving more efficient materials management include: 1) Creating a legislative mandate for reducing waste in County operations by 20% by 2020; 2) Establishing an environmentally responsible and sustainable solid waste disposal system at the County level 3) Developing an "Environmentally Preferable" purchasing policy for all County procurement, and provide the staff training and technical support needed for policy implementation.

## 4/ LAND AND WATER USE

Climate change will impact Land and Water Use in terms of flooding, water supply, erosion, invasive species, public health, and agriculture and its economic impacts. Although Sullivan County has the highest percentage of open space in the Mid-Hudson region, 83% of this land is privately-owned. In response, the County establishes two general goals for conscientious land and water use. The first goal is to preserve and expand open space, park land and forests in the County. This would specifically entail promoting best forest management practices, developing



an invasive pest management plan, and identifying potential properties for open space acquisitions. The second goal prioritizes low emissions development that is resilient to climate change and reduces GHG emissions. Examples of low emissions development include sustainable agriculture, smart growth development practices, and establishing low emissions construction and renovation standards for County facilities.

## **5/ PUBLIC HEALTH**

For Sullivan County, a key vulnerability is food deserts in and around Monticello, Liberty, White Sulphur Springs, and Ferndale. As designated by the USDA, food deserts are communities where a high number of low-income households without vehicles are located further than 0.5 miles from a supermarket. There are also more general public health concerns associated with climate change including heat-related illnesses and mortalities, deteriorating air quality, and water- and food-borne diseases caused by flooding and sewage overflows. County public health goals include 1) Protecting the health of all County employees and visitors to County buildings and facilities and 2) Preparing effective strategies for County Health response to health issues exacerbated by climate change.

## **6/ EMERGENCY PLANNING**

In Sullivan County, extreme weather events including Tropical Storm Lee, Hurricane Irene and Superstorm Sandy have brought prolonged power outages, disruptions to communications systems, stymied mobility systems due to downed trees and electric lines, flooding, damage to buildings and residences as well as the need to establish emergency shelters. The County Government Center in Monticello is particularly susceptible to utilities disruptions as it is powered solely by the commercial electric grid. In event of a prolonged power outage, the back-up system, as of 2008, provides only about 4 hours of energy. This is hardly sufficient to shut down computers and evacuate the building. Main goals include 1) Enabling the SC Government Center's continued operation during a prolonged power outage; 2) Building the County's resiliency through continual assessment of emergency response needs, identifying vulnerabilities, and upgrading equipment and procedures.

# Agricultural and Farmland Protection Plan (2014)

## OVERVIEW

This document provides an overview of the state of agricultural resources in Sullivan County, takes stock of current agricultural initiatives, provides a robust SWOT analysis, and maps out visions, goals, and strategies for improving the agricultural sector as a whole.

As one of Sullivan County's top three economic sectors, the agricultural industry faces myriad challenges, including a large decrease in sales of agricultural products (between 2007 and 2012, sales of agricultural products declined nearly 36%), dispersed and lack of high-quality soils (6.2% of the entire County, putting farmers at a disadvantage for State PDR (Purchase of Development Rights) programs), and the majority of farms do not generate significant income from sale of agricultural products. Because soils are so important in qualifying for funding, soil quality can be monitored and improved to elevate agricultural productivity, environmental health, and qualifications for SDR programs. Furthermore, in some municipalities, there are zoning laws that create adverse conditions for farmers trying to start or expand their businesses (ex. Acreage and setback requirements, number of animals allowed, etc..)

## 1/ AGRICULTURAL RESOURCES

Sullivan County is home to two agricultural districts, as designated by NYS Agriculture and Markets. Both districts are required to be reviewed every eight years. Agricultural District #1 contains 74,247 acres in farms; Ag District #4 contains 27,680 acres in farms. As of 2012, there were 321 farms in Sullivan County working 53,859 acres of land (8.9% of County's total land area). There has been a sharp decline in the dairy industry, from 631 dairy farms in 1950 to just 32 in 2012. Over half of all farms in the County reported their principal product as mixed crops, while other products include hay (27%), mixed livestock (23%), and beef cattle (13%).

Sullivan County farms generated \$27.1 million in cash receipts in 2012, with livestock and poultry accounting for \$23.1 million (8.5%) and crops \$4.1 million. From 2007 to 2012, sales of agricultural products declined nearly 36%. Nine farms had sales of \$500,000 or more, accounting for 63% of the County's agricultural output. The majority of farms in the County do not generate significant income from the sale of agricultural products.

County soils have been classified by the USDA according to their agricultural use capacities and the 1989 Soil Survey of Sullivan County. NYS indicates ~39,000 acres or 6.2% of the County's total area is considered "prime farmland." This superlative classification is reserved for soils that produce the highest yields with minimal energy required, economic investment, and damage to the environment. In Sullivan County, such soils are largely limited to hilltops and river valleys with less than 8% slope. Agricultural land is broadly dispersed throughout the County but concentrated on the west side. Most of the County's highest quality farmland is found along the Delaware River running through Cohecton and along the Shawangunk Kill near Bloomingburg.

Slope is the primary constraint for most soils within Sullivan County and much of it is suitable for agriculture, for instance, in pockets of more level topography or for less demanding crop cultivation. In fact, the majority of forage crops in the County are grown on soils which fall into "good" classes that are not quite prime quality. Dynamic terrain and inconsistent soils have led to farms scattered throughout County, rather than being concentrated and continuous. Farms are frequently separated by large swaths of woodland and as a result, forestry is a compatible use for many farms.



## 2/ CHALLENGES AND OPPORTUNITIES

Challenges	Opportunities
<ul style="list-style-type: none"> <li>• Farmers are unaware of support mechanisms and programs</li> <li>• There is often a lack of communication and coordination among agencies and organizations involved in agriculture and helping farmers</li> <li>• Some farmers who sell directly to individuals lack marketing expertise</li> <li>• Lack of new and “next generation” farmers makes the future less certain</li> <li>• There is a continued loss of dairy farms</li> <li>• Farming has high production expenses with low profitability</li> <li>• Farmers often have difficulty finding qualified labor</li> <li>• Vegetable and crop production and sales does not reach its potential</li> </ul>	<ul style="list-style-type: none"> <li>• Growing interest in agritourism</li> <li>• Value-added and niche markets exist and can be taken advantage of</li> <li>• Land and resources that would be attractive to new farmers</li> <li>• Financial and technical assistance to farmers is available</li> <li>• Direct marketing locally and in urban areas has growth opportunities</li> <li>• Existing regional brands exist that farmers can take advantage of</li> <li>• Initiatives are underway that can be enhanced such as the food hub and red meat processing</li> <li>• Farmland protection can be promoted using the “Important Farmland Map” as a guide to target programs to certain areas, but Plan’s premise is that the best way to preserve farmland is to have economically viable farm operations</li> <li>• More public education and marketing could benefit agriculture</li> </ul>

## 3/ INITIATIVES RECOMMENDED IN THE PLAN

There are a variety of current organizations and initiatives supporting the agricultural sector including conferences, kitchens, financial assistance programs, and food hubs. A County-wide Agricultural Summit was held in 2011 to address the most significant challenges faced by the agriculture communities and proposed solutions including a “one-stop shop” for assistance with financing and business planning, leveraging political and economic power in farming communities, and sustainable farming practices.

The Liberty Red Meat Processing Facility was proposed as a County-led project that would serve livestock producers within a 50- to 100-mile radius that lack slaughter facilities. The Livestock Processing and Profitability Project is run by Cornell Cooperative seeks to improve the economic viability of County and regional livestock farms. This project provides workshops, technical assistance, a Livestock Manual, and economic impact analysis for processing options for different scales of farms. The food project creates “hyper local distribution nodes” that creates a distribution system that can move smaller volume shipments to market, thus helping Sullivan County farmers to sell products to downstate and Pennsylvania consumers.

#### 4/ VISIONS, GOALS, STRATEGIES

The main goals for agriculture and open space protection include:

1. Maintain the County's valuable farmland in active agricultural use.
2. Increase the financial success and stability of farm operations.
3. Integrate agricultural economic development into County economic strategies.
4. Increase public recognition of the value of agriculture and farmland, and develop a better understanding of farm issues by non-farmers.
5. Attract new entrepreneurs and younger households to farming ventures and assist this next generation of farmers.

To support the above goals, the Plan proposes the following priority initiatives and project initiatives:

1. Building Capacity, Organization, and Collaboration
2. Agricultural Business Retention and Expansion (BR&E) Program
3. Agritourism Enhancement
4. New / Young Farmer Program
5. Value-Added and Diversification Initiative
6. Buy local initiative
7. Farmland Preservation and Access
8. Marketing and Public Relations Programs

## Open Space Protection Plan (2008)

### Conserving Open Space & Managing Growth

#### OVERVIEW

The 2008 County open space management plan aims to protect areas that conserve natural and scenic resources, protect water supply, promote conservation of soils, wetlands, watersheds, and floodplains, serve public values (e.g. parks), and enhance recreation. This document approaches open space protection through the topics of 1) Agricultural Resources 2) Biodiversity Resources 3) Recreational and Cultural Resources 4) Water Resources – Consumption 5) Water Resources – Flooding 6) Growth and Development. The Plan includes resource maps of Priority Areas for each of the six topics and provides brief descriptions of all Priority Areas. Through public workshops and summit meetings, this Plan identifies obstacles and opportunities, and issues and impact for each topic. Strategies and Actions are then laid out to address the list of goals for each section. Each chapter ends with a section on additional resources and potential partners including local, regional, State, and Federal agencies and programs as well as relevant non-profit organizations. In the final chapter, the topics and goals addressed throughout the chapters are synthesized into an Action/Implementation Plan that are sorted into short-, medium-, and long-term action items. Open Space education and outreach efforts would be organized and spearheaded by County agencies and outside agencies.

#### 1/ AGRICULTURAL RESOURCES

The County's agricultural goals include protecting and maintaining existing farms, effective marketing and promotion of existing and future farms, preserving the rural and historic qualities of Sullivan County, and continuing supporting agricultural diversification. The best soils in the County are located in Agricultural District One (as designated by NYS Agriculture and Markets), a Priority Area encompassing parts of four towns: Bethel, Callicoon, Cohecton, and Delaware. This area is also called the "Beechwoods", an area with highest concentration of farms within the County. Another Priority Area is Agricultural District Four, which is historically home to important farming areas that covers portions of



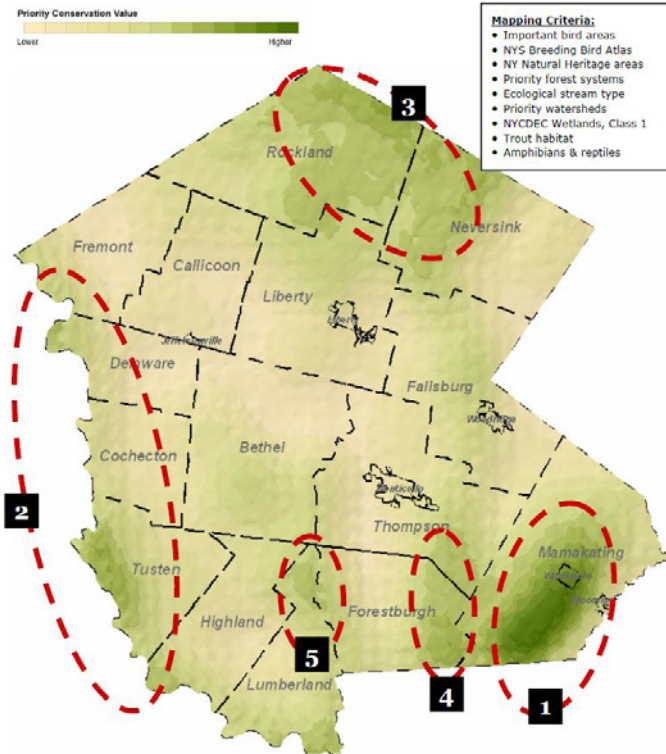
Bethel, Liberty, Fallsburg, and Neversink. This chapter recommends five key strategies to support its agricultural sector and farming communities: 1) Create a branding and marketing campaign to promote Sullivan County agricultural projects and agri-tourism 2) Improve access to funding and encourage programs that protect farmland 3) Identify new markets for local agricultural products 4) Educate the public about the personal and societal benefits of supporting global agriculture 5) Improve farm profitability and product diversification. .

## 2/ BIODIVERSITY RESOURCES

To protect the County's rich Biodiversity Resources, this document sets out goals including identifying and protecting significant ecological areas, improving public aware surrounding the value of natural habitats, limiting encroachment of important ecosystems, and coupling biodiversity conservation with eco-tourism. There are a total of five biodiversity Priority Areas, from the marshes and biological corridors of Bashakill Wildlife Management Area, with over 220 species of birds, 30 species of fish, and 40 species of butterflies recorded, to the Delaware River Corridor, the longest free-flowing river in the northeast home to ~70% of the state's river otter population. Other Priority Areas include the Catskill Park, Neversink River Valley, and Mongaup River Valley. This chapter concludes with four strategies to protect the County's biological and ecological resources: 1) Identifying and protecting biological corridors the County 2) Raising public awareness about the importance of biodiversity 3) Developing a regional approach to protecting biodiversity 4) Creating a brand and marketing identify celebrating the County's unique natural resources.

Map of biodiversity Priority Areas in Sullivan County

- 1** The Bashakill Wildlife Management Area
- 2** Delaware River Corridor
- 3** Catskill Park
- 4** Neversink River Valley
- 5** Mongaup River Valley



## 3/ RECREATIONAL AND CULTURAL RESOURCES

The County's many Cultural and Recreational Resources can be strengthened by cataloguing and preserving existing historic resources, connecting open spaces through trails and corridors, promoting and developing cultural and historic resources, and more extensively marketing the County as a destination for outdoor recreation. The four Priority Areas reflect the highest concentration of historic, cultural, and recreational sites, but mainly feature significant sites for outdoor activities such as the Delaware River Corridor, Bashakill Wildlife Management Area, Catskill Park, and Junction Pool, where the Beaverkill meets the Willomec

Creek. Four strategies emerged from this chapter's analysis to support the County's historic resources: 1) Helping municipalities guide development to minimize impact on historic, scenic, recreational, and cultural resources 2) Improving existing public recreational facilities and identifying future projects 3) Encouraging expansion of trail systems to link existing open spaces and recreational resources 4) Expanding efforts to promote the County's historic, cultural, and recreational resources.

#### 4/ WATER RESOURCES - CONSUMPTION

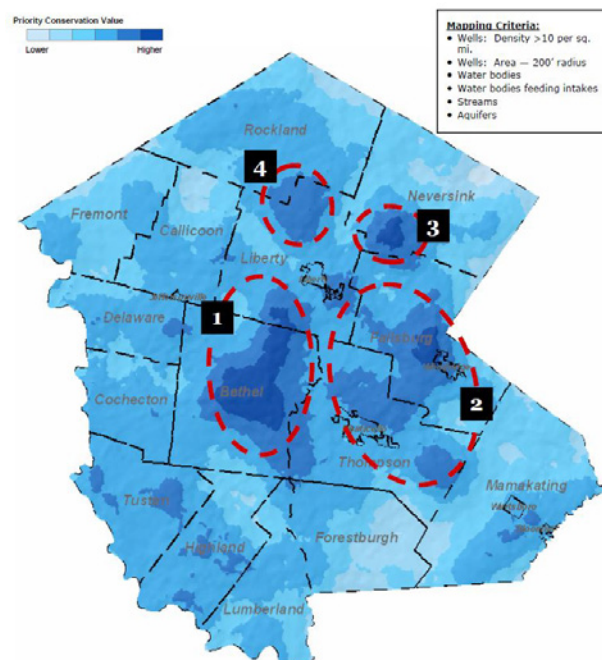
The Water Resources – Consumption Chapter prioritizes protecting and improving water quality for public health and safety as well as ensuring that the water supply is sufficient to meet future needs. The four priority areas are most in need of water protection due to high concentrations of wells, waterbodies, aquifers, and streams. For example, the Neversink Priority Area includes a reservoir that is part of the NYC water supply system and provides nearly half of the city's daily water consumption. Other water consumption Priority Areas are located in Bethel/White Lake, Fallsburg/Thompson, and Liberty. The chapter identifies five key strategies to protect water quality for consumption: 1) Creating a regularly updated, county-wide clearinghouse for water resources 2) Assisting municipalities to assess development impacts on water resources 3) Facilitating inter-municipal water resource planning 4) Ensuring infrastructure can meet future and current needs 5) Reducing non-source pollution.

#### 5/ WATER RESOURCES - FLOODING

The next chapter on Flooding highlights floodplain management by setting goals including preventing loss of property and habitat destruction, ensuring community safety, and protecting and restoring floodplains, wetlands, and riparian areas. The six Flooding Priority Areas include watercourses and watersheds with a history of severe flooding as well as floodplains facing development pressures such as the Callicoon Creek watershed and Beaverkill/Willomac Creek, as well as Ten Mile River/East Branch of the Ten Mile River/Beaver Brook Tributaries, Bashakill/Pine Kill/Shawangunk Kill, NYC Watershed/Neversink River, and Mongaup River. Floodplain management recommendations are directly informed by stakeholder feedback, in addition to analysis: 1) Limit and restrict development in floodplains and floodways 2) Promote public education on the function and protection of floodplains and wetlands 3) Help municipalities and landowners implement flood amelioration practices 4) Improve safety and maintenance of public dams.

Map of flooding Priority Areas in Sullivan County

- 1** Bethel/White Lake Priority Area
- 2** Fallsburg/Thompson Priority Area
- 3** Neversink Priority Area
- 4** Liberty Priority Area





## 6/ GROWTH AND DEVELOPMENT

In the Growth and Development chapter, the County aims to encourage conscientious development in areas that can support future growth, help communities plan for growth that is consistent with their specific features and goals, utilize the County natural resources to drive the economy, and strengthen the County's ability to target, attract, and locate compatible business and industry. Growth Priorities Areas were determined by overlapping the areas have experienced the most growth over the past 20 years and the Priority Areas determined the previous chapters. The six Priority Areas are the Route 17/ Future I-86 Corridor, Liberty Business Parks, G\_Tech Park, Water and Sewer Districts, Emerald Corporate Center, and Sullivan County International Airport. Growth and Development strategies aim for a balance between growth and conservation of open spaces and natural resources: 1) Foster partnerships to help communities create economic development plans that respond to their unique needs and natural resources. 2) Develop a comprehensive plan for the I-86 corridor 3) Encourage more compact residential development 4) Encourage businesses to maximize existing infrastructure 5) Promote the County's natural assets to attract investment 6) Improve community services and quality of life to be conducive to business development.

# Second Home Owner Study (2008)

## OVERVIEW

Based on an extensive mail survey study (sample size 1379 people), the goal of the Second Home Owner Study is to understand second home owners in Sullivan County by examining demographic trends, reasoning and information sources used by this demographic for purchasing, property locations and use patterns, travel behavior, purchasing behavior, as well as philanthropic giving.

## 1/ PROFILE OF SECOND HOME OWNERS

The following common profile has emerged for second home owners in Sullivan County based on survey results:

- Age: 55 – 74
- Race: white
- Primary home: NYC
- Family status: no children at home
- Education level: Bachelor's Degree +
- Employment status: full-time employed
- Income level: \$100,000 - \$149,000

Although Sullivan County has historically attracted second home owners from NYC, there are also a significant number of buyers from NYS including Long Island and New Jersey. 55.2% of respondents are between ages 45 and 64, which is an age cohort that has grown between 1997 and 2007. On average, second home owners earn higher incomes than full-time residents of Sullivan County. These socioeconomic differences may lead to different definitions of "quality of life", such as economic development that prioritizes employment opportunities vs. lifestyle activities. Between 2001 and 2007, the County experienced a 65% increase in second home ownership. Median ownership duration is 16 years, with 90% of respondents indicating they will not sell their home in near future.

## 2/ INFORMATION SOURCES USED BY SECOND HOME OWNERS AND WHY THEY BOUGHT HERE

The survey reveals that 47.3% of home owners heard about Sullivan County through informal networks (friends and family) or have traveled to the County in

the past. Competing second home locations include Southern states as well as New England and the Adirondack region. Most respondents (62.6%) found their homes by consulting local realtors in 2007, but technological advancements in the last 15 years have surely changed how second home buyers approach real estate in Sullivan County.

### **3/ PROPERTY LOCATION AND USE PATTERNS**

This study shows that municipalities with the highest percentage of second homeowners are those most easily accessed by I-86 (Route 17) or State Routes 17B, 42, and 52, which include Bethel (16%), Thompson (14.7%), Rockland (11.2%), and Fallsburg (11%). These results suggest that connectivity to major routes is important for home locations, while the more remote Town of Rockland allows access to several natural areas (Catskills Park, Willowemoc Wild Forest, Beaver Kill), which is also valued.

Over 50% of respondents have owned their property for 16 years or more, while around 30% of owners have owned their second home for less than six years. 64.5% of second home owners use their homes for personal use and 44.9% give access to friends and family. Approximately 60% of second home owners use their Sullivan County Property as a second home. Over 60% of respondents use their property for over 60 days throughout each year, while 30% use their second home for over 120 days every year. Most second home owners (~70%) spend most of their time at their property in summer and fall and with very infrequent use in winter.

### **4/ EMERGING ISSUES**

There are concerns amongst second home owners regarding quality of services and shopping, poor cell service, the state of town infrastructure, and high tax rates in relation to quality of services. As of 2007, there were widespread perceived shortcomings in health care facilities in the County. This could further compromise long-term home ownership for older second home owners (age 60 and above), who already have a tendency to sell their homes due to changes in health and marital status. There were also public health and air pollution concerns surrounding prospective gas drilling in the County.

### **5/ RECOMMENDATIONS AND GOALS FROM THE STUDY**

Based on insights drawn from the survey, the study puts forth the following recommendations: 1) Sustain and expand the market demand for new second home buyers in Sullivan County 2) Maintain aspects of the County that attract current and prospective second home owners 3) Capture greater economic impact from second home owners 4) Introduce strategies and policies that build productive relationships between full-time communities and second home populations.



# Wind Energy Market Assessment (2005)

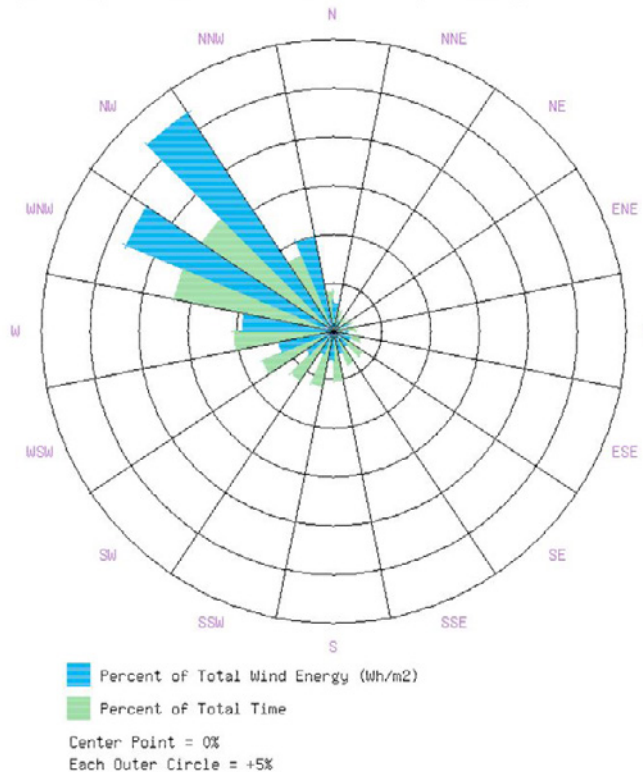
## OVERVIEW

The Wind Energy Market Assessment report provides information and strategies for pursuing wind power development in Sullivan County. The report identifies sites for utility-scale wind development and onsite or distributed generation of wind energy. It also highlights the potential of small wind and overarching marketing concepts and techniques. The assessment concludes that investing in wind energy will be conducive to the County's economic development.

## 1/ LARGE-SCALE WIND DEVELOPMENT POTENTIAL

Wind energy resources in Sullivan County

Figure 1 – Representative Wind Rose of Sullivan County's Wind Regime



There are six potential sites for utility-scale wind farm projects in the County with a maximum total capacity of 336 MW: Lily Pond, Thunder Hill, Monticello – Forestburg, Revonah Hill – Liberty, Livingston Manor 8, Callicoon – Fremont. The County can use this analysis as a tool to attract commercial wind developers, while commercial wind developers can build on this analysis to accelerate the evaluation and construction process and reduce development costs of building utility-scale wind farms.

## 2/ ONSITE GENERATION OF DISTRIBUTED WIND ENERGY

The report identifies twelve facilities - commercial, industrial or large agricultural – that are suitable for onsite wind power generation:

- Commercial: Sullivan County Community College, The Concord, Kutshers, Crystal Run Medical Center, Villa Roma 15, Bethel Woods Performing Arts Center, Lanza's Country Inn, Tennanah Lake Golf and Country Club
- Municipal water facilities: Lily Pond Rd. – Village of Liberty
- Large farms: AGY, Ackerman, Hughson
- There are numerous state and national policies that enhance market competitiveness of wind energy in comparison to conventional electricity generation. The 12 identified sites are estimated to save \$300,000 to

\$1,800,000 each over a 25-year project life span, with an approximate total of \$12,986,000 that can be saved and potentially reinvested within the County.

### **3/ SMALL WIND**

To market small wind systems, the report recommends focusing efforts on sites that exhibit optimum conditions for employing the technology. To that end, this report includes a marketing campaign that will identify and target the top 150 small wind sites in the County. An advantage of small wind turbines is that they do not have significant impact on migratory bird populations, unlike large wind turbine frames, which necessitate migratory studies. Realizing all 150 small wind sites can offset annual emissions including 3 million pounds of carbon dioxide, 13,000 pounds of sulfur dioxide, and 4,000 pounds of nitrous oxide.

### **4/ ECONOMIC DEVELOPMENT**

Sullivan County is characterized by a medium to strong wind resource, complex topography, and sufficient population density. As such, development of utility-scale wind projects would be attractive to developers, but potentially challenging in terms of construction. The report concludes that the County would significantly benefit from development of its wind resources in terms of job creation, tax revenues, land lease payments, and indirect economic output from large-scale wind farms; attracting businesses from the New York, Pennsylvania and New Jersey wind markets; providing a market space for existing businesses that have the capacity to produce components for the utility-scale wind industry; as well as providing more cost effective electricity purchasing options for residents, small farms, and large electricity consumers.

## **Sullivan 2020 Comprehensive Plan (2005)**

### **OVERVIEW**

The 2005 Comprehensive Plan includes a Tool Box consisting of two types of guiding documents, Goals and Strategies and Factsheets, which cover subjects including Open Space and Natural Resource Management, Land Use Planning and Zoning, Infrastructure, Community Development and Housing, Economic Development, and Facilities Planning.

### **1/ OPEN SPACES AND NATURAL RESOURCE MANAGEMENT**

Open Space highlights Sullivan County's significant open space assets and focuses on achieving a conscientious balance between conserving open spaces and development for sustainable growth. To achieve this goal, the Comprehensive Plan recommends creating an inventory of open spaces and natural sources, holding municipal workshops to prioritize priority areas, encouraging municipalities to include open space strategies comprehensive plans, and adopting a Countywide Open Space Plan.

Farmland Protection and Forestry seeks to maintain farmland in active agricultural use in parallel with promoting land use and zoning strategies to counter farmland conversion. There is also a sizeable forestry industry in Sullivan County, which requires sustainable forest management. Some methods for maintaining farmland and woodlands include securing priority parcels by seeking Purchase of Development (PDR), developing a local fund for acquiring agriculture conservation easements, creating a simple transfer of development rights (TDR) program and brokering it to prospective farmers and developers, and creating forestry education programs.

Water Resource Management entails maintaining water quality and quantity through Sullivan County to meet population and environmental needs. This is addressed by inventorying water resource data and identifying data gaps, developing a County comprehensive water resource management plan, creating watershed protection educational curriculums for citizens and town decision-makers, providing technical assistance to towns for reviewing codes and regulations, drafting a County-wide floodplain management and mitigation plan, and developing site design criteria to minimize development impacts on waterways.

## **2/ LAND USE PLANNING AND ZONING**

In terms of zoning, the County plan encourages mixed-use development, ensuring compatibility of design and scale with respect to local neighborhood character as well as protecting viewsheds, environmentally sensitive areas, and natural resources. The fact sheet provides a comprehensive list of zoning terms relevant to Sullivan County's existing land use conditions and questions for evaluating existing zoning.

Another Comprehensive Plan goal is to establish a Parks and Recreation System by introducing facilities that meet all the future needs of the community and providing active public recreational space within a quarter mile of all residents. In addition, increased public awareness and Park and Recreational resources are necessary to implement a community vision for open space. This chapter also provides a brief guide to trail design, recommended hiking trail standards, and funding sources for trails and greenways.

## **3/ INFRASTRUCTURE**

The Comprehensive Plan aims to establish a robust information technology infrastructure system that improves communications, access to technology, and public services throughout the County. Recommendations to enhance IT infrastructure include aligning regional efforts in bolstering County-wide IT infrastructure, expanding and upgrading telecommunications infrastructure, and improving the County government IT systems for more efficient agency operations. Out of the entire Comprehensive Plan, the state of IT and internet connectivity is most in need of updates.

Composting and Recycling aims to develop a County solid waste management plan and nutrient management plan. This can include implementing composting in recycling of agriculture, developing waste-to-energy conversion technologies, and implementing composting and recycling solid and liquid industrial waste. The fact sheet includes waste management guides for composting and liquid waste as well as information on the workings of municipal landfills and source reduction tips.

Emergency Management seeks to more efficiently manage emergency responses and reduce the risk of hazards and recurring emergencies. The Sullivan County Office of Emergency Management completed an assessment of hazard risks that concluded the highest risk hazards, including power failures, structure fires, tornadoes, ice storms, dam failures, winter storms, HAZMAT incidents, flooding, transportation accidents. In order to improve emergency management, it is recommended that the County identifies and analyzes risks and hazards throughout the County, introduces municipal risk reduction programs, strengthens County leadership in risk reduction planning, performs continual assessments of emergency management systems, reflects and evaluates past emergency responses, and implements effective emergency recovery operations such as reconstructing critical facilities and services.



Transportation goals include enhancing the efficiency of the highway system and promoting the use of public transit, walking, and bicycling. Recommendations include making selective modification to the highway network, ensuring high quality maintenance, providing infrastructure and opportunities for walking and biking, increasing public transit resources, and overall promoting a transportation system characterized by nodal, compact development and environmental consciousness. This section also provides guidelines for park-and-ride development and complete streets as well as a fact sheet on the benefits of biking.

#### **4/ COMMUNITY DEVELOPMENT AND HOUSING**

**Community Capacity Building:** In order to introduce community development policies, processes, and programs to enhance communities and neighborhoods throughout the County, the County could address quality of life issues by enabling partnerships among County, towns, and local development corporations, encouraging residential uses that minimize impact on surrounding areas, and motivating developers to adopt sustainable technologies in building construction.

**Housing:** According to the Comprehensive Plan, the availability, quality, and affordability of housing can be improved through increasing housing stock, building preservation, and code development and enforcement. Housing conditions would be enhanced through the following recommendations:

1. Promote adequate supply of housing through inter-municipal and -governmental cooperation with public-private partnerships.
2. Create incentives for large employers to provide workforce housing.
3. Provide for the development of a balanced variety of dwelling unit types and densities within the County with maximum choices of living environment, considering the needs of the public at all economic levels to enhance the overall quality of life.
4. Preserve existing housing stock by prioritizing the rehabilitation of the County's existing housing.
5. Provide housing alternatives taking into account price, tenure type, and density that meet regional housing needs.
6. Establish consistent, environmentally conscious development regulations and procedures that prioritize public health and safety standards.
7. Promote walkability from residential areas to commercial, institutional, and recreational by encouraging mix-used development.
8. Ensure that the population has access to resources on home buying, home ownership, and renting.

**Historic Preservation:** In order to preserve and protect historic sites and landscapes to foster stewardship among County residents and utilize historic resources to promote tourism in County, this chapter recommends the following:

1. Identify and inventory historic sites, landscapes, and resources in the County.
2. Include historic preservation in planning efforts.
3. Create economic incentives to further historic preservation efforts.
4. Encourage protection through thorough management of historic resources.
5. Encourage façade restoration and Main Street revitalization throughout all towns and villages.

The fact sheet on Historic Preservation includes information on the National Register of Historic Places, ways to promote archaeology, and a checklist for rehabilitating historic buildings.

**Village and Hamlet Revitalization:** The Comprehensive Plan encourages creating downtown cores that meet consumer needs, enabling small business retention and attraction, and preserving the County's rural image, quality of life, and sense of community. Village and hamlet revitalization in Sullivan County can

entail the following:

1. Develop a hamlet/village master plan.
2. Continue development of the Sullivan County Division of Planning & Community Development's "Main Street Center".
3. Improve the image and appearance of the hamlets and villages by encouraging the adoption of design guidelines and/or development standards.
4. Review and update local ordinances and regulations.
5. Creating walkable communities.
6. Extending principles of hamlet/village revitalization to surrounding corridors and community gateways.

The fact sheet includes an introduction to hamlet master plans, an overview of the benefits of local businesses, and a brief guide on the Main Street Approach.

## 5/ ECONOMIC DEVELOPMENT

**Diversified Industries:** As of 2004, Sullivan County's economy relies heavily on the service industries, with over 25.7% of the employed population employed in education, health care, and social services. Reliance on government jobs, likely due to a lack of diverse, well-paying jobs in the private sector renders the County more vulnerable to volatile trends in the housing, tourism, and social service industries. As such, diversifying employment opportunities in private entrepreneurship can be significant in addressing growth and quality of life challenges. The Comprehensive Plan prioritizes the diversification of the County's economy by attracting entrepreneurship and new businesses, while conscientiously maintaining a balance between the built and natural environment.

1. Create attractive financial incentives and sources targeting health services, research and development, light manufacturing, and professional and corporate offices.
2. Establish sites and infrastructure (in the form of shovel-ready sites) to accommodate new diversified economic development.
3. Develop partnerships with interested towns and villages to promote new niche enterprises.
4. Pursue a marketing strategy that effectively brands the County based on its marketable competitive advantages for targeted industries.
5. Link marketing of the County for business with tourism and regional marketing programs.
6. Identify and promote development of service industry sub-sectors with the potential to generate spin-off small businesses.
7. Target the second-home population as a source of potential entrepreneurs who may be enticed to develop new small businesses in Sullivan County.
8. Provide business planning assistance and entrepreneurship training on an ongoing basis.
9. Encourage the development of new small businesses that offer potential for future growth and are compatible with both rural hamlet/village environments.
10. Create business-friendly land use regulations with respect to small businesses and home occupations.

**Alternative Energy Sources:** To promote sustainable initiatives in Sullivan County that simultaneously create economic opportunities and protects natural resources, the County can consider:

1. Exploring ways in which alternative energy can act as an economic stimulant.
2. Establishing avenues for alternative energy use in agricultural settings.
3. Pursuing alternative energy industries as a means for job creation.
4. Pursuing alternative energy innovation to enhance tourism.

To support these recommendations, this chapter's fact sheet provides further information on wind power and net metering practices.

**Agricultural Diversification:** Agriculture is one of the most significant economic sectors within the County, being close or equal to the tourism sector. Sullivan County's agricultural industry comprises poultry, dairy, livestock, horticulture and aquaculture producers, with combined revenue exceeding \$60,000,000 in 2004. In addition, there is over 500,000 acres of forest in the County (93% privately owned) growing high quality hardwoods that contribute several million dollars of additional sales.

As of 2004, there were 380 active farms in the County spread across approximately 63,500 acres, with much of the County in forest use. Western Sullivan County is home to the best farmland, especially in areas including the Beechwoods and along the Delaware River. Much of the dairy is shipped to plants in New Jersey or Massachusetts for processing, while the majority of the eggs, specialty poultry, and foie gras are shipped into New York City markets.

The County can seek to innovate upon agriculture diversification strategies and sustain critical mass of farms and agricultural support services in the County by pursuing the following recommendations

1. Provide marketing and product development assistance to farmers and agri-businesses.
2. Promote direct marketing and agri-tourism.
3. Encourage alternative forms of agriculture
4. Maintain at least 30,000 acres in active agricultural use.
5. Create regional technical, professional and regulatory support network
6. Establish clear communication between agencies, municipalities and the agricultural community to avoid superfluous restrictions on the agricultural sector.
7. Provide business planning assistance to farmers, youth and agri-businesses with business
8. Clarify issues, goals, and balanced solutions at the town-level to encourage sustainable forestry as a tenable economic development option.

**Workforce Development:** For developing a sustainable workforce, Sullivan County can strengthen its existing workforce through employment programs and services, including jobs for the disabled, linking youth to jobs, providing transition to work for former welfare recipients, enforcing employee rights, and processing unemployment claims. In addition, childcare is a market sector that serves both public and private needs in Sullivan County. By providing access to affordable, high-quality childcare, parent would be able to pursue stable employment and support their families.

The following recommendation support the goal of establishing key services and support infrastructure for business development, especially childcare:

1. Develop financial incentives to encourage both employers and individuals to invest in childcare.
2. Utilize other community models and best practices to create childcare workforce training.
3. Expand job opportunities for high school graduates.
4. Support the County workforce with life-long learning and ongoing skill development.

**Tourism:** To support the County's key tourism sector, the Comprehensive Plan recommends diversifying the tourism industry with all-season activities and attractions such as eco-tourism and outdoor recreation, agri-tourism, casinos, hotels and living accommodations, and cultural and art events. Recommendations for promoting the tourism industry is as follows:

1. Preserve the natural and rural character of the County by promoting the value and benefits of protecting the County's natural resources.
2. Increase the availability of quality trails, and diverse sports and recreation areas.



3. Identify and promote places of historic significance to promote heritage tourism.
4. Encourage façade restoration and Main Street revitalization throughout all municipalities.
5. Develop high quality resorts, accommodations, service facilities and infrastructure.
6. Encourage the development of the Visual and Performing Arts.
7. Promote Agri-Tourism as a Key Tourism Sector.
8. Improve marketing for tourism in Sullivan County

**Web and Social Media Updates:** The Consultant team can host a website OR provide content for updating the County website throughout the duration of the project. In addition social media posts for Twitter, Instagram and Facebook will be prepared in the right format for each outlet.

**Arts and Cultural Development:** Arts and cultural activities are a character-defining part of Sullivan County, which have made a resurgence in the years leading up to 2004. There has been an influx of artists attracted to the area by its natural and scenic beauty as well as the historic Woodstock Music and Arts Festival. As of 2004, there were over 1000 artists in Sullivan County and active local organizations include the Delaware Valley Arts Alliance (DVVA), which hosted Jazzfest, Riverfest, the Delaware Valley Opera, and administered New York State Council on the Arts (NYSCA) and Sullivan County grants. To enhance the vitality of arts and culture, the County can expand existing and future arts and culture activities based on impact studies and expand arts and cultural programming through collaborations and resources similar to that of nearby counties.

## **6/ FACILITIES PLANNING**

**Municipal Collaboration:** To enhance coordination and cooperation among municipalities in Sullivan County to ensure efficiency and efficacy in the provision of municipal services, the Comprehensive Plan recommends the following:

1. Coordinate activities between municipal and county agencies, to ensure continuity and consistency of overall community planning and development activities.
2. Continue to identify and secure grants, loans, and other sources of state and federal funding and incentive programs.
3. Work cooperatively with municipalities regarding mutual concerns and needs in improving the overall appearance and economic sustainability of the major corridors.
4. Continue to encourage communication and collaboration among service providers to provide the most efficient and cost-effective services possible.

Sullivan County and its villages, town, special districts, and State and Federal agencies could consider establishing interagency planning teams to encourage program coordination between municipalities. These teams could develop specific procedures for:

1. Participating, reviewing and commenting on proposed plans and implementation measures to assure consistency with this Comprehensive Plan.
2. At a minimum every five years, periodically reviewing capital improvement plans, to enhance, improve and focus concurrency and consistency with this Plan.
3. Improving joint efforts to achieve greater efficiency and effectiveness in service provision.

**Integrated GIS:** The Comprehensive Plan recommends introducing an integrated County Geographical Information System to improve the management and analysis of information in Sullivan County. To realize integrated GIS, the County could create a GIS Resource Center, launch a web-based GIS application, maintain GIS applications for County GIS staff and other trained staff, maintain a centralized GIS Data Repository, and expand public access to GIS data. In 2004, Sullivan County initiated GIS upgrading efforts by analyzing and improving the use of GIS within the County government system. The fact sheet introduces GIS and its analysis capabilities as well as a guide on hosting a “GIS Day” open house event.

**Health and Human Services:** The Comprehensive Plan highlights the need to proactively build and enhance the County’s Health and Human Services as a growing economic sector, and provide socioeconomic support for the County’s diverse communities. This could be achieved by improving resident access to information about Health and Human Services, promoting the health sector as an economically viable industry, and increasing the number of health and medical professionals. The County can also aim to reduce the number of County residents dependent on Temporary Assistance for Needy Families (TANF) from 20% to 10%.

This chapter’s fact sheet covers the impacts of land use planning and community design on public health as well as an overview of the Temporary Assistance for Needy Families (TANF) program administered by the County Office of Family Assistance.

**Education:** The Comprehensive Plan seeks to support high-quality schools and libraries as key resources for residents in providing social and educational benefits, as well as being key institutions for ensuring a quality workforce. The chapter identifies challenges for education caused by limited coordination between public facilities planning and land use planning needs, limited communication and opportunities for joint-use ventures between local governments due to jurisdictional complexity, and limited financial tools for land acquisitions. In response to these challenges, it is recommended to adopt planning techniques for school expansion and new constructions, prioritize the improvement of existing school buildings, align school board facilities planning and local development initiatives, improve coordination between service providers to support school facilities as community centers, and ensure that the County’s library system can provide for the needs of a growing population.



Livingston Manor | The New York Times



# Chapter 4

## Land Use and Zoning

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# 1 / County Overview

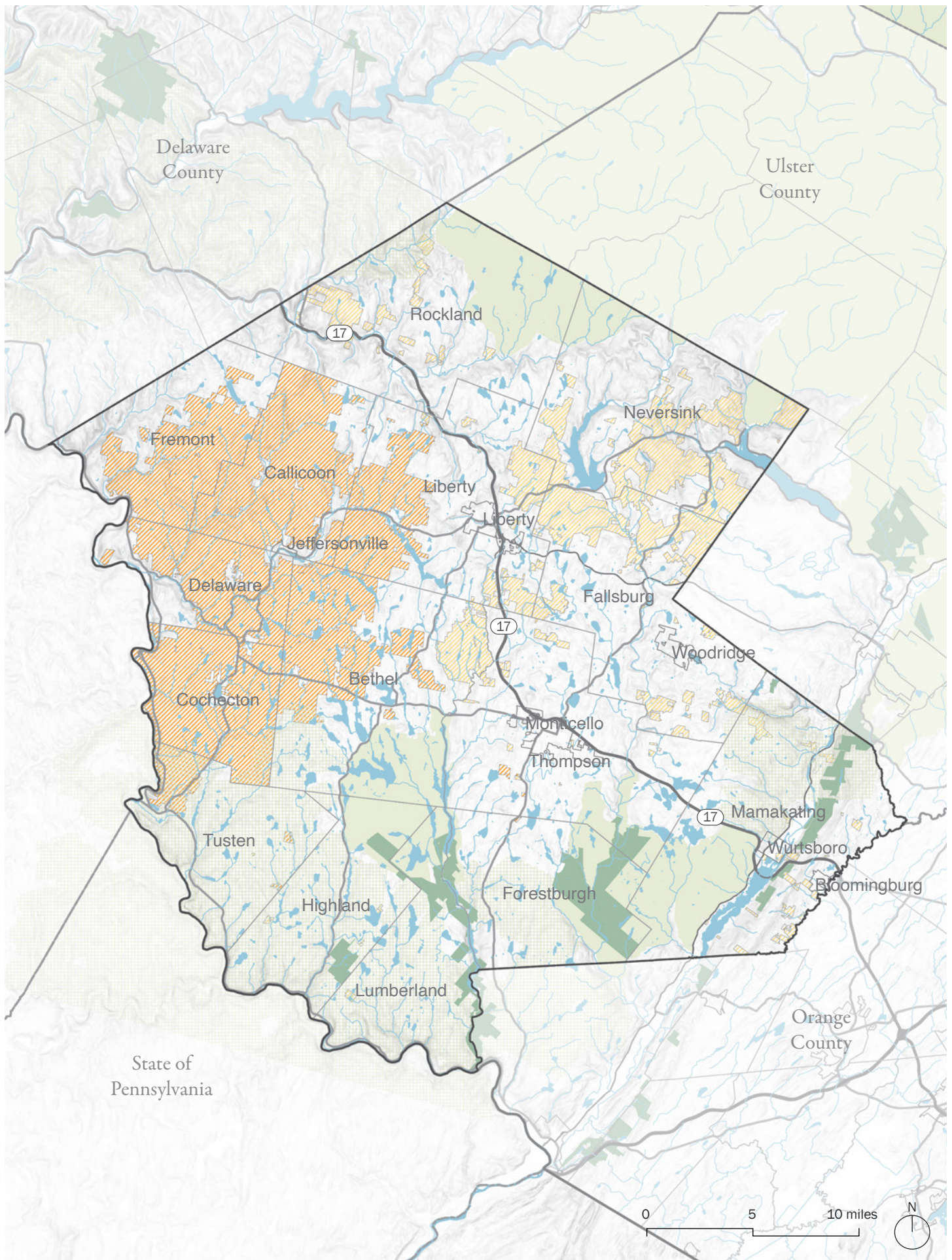
Sullivan County's location is one of its greatest assets, situated between the Delaware River in the south and west and the Catskill Mountains in the north. This location allows Sullivan County to host an abundance of valuable natural infrastructure, including untouched forests and historic farmland. Over the last century, these assets allowed Sullivan County to foster thriving tourism and farming industries, taking advantage of its natural beauty and fertile soils. Residential patterns have been largely respectful to the land, focusing on dense main-streets or low-density, low impact uses like camping and farming. These uses have allowed 30,000 acres of Sullivan County's forests to remain in the top 1% of forests in the Hudson Valley Region, due to their size, connectedness, habitat diversity, and ability to sequester carbon.<sup>1</sup>

Today, Sullivan County's assets are under threat due to changing weather patterns and the impacts of residential sprawl. Changing weather patterns have accelerated the introduction of invasive species and increased the frequency of flooding throughout the county. Inefficient land uses, sprawl, and development pressures are replacing farmland and fragmenting the forests on which the tourist industry of Sullivan County relies. These threats can be mitigated through the regulation of land use, a practice generally occurring at the municipal level in Sullivan County. Land use regulations such as zoning and design guidelines influence and determine land use and development patterns, affecting the County as a whole. Decisions made at the municipal level are inextricably linked to the environmental, economic, and community resiliency of the county, and in this chapter we will examine how.

As decision making power related to land use in Sullivan County is held at the municipal level, this plan attempts to characterize four unique municipal land use patterns in Sullivan County, based on parameters such as forest coverage, agricultural land use, population density, and municipal status: Rural Agricultural Municipalities, Rural Forestland Municipalities, Rural Suburban Municipalities, and Incorporated villages. Through these lenses we will be able to discuss the issues facing Sullivan County with a higher degree of specificity, respectful of differing development patterns and economic activities throughout the county. The specific parameters used to differentiate each development pattern are outlined in the table below. Not all municipalities fall neatly under each land use pattern and may present attributes of two or more typologies. This chapter will expand upon the unique set of resiliency challenges faced under each land use pattern and showcase a municipality within each land use pattern to demonstrate how specific municipalities are impacted by these challenges. Finally, we will discuss the strengths and weaknesses specific to each development typology outlined below.

Three "hybrid municipalities" have been identified as well, with each town containing large portions of Rural Agricultural and Rural Forestland municipalities. These municipalities include Bethel, Neversink, and Rockland.







## Development Pattern Matrix

	Rural Agricultural Municipality	Rural Forestland Municipality	Rural Suburban Municipality	Incorporated Villages Incorporated Villages
<b>NYS Agricultural District Area</b>	45-95% <sup>2</sup>	0-15% <sup>3</sup>	0-30%	0-10% <sup>4</sup>
<b>Tree Canopy</b>	50-65%	70-80%	50-80%	
<b>Population Density/ square mile</b>	20-65	10-50	125-200	400-1,800
<b>Average Lot Size (acres)</b>	13.4	14.1	7.0	1.1
<b>Impervious Surfaces</b>	0.5-1.6%	0.2-0.8%	2.5-16.2%	

*Sullivan County Resiliency Plan*

**Figure 3.1. Sullivan County  
Agricultural Districts and Forestlands**

LEGEND

AGRICULTURE

 Agricultural District 1

 Agricultural District 4

FORESTS

 Matrix Forest Blocks

 Forest Linkage Zones

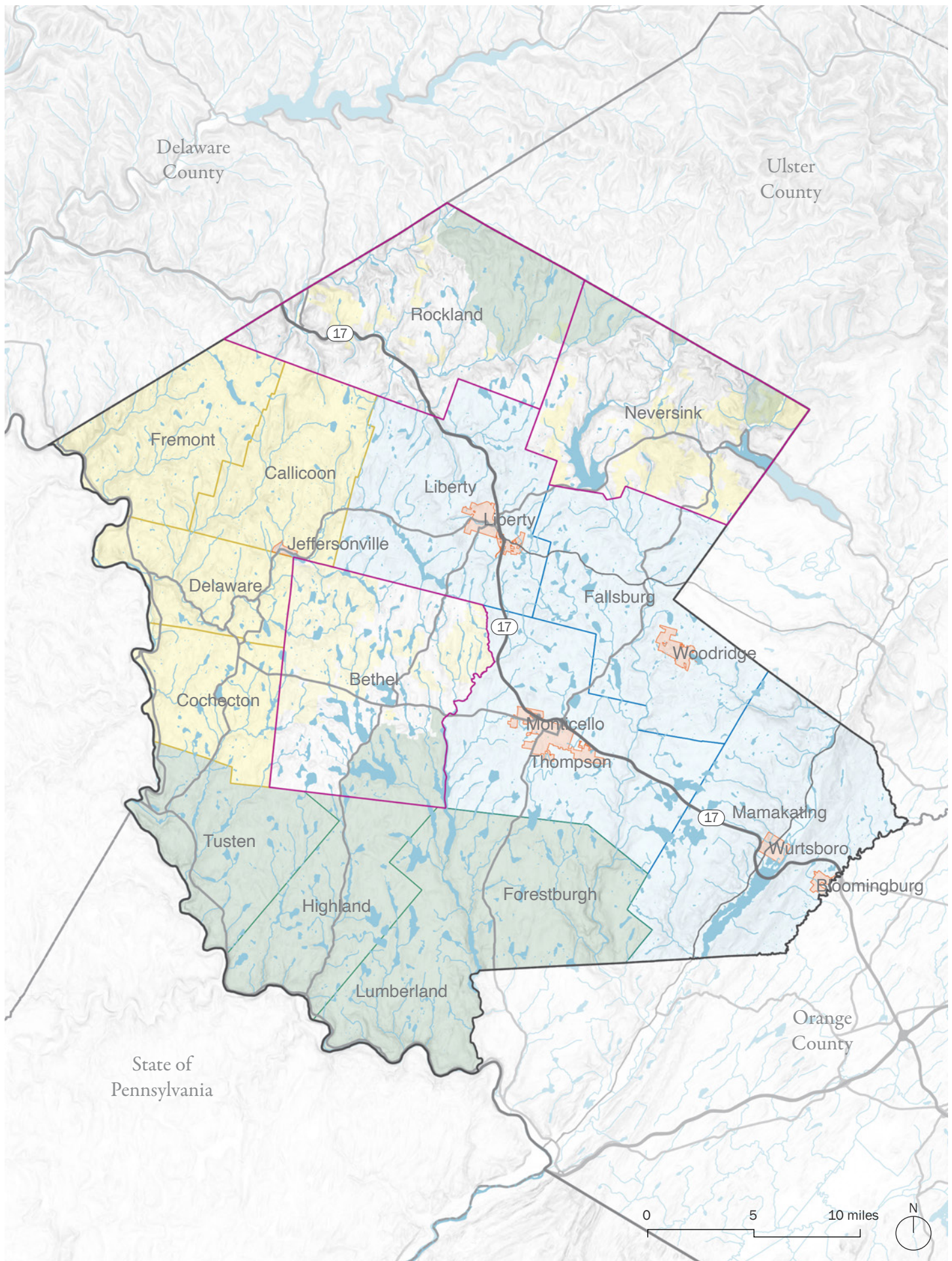
 DEC Forest Lands

WATER

 Waterbodies

 Streams / Tributaries

- 2 Fremont is the only Rural Agricultural Municipality with less than 70% agricultural district land (49.5% agricultural district area) due to a significant forested area along the East Branch of Basket Creek in the Northeast of the town.
- 3 Tusten is an outlier related to other Rural Forestland Municipalities, due to the prevalence of agricultural uses (12.3% agricultural district area) in the northwest corner of the town, to the north and east of the hamlet of Narrowsburg. All other Rural Agricultural Municipalities have less than 1% agricultural district area.
- 4 Wurtsboro is the only Incorporated Village with agricultural district land over 0.5% (6.8% agricultural district area)










# 1 / Rural Agricultural Municipalities

Sullivan County Resiliency Plan



**Figure 3.2 Sullivan County Municipal Development Patterns**

LEGEND

DEVELOPMENT TYPOLOGIES

-  Rural Agricultural
-  Rural Forestland
-  Population Centers
-  Incorporated Villages
-  Hybrid Municipalities

WATER

-  Waterbodies
-  Streams / Tributaries

Rural Agricultural Municipalities in Sullivan County are characterized by the prevalence of agricultural, farmland and rural land uses, punctuated by downtown areas associated with the county's hamlets and villages. Dominated by lot sizes greater than 10 acres, Rural Agricultural Municipalities in Sullivan County include the Town of Callicoon, the Town of Cohecton, the Town of Delaware, and the Town of Fremont, along with portions of the Town of Bethel, the Town of Rockland, the Town of Neversink, the Town of Liberty, and the Town of Fallsburg. These municipalities are concentrated in two portions of the County, corresponding to NYS-designated Agricultural Districts #1 and #4 as part of the New York State Agricultural Districts Program.<sup>5</sup> This program prioritizes viable land for farming by designating agricultural districts where municipalities may not create strict regulations which might restrict agricultural activity. Agricultural District #1, contains 74,247 acres of farmland, and makes up much of the northwestern portion of the county. This area is also called the "Beechwoods", an area with highest concentration of farms within the County. Agricultural district #4 is primarily located in the northeastern part of the County. Agricultural District #4 is a historically important farming area that contains 27,680 acres in farms.<sup>6</sup> Sullivan County's average farm size is 160 acres, significantly smaller than the national average of 400 acres.

Zoning in Rural Agricultural Municipalities generally restricts allowable residential types to one and two family homes, with smaller lot sizes in hamlets and larger lot sizes (1-2 acres) in more rural areas. Both Callicoon and Fremont, in the north of the county, maintain variable zoning for residential, requiring larger lot sizes depending on severity of slope.

## A. CHARACTERISTICS

- Greater than 45% of land within NYS Agricultural District
- Impervious surfaces making up less than 2% of land
- 50-65% tree canopy
- Population density between 20 and 65 people per square mile

## B. AGRICULTURAL MUNICIPALITY SPOTLIGHT: TOWN OF CALLICOON

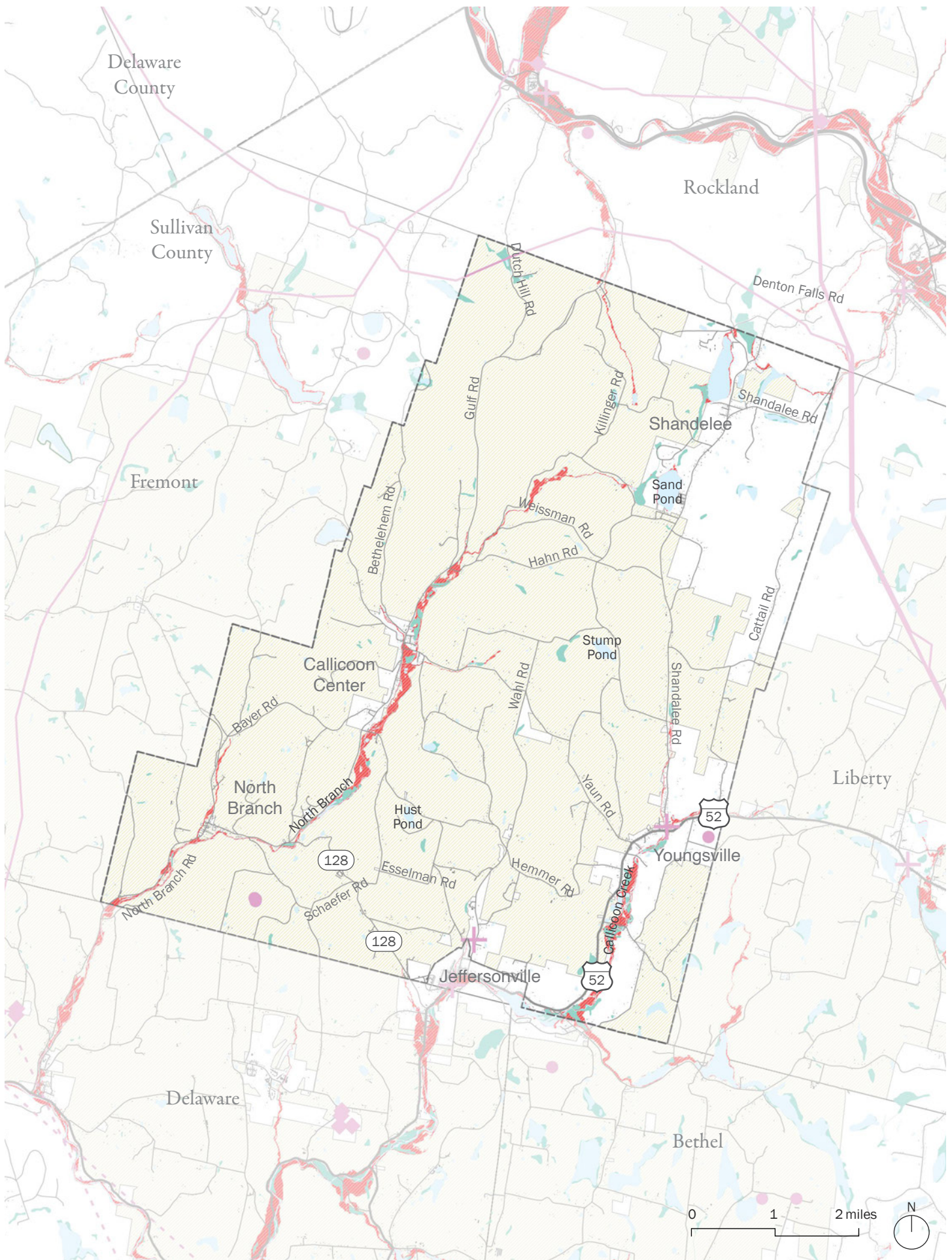
Located in the western part of Sullivan County, the Town of Callicoon is well away from the County's most developed and populous areas. Callicoon has a total land area of 31,769 acres, with agriculture as the leading land use at 49%. Approximately 80% of the total town area is located within Agricultural District #1 of the New York State Agricultural District Program, although not all land in the Agricultural District is devoted to agriculture. With the goal of preserving the farmland character of the landscape, the town's 2013 Code of Callicoon delineates five zoning districts in town:

- Conservation District (CD): Minimum lot size of 3 acres, with permitted agricultural, single-family residential and preservation-oriented uses intended to protect sensitive natural areas from overdevelopment.
- Rural District (RD): Minimum lot size of 2 acres, with permitted agricultural, single family residential and preservation-oriented uses intended to allow for growth while protecting agricultural and open space uses and preserving the rural character of the town. While permitted uses are fairly similar to the Conservation District, Rural Districts allow for different conditional uses, including multi-family homes, mobile homes,

<sup>5</sup> The NYS Agricultural Districts Program is the products of state legislature Article 25-AA of the Agriculture & Markets Law enacted in 1971 to protect and promote the availability of land for farming purposes. <https://agriculture.ny.gov/land-and-water/agricultural-districts>

<sup>6</sup> 2008 Sullivan County Open Space and Farmland Protection Plan, Sullivan County Agricultural and Farmland Protection Plan (2014)

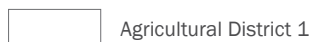




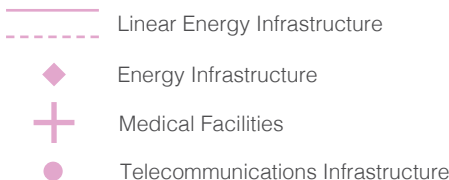
**Figure 3.3. Rural Agricultural Municipality Spotlight: Town of Callicoon**

LEGEND

AGRICULTURE



INFRASTRUCTURE



WATER



- restaurants, and retail.
- Settlement District (SD): Minimum lot size of 1 acre, with permitted agricultural, single-family, and multi-family residential uses intended to provide areas for low to medium-density residential development.
- Business Development District (BD): Minimum lot size of 1 acre, with permitted single-family residential and commercial uses intended to provide areas within the town for expansion of existing developed areas.
- Rural Business District (RB): Minimum lot size of 2 acres with permitted agricultural, single-family residential and commercial uses intended to accommodate growth under controlled conditions, preserving the rural character of the town.

The most common land use in the town of Callicoon is farmland, at 49%. Despite a decrease in the prevalence of agriculture, farm sizes are increasing. When some small farms go out of business, their land is often purchased by remaining farms, merging the land, and keeping the original farmland in production. While the minimum lot size of a conservation zone in Callicoon is 3 acres, the average farm size in Sullivan County is 160 acres. This is significantly smaller than the national average farm size of 400 acres. Furthermore, to increase farm production, many farmers lease large tracts of land from non-farming neighbors. This practice not only helps to preserve the desired rural character of the town, but also helps to maintain existing agricultural land in production.<sup>7</sup>

As discussed in Callicoon's 2013 comprehensive plan update, the town is also dedicated to the preservation of forestland, the second most prevalent land use at 40%. Much of this preservation of forestland in Callicoon as well as throughout the rest of Sullivan County occurs at the private level due to the high prevalence of private land ownership in the county. Forests are maintained by farms as a secondary land use, and by residents with large properties for reasons of privacy and recreation.

## C. RESILIENCY STRENGTHS AND WEAKNESSES

### Soil Quality

Soil quality presents both economic and environmental challenges in Sullivan County, particularly in Rural Agricultural Municipalities where farming is a prevalent land use. While around 39,000 acres of county land (6.2%) is considered "prime farmland" according to New York State, this land is primarily limited to river valleys and hilltop areas with less than 8% slope in the southeastern portion of the county. Over time, much of the topsoil in Sullivan County has lost fertility due to erosion and farming throughout the 20th century. Today, most land in these agricultural districts is classified as "Soils of Statewide Significance," indicating moderate to severe limitations that restrict the choice of plants and require special conservation or careful management. These limitations can result in increased costs and the use of environmentally detrimental synthetic fertilizers and techniques to compensate for soil deficiency. The use of synthetic fertilizer results in runoff pollution from agricultural practices, which can pose serious threats to the hydrology, soils, and drinking water supply in parts of Sullivan County.

### Groundwater Quality

The quality of Sullivan County's groundwater is a benefit to residents of Sullivan County, both to the county as a whole and to Rural Agricultural Municipalities specifically, as a significant portion of drinking water in these towns are drawn from private wells on properties not connected to a municipal water system. High quality groundwater also contributes to the suitability of Sullivan County for farming, a boon for economic resiliency.





Upper Delaware Scenic & Recreational River  
National Park

### Development Pressures

Suburban residential growth in Sullivan County has accelerated in recent years due to the high cost of living in nearby metropolitan areas like New York City as well as immigration from Latin America, often related to changing weather patterns affecting economic resiliency in the tropical region. Stakeholders mentioned two large trends: first, the increasing prevalence of remote work has allowed many young urban professionals to move to Sullivan County during the COVID-19 pandemic. Many of them have stayed, particularly in areas like Livingston Manor in the Town of Rockland. Second, the prevalence of affordable land zoned for residential during the real-estate bubble of the early 2000s has attracted interest from developers in recent years, catering primarily to members of the Brooklyn Hasidic community. Many of these zones were intended for seasonal residential/recreational uses such as resorts, and are therefore situated separate from existing residential zones in the county – an inefficient development pattern known as “leap-frog development”. Additionally, these new developments often support a larger year-round population than intended by the original zoning.<sup>8</sup> Low density development patterns required by zoning in Rural Agricultural Municipalities generates several challenges, including an increased reliance on automobiles or public transit due to limited walkability, heightened carbon emissions due to increased automobile use, and lengthened emergency response times.

Agricultural areas are particularly vulnerable to pressure from real estate and development due to the desirability of agricultural land to developers. While undeveloped forestland must be cleared prior to development, agricultural land requires only minor preparation in comparison. Coupled with declining profits from agriculture, real estate pressure on agricultural land presents a serious concern for environmental resiliency in Sullivan County.

8 <https://www.nytimes.com/2016/12/15/nyregion/builders-tried-to-rig-a-vote-and-take-over-a-village-us-indictment-says.html>



### **Agritourism**

Agritourism presents agricultural landowners with an additional source of revenue in addition to traditional agricultural land uses. While there is little detailed data on agritourism at the county level, USDA research showed agritourism tripled in revenue from 2002 to 2017. Further, downstate New York was a “hot spot” showing clusters of farms with income from agritourism, likely due to existing travel infrastructure and proximity to an urban market. More detailed state and county data will be available with the release of the 2021 Agricultural Census, but given local characteristics, there is significant potential for agritourism growth. Economic diversity is central to economic resiliency in Sullivan County.<sup>9</sup>

### **Private Water and Sewer Infrastructure**

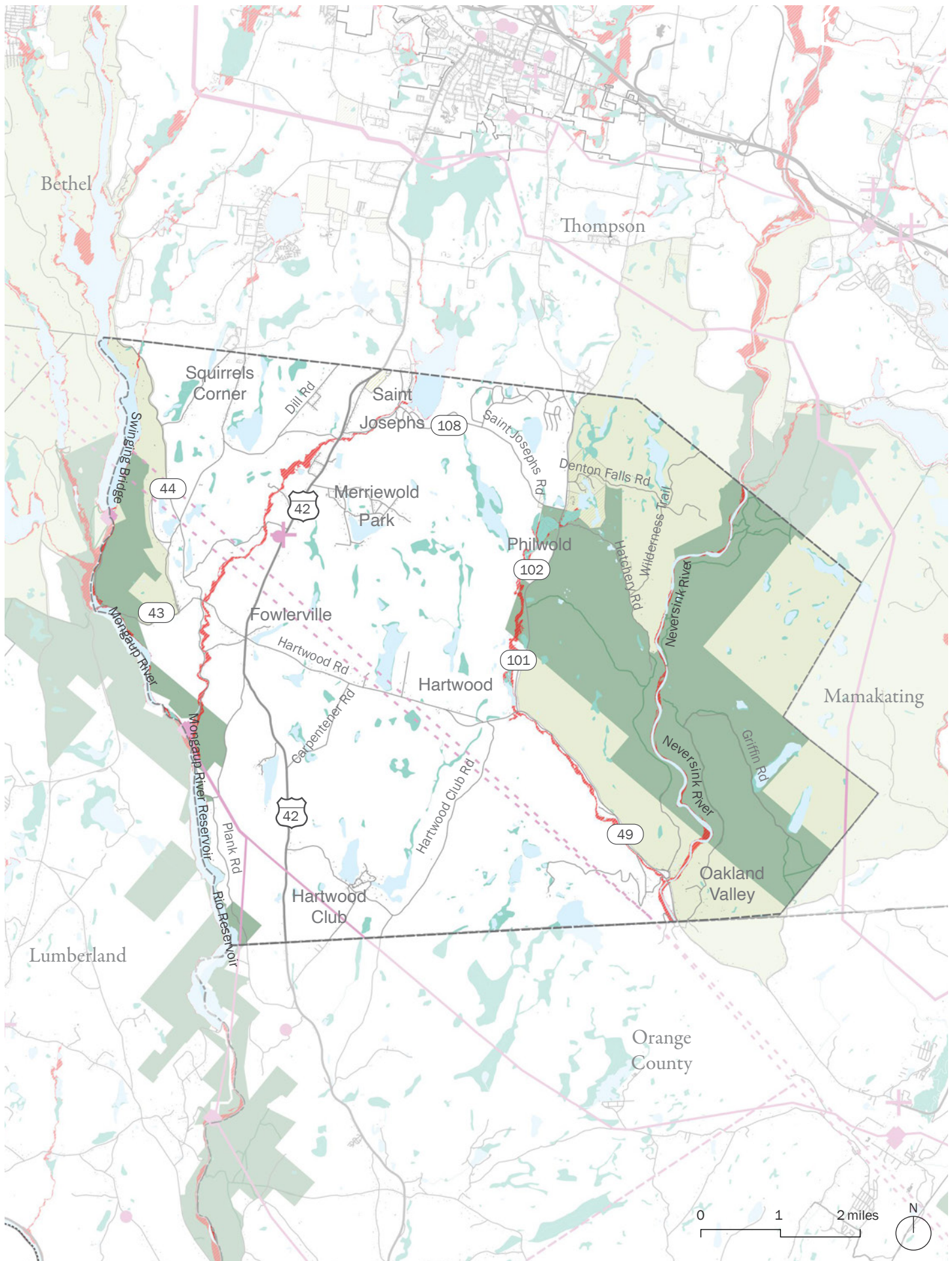
Due to the dispersed, rural nature of Rural Agricultural Municipalities in Sullivan County, most properties rely on private water management systems like wells for drinking water and septic for wastewater. While independent water systems provide benefits for their users by avoiding issues related to centralized systems, independent systems are also more likely to be severely affected by water table issues related to climate change and seasonal population fluctuation in Sullivan County. A detailed discussion about private water management systems is included in the Infrastructure Systems chapter of this plan.

### **Terrain**

Due to the prevalence of mountains and valleys in Sullivan County (particularly within Agricultural District #4), slope results in scattering of agriculture, with farms occupying areas with more level topography, allowing for less demanding crop cultivation. As discussed with the Cornell Cooperative Extension, the dispersed nature of agriculture in Sullivan County presents an economic resiliency challenge due to the inability of small farms to benefit from economies of scale. The separation of farms by large swaths of woodland presents an opportunity for forestry and associated tourist activities as a compatible use for many farms. Forestry helps the county to become more environmentally resilient through the maintenance of natural infrastructure, while diversification of income for farmers helps to buffer the economic resiliency of Sullivan County.

## **2 / Rural Forestland Municipalities**




The Rural Forestland Municipality typology is characterized by significant tree canopy and a relative lack of agricultural activity as compared to Rural Agricultural Municipalities. This typology is concentrated in the southern portion of the County along the Delaware River, as well as parts of communities in the northern portion of the county among the Catskill Mountains. Conservation uses such as forest and wildlife management are prevalent in Rural Forestland Municipalities. Residential zoning in Rural Forestland Municipalities generally allows 1 & 2 family homes, with some exceptions for multi-family homes in the area’s hamlets. Zones in Lumberland and Tusten aim to maintain the county’s tree canopy by instituting lot clearing maximums, allowing only a certain percentage of each property to have vegetation cleared. Rural Forestland Municipalities contain some of the largest individual lots in Sullivan County, with the largest average lot size of our development patterns at 14.1. Rural Forestland Municipalities in southern Sullivan County include the Town of Tusten, the Town of Highland, the Town of Lumberland, the Town of Forestburgh, and parts of the towns of Bethel and Mamakating, while the northern Rural Forestland area falls within parts of the Town of Rockland and the Town of Neversink.







**Figure 3.4. Rural Forestland Municipality Spotlight: Town of Forestburgh**

LEGEND


FORESTS

-  Matrix Forest Blocks
-  DEC Forest Lands
-  DEC Trails

INFRASTRUCTURE

-  Linear Energy Infrastructure
-  Energy Infrastructure
-  Medical Facilities
-  Telecommunications Infrastructure

WATER

-  Waterbodies
-  Streams / Tributaries
-  Wetlands
-  Flood Zones A, AE, and X500

## A. PARAMETERS

- 70-80% Tree canopy
- Less than 15% of land within a NYS Agricultural District
- Population density 10-50 people per square mile
- Impervious surfaces making up less than 1% of land

## B. FORESTLAND MUNICIPALITY SPOTLIGHT: TOWN OF FORESTBURGH

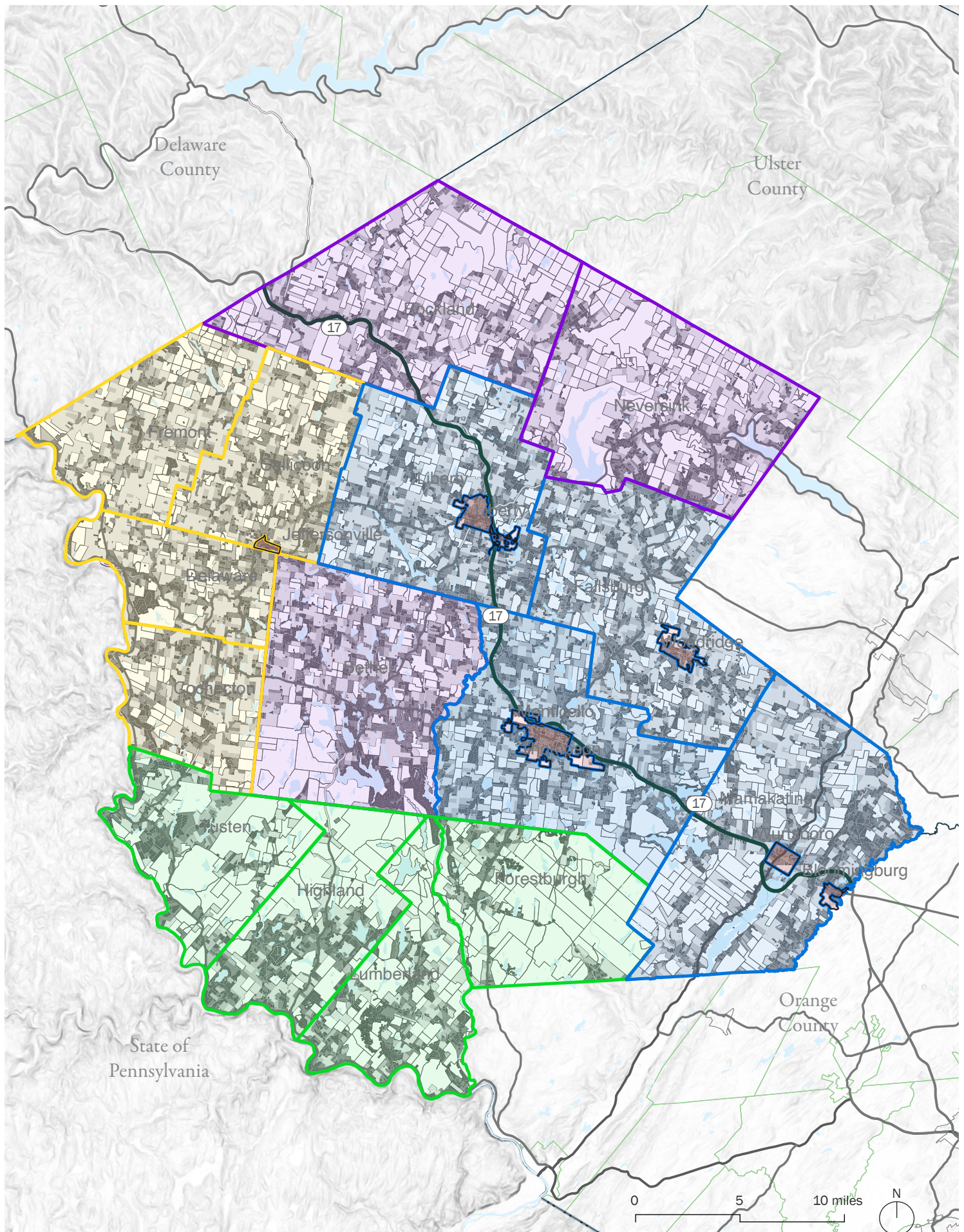
The Town of Forestburgh is located in southern Sullivan County, bordering the Town of Mamakating to the east and the Town of Lumberland to the west. Forestburgh covers 36,040 acres of chiefly forested land. Community facilities, including the Town Hall, the firehouse, the general store, the Forestburgh Theater, the Catholic Church, are located on or adjacent to NYS Route 42 between Monticello and the hamlet of Forestburgh. Land use regulations in Forestburgh are geared towards the preservation of the town's Rural Forestland character, with three zones described in the town's 2017 comprehensive plan:

- **Residential Recreational District (RR-1):** To preserve the character of the town, the vast majority of the central NY-42 corridor of Forestburgh has been designated as Rural Residential. This zone allows for one- and two-family homes, agriculture, forest management, public utilities, and non-commercial outdoor recreation, in addition to more than a dozen special uses subject to approval by the town planning board. The RR-1 zone allows for a maximum of 1 dwelling unit per lot, with a minimum lot size of 2.3 acres.
- **Rural Conservation District (RC):** The rural conservation district is focused on the preservation of natural infrastructure in Forestburgh, particularly along the Neversink River in the eastern portion of the town and the Swinging Bridge and Mongaup Falls Reservoirs in the western portion of the town. This zone allows for one- and two-family homes, forest management and wildlife management, with special uses subject to planning board approval including cabins, schools, churches, and residences on steep slopes. The RC zone allows for a maximum of 1 dwelling unit per lot, with a minimum lot size of 5 acres.
- **Business District (B-1):** The B-1 district has the smallest area in Forestburgh, with 3 designated zones along NY-42 at its intersections with the town border in the north, St. Joseph's Road, and Forestburgh Road. This zone allows for one- and two-family homes, retail and service establishments, restaurants, offices and funeral homes, with special uses subject by approval to the town planning board including but not limited to churches, schools, hotels and auction houses. The B-1 zone has a minimum lot size of 2.3 acres.

In addition to the zones described above, there is a Planned Development District comprising 2,112 acres in the northeast of the town, originally intended for construction of 2,600 units related to the cancelled Lost Lake Resort project. Since the sale of the property in 2020, this district is currently the center of a legal battle related to future development in Forestburgh.

There are many extensive private land holdings in the town: Orange and Rockland Utilities, Inc., Lake Joseph Development Corporation, the Monmouth Council of the Boy Scouts of America, the Passaic Valley Boy Scouts, the Federation of Jewish Philanthropies, Merrieworld Club Inc., and the Hartwood Club are some of the large land holders in the Town of Forestburgh. Many of these landowning businesses point to the economic nature of Rural Forestland Municipalities, which is based in large part on the tourist industry which depends on Sullivan County's abundant natural infrastructure.

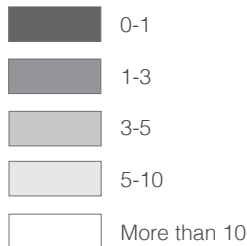




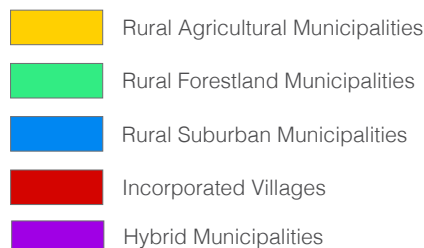
**Figure 3.5. Sullivan County Lot Sizes**

## LEGEND

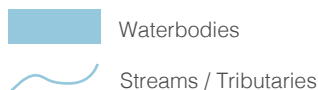
## LOT SIZE (ACRES)



## DEVELOPMENT PATTERNS



## WATER

**C. RESILIENCY STRENGTHS AND WEAKNESSES****Unfragmented Forests**

The primary benefit to resiliency from Rural Forested Municipalities in Sullivan County is the quality and quantity of uninterrupted forestland. As an important part of the county's spectacular landscape, forestland is an integral part of the tourism industry in Sullivan County. In addition to their economic benefits, unfragmented forests provide several infrastructural benefits to the county as well, including stormwater filtration, carbon sequestration, and habitat for wildlife. Forestland also protects the waters of Sullivan County by providing shade which maintains lower water temperatures, and acts as a buffer for the rest of the region, slowing the spread of invasive species. While private land owners in Sullivan County tend to be responsible stewards of its forests, low density development is of particular concern in Rural Forestland Municipalities due to the quantity of land needed to add new residential units. Forest fragmentation is of primary concern in these areas, with deforestation and roads disrupting migration patterns for local wildlife and reducing the infrastructural benefits of unfragmented forests.

The dedication of Sullivan County's Rural Forestland Municipalities to conservation of their unfragmented tracts of forestland is one of the county's greatest strengths, ensuring that the resiliency benefits of natural resources are sustained for future generations. This dedication can be seen at the municipal level through the implementation of conservation zoning as displayed by the Town of Forestburgh above but can also be seen at the federal, state, and county level through the creation of parks and protected areas, the incentivizing of conservation easements, and the review of environmental impact studies before development of additional land. As mentioned above, Rural Forestland Municipalities contain some of the largest individual lots in the county, giving property owners in this development pattern the ability to make a significant difference. Figure 3.5 shows the greatest variation in lot size in the Rural Forested Municipality area, with both small and very large lots. While the average lot size for Rural Agricultural Municipalities is similar, this variation is not seen.

There may be some correlation between large lots and wealth in Forestburgh where median income is \$148,000, but that is not likely in Tusten where the median is only \$57,000.

While low-density zoning has been quite successful at maintaining Sullivan County's unfragmented forests, it also poses equity and accessibility challenges for residents of Sullivan County. The requirement for large lots restricts the housing supply, increasing the overall cost of housing in the area. This is felt directly by employers in Rural Forestland Municipalities. For example, while much of the tourist industry in Sullivan County occurs in Rural Forestland Municipalities, most of the workforce for this industry cannot afford to live in these areas. Reliance on workers from outside of Rural Forestland Municipalities as well as the dispersed development pattern required by large-lot zoning exacerbates the county's reliance on automobiles and restricts access to employers for workers without access to automobiles or public transit.

**Conservation Programming**

Forest conservation occurs throughout Sullivan County, but particularly in the rural forested areas through a combination of public and private programs. While the state, county and municipal governments carry out maintenance of parks in the county to conserve forests, education and incentives exist to aid private forest owners in the management of their forests. Some of these programs include "Women and their Woods" a Delaware Highlands Conservancy program focused on teaching local women forest management skills, and the Conservation Reserve Program, a USDA incentive program which pays forest landowners for enrolling their lands. While the cost of maintaining forestland can be prohibitive, programs like these encourage private landowners to help contribute to the environmental resiliency of the county as a whole.



Other organizations like the Catskill Regional Invasive Species Partnership (CRISP) and Friends of the Upper Delaware River (FUDR) run educational events to teach residents of Sullivan County and the surrounding area about identification and management of invasive species which threaten its environmental resiliency.

### **Development Pressures**

As exemplified by the Lost Lake project in Forestburgh, Chestnut Ridge in Bloomingburg, and Tribeca Estates and Alpine Acres in South Fallsburg, suburban residential growth has begun to accelerate in Sullivan County in recent years due to cost of living and climate related concerns elsewhere. Rapid and sprawling development threatens to stress electrical, wastewater, and drinking water facilities already nearing capacity in many parts of Sullivan County. Similarly, rapid and sprawling development is straining natural resources in Sullivan County through deforestation and generation of pollution.

### **Groundwater Quality**

Due to the dispersed, rural nature of Rural Forestland Municipalities in Sullivan County, most properties rely on private water management systems like wells for drinking water and septic for wastewater. This reliance necessitates access to high quality groundwater, which is prevalent in Sullivan County due to the natural infrastructure benefits of the forests in the Rural Forestland Municipalities. A detailed discussion about private water management systems is included in the Infrastructure Systems chapter of this plan.

### **Flooding**

Due to their location within the county along the Delaware and Mongaup rivers as well as the steep slopes of the Catskill Mountains and river valleys, flooding is a significant issue in rural forestland communities. A severe example of flooding in Rural Forestland Municipalities are the August 2011 flash floods in Neversink, causing half a million dollars in damage. Flooding causes safety and accessibility concerns in this area as discussed in the transportation chapter of this plan.

### **Terrain**

37.8% of land in Sullivan County has a slope of 8% or greater, due to its mountains and river valleys, presenting both strengths and challenges for the county. While areas with steep slopes are difficult to develop for cost and safety reasons, the terrain of Sullivan County is important to its natural character and therefore important to the tourist industry which drives the economic resiliency of Rural Forested Municipalities. As in the example of Forestburgh above, Rural Forestland Municipalities can use Land Use Regulation to ensure that unsafe development does not occur on dangerous slopes.



## 3 / Rural Suburban Municipalities

Rural Suburban Municipalities are towns which roughly run down the center of the County and along Interstate Route 17. These towns are characterized by the presence of higher density development such as villages and hamlets as well as the beginnings of suburban sprawl. Rural Suburban Municipalities in Sullivan County are also characterized by their quaint main streets and increased levels of diversity relative to the rest of the county. These municipalities host the highest number of rentals (greater than 900 each), have the lowest rate of automobile ownership (11.2% of households without a car), and have the highest rates of poverty in the county. (14% of households below the poverty line) Rural Suburban Municipalities in Sullivan County include the Town of Liberty, Town of Thompson, Town of Fallsburg, and the Town of Mamakating.

Zoning in Rural Suburban municipalities tends to be more complex than that in Rural Agricultural or Rural Forestland Municipalities, with a wider range of residential options reflecting the higher population densities of the area. All four rural forestland municipalities maintain zoning with variable density depending on access to municipal sewer and water systems. For example, while a lot allowing single family housing within the residential district of Fallsburg within the sewer and water district has a minimum lot area of 0.5 acres, single family housing in the same district without access to sewer and water has a minimum lot size of 3 acres. Large lot zoning specific to residential uses is another strategy used by Rural Suburban municipalities to manage growth in areas for conservation like farmland and forestland. Examples include 10 acre minimums for residential uses in conservation zones in Fallsburg, Mamakating and the Town of Liberty.

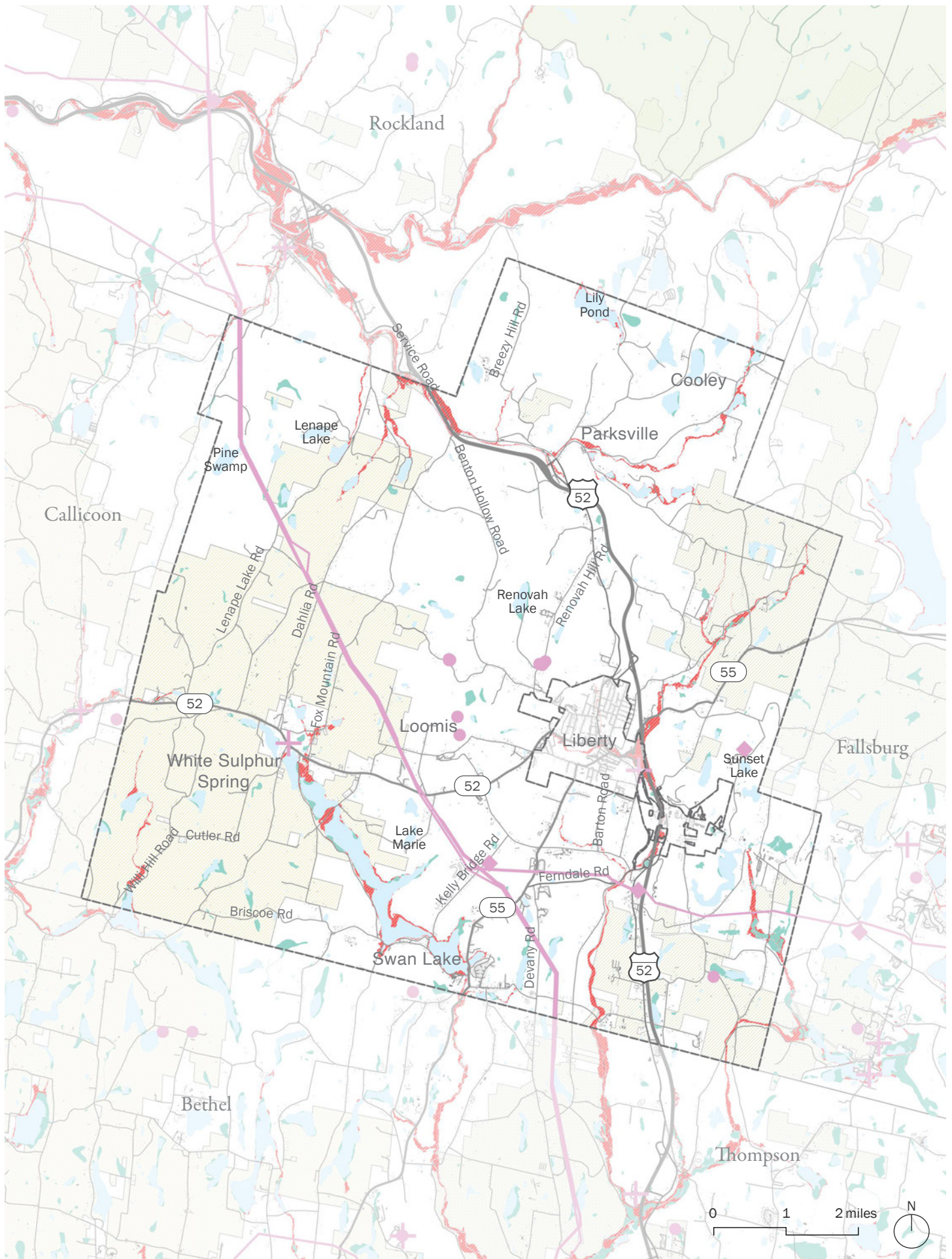
### A. PARAMETERS

- Population density between 125 and 200 per square mile.
- Area of impervious surface greater than 3%
- Less than 30% of land within a NYS Agricultural District
- 50-80% tree canopy

### B. RURAL SUBURBAN MUNICIPALITY HIGHLIGHT: TOWN OF LIBERTY

With the Village of Liberty and hamlet downtown cores such as Swan Lake and Parksville punctuating a rural landscape, the Town of Liberty is an emblematic Rural Suburban Municipality in Sullivan County. The Town of Liberty's predominant land use is rural agricultural conservation and rural and residential, along with several commercial corridors along main roads as well as two industrial/commercial corridors. Other denser land uses include small areas for resort hotel and downtown/hamlet commercial center in the southern extremity of Town. The town prioritizes economic and population growth without compromising the important natural and physical resources while maintaining its small-town character. Land in the Town of Liberty is broken down into 12 zones, with the primary underlying zoning described below:

- Agricultural/Conservation (AC): intended to encourage the preservation of agricultural land and open space. Minimum lot size 10 acres.
- Rural Development (RD & RD-2): intended to maintain the rural character of the town and provide a transition area between AC and R-1 zones through permission of camps, agricultural and low density residential uses. Minimum lot size of RD 3 acres, minimum lot size of RD-2 25 acres.
- Residential (R-1 & R-2): Liberty's residential zones allow for single-family, two-family, and multi-family residential uses adjacent to villages. Minimum lot size with access to municipal water and sewer for R-1 0.23 acres, without access to water and sewer, minimum lot size is 1 acre. The minimum lot size





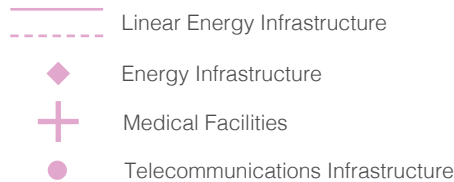
**Figure 3.6. Rural Suburban Municipality Spotlight: Town of Liberty**

## LEGEND

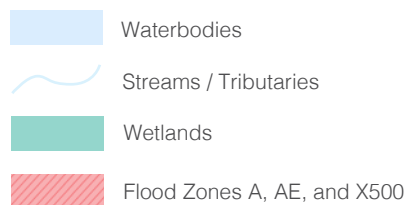
## AGRICULTURE



## INFRASTRUCTURE



## WATER



- for the R-2 zone is 0.16 acres.
- Downtown Commercial Core (DCC): intended to maintain traditional hamlet and downtown character via permitted commercial and residential uses. Minimum lot size 0.09 acres.
- Service & Industrial Commercial (SC & IC): these districts allow for commercial uses congruous with the rural residential character of the town. Minimum lot size SC 0.23 acres, minimum lot size IC 1 acre.

The Town of Liberty is centered around the Village of Liberty, and is bisected north to south by NY-17 and east to west by NY-52. Another major artery in the Town of Liberty is NY-55, which runs south from the Village of Liberty, parallel to NY-17 to the West. The primary zones in the Town of Liberty are AC and RD, with large swaths of AC in the western and northeastern sections of the town. Significant RD zoning can be found in the northern, northwestern and southwestern portion of the town. Characteristic of a rural suburban municipality in Sullivan County, the primary residential areas of the Town of Liberty are found in the area surrounding the Village of Liberty, as well as along NY-17 to the north of the village and along NY-55 to the south. SC zones are primarily located along NY-52 to the east and west of the Village of Liberty, and IC zones are located along NY-17 to the north and south.

## C. RESILIENCY STRENGTHS AND WEAKNESSES

### Limited Access to Automobile Infrastructure

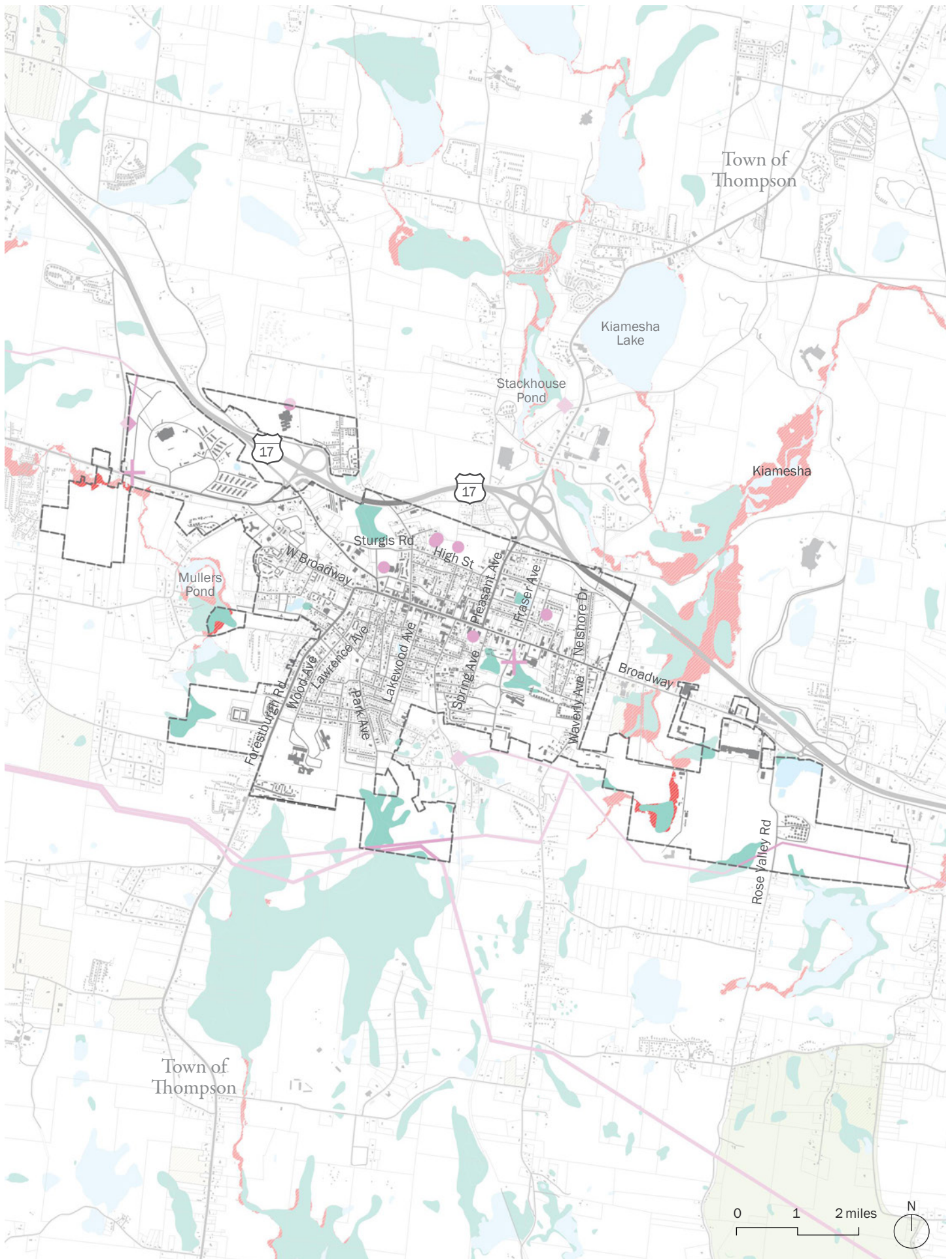
More households lack access to an automobile in Rural Suburban Municipalities than any of the other regions of Sullivan County. This presents both economic and community resiliency challenges due to the dispersed nature of social, medical and economic infrastructure throughout the county. This lack of access results in an exacerbation of issues related to job security, access to workers, and access to food and healthcare. Issues related to limited access to automobiles can be addressed through land use considerations related to last mile options for users of public transit in Rural Suburban Municipalities, allowing community members to access nearby amenities and public transit such as MOVE Sullivan, which provides access to amenities farther afield.

### Development Pressures

Suburban residential growth has begun to accelerate in Sullivan County in recent years due to cost of living and climate related concerns elsewhere. Real estate pressure is significant in Rural Suburban Municipalities due to their proximity to Sullivan County's downtown economic centers and the availability of affordable undeveloped land. Residential zoning in Rural Suburban Municipalities encourages development contiguous to incorporated villages as demonstrated by the example of the town of Liberty above. In certain instances, land for development in Rural Suburban Municipalities will be annexed into incorporated villages, as in the example of Chestnut Ridge, originally in Mamakating and incorporated into Bloomingburg in 2006. The impact of uncontrolled development is particularly dangerous to Sullivan County's economic and environmental resiliency in towns like Mamakating, where the reliance on the natural infrastructure and economic benefit of the Neversink River are paramount.

Certain developments in Rural Suburban Municipalities are developed in a sprawling, "leap-frog" pattern, farther away from incorporated villages. The threat of this development pattern presents serious challenges to Rural Suburban Municipalities in Sullivan County. From an economic perspective, "leap-frog" development results in heightened expenses related to the provision and maintenance of roads and utilities. From a community perspective, "leap-frog" development exacerbates issues related to limited automobile access discussed above. The environmental impacts of sprawling development are plethora, from inefficient allocation of natural resources to the destruction of forest and wetland areas, vital habitat for local wildlife.





## Flooding and Zoning

Flooding presents a particularly high risk in Rural Suburban Municipalities due to higher levels and density of population and development. The New York State Hazard Mitigation Planners shows multiple flooding events in each Rural Suburban Municipality. Significant floodplains are present in Thompson, Fallsburg and Mamakating, and a large floodplain can be found near the hamlet of White Sulfur Springs in the Town of Liberty. Flooding presents an economic risk to the county's businesses, utilities and municipalities, an environmental risk to local biodiversity, and a community risk to county residents affected by flooding. There are 11,000 buildings facing flood risks at the time of this plan, an issue which must be addressed through land use and planning. Adapting Sullivan County to a wetter and more volatile future should include retrofitting of buildings within the floodplain, regulations related to future construction within the floodplain, and managed retreat to mitigate the future effects of flooding. The Town of Liberty sets an example by maintaining a floodplain overlay zone, significantly reducing dangerous development within the floodplain by requiring additional permitting for construction within the floodplain.




# 4 / Incorporated Villages

Sullivan County Resiliency Plan





**Figure 3.7. Incorporated Village  
Spotlight: Village of Monticello**

LEGEND

### INFRASTRUCTURE

-  Linear Energy Infrastructure
-  Energy Infrastructure
-  Medical Facilities
-  Telecommunications Infrastructure

### WATER

-  Waterbodies
-  Streams / Tributaries
-  Wetlands
-  Flood Zones A, AE, and X500

Smaller in scale, Sullivan County's Incorporated Villages form nodes of economic activity and population density within the previously discussed towns, and throughout the predominantly rural and agricultural landscapes. Villages in New York State remain a part of the town in which they are incorporated, and village borders may change over time with the annexation of additional town land.<sup>10</sup> For example, Bloomingburg expanded in 2006 to include the Chestnut Ridge development. Villages provide additional services, denser housing types, and are typically fully served by municipal water and sewer infrastructure. As such, incorporated villages are able to support a higher density of housing than other development typologies in Sullivan County. For example, the "Residential Low Density" zone in the Village of Liberty requires a minimum lot size of 0.23 acres, more than 4 times smaller than the standard residential zone in a Rural Forestland Municipality like Highland, where the minimum lot size is 1 acre. Officially Incorporated Villages in Sullivan County include the Villages of Bloomingburg, Jeffersonville, Liberty, Monticello, Woodridge, Wurtsboro, and the newly formed village of Ateres .

## A. PARAMETERS

- Population density between 400 and 1,800 per square mile.
- Area of impervious surface greater than 3%
- Less than 10% of land within a NYS Agricultural District
- 50-80% tree canopy

## B. INCORPORATED VILLAGE HIGHLIGHT: VILLAGE OF MONTICELLO

The Village of Monticello is the seat of Sullivan County, and is characterized by high density development, smaller lot sizes and a distinct "main street" character. Monticello has a population density of 1,757.5 per square mile, second only to Liberty Village out of all municipalities in Sullivan County. Located at the crossroads of New York Routes 17 and 42, Monticello's small lot sizes and higher density development allow for a more diverse range of uses than many of the more rural municipalities in Sullivan County, resulting in 11 distinct zoning districts.

- Residential (R-1, R-2, RM, RM-MHP): Monticello’s residential zones allow for a range of residential uses throughout the Village, ranging from single family homes on minimum 10,000 sq ft lots to mobile homes to 75 foot tall apartment buildings.
- Business (B-1, B-1-O, B-2, BLI): Monticello’s business zones include fairly standard B-1 and B-2 zones allowing for retail, office uses and restaurants, as well as B-1-O zones which restrict use to office purposes. BLI districts allow for retail, wholesale and more intense business uses such as auto repair shops, gas stations, research facilities, and golf courses.
- Senior Citizen Affordable Housing Floating District (SCAHFD): This zone allows for flexibility in base zoning districts to allow for accessory uses related to senior citizen housing such as recreational facilities, laundry facilities and cafeterias.
- East Broadway Districts (EBV, EBG): These contextual districts allow the planning board extensive control over the development of Broadway to the east of Pleasant Street, by requiring special permits for most non-residential uses. Uses by special permit within the centrally located East Broadway Village district are broad, including but not limited to mixed use development, nursing homes, gas stations, hotels, schools, hospitals and retail. The East Broadway Gateway district exists as a buffer between the EBV district and the Town of Thompson, and permits agricultural uses without a special permit, while requiring a special permit for uses such as mixed use development, gas stations, hotels, warehouses and retail.

In common with many of the other incorporated villages in Sullivan County, Monticello is anchored by its main street, Broadway. The B-1 & B-2 districts to the west of Pleasant Street encourage the walkable, small-town character which is an asset to the county’s tourist industry as well as accessibility for local residents. Broadway also functions as a major thoroughfare to connect Monticello to the rest of the region and its amenities. The downtown core is surrounded by non-retail office districts to the north and south, as well as single- and multi-family residential zones. Monticello is also notable for the Monticello Raceway, a harness racing track located in the northwestern B-1 district.

In 2015, a zoning amendment permitted upper story residential uses in the downtown business district for the first time in over 30 years. As of 2015, upper story residential uses are permitted in buildings in the downtown business district. As such, there is developable affordable mixed-use space in the downtown core.<sup>11</sup> While Monticello is situated near rural conservation zoning districts in the Town of Thompson, Monticello provides very limited access to open space for residents without automobile access, with two small parks: Bailey Commons, a quarter-mile trail; and De Hoyas Memorial Park and Pond, east of the downtown core.<sup>12</sup>

While the land on Broadway to the east of Pleasant Street was formerly zoned for Business Light Industry, resulting in the beginnings of sprawl type development, recent land use in Monticello has been influenced by the 2019 “Grow the Gateways Corridor Study.” In response, Monticello instituted the East Broadway Village and Gateway district rezonings described above, which seek to encourage contextual, sustainable development in areas of the village which see significant local and regional traffic.



## C. RESILIENCY STRENGTHS AND WEAKNESSES

### Development Pressures

As described earlier in this chapter, all regions of Sullivan County are experiencing increasing populations and subsequent real estate pressure due to cost of living and climate issues in the surrounding region. Unchecked, this growth presents community, economic and environmental threats to Sullivan County's villages, as sprawl-style growth generates diverse issues including but not limited to accessibility issues for residents without access to automobiles, environmental issues related to the proliferation of impermeable surfaces and increased emissions from automobiles, health issues related to heat islands and increased emissions, and economic issues related to inflexible retail uses like big box stores. Land use regulations like those implemented by Monticello demonstrate how other municipalities in the county can harness the opportunity presented by growth to benefit the resiliency of the community, economy and environment. Walkable downtowns reduce the amount of driving required to visit multiple establishments, thus mitigating the emissions-related issues discussed above, and require less parking, mitigating environmental challenges. Walkable downtown spaces also provide a more accessible option for all residents of Sullivan County to congregate and do business. Finally, development which meshes with the existing downtown character strengthens Sullivan County's main streets, a draw for the tourist industry.

### Flooding and Zoning

All 6 Incorporated Villages in Sullivan County include land within the Sullivan County's floodplains. As the County's top environmental risk, flooding can be addressed through land use and planning. While village codes do regulate construction within the floodplain to varying extents, existing buildings within the floodplain face risk of damage due to increasing frequency and severity of flooding.

### Urban Heat Island Effect

Due to existing density and prevalence of impervious surfaces in incorporated villages in Sullivan County, there are urban heat island effects in the Villages of Bloomingburg, Liberty, Monticello, and Wurtsboro, where surfaces like roads, parking lots, sidewalks, and roofs capture and re-emit heat from the sun, resulting in temperatures 1-7 degrees hotter than the surrounding.<sup>13</sup> Heat islands result in higher energy use for air-conditioning in the summer, straining Sullivan County's energy infrastructure and contributing to blackouts and brownouts. Heat islands also present a community resiliency challenge related to health outcomes particularly for vulnerable populations like children and the elderly.

# Chapter 5

## Socioeconomic Characteristics and Economy

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# 1 / Socioeconomics

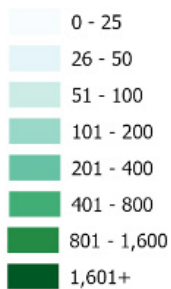
People are the greatest asset of any community. The following inventory of the population and its demographic characteristics, as well as the housing and economic systems that protect and support them is key to creating an inclusive and equitable resiliency plan for Sullivan County.

## POPULATION

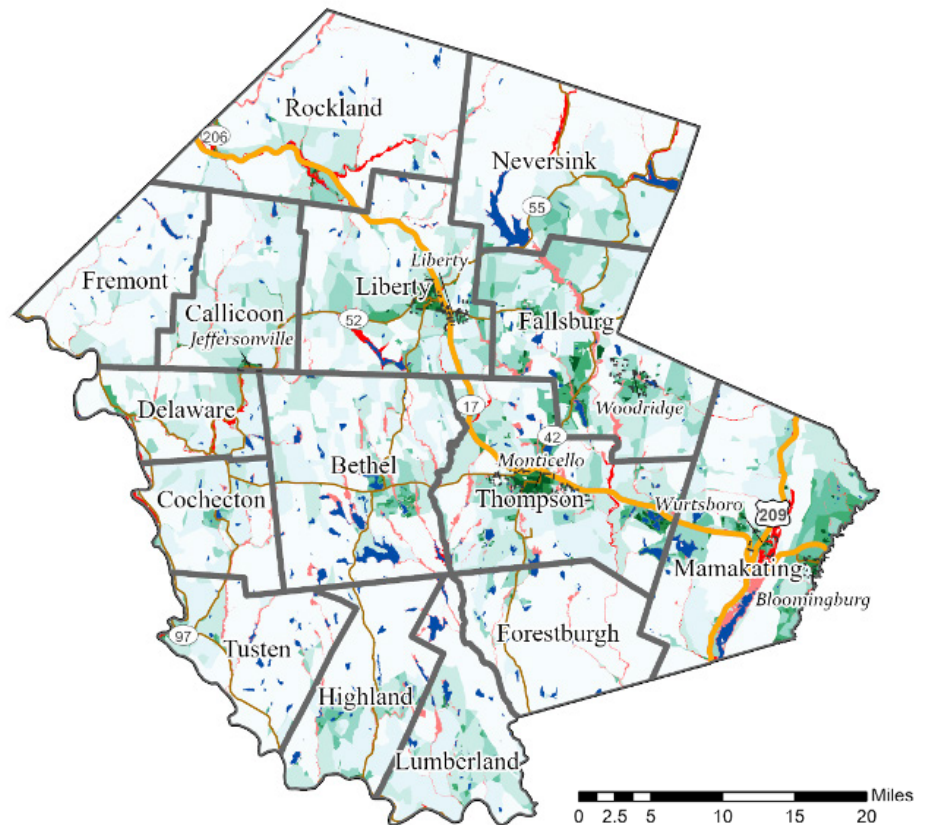
Sullivan County is made up of 15 towns and six villages. The County had a population of 79,806 residents according to the US Census Bureau's July 1 annual population estimates program, up from 78,643 in 2020. The County is largely rural with population concentrated in the villages and core hamlets of each town. The map that follows shows population density throughout the County overlaid with FEMA flood hazard data.

*Figure 4.1 Population Density, 2020, Per Sq. Mile, by Census Block*

Sources: US Census Bureau, 2020 Decennial Census P.L. 94-171 Redistricting Data; FEMA, National Flood Hazard Layer, 2021.



### FEMA Flood Hazard Risk, 2021



## AGE

The county's population by age is equally distributed among the five primary age groupings: children (0-17), young adults (18-34), prime working age (35-49), older working age (50-64), and seniors (65+). When compared to New York State, Sullivan County has a greater share of children at 21.4 percent to the State's 20.4 percent. It also has higher shares of older working age and seniors as shown in the chart that follows. The County lags behind the State in shares of young and prime working-age adults, both important labor force cohorts. Both children and seniors are considered vulnerable populations.



**Figure 4.2. Population by Age Cohort**

Source: US Census Bureau, ACS, 2017-2021  
5-Year Estimate

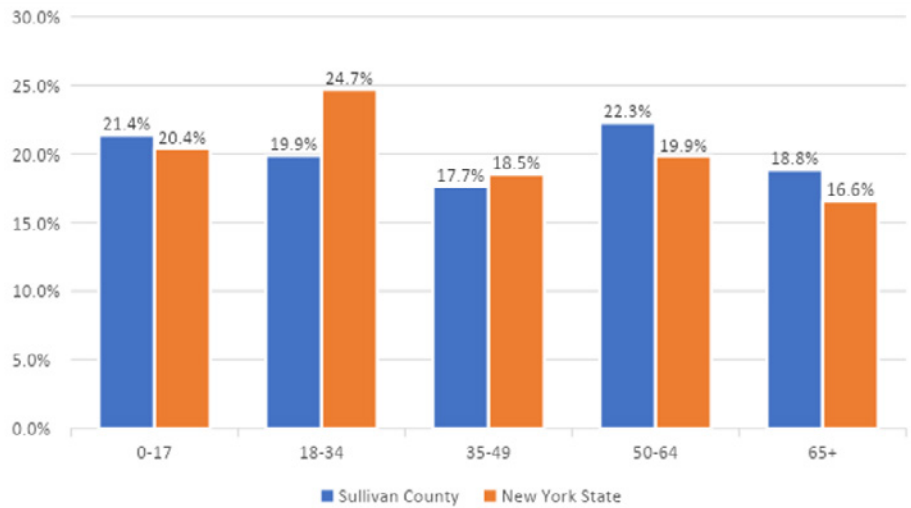
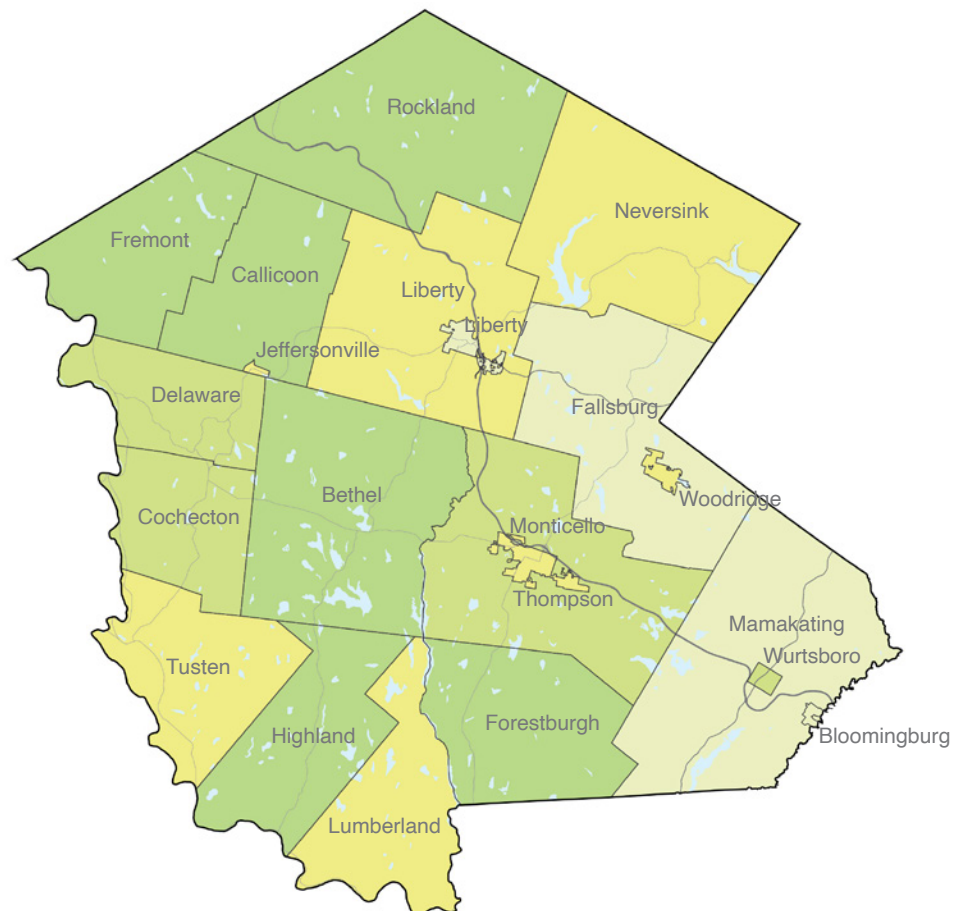
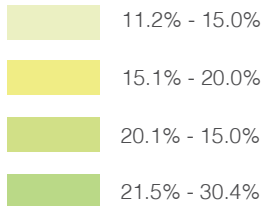


Figure 4.3 shows the share of population per town or village that is age 65 or older. Six towns have between 25 and 30 percent of their populations 65 and older: Bethel (27.6%), Callicoon (25.3%), Forestburg (28.5%), Fremont (27.9%), Highland (26.1%), and Rockland (30.4%). The villages of Bloomingburg and Liberty, and the towns of Fallsburg and Mamakating have the lowest shares of senior populations at 11.2%, 13.7%, 13.1%, and 13.8%, respectively.

**Figure 4.3. Population 65+ by Town/village, 2021**

Source: US Census Bureau, ACS, 2017-2021  
5-Year Estimate

**LEGEND**

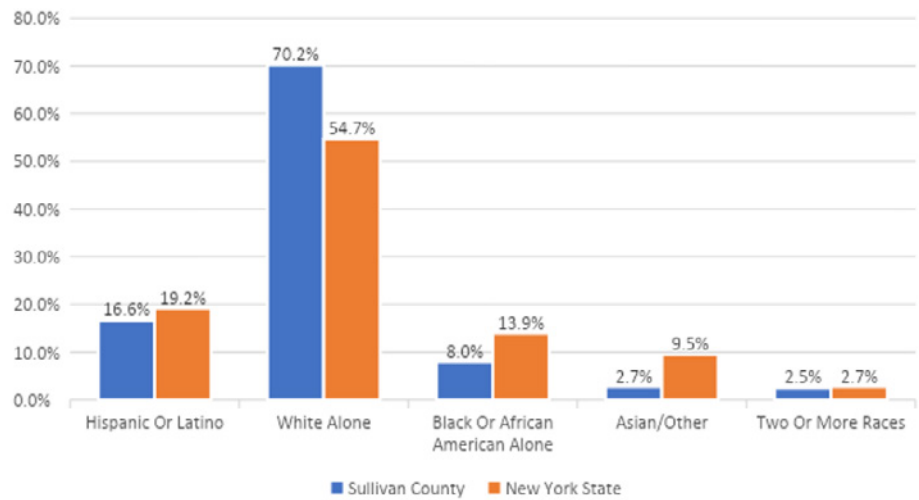


**RACE/ETHNICITY**

As shown in Figure 4.4, Sullivan County is considerably less diverse than New York State as a whole, with 70.2 percent of the population identifying as white, non-Hispanic. Communities of color are often underserved in the United States and are the people last and least-served in emergency situations as evidenced by the current COVID-19 public health emergency. Just 16.5% of the population

identifies as Hispanic or Latino, 8.0% as Black or African American, 2.7% as Asian, Pacific Islander, or Native American, and 2.5% of the population self-identified as 2 or more races.

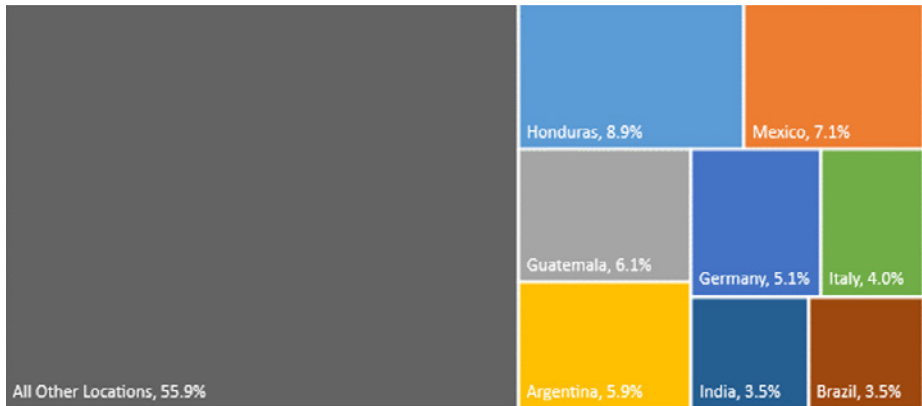
*Figure 4.4 Population by Mutually Exclusive Race/Ethnicity*  
Source: US Census Bureau, ACS, 2017-2021 5-Year Estimate



**NATIVITY AND LINGUISTIC ISOLATION**

Just under 10 percent (7,699) of Sullivan County residents were born outside of the US and its territories according to estimates from the US Census Bureau’s most recent 5-year American Community Survey (ACS). The largest concentrations of resident immigrants are from Latin America, including Honduras (8.9% of total foreign-born), Mexico (7.1%), Guatemala (6.1%), Argentina (5.9%), and Brazil (3.5%). Germany, Italy, and India (5.1%, 4.0%, and 3.5%, respectively) round out the top nine. The remaining 4,300 foreign-born residents come from countries ranging from China and Korea to the United Kingdom, Haiti and Jamaica, Poland, and Ukraine.

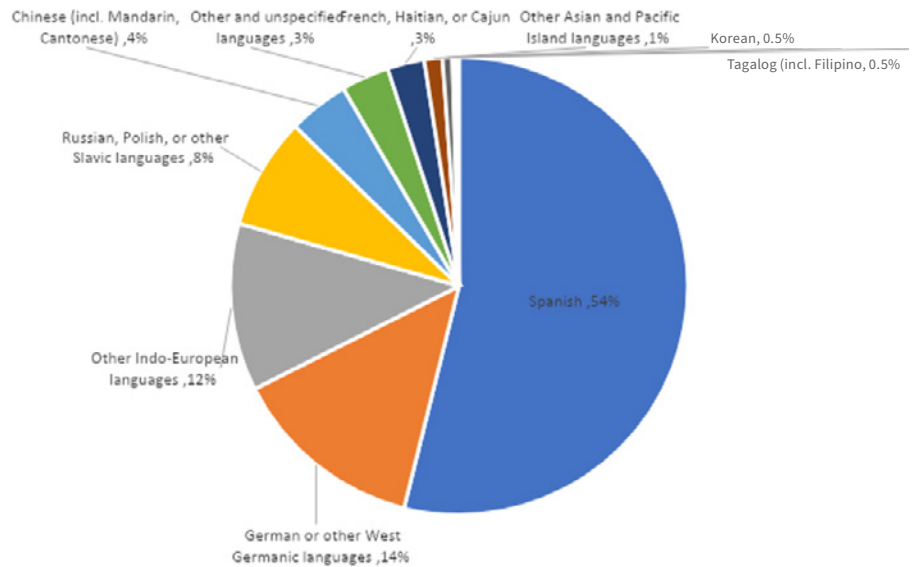
*Figure 4.5. Place of Birth of Foreign-Born Population: Sullivan County 2021*  
Source: US Census Bureau, ACS, 2017-2021 5-Year Estimate



More crucial to resiliency than nativity is linguistic isolation. Some 12,500 Sullivan residents (16.9%) speak a language other than English at home. The Figure that follows shows the diversity of those languages. Spanish is the most common language spoken at home (6,715 persons, or 53.9%). German or other West Germanic, Other Indo-European, and Other and Unspecified languages, which include Yiddish and Hebrew, are spoken at home by a combined total of 3,600 or 29% of county residents. Russian, Polish, and other Slavic languages are spoken by 7.9% of residents, Chinese by 4.3%, and French, Haitian, or Cajun by 2.6%.

**Figure 4.6. Language (Other than English) Spoken at Home: Sullivan County 2021**

Source: US Census Bureau, ACS, 2017-2021 5-Year Estimate

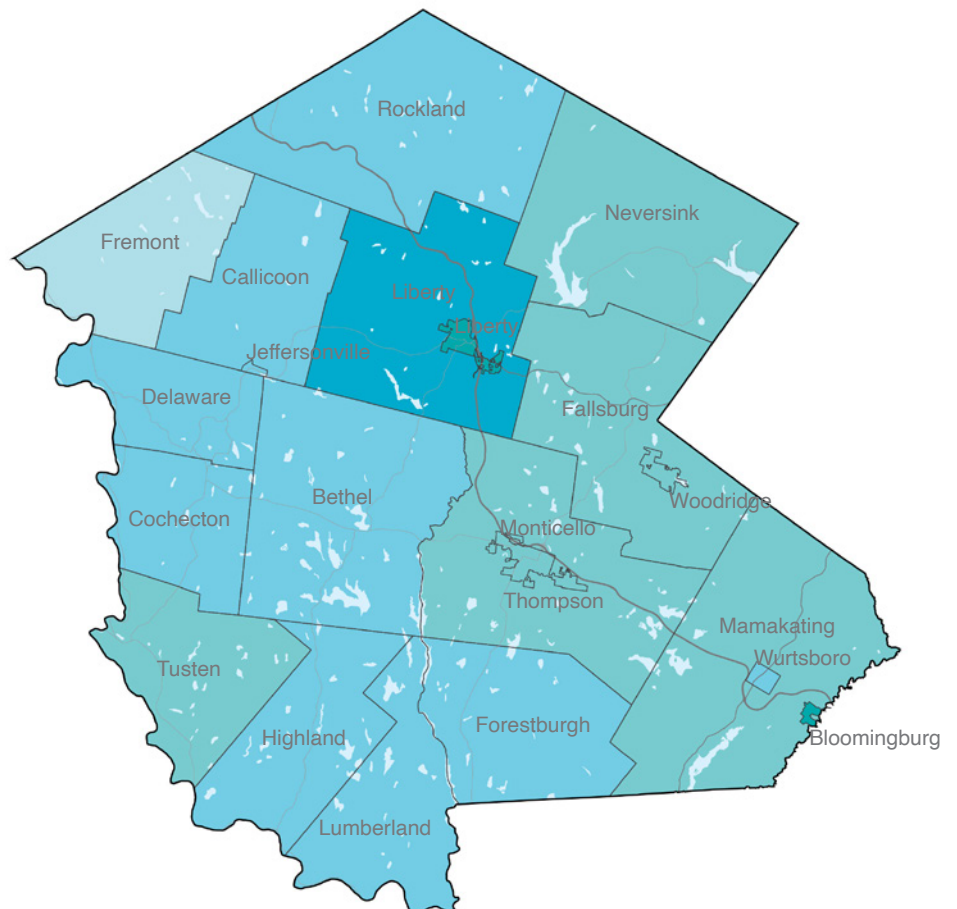
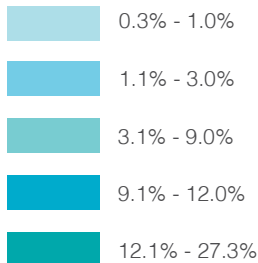


While there are a number of languages spoken in Sullivan County other than English, only one third of those who speak these languages at home (4,318) are in the linguistically isolated category of speaking English “less than very well” and as such are in danger of not being able to understand official instructions in emergency situations. As shown in Figure 4.7, this is the case in the villages of Liberty and Bloomingburg, where 16.2 percent and 27.3 percent, respectively, speak English “less than well” according to the ACS.

**Figure 4.7. Percent of Town/Village Population that Speak English Less than Well**

Source: US Census Bureau, ACS, 2017 -2021 5-Year Estimate

**LEGEND**





## 2 / Households

There are 28,816 households in Sullivan County according to the latest estimates from the ACS.

### FORMATION AND SIZE

Single-person elderly households and households with children under 18, especially those with only one adult, are considered vulnerable. As shown in Figure 4.8, 31.7% of Sullivan County households are single-person, of which almost half are residents age 65 or older. Another 8,254 households (28.6%) include children under the age of 18; of these, roughly two in five are single-parent families.

*Figure 4.8. Households by Type and Size: Sullivan County 2021*

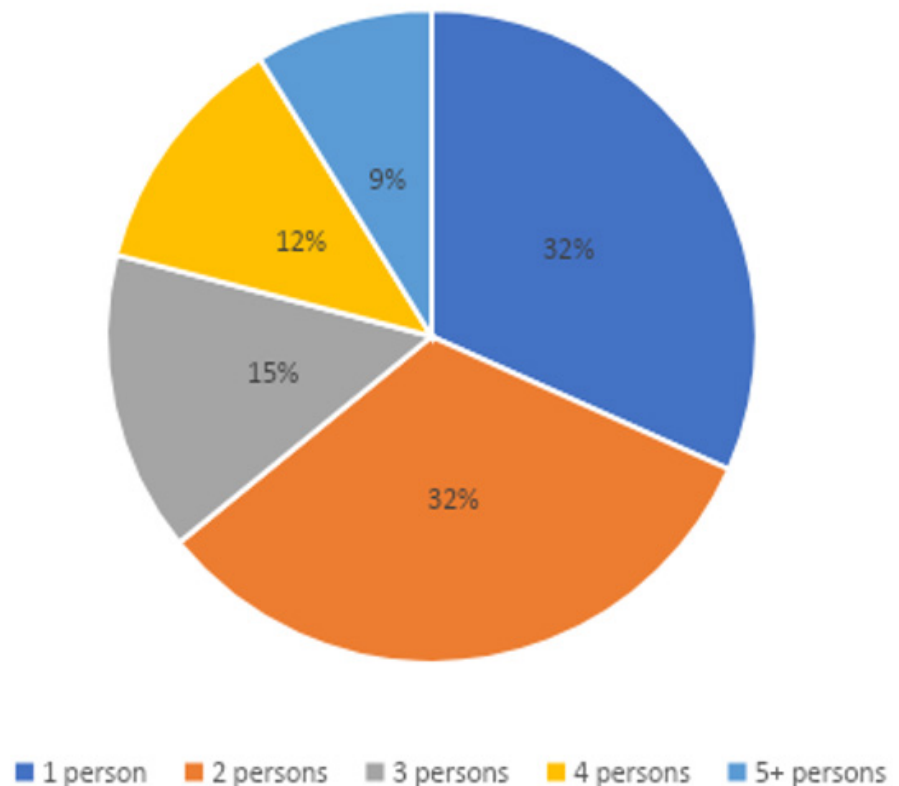
Source: US Census Bureau, ACS, 2017-2021 5-Year Estimate

Households by Type	Sullivan County		
	Count	% Share of Total	% Share of Subtotal
Total Households	28,816	100.0%	
Single-Person	9,129	31.7%	100.0%
Householder <65 Years of Age	4,778	16.6%	52.3%
Householder 65+ Years of Age	4,351	15.1%	47.7%
Multi-Person	19,687	68.3%	100.0%
Householder <65 Years of Age	15,013	52.1%	76.3%
Householder 65+ Years of Age	4,674	16.2%	23.7%
Hshlds with Children Under Age 18	8,254	28.6%	100.0%
Married Couple Families	4,947	17.2%	59.9%
Single Parent Families	3,227	11.2%	39.1%
Hshlds without Children Under Age 18	20,562	71.4%	100.0%
Married Couple Families	7,446	25.8%	36.2%
Single Parent Families	2,039	7.1%	9.9%
Nonfamily Households	11,077	38.4%	53.9%

### HOUSEHOLD SIZE

The average household size in Sullivan County is 2.54 persons per household, compared to 2.6 persons per household in New York State as a whole. As shown in Figure 4.9 on the next page, while 21.0 percent of households have four-or-more residents, this is balanced by the 31.7 percent of Sullivan County's households that include individuals living alone.

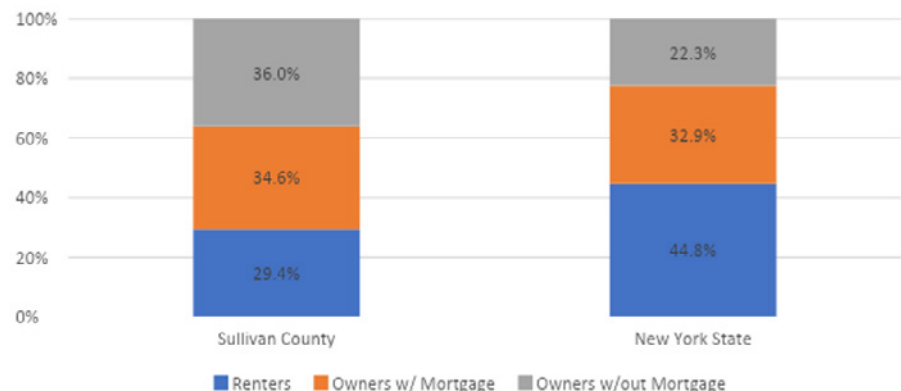
**Figure 4.9. Households by Number of Persons: Sullivan County 2021**  
Source: US Census Bureau, ACS, 2017-2021 5-Year Estimate



### TENURE

Housing tenure is an indicator of the potential economic resiliency of a household. Households that need to make monthly rent or mortgage payments have fewer available resources for use in emergencies. An estimated 70.6 percent of the households in Sullivan County are owner-occupied, compared to only 55.2 percent in New York State as a whole. However, while a smaller share than New York State's, almost half of owners make monthly mortgage payments. Just under two-thirds (64%) of Sullivan County households make monthly housing payments.

**Figure 4.10. Households by Tenure: Sullivan County and New York State 2021**  
Source: US Census Bureau, ACS, 2017-2021 5-Year Estimate



### INCOME

Sullivan County is less affluent than New York State as a whole. As shown in Figure 4.11, greater shares of Sullivan households are in the two lowest income categories 40.6% earn less than \$50,000, and 30.5% earn between \$50,000 and \$99,999, compared to 35.0% and 26.6% of New York State's households, respectively. Lower income households are less resilient because they generally lack the resources and/or savings needed to bridge the gaps in income that can occur due to disruptive events, be it weather closures, power outages, or pandemic shutdowns all of which may require temporary relocations from homes and

disruptions to employment. In the case of emergencies, there is a tendency to rely on credit cards. Low-income households have lower borrowing capabilities with credit limits and higher interest rates, which drives up debt at a greater rate than wealthier households who have higher borrowing limits and lower interest rates. This creates difficulties for single-income families as well, where the primary income earner may have decent borrowing limits on a credit card while the low-income earner may be incapable of depending on a credit card while in an emergency.

*Figure 4.11. Households by Income Distribution: Sullivan County and New York State 2021*

Source: US Census Bureau, ACS, 2017-2021 5-Year Estimate

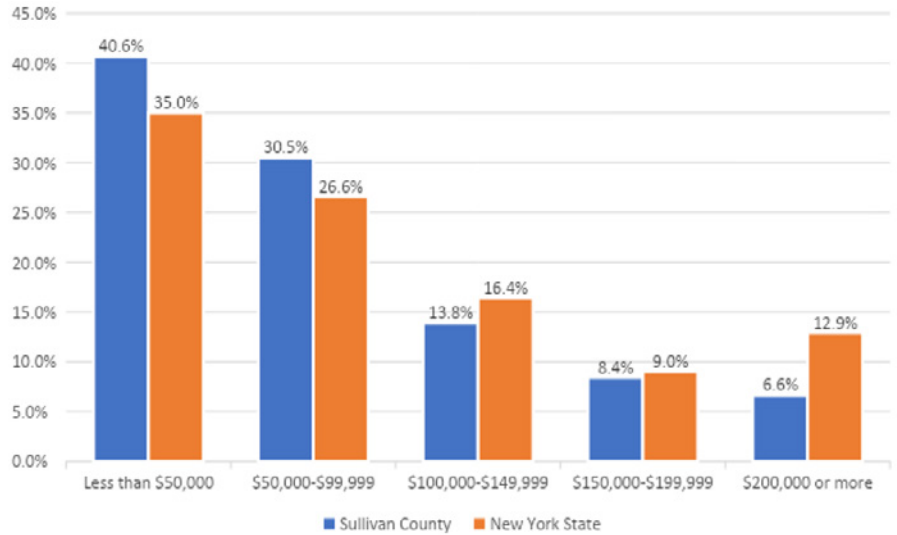
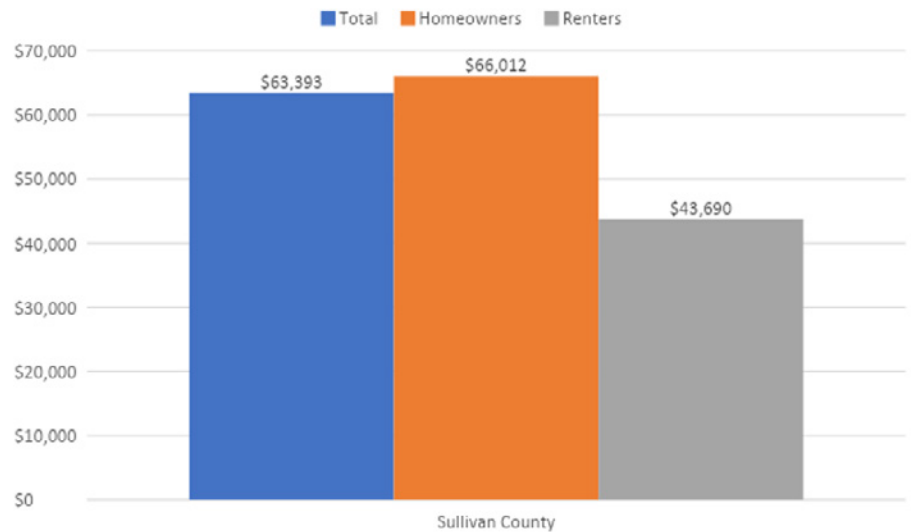


Figure 4.12 looks at income in conjunction with housing tenure. The median income (or middle-tier income level, meaning half of households have higher incomes and half lower) in Sullivan County is \$63,393. Homeowners have a slightly higher median at \$66,012. The renter median income level however, is only \$43,690.

*Figure 4.12. Median Income by Housing Tenure: Sullivan County 2021*

Source: US Census Bureau, ACS, 2017-2021 5-Year Estimate



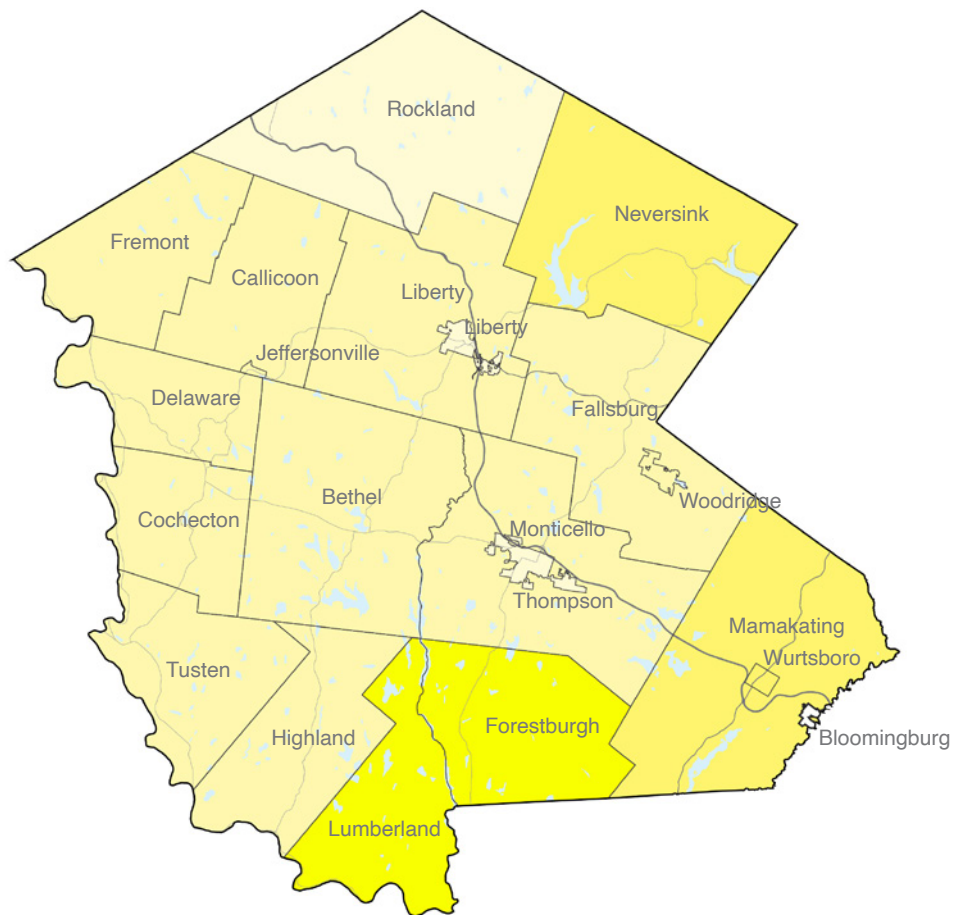
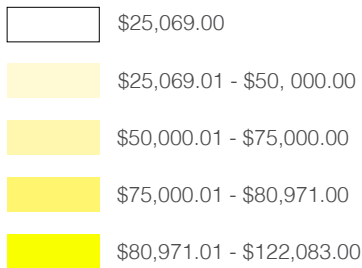
The figure that follows presents the median income of each individual town and village in Sullivan County for 2021. The Village of Bloomingburg, along with having the greatest degree of linguistic isolation, also has the lowest median household income at only \$25,069; for Bloomingburg renters, the median income is even lower, at \$22,969. The Villages of Liberty and Monticello also have median incomes that indicate local households are particularly vulnerable to disruptive events at \$34,651 and \$38,885, respectively.



**Figure 4.13. Median Household Income by Town/Village**

Source: US Census Bureau, ACS, 2017-2021 5-Year Estimate

**LEGEND**

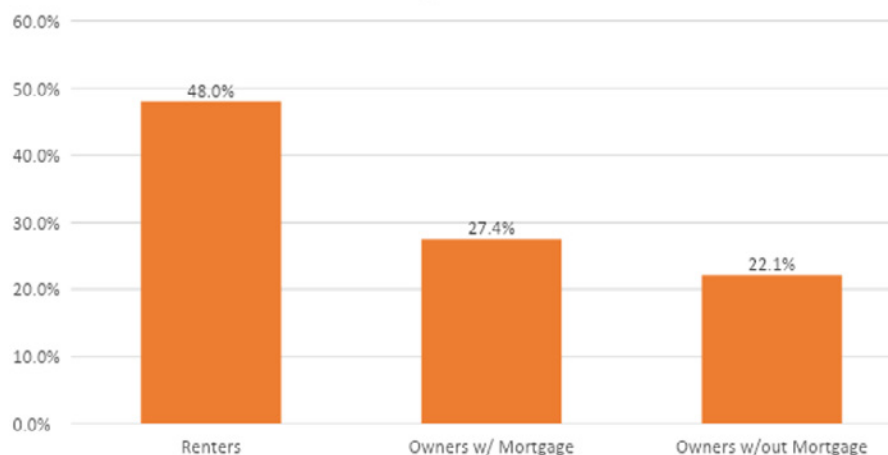


### COST-BURDENED

If more than 30% of household income goes toward housing costs, the household is paying more than is considered affordable for housing, meaning that there is not sufficient excess income to pay for other necessities. This is referred to as “housing cost burdenship” according to the US Department of Housing (HUD).<sup>14</sup> Within the real estate sector, the 30% rule is a common standard for considering market rent affordability when accounting for gross rent or the sum of monthly rent plus utilities as a share of total income before taxes or deductions. A similar standard, known as the 28/36, is advised by financial experts for potential homeowners. The 28/36 rule suggests that total housing expenses including mortgage payments, taxes, and insurance costs should not exceed 28% of a household’s gross monthly income. Figure 4.14 shows the percentage of households by tenure that are housing cost-burdened.

**Figure 4.14. Cost-Burdened Housing by Tenure: Sullivan County 2021**

Source: US Census Bureau, ACS, 2017-2021 5-Year Estimate



<sup>14</sup> The 30% rule for measuring affordability originated in the Brooke Amendment of 1969 for use in capping public housing rent at 25% of a resident’s income, authored by Senator Edward Brooke, a coauthor of the 1968 Fair

As expected given their lower income levels, Sullivan County renters are most likely to be cost-burdened with 48% paying more than is considered affordable. More than a quarter (27.4%) of owners with a mortgage are considered cost-burdened as well. Rents and mortgages are not the only housing costs, however; other costs include property taxes, upkeep, and maintenance. Because of these additional costs, 22.1 percent of Sullivan's homeowners without a mortgage are also considered housing-cost burdened. Often, the cost-burdened homeowners without mortgages are retiree households with fixed incomes.

The maps that follow show the share of housing by tenure in each town and village that are cost-burdened. The scale for each map is the same to maintain a consistent frame of reference.

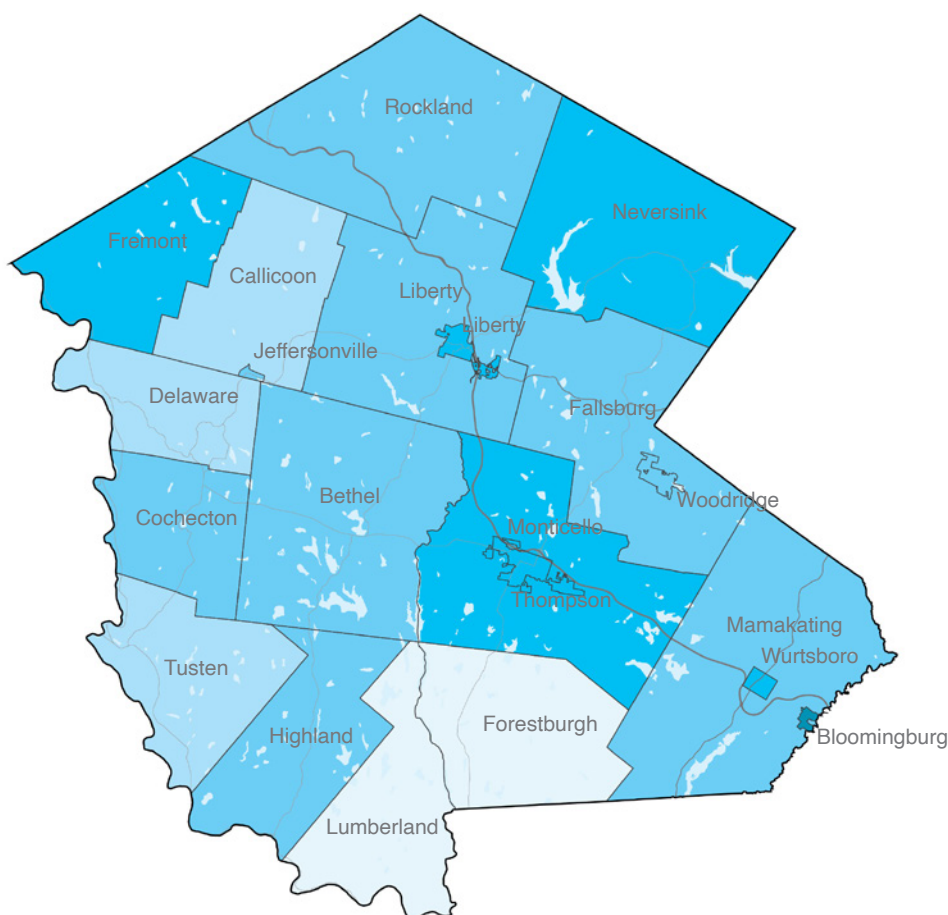
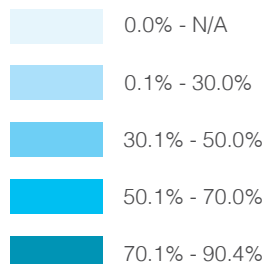
As shown, the county's villages tend to have the highest shares of cost-burdened renter housing. This is particularly true for Bloomingburg, Liberty, and Monticello, at 90.4%, 52.6%, and 63.4%, respectively. However, similarly high percentages of renters are cost-burdened in the towns of Freemont (52.4%), Neversink (65.0%), and Thompson (57.4%).

The towns with the lowest levels of cost-burdened rental housing are Callicoon (20.8%), Delaware (29.8%), and Tusten (16.5%). Forestburgh and Lumberland do not have any rental units or fewer than the ACS can reliably estimate on a year-to-year basis.

**Figure 4.15. Cost-Burdened Renter Housing by Town/Village**

Source: US Census Bureau, ACS, 2017-2021 5-Year Estimate

LEGEND



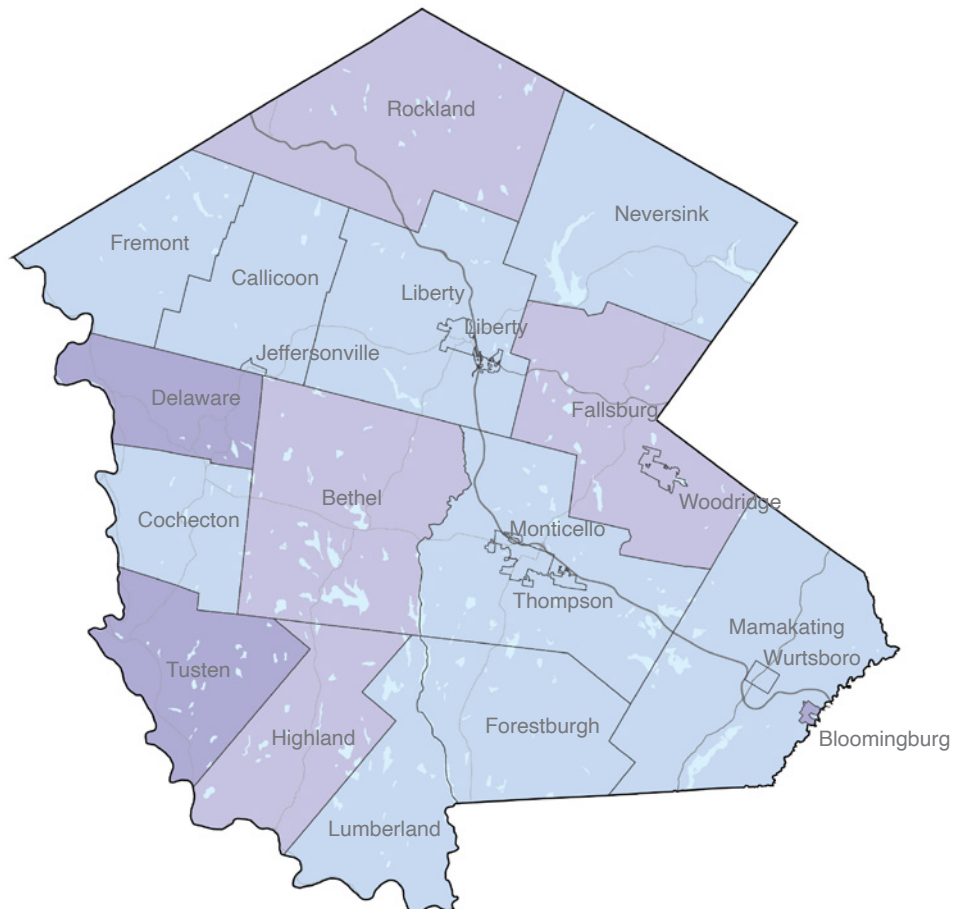
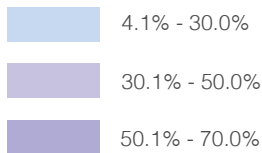
Housing Act. Representative Barney Frank stated that "[the amendment] said originally that the poorest of the poor who get housing through various public programs shouldn't be expected to pay more than 25 percent of their income for housing, precisely because they have so little." The Brooke Amendment was revised by Congress in 1981 from 25% to 30%. PD&R Edge, September 22, 2014. "Rental Burdens: Rethinking Affordability Measures." HUD USER. Available at: [https://www.huduser.gov/portal/pdredge/pdr\\_edge\\_featd\\_article\\_092214.html#:~:text=HUD%20defines%20cost%2Dburdened%20families,of%20one's%20income%20on%20rent](https://www.huduser.gov/portal/pdredge/pdr_edge_featd_article_092214.html#:~:text=HUD%20defines%20cost%2Dburdened%20families,of%20one's%20income%20on%20rent).

Homeowners with mortgages that are cost-burdened are shown in Figure 4.16. While Delaware and Tusten were among the areas in Sullivan County with the lowest levels of cost-burdened renters, the share of homeowners with mortgages paying more than is considered affordable is among the highest at 65% each. The recent slowdown in housing prices coupled with increasing mortgage rates puts those cost-burdened mortgage-holding homeowners in a particularly vulnerable position as comparable properties are now more costly to own but worth less than sales prices of similar homes in the recent past. The Village of Bloomingburg once again has a high share of cost-burdened households at 51.6% in the homeowners with a mortgage category.

**Figure 4.16. Cost-Burdened Owner w/ Mortgage Housing by Town/Village**

Source: US Census Bureau, ACS, 2017-2021 5-Year Estimate

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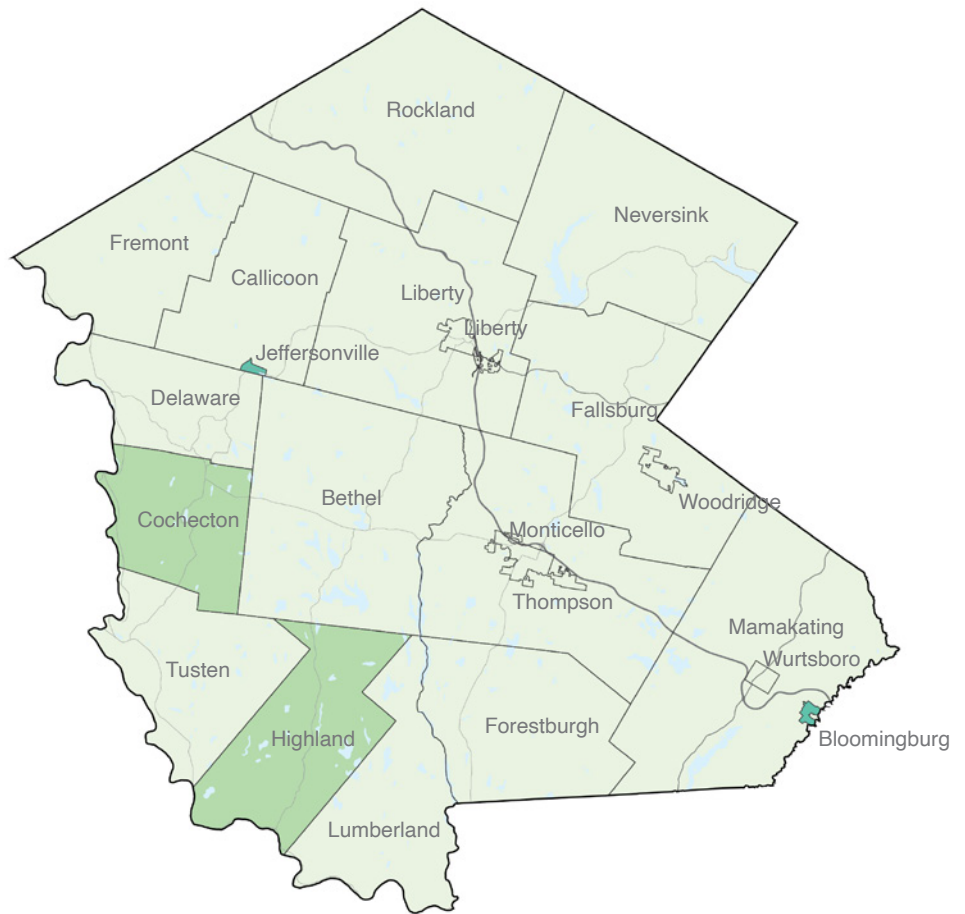
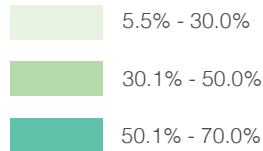
The Villages of Bloomingburg and Jeffersonville have the highest shares of homeowners without a mortgage that are paying more than 30 percent for housing costs at 52.4 percent and 58.3 percent, respectively. There are also large shares of cost-burdened owners without mortgages in the towns of Cochecton (40.3%) and Highland (36.8%)



**Figure 4.17 Cost-Burdened Owner w/out Mortgage Housing by Town/Village**

Source: US Census Bureau, ACS, 2017-2021 5-Year Estimate

**LEGEND**



## 3 / Housing

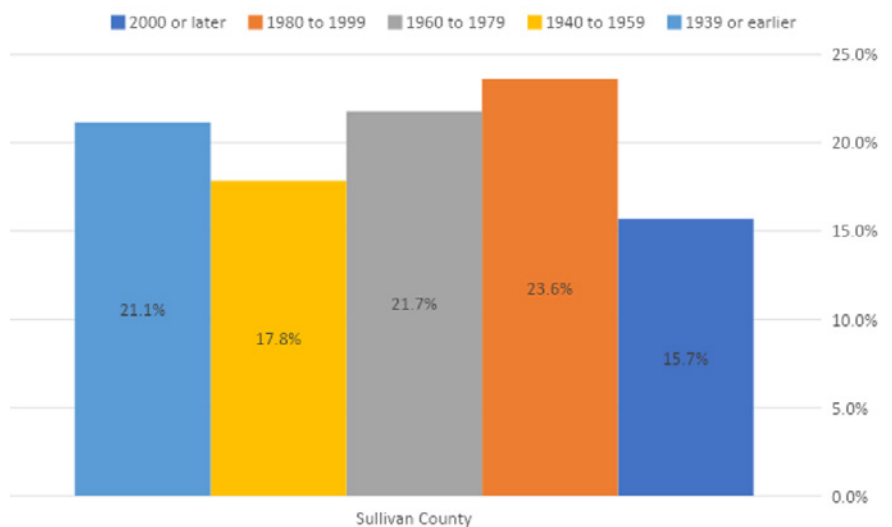
Sullivan County had 49,565 housing units according to the US Census Bureau' July 1 annual estimates of housing units, up from 49,181 in 2020.

### YEAR BUILT

Of the 49,231 housing units in Sullivan County, 10,403 or 21.1% were built before 1940 as shown in Figure 4.18. An additional 8,780 units (17.8%) were constructed between 1940 and 1959. Housing construction continued to grow in each subsequent 20-year post-war period, with 21.7% from 1960 to 1979, and 23.6% between 1980 and 1999. There was a slowdown in housing construction after 2000, due to several factors including rural preservation acts and rezonings as well as market forces including multiple recessions; subsequently, only 15.7 percent of Sullivan's housing has been constructed since the turn of the century.

**Figure 4.18. Housing by Year Structure Built: Sullivan County 2021**

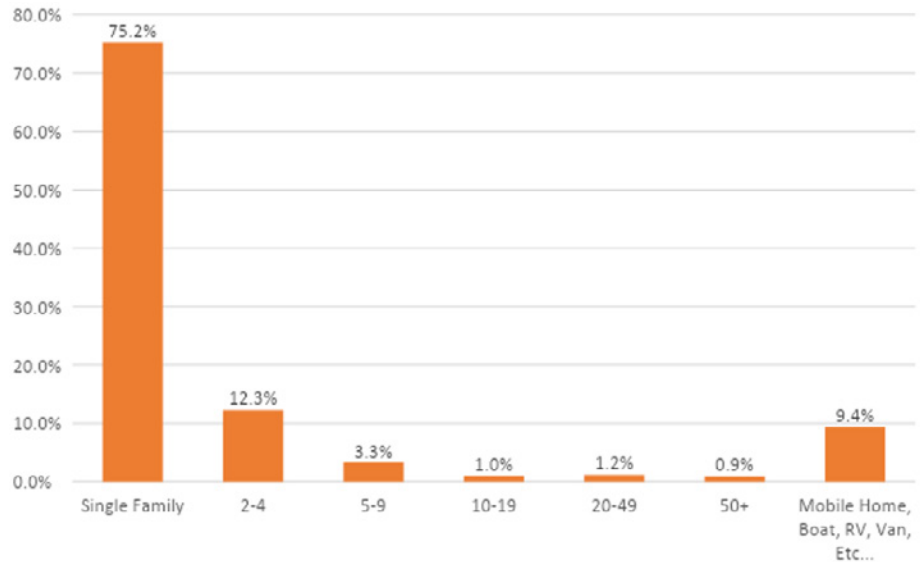
Source: US Census Bureau, ACS, 2017-2021 5-Year Estimate



## STRUCTURE TYPE

Three out of four housing units in Sullivan County are single-family homes. 12.3% of units are duplex/triplex houses or townhomes. Low and high-rise multifamily structures make up 6.4 percent of units. The remaining 4,621 units (9.4%) are structurally less permanent residences including Mobile Homes, Boats, RVs, Vans, etc.; these units can be particularly vulnerable in extreme weather conditions.

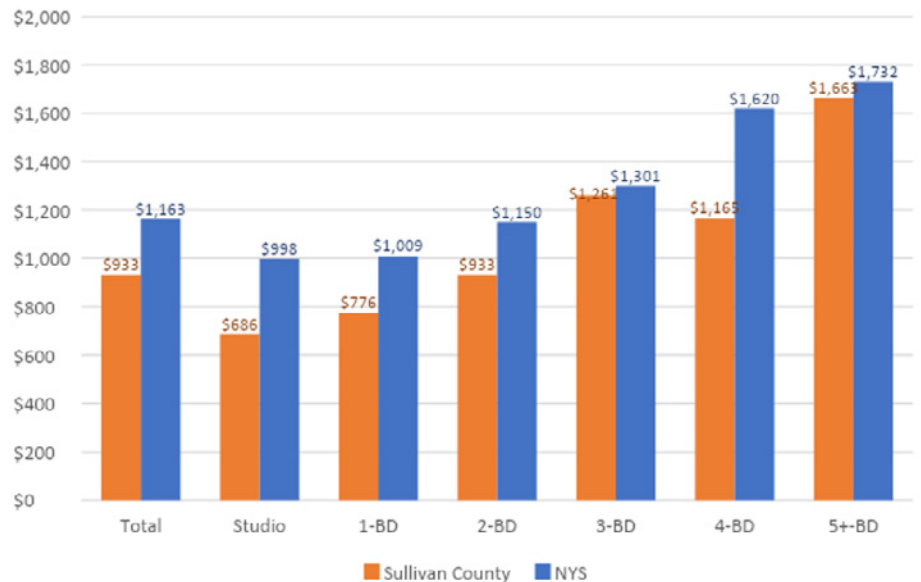
**Figure 4.19. Housing by Structure Type: Sullivan County 2021**  
Source: US Census Bureau, ACS, 2017-2021 5-Year Estimate



## COSTS

Figure 4.20 presents median gross rent by number of bedrooms. The median cost for all Sullivan-occupied rentals is \$933, \$230 less than the State median. Overall, rentals in Sullivan County are more affordable than in the State at large.

**Figure 4.20. Median Gross Rent by Number of Bedrooms: Sullivan County and New York State 2021**  
Source: US Census Bureau, ACS, 2017-2021 5-Year Estimate



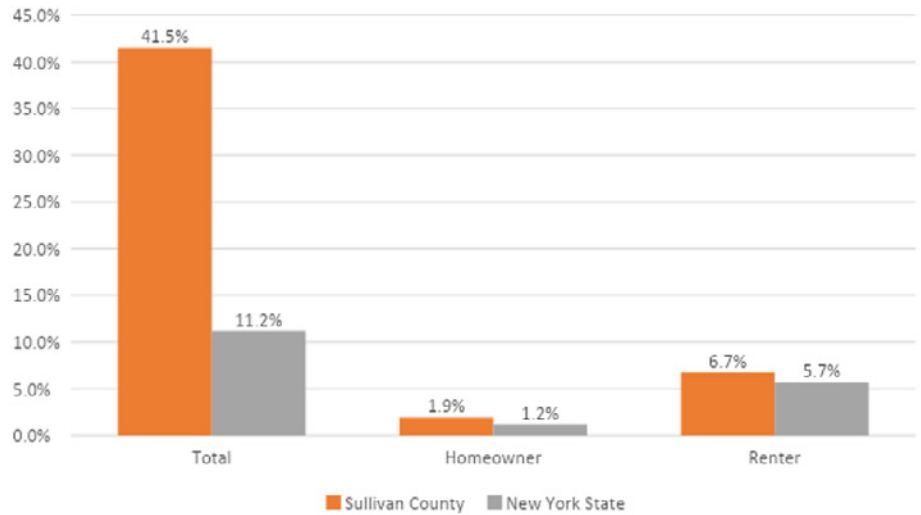
Earlier in the chapter, it was noted that the median income of renter households in Sullivan County is \$43,690. Using the 30% affordability measure, half of renter households can afford housing with a monthly cost of more than \$1,092; the other half can only afford less than that amount. Larger households, especially those with only one working adult and those households requiring multiple bedrooms are prone to being further strained by the additional housing costs.

## VACANCY

One of the key contributors to housing costs is availability. A healthy housing market, which allows for mobility, is roughly eight percent of total rental housing being available for rent and between 2 and 3 percent of total owner units available for sale. Figure 4.21 presents vacancy rates by tenure for Sullivan and New York State housing, which shows that 1.9% of owner units are vacant and 6.7% of renter units are vacant. The overall vacancy rate for the County is 41.5% due to the 15,904 residential units in the county that are reserved for seasonal, recreational, or occasional use and are therefore considered “off the market.”

**Figure 4.21. Housing Vacancy Rates by Tenure: Sullivan County and New York State 2021**

Source: US Census Bureau, ACS, 2017-2021 5-Year Estimate

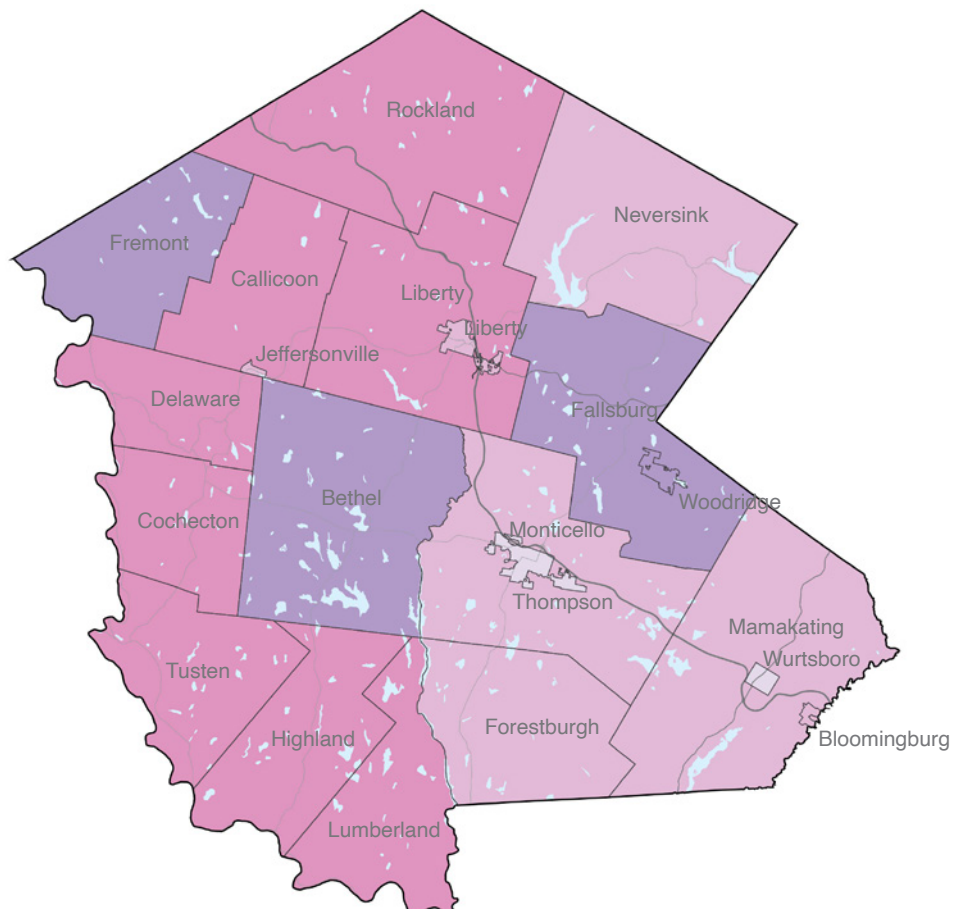
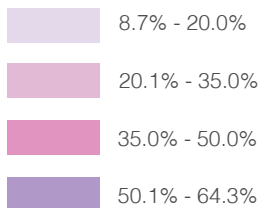


As shown in the figure that follows, the highest overall vacancy rates are found in the Village of Woodridge (64.3%) and the Towns of Fremont (62.6%), Bethel (59.4%), and Fallsburg (52.2%).

**Figure 4.22. Vacancy Rate by Town/Village**

Source: US Census Bureau, ACS, 2017-2021 5-Year Estimate

### LEGEND

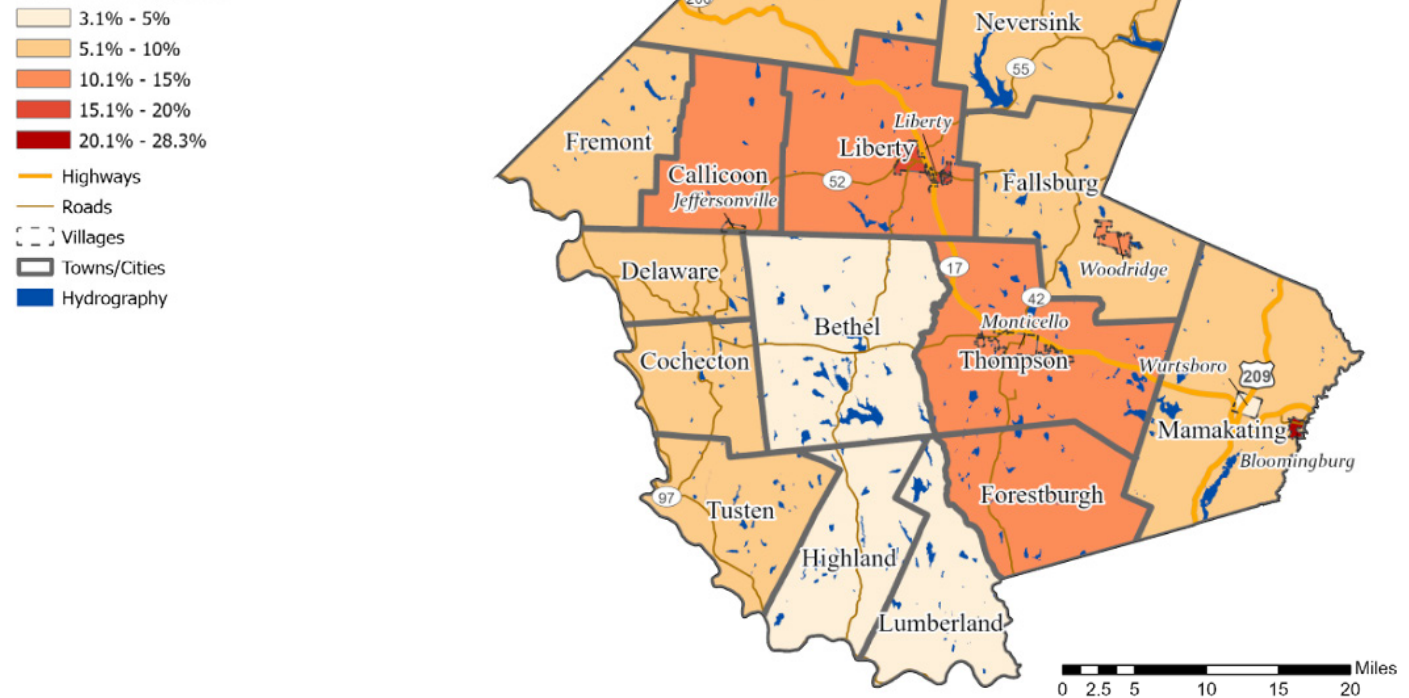




In Sullivan County, more than 17,000 vacant housing units are seasonal homes that are maintained for vacation and occasional use. Figure 4.23 shows only those vacant units that are year-round permanent housing, changing the vacancy rates significantly throughout the county. With seasonal units removed, the greatest concentrations of vacancy are in the villages of Bloomingburg and Liberty at levels greater than 15 percent.

**Figure 4.23. Permanent Housing Vacancy by Town/Village**

Source: US Census Bureau, ACS, 2017-2021 5-Year Estimate

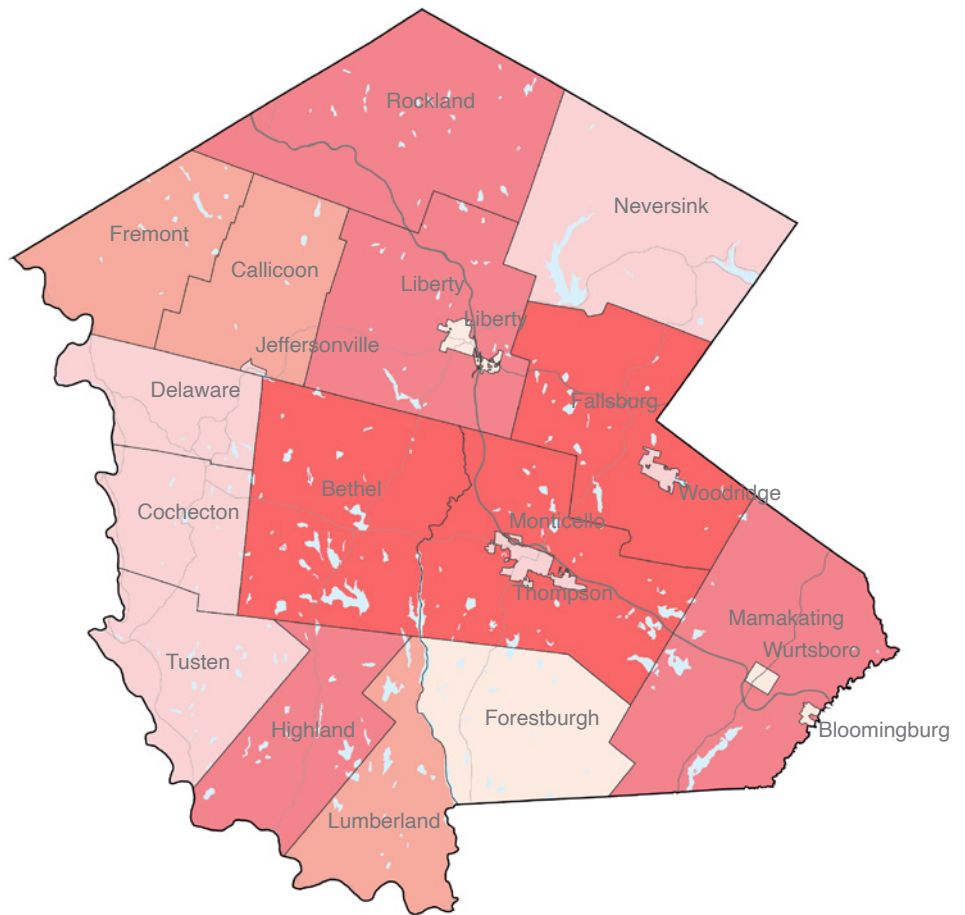
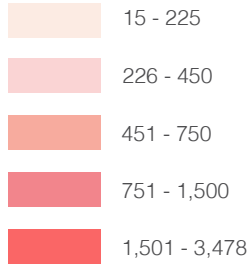


As shown in Figure 4.24, the largest numbers of seasonal vacancies are found in Fallsburg (3,656 or 21.5% of the County total), Bethel (2,468 or 14.5%), and Thompson (2,138 or 12.6%). Fremont, which has a high vacancy rate of 62.6%, only has 814 seasonal units, however, these units make up more than half of the town's 1,441 housing units.

Given the popularity of Sullivan County as a vacation getaway, it can be assumed that along with the units that are vacant for seasonal use, a number of the owned and rented units are available on short-term rental sites. A January 12, 2023 search of Airbnb brought up more than 1,000 listings in Sullivan County. A similar search of Vrbo found more than 300 properties.

**Figure 4.24. Seasonal Use Vacant Units by Town/Village**  
Source: US Census Bureau, ACS, 2017-2021 5-Year Estimate

LEGEND



## 4 / Labor Force

### LABOR FORCE PARTICIPATION

The potential resident labor force includes the entire total population age 16 and older. Sullivan County has only 0.4 percent of New York State's potential labor force with 63,516 persons. Of these, 56.1 percent (35,633) participate in the labor force, meaning that they are in the Armed Forces or the Civilian labor force either employed or unemployed and looking for work. Adults who are not in the labor force may be stay-at-home caregivers, retired, or unable to work due to disability, among other reasons. As Figure 4.25 indicates, the labor force participation rate for Sullivan County is 7 percentage points lower than New York State's at 63.1 percent.

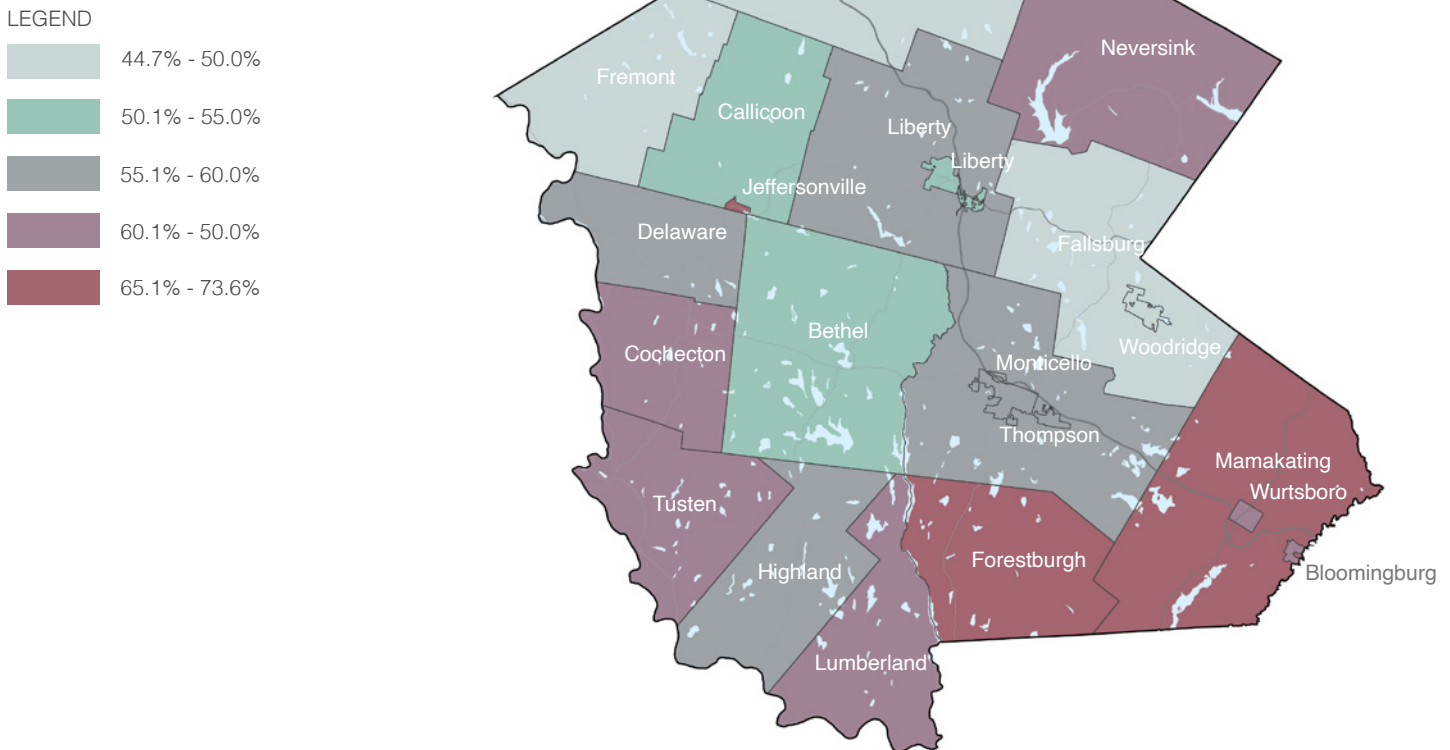
**Figure 4.25. Labor Force Participation: Sullivan County and New York State 2021**  
Source: US Census Bureau, ACS, 2017-2021 5-Year Estimate

	Sullivan County	New York State
Total Population 16 & Older	63,516	16,383,427
In labor force	35,650	10,331,727
Civilian Labor Force	35,633	10,306,430
Employed	32,767	9,663,517
Unemployed	2,866	642,913
In Armed Forces	17	25,297
Not in labor force	27,866	10,337,942
Unemployment Rate	8.0%	6.2%
Labor Force Participation Rate	56.1%	63.1%

As shown in the map in Figure 4.26, labor force participation varies by municipality. Forestburgh, Mamakating, and the Village of Jeffersonville have the highest labor force participation rates at 73.6 percent, 66.0 percent, and 65.8 percent, respectively.

The lowest labor force participation rates are in Fallsburg (44.7%), Fremont (49.8%), Rockland (46.2%), and the Village of Woodridge (48.1%). Fremont and Rockland have particularly high shares of population over the age of 65, which may explain their low labor force participation rates, however, Fallsburg and Woodridge's populations are relatively young, so retirees are not the primary factor.

**Figure 4.26. Labor Force Participation by Town/Village 2021**  
Source: US Census Bureau, ACS, 2017-2021 5-Year Estimate



## UNEMPLOYMENT

Along with the lower labor force participation rate, the unemployment rate (those who are currently looking for jobs) in Sullivan County is high (8.0%) compared to 6.2 percent in New York State for 2021. Just under 2,900 persons were looking for work in 2021 according to Census estimates.

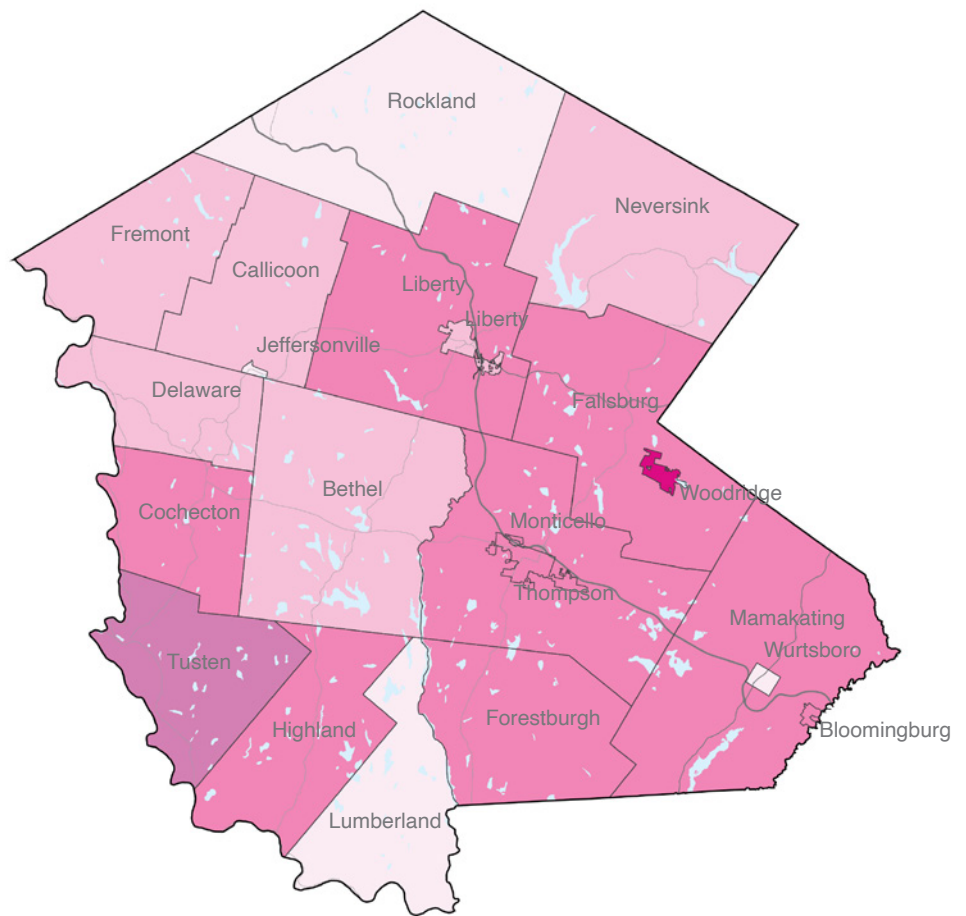
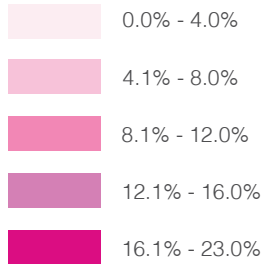
Figure 4.27 illustrates unemployment rates by town and village for 2021 based on Census estimates. As shown, Woodridge and Tusten have the highest unemployment rates at 23.0 percent and 14.0 percent, respectively. Meanwhile, Rockland and Lumberland have the lowest rates at 0.0 percent (unemployment is too low to estimate, therefore estimated at zero) and 3.2 percent, respectively.



**Figure 4.27. Unemployment Rate by Town/Village 2021**

Source: US Census Bureau, ACS, 2017-2021 5-Year Estimate

**LEGEND**

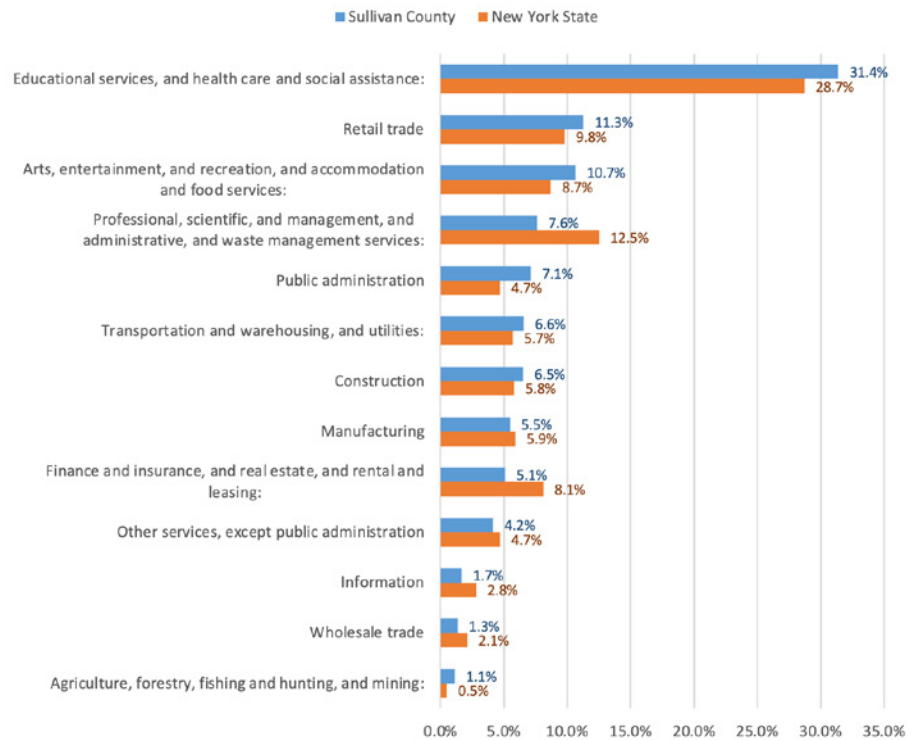


## INDUSTRY

As seen in Figure 4.28, the largest share (31.4%) of Sullivan County residents are employed in education and health services, a slightly larger share than New York State (28.7%). The next largest employer is Retail, followed closely by Arts, Entertainment, Recreation, Accommodation, and Food Services (Leisure & Hospitality) at 11.3 percent and 10.7 percent, respectively; all of which are slightly greater shares than the State. An estimated 7.6 percent of employed residents work in Professional, Scientific, and Management and Administrative Services, a significantly smaller share than the New York State share of 12.5 percent in that sector. Sullivan County is home to larger shares of Public Administration, Transportation, Warehousing, and Utilities, and Construction workers at 7.1 percent, 6.6 percent, and 6.5 percent, respectively. Only 5.1 percent of employed residents work in Finance, Insurance, and Real Estate compared to 8.1 for the state. The other sectors have less than five percent shares.

**Figure 4.28. Industry of Employment for the Residential Labor Force: Sullivan County and New York State 2021**

Source: US Census Bureau, ACS, 2017-2021 5-Year Estimate



## OCCUPATION

An occupation reflects the type of job a person does, rather than the industry for which it is performed; e.g., a person can be an administrative assistant (an office occupation) in the Construction sector.

**Figure 4.29. Occupation of the Residential Labor Force: Sullivan County 2021**

Source: US Census Bureau, ACS, 2017-2021 5-Year Estimate

	Count	Share
Total	32,767	100.0%
Sales and office occupations	6,037	18.4%
Education, legal, community service, arts, and media occupations	4,555	13.9%
Production, transportation, and material moving occupations	4,134	12.6%
Management, business, and financial occupations	3,955	12.1%
Natural resources, construction, and maintenance occupations	3,084	9.4%
Healthcare practitioners and technical occupations	2,429	7.4%
Healthcare support occupations	2,031	6.2%
Protective service occupations	1,445	4.4%
Computer, engineering, and science occupations	1,020	3.1%

## TRANSPORTATION TO WORK

As shown, the vast majority (86.9%) of employed residents drive to work, most of whom drive alone. The dependence on vehicular transportation underlines the importance of the traffic infrastructure and the vulnerability of the economy to disruptions.

*Figure 4.30. Mode of Transportation to Work for the Residential Labor Force: Sullivan County 2021*  
Source: US Census Bureau, ACS, 2017-2021 5-Year Estimate

	Count	Share
Total	31,768	100.0%
Car, truck, or van	27,592	86.9%
Car, truck, or van: Drove alone	25,431	80.1%
Worked at home	2,446	7.7%
Car, truck, or van: Carpooled	2,161	6.8%
Walked	634	2.0%
Public transportation	543	1.7%
Bus or trolley bus	310	1.0%
Taxicab	187	0.6%
Bicycle	171	0.5%
Subway or elevated	147	0.5%
Other means	125	0.4%
Railroad	86	0.3%
Motorcycle	70	0.2%

## 5 / Employment

Employment discusses jobs at local places of work in the county, which is in contrast to the previous section on the employed labor force, which discussed the characteristics of the jobs held by Sullivan County residents, both in the county and elsewhere.

### ECONOMIC RESILIENCY

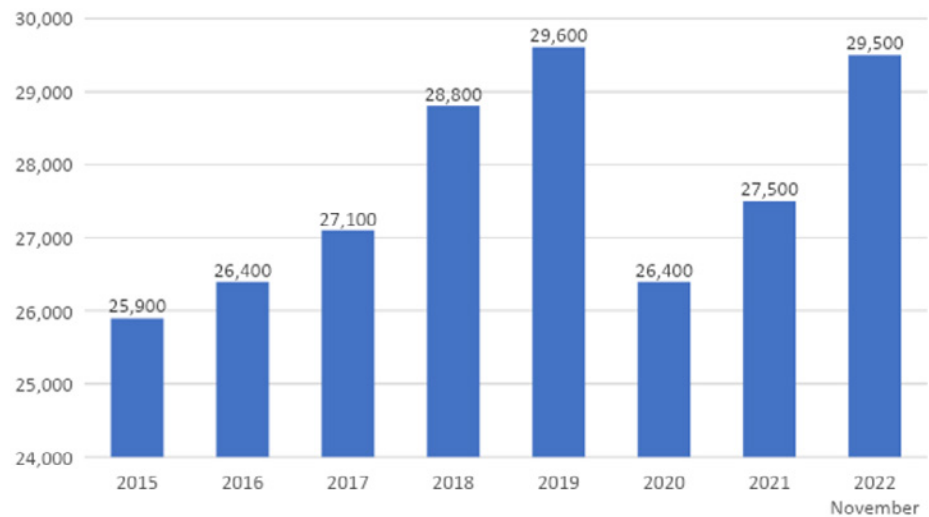
Economic resiliency is the ability of the local economy to withstand disruptive events. Resiliency is not only the extent to which businesses are protected from environmental threats but economic downturns as well. Diversity of jobs across industries and occupations is the greatest boon to economic resilience.

### OVERVIEW

As shown in the figure that follows, Sullivan County's total non-farm employment was at 29,500 in 2019 according to the New York State Department of Labor (NYSDOL)'s Current Employment Statistics (CES) program. The County lost some 3,200 jobs in 2020 due largely to the economic shutdown required to respond to the COVID-19 pandemic. By November of 2022, the latest date for which data are available, Sullivan County non-agricultural (non-ag) employment had been almost restored to pre-pandemic levels, reaching 29,300 jobs.



**Figure 4.31. Total Non-Agricultural Employment for Sullivan County 2015 to November 2022**  
Source: NYSDOL CES accessed 1/13/2023

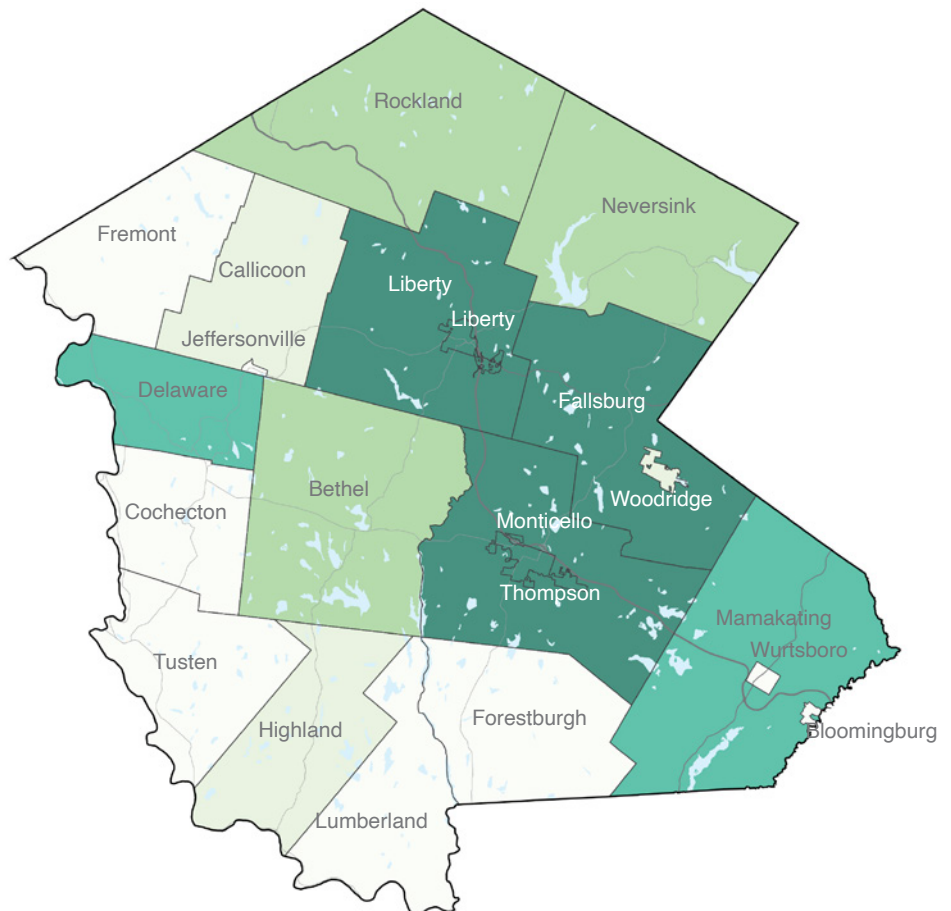
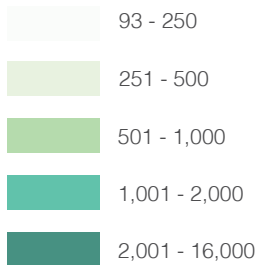


Detailed employment data by place of work are not available from the CES at the municipal level, so comparisons of local employment to the County are generated using the Census Bureau's Longitudinal Employer Household Dataset (LEHD), which it compiles in cooperation with the NYSDOL.

The maps in Figures 4.32 and 4.33 show the distribution of jobs by municipality in total numbers and as a share of County employment, respectively. More than half of Sullivan County's jobs are in the Towns of Thompson, Fallsburg, and Liberty with 13,605 (8,019 of which are in the Village of Monticello), 4,553 and 2,485, respectively. These areas are particularly important to the economic well-being of the county.

**Figure 4.32. Total Jobs by Town/Village of Job Location 2019**  
Source: US Census Bureau, Longitudinal Employer Household Dataset (LEHD), 2019

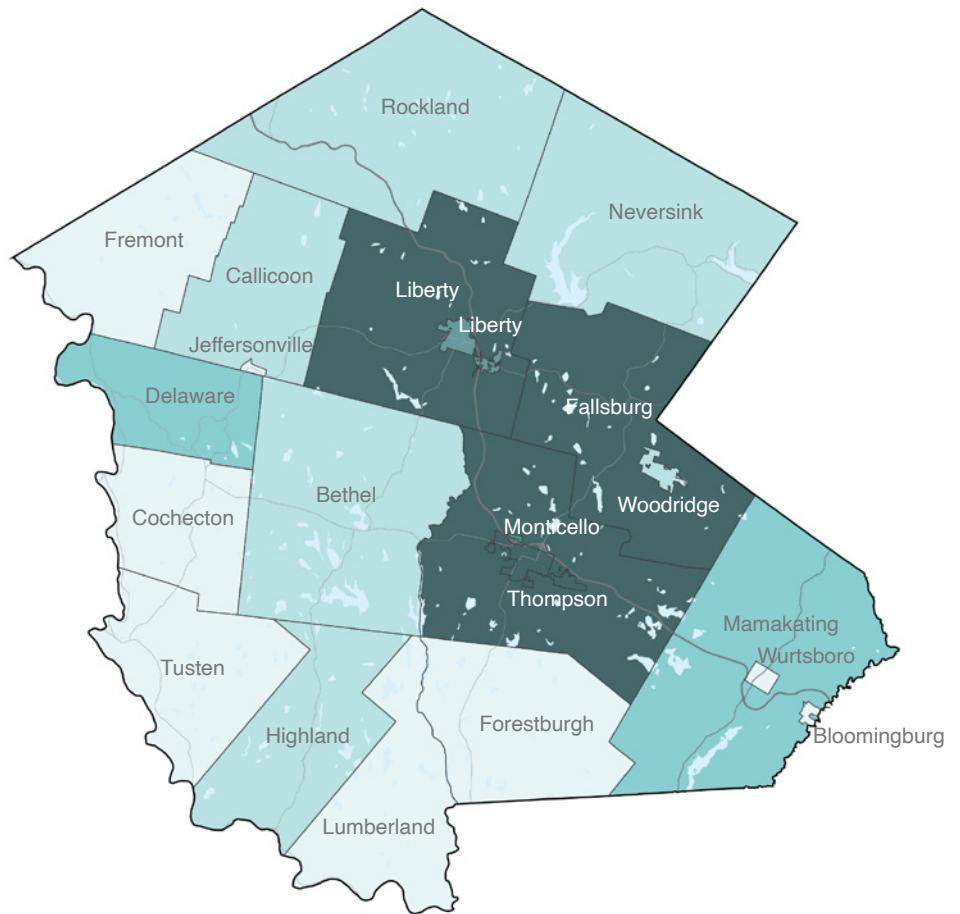
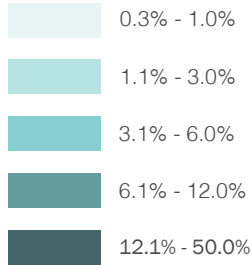
LEGEND



**Figure 4.33. Total Jobs by Town/  
Village of Work as a Share of County  
Jobs 2019**

Source: US Census Bureau, Longitudinal  
Employer Household Dataset (LEHD), 2019

**LEGEND**



### EMPLOYMENT BY INDUSTRY

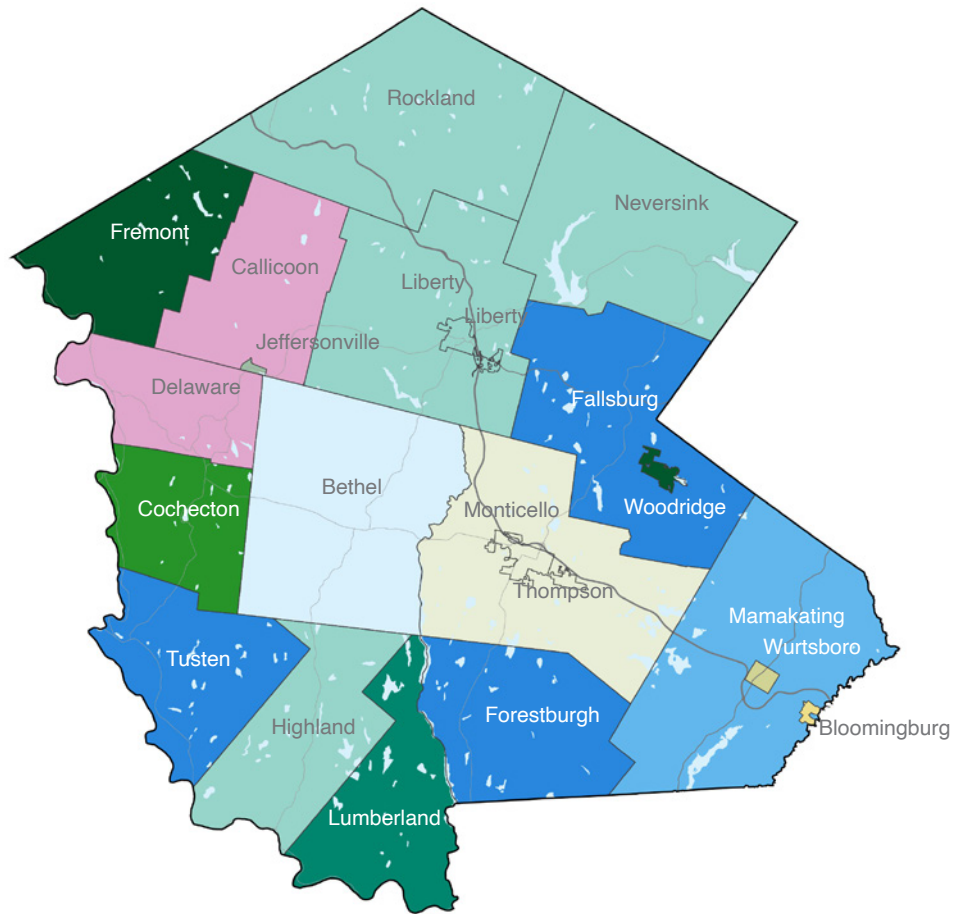
While the total number of jobs is important, the industry each job is in plays a role in economic resiliency as well. Disruptive events affect various industries in different ways. The map that follows shows the most prevalent industry sector (job creator) in each municipality in 2019. Except for Tusten and Callicoon, each municipality has more than 25 percent of all jobs in a single industry, leaving each community vulnerable to industry-specific as well as overall disruptions.

Educational Services is the largest employer in Highland (30.4% of all jobs), Liberty (30.7%), Neversink (42.1%), and Rockland (30.6%). Public Administration is the predominant employer in Fallsburg (26.4%), Forestburgh (34.6%), and Tusten (22.5%). Manufacturing is the top sector in Fremont (32.3%) and the Village of Woodridge (34.6%); accommodations and Food Services in Callicoon (22.4%) and Delaware (30.6%); Construction in Bethel (28.7%); Wholesale in Cochection (28.1%); Transportation and Warehousing in Mamakating (35.6%); and Other Services and Public Administration in Lumberland at 28.2 percent each. Finance is the largest employer in the Village of Jeffersonville, accounting for 40.5 percent of all jobs in the village.

**Figure 4.34. Most Prevalent Industry Sector by Town/Village of Work 2019**

Source: US Census Bureau, Longitudinal Employer Household Dataset (LEHD), 2019

**LEGEND**

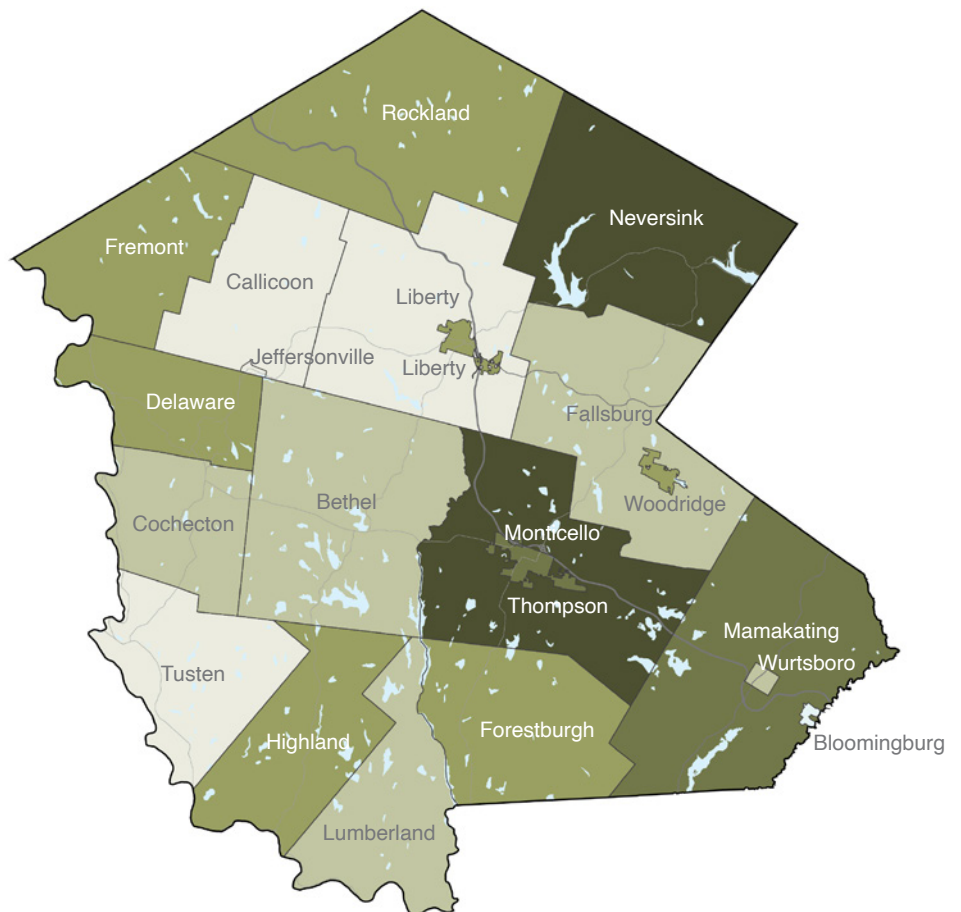
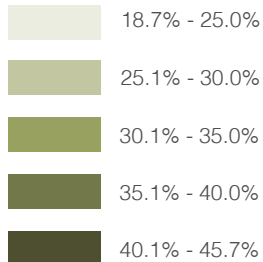


**Figure 4.35. Dominant Industry Sectors by Town/Village as a Percentage of Countywide Employment 2019**

Source: US Census Bureau, Longitudinal Employer Household Dataset (LEHD), 2019

This figure shows the proportion of employment in the largest industry sector of each Town/Village compared to the total county employment in that same industry sector.

**LEGEND**





### AGRICULTURAL EMPLOYMENT

The previous section looked at non-agricultural or non-farm employment only. According to the 2017 Census of Agriculture, there were 366 farms spread throughout Sullivan County with 614 producers (farmers). The 2022 American Community Survey estimates there are 553 individuals in the County's agriculture, forestry, fishing, or hunting industry, but 687 who have farming, fishing, and forestry occupations. Sullivan County's farms are important to Sullivan's history and identity and agriculture bolsters other sectors such as hospitality and tourism; however, they are not large employers with an average of less than 2 employees per venture and contribute only 0.1 percent to the County's 3.98 billion gross domestic product (GDP) in 2022.

## 6 / Key Sectors

The NYSDOL CES groups related industries into "Supersectors" for discussion at the County level. This section will discuss each of Sullivan County's supersectors, starting with those providing the largest numbers of jobs.

### EDUCATION AND HEALTH CARE

At 12.0 percent of the county's GDP, the combined education and health care supersector also provides the greatest number of jobs in Sullivan County with 7,100 as of November 2022. As shown in the figure that follows, Education and Health Care employment peaked in 2019 with 7,800 jobs, but the industry lost some 700 jobs with the onset of the pandemic in 2020 and at this point in time, has not recovered.

*Figure 4.36. Education and Health Care Employment for Sullivan County 2015 to November 2022*  
Source: NYSDOL CES accessed 1/13/2023

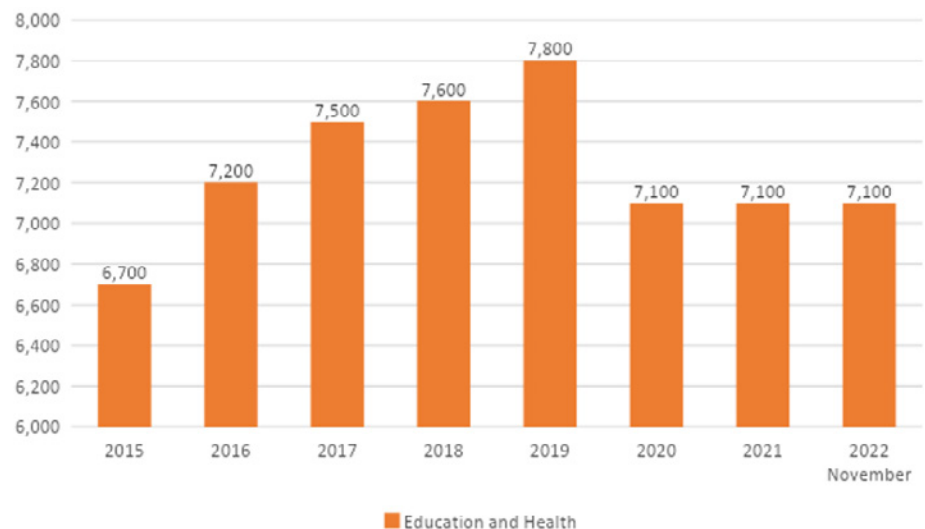
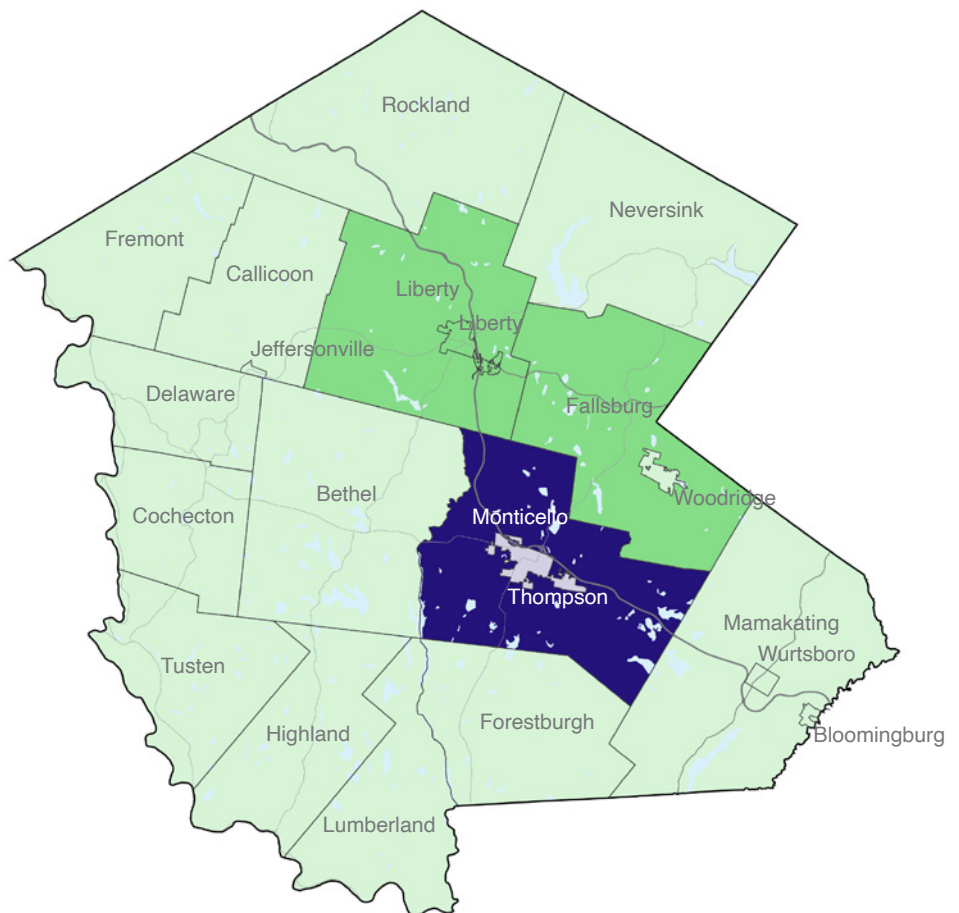
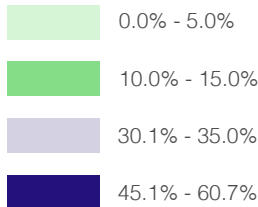


Figure 4.37 presents the municipal share of Sullivan County’s education and health care jobs in 2019—at the peak of employment. As shown, Thompson was home to 60.7 percent of supersector jobs, of which Monticello had 30.9 percent. Fallsburg and Liberty were home to the next greatest shares of jobs at 12.5 percent and 10.0 percent, respectively, of the 2019 county total.

*Figure 4.37. Education and Health Employment by Town/Village as a Share of Sullivan County Total 2019*

Source: US Census Bureau, Longitudinal Employer Household Dataset (LEHD), 2019

LEGEND



One bright spot is the Center for Discovery, a facility for children with complex disabilities including those on the spectrum and with behavioral health. The largest single employer in Sullivan County, it rebuilt the Hurleyville medical facility and is building a new (adaptive reuse) facility in Rock Hill. Other employers include Crystal Run Health Care, New Hope Community, The Arc Sullivan-Orange Counties, as well as the Brooklyn-based Orthodox Ahava Medical located in Liberty.

Despite the specialty niches, health care at large is struggling. Sullivan is ranked 61 out of 62 New York Counties in quality health care. Garnett Health recently took over Catskill Regional and closed half of the hospital due to pandemic challenges; there are hopes to use the empty half of the building to expand nursing training.

Along with SUNY Sullivan, educational employment is provided largely by the county’s eight public school districts:

- Eldred
- Fallsburg
- Liberty
- Livingston Manor
- Monticello
- Roscoe
- Sullivan West
- Tri-Valley

## GOVERNMENT/PUBLIC ADMINISTRATION

Government/Public Administration is the second largest contributor to the County's economy, providing 18.7% (\$746.5 million) to GDP and supporting 6,200 jobs in Sullivan County at its peak in 2018. In 2019, the number of jobs declined to 6,100, and the two years of the pandemic dropped employment even further to only 5,600 jobs in 2021. As of November 2022, however, the number of sector jobs had increased to 5,900. This includes public health jobs if they are related to the administration of public health programs.

*Figure 4.38. Government/Public Administration Employment for Sullivan County 2015 to November 2022*

Source: NYSDOL CES accessed 1/13/2023

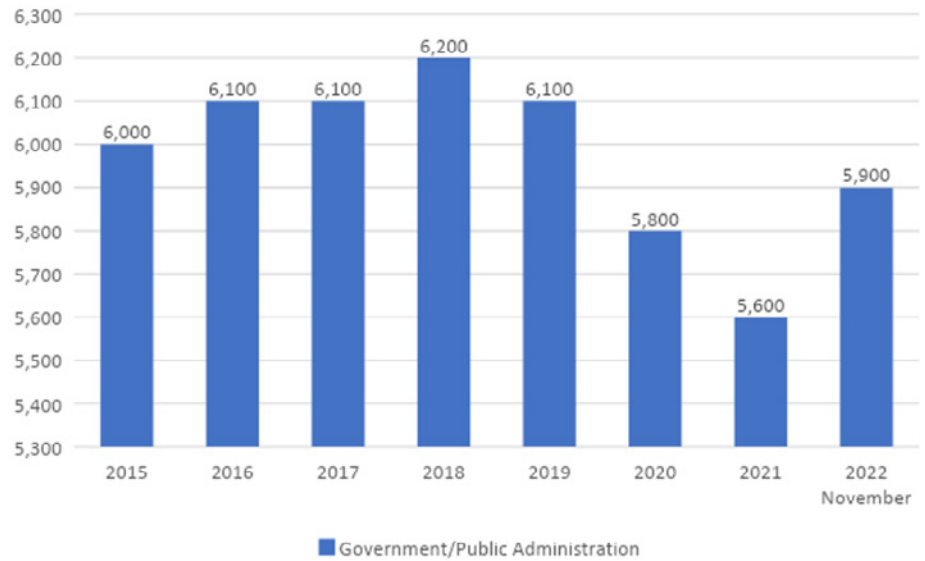
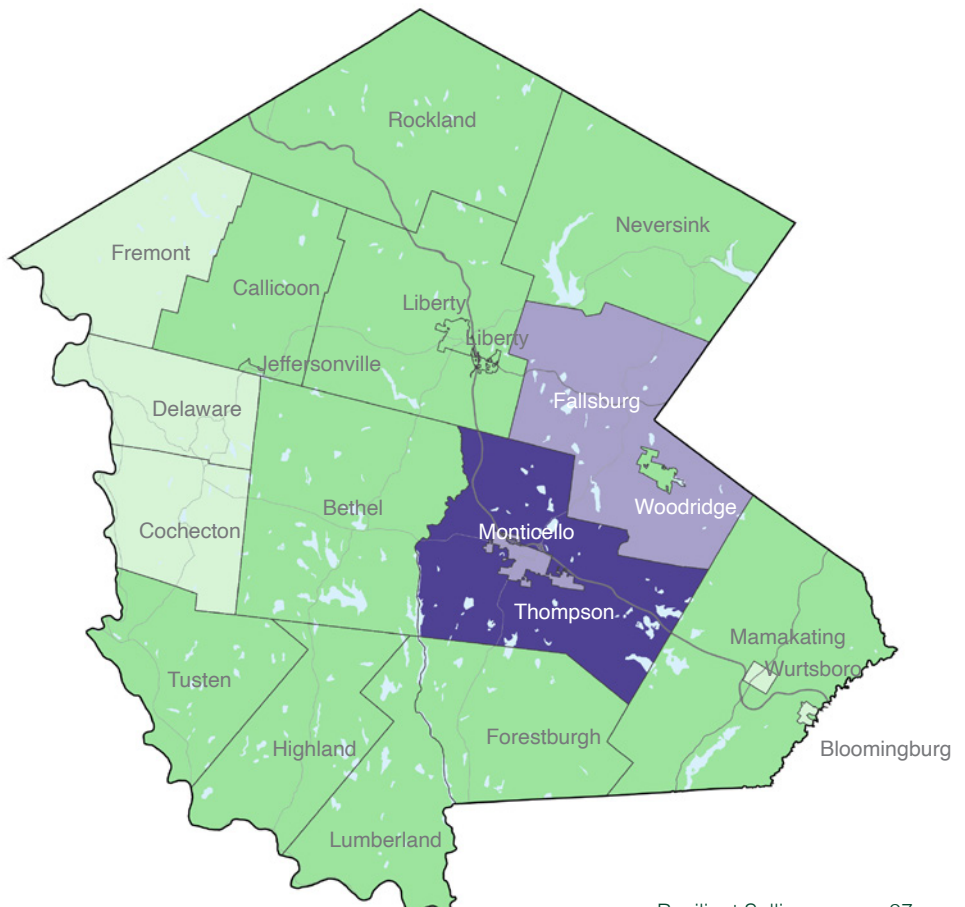
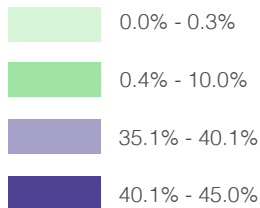


Figure 4.39 presents the municipal share of Sullivan County's public administration jobs in 2019. As shown, Thompson and Fallsburg were home to the greatest number of jobs at 43.4 percent and 37.3 percent, respectively, of the 2019 county total. A total of 1,216 of the Thompson jobs were located within the Village of Monticello.

*Figure 4.39. Government/Public Administration Employment by Town/Village as a Share of Sullivan County Total 2019*

Source: US Census Bureau, Longitudinal Employer Household Dataset (LEHD), 2019

### LEGEND





## TOURISM

Tourism is one of the cornerstones of Sullivan's economy, with seasonal homes, rentals, and camps spread throughout the county, generating \$291 million in business revenues in 2022.<sup>15</sup> The NYSDOL tracks Leisure and Hospitality employment for Sullivan County which includes the smaller sector categories of Accommodations and Food Services as well as Arts, Entertainment, and Recreation. According to the NYSDOL, as of November 2022, 4,700 of these jobs are located in Sullivan County, 100 more than the pre-pandemic peak in 2019.

**Figure 4.40. Total Non-Agricultural Employment for Sullivan County 2015 to November 2022**  
Source: NYSDOL CES accessed 1/13/2023

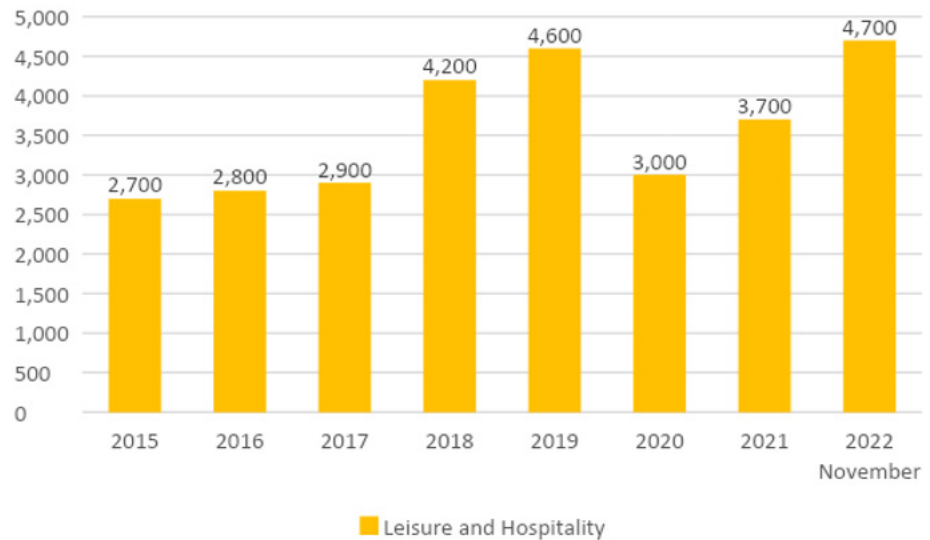
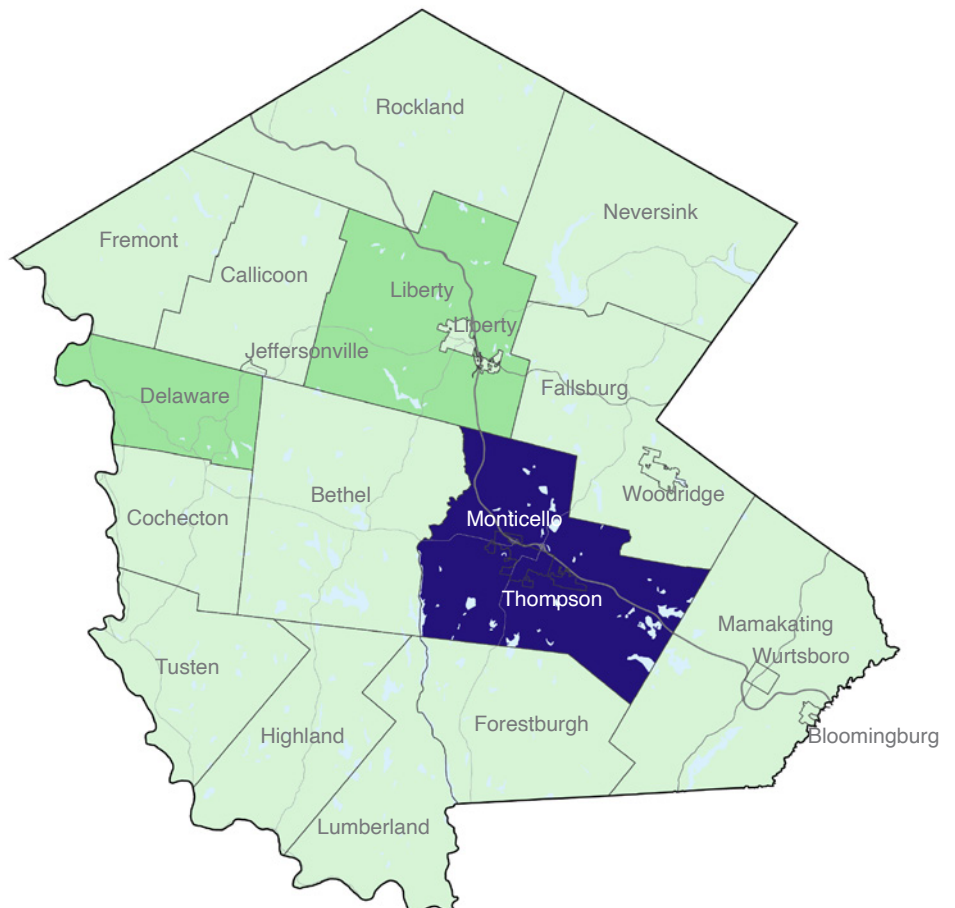
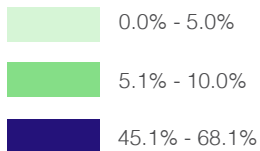


Figure 4.41 presents the municipal share of Sullivan County's leisure and hospitality jobs in 2019. As shown, the Town of Thompson is home to the greatest number of these jobs with 68.1 percent of the 2019 county total.

**Figure 4.41. Leisure and Hospitality Employment by Town/Village as a Share of Sullivan County Total 2019**  
Source: US Census Bureau, Longitudinal Employer Household Dataset (LEHD), 2019

### LEGEND



<sup>15</sup> U.S. Bureau of Economic Analysis, "Table 1. U.S. International Transactions," [apps.bea.gov/iTable/](https://apps.bea.gov/iTable/)

Interviews were held with the Sullivan County Visitors Association and the Chamber of Commerce in January of 2023.<sup>16</sup> These conversations highlighted the strengths of the industry, which was referred to as having the “biggest impact on the county right now,” i.e., coming out of the pandemic. Currently international visitors are “seeking authenticity” in their experiences while domestic visitors are looking for alternatives to urban density. Water and the outdoors are the greatest draw, but the industry is seen as needing variety.

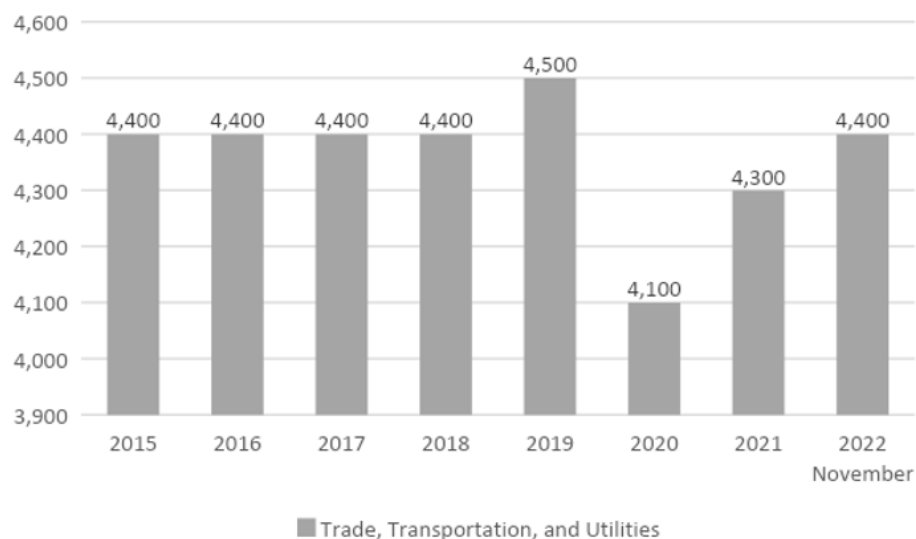
Developers are capitalizing on this, with the adaptive reuse of older Borscht Belt resorts as sustainable on-trend boutique style spaces including Foster Supply, Arnold House, New Neversink Spa, Resorts World Catskills, Kartrite Resort and Indoor Waterpark. These new attractions complement more venerable institutions such as Bethel Woods Center for the Arts. All serve as feeders to the larger economy.

The momentum of the industry is building, Sullivan Catskills Visitors Association announced that tourism in 2022 grew 154.4 percent over 2019 spending.<sup>17</sup>

## 7 / Trade, Transportation, and Utilities

The Trade, Transportation, and Utilities supersector as tracked by NYSDOL consists of Wholesale and Retail Trade, Transportation, Warehousing, and Utilities sectors and comprised some 11.4 percent of County GDP in 2022.<sup>18</sup> As shown in Figure 4.42, the supersector lost almost 10 percent of its jobs in 2020 due to the pandemic, which shuttered all but essential retail and caused international distribution chain disruptions that affected Transportation and Warehousing. As of November, 2022, the supersector had almost returned to pre-pandemic levels with 4,400 jobs.

*Figure 4.42. Trade, Transportation, and Utilities Employment for Sullivan County 2015 to November 2022*  
Source: NYSDOL CES accessed 1/13/2023



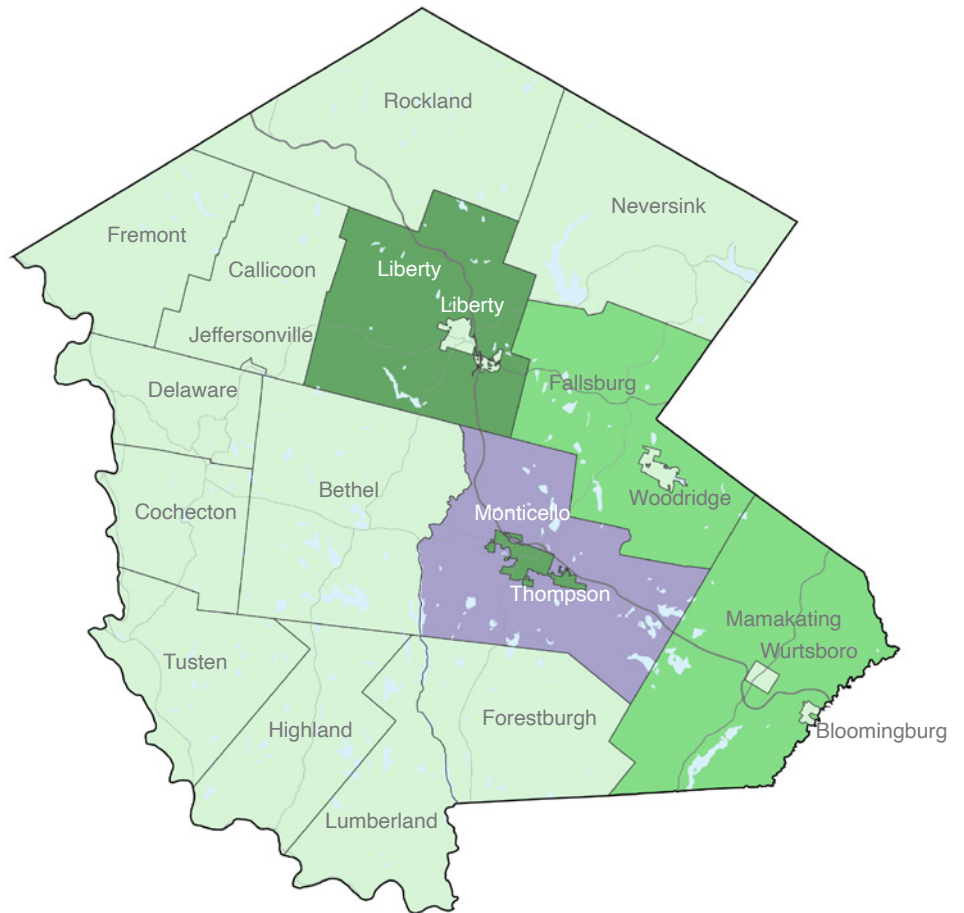
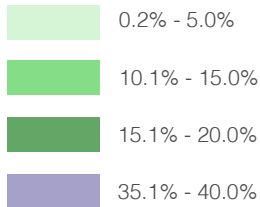
16 Jaime Schmeiser, “Sullivan County Resiliency Plan, Advisory Committee Member Interview--Chamber of Commerce” (meeting, zoom, January 20th, 2023)  
17 “Sullivan Catskills Celebrates Remarkable Surge in Tourism Spending,” Explore New York Attractions & Things To Do, September 27, 2023, <https://www.iloveny.com/thebeat/post/sullivan-catskills-celebrates-remarkable-surge-in-tourism-spending/>.  
18 U.S. Bureau of Economic Analysis, “Table 1. U.S. International Transactions,” [apps.bea.gov/iTable/](https://apps.bea.gov/iTable/)

Figure 4.43 presents the municipal share of Sullivan County's Trade, Transportation, and Utilities jobs in 2019. As shown, Thompson and Liberty were home to the greatest number of jobs at 38.4% percent and 11.3 percent, respectively, of the 2019 county total.

*Figure 4.43. Trade, Transportation, and Utilities Employment by Town/Village as a Share of Sullivan County Total 2019*

Source: US Census Bureau, Longitudinal Employer Household Dataset (LEHD), 2019

LEGEND

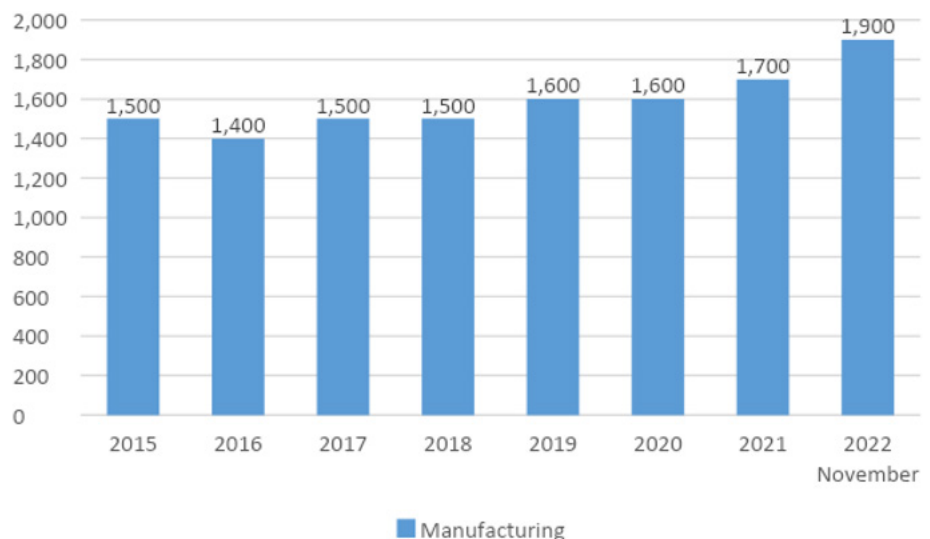


## 8 / Manufacturing

Manufacturing is the fifth largest sector in Sullivan County in terms of employment, with 1,900 jobs in 2022, but contributed only 6 percent of GDP.<sup>19</sup> As shown in Figure 4.44, manufacturing has grown slowly, but steadily since 2016. Manufacturing activity in Sullivan County continued during the pandemic when other industries saw significant declines in job numbers.

*Figure 4.44. Manufacturing Employment for Sullivan County 2015 to November 2022*

Source: NYSDOL CES accessed 1/13/2023



<sup>19</sup> Ibid.

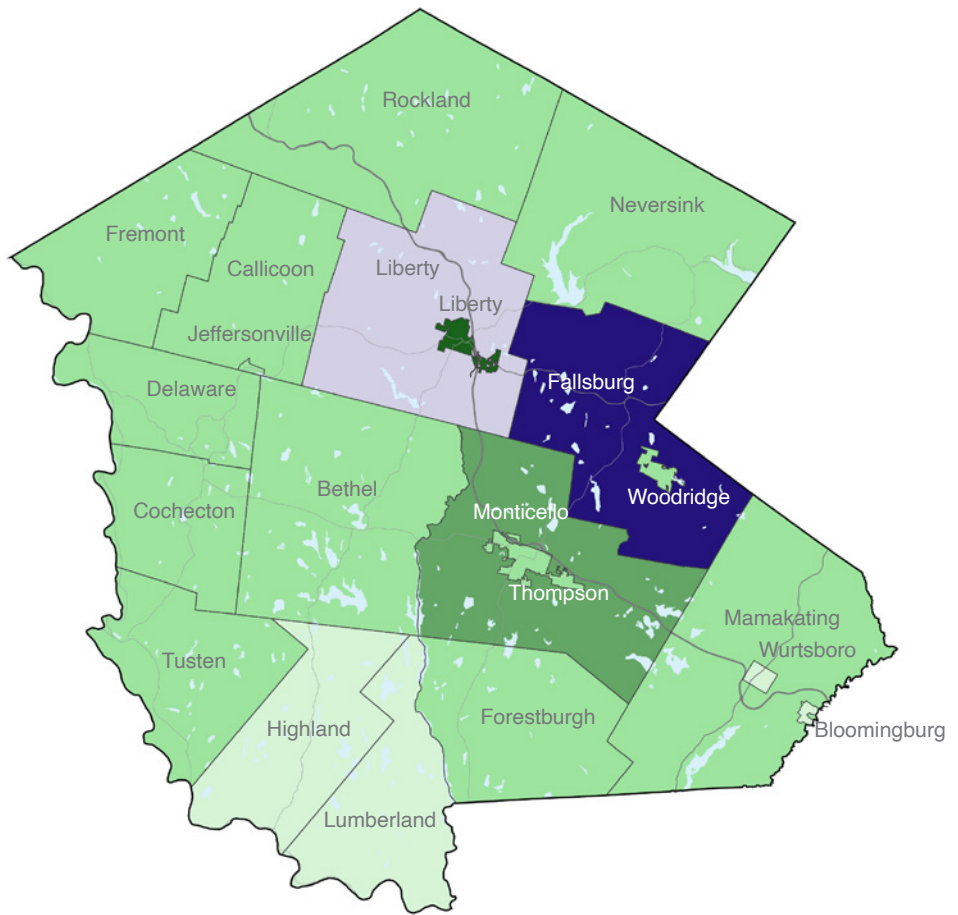
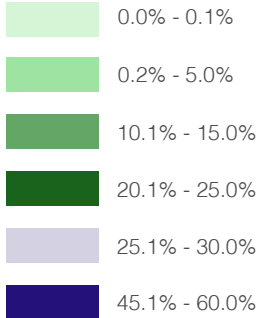


Figure 4.45 presents the municipal share of Sullivan County’s manufacturing jobs in 2019. As shown, Fallsburg and Liberty were home to the greatest number of jobs at 45.5 percent and 23.1 percent, respectively, of the 2019 county total.

**Figure 4.45. Manufacturing Employment by Town/Village as a Share of Sullivan County Total 2019**

Source: US Census Bureau, Longitudinal Employer Household Dataset (LEHD), 2019

LEGEND



Key industry employers include Kohl’s Distribution, Ideal Snacks, Nonni’s Foods, and several processing plants tied to agriculture: Formaggio Cheese, La Belle Poultry, and Hudson Valley Foie Gras. There are more than a dozen solar projects in the county (6 in Delaware alone).

Confirmed in a conversation with Sullivan County IDA, the manufacturing industry and the county at large is suffering from an acute labor crisis.<sup>20</sup> Small employers are losing staff to larger companies that can afford better benefits. Employers are finding it difficult to find unemployed residents with basic job skills or transportation access to work. Attracting new labor to the county is difficult due to lack of housing.

# 9 / Professional and Business Services

The Professional and Business services (including information) supersector reached a new peak of 2,000 jobs in Sullivan County as of November 2022. The supersector lost very few jobs during the pandemic, likely due to the ability of individuals to work from home.

Figure 4.46. Professional and Business Services Employment for Sullivan County 2015 to November 2022  
Source: NYSDOL CES accessed 1/13/2023

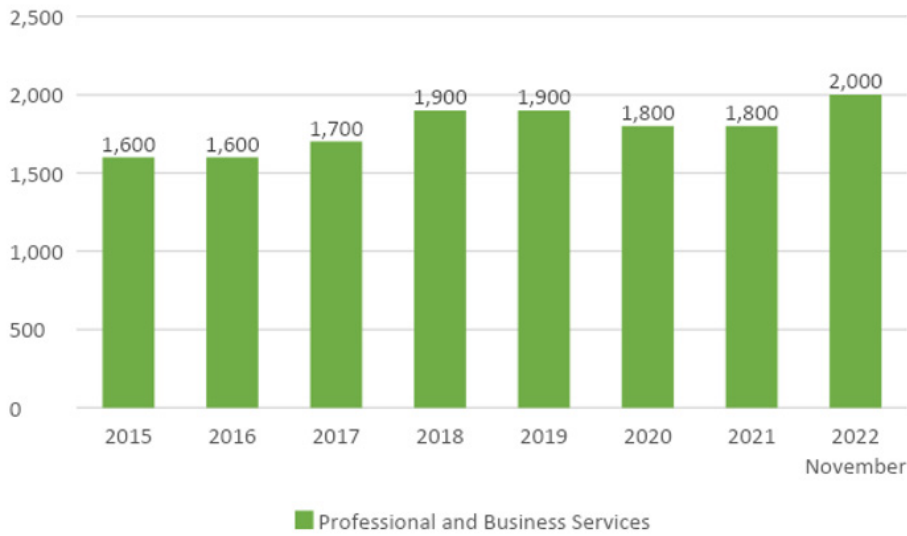
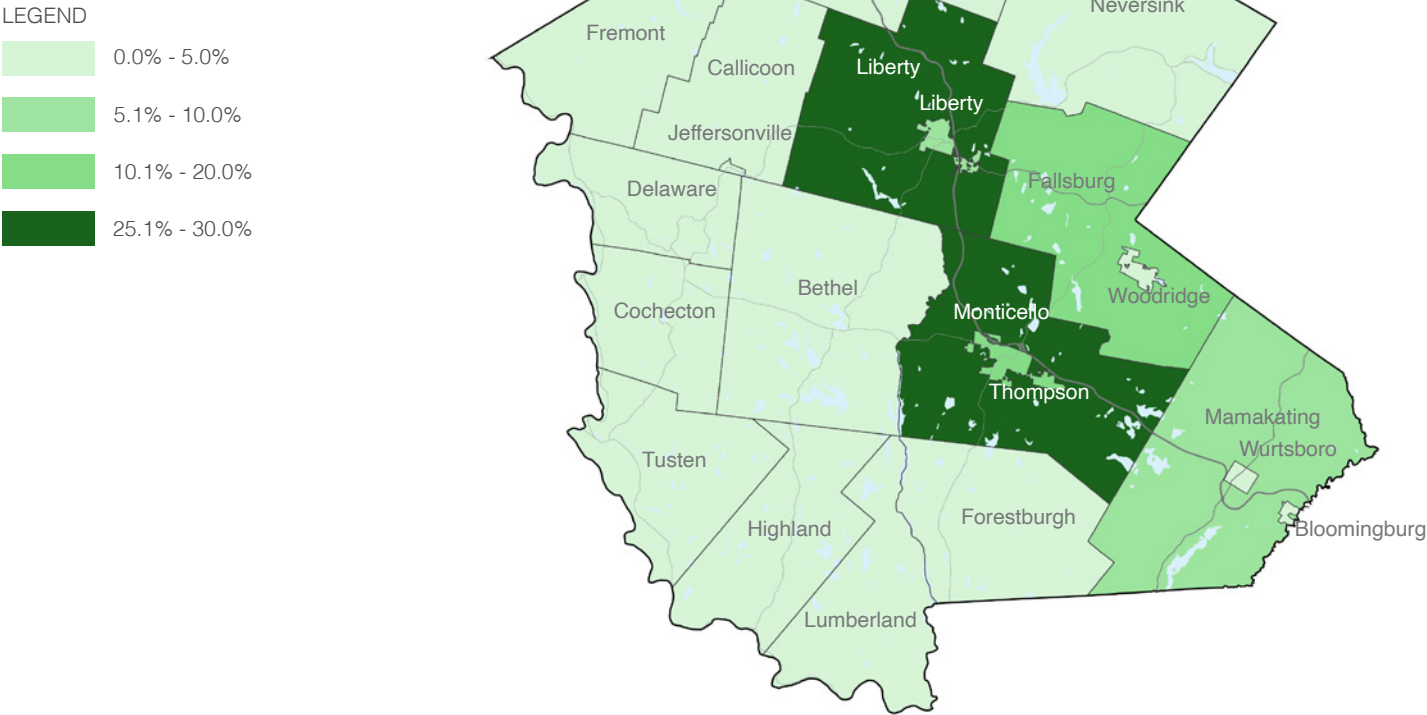


Figure 4.47 shows the concentrations of supersector employment as a share of total county jobs by town and village. Once again, Thompson and Liberty are seen to be the business core of the County with 28.4 and 28.8 percent of activity, respectively.

Figure 4.47. Professional and Business Services Employment by Town/Village as a Share of Sullivan County Total 2019  
Source: US Census Bureau, Longitudinal Employer Household Dataset (LEHD), 2019



# 10 / Natural Resources, Mining, & Construction

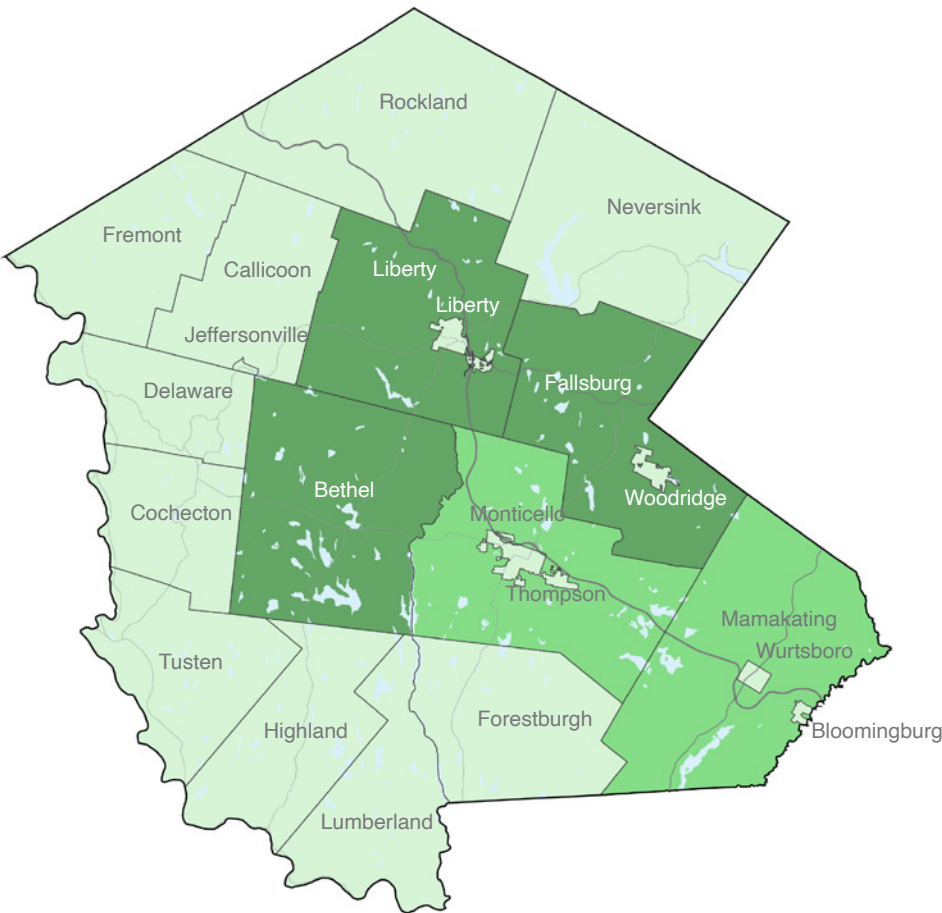
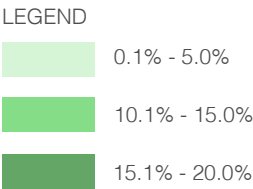
The Natural Resources, Mining, & Construction supersector is primarily made up of Construction in Sullivan County. As shown in Figure 4.48, the sector has grown steadily since 2015, without any pandemic losses, to reach 1,400 jobs in November of 2022.

*Figure 4.48. Natural Resources, Mining, & Construction Employment for Sullivan County 2015 to November 2022*  
Source: NYSDOL CES accessed 1/13/2023



Bethel, Fallsburg, and Liberty towns have the greatest shares of supersector employment with 18.9, 12.7, and 29.5 percent, respectively as shown in Figure 4.49.

*Figure 4.49. Construction Employment by Town/Village as a Share of Sullivan County Total 2019*  
Source: US Census Bureau, Longitudinal Employer Household Dataset (LEHD), 2019



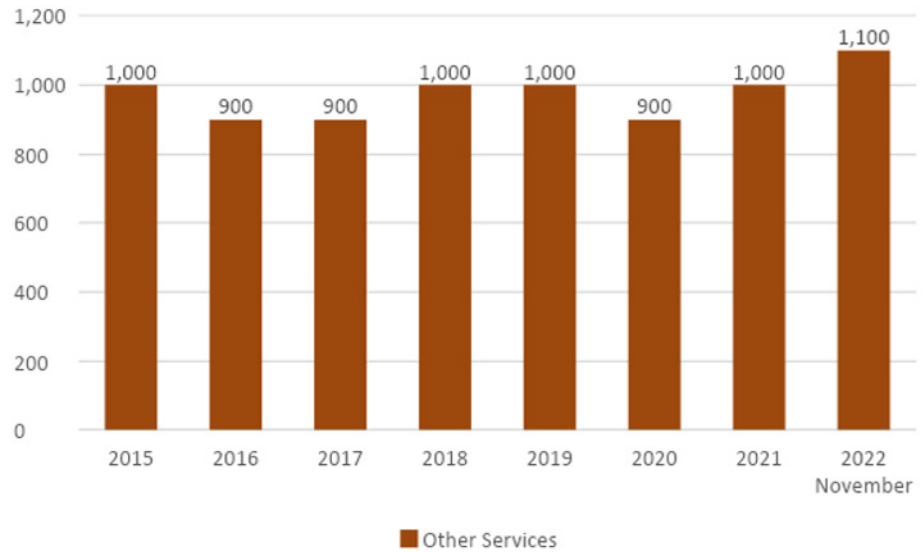


# 11 / Other Services

Other services jobs (including personal services such as salon and spa services, seasonal home repair and maintenance, religious and civic organizations, and private household services) reached a new peak in 2022 with 1,100 jobs after experiencing a brief pandemic dip of 10 percent.

*Figure 4.50. Other Services  
Employment for Sullivan County  
2015 to November 2022*

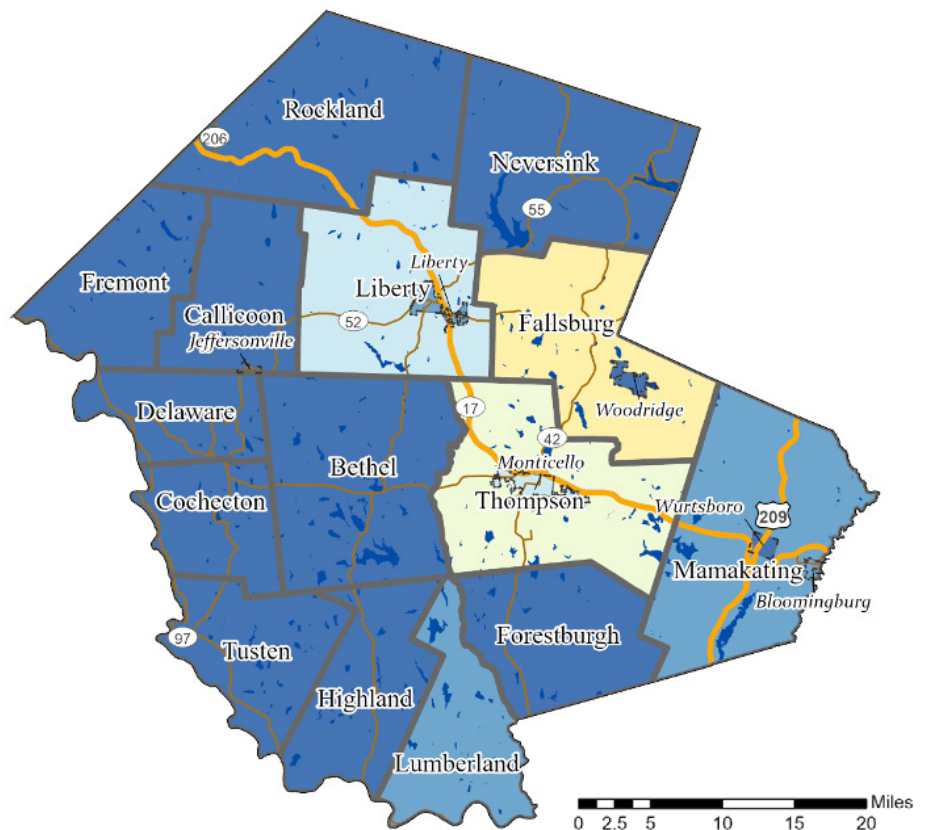
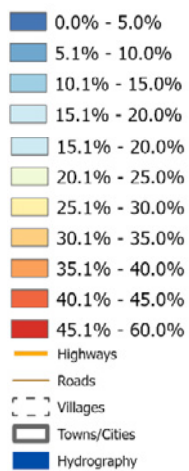
Source: NYSDOL CES accessed 1/13/2023



Like most other service industry jobs, the majority are located in Fallsburg, Thompson, Monticello, and Liberty towns with 27.3, 24.6, 18.7, and 16.5 percent, respectively, of the County total.

*Figure 4.51. Other Services  
Employment by Town/Village as a  
Share of Sullivan County Total 2019*

Source: US Census Bureau, Longitudinal Employer Household Dataset (LEHD), 2019

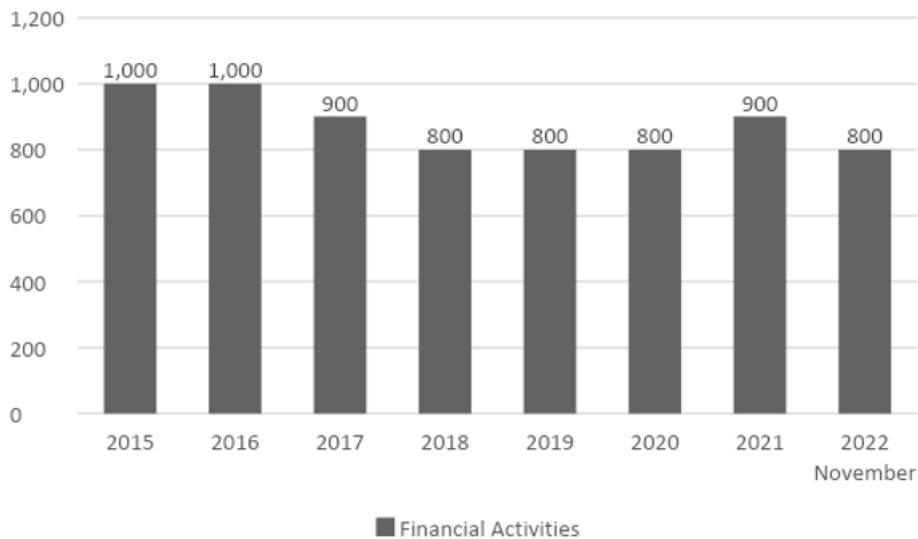


# 12 / Financial Activities

Financial activities including Finance, Insurance, and Real Estate have struggled in Sullivan County in the last several years as shown in Figure 4.52. As of November 2022, there were only 800 such jobs in Sullivan County, however this business activity contributed \$1.2 billion (29.3%) of the county's 2022 GDP.<sup>21</sup>

*Figure 4.52. Financial Activities Employment for Sullivan County 2015 to November 2022*

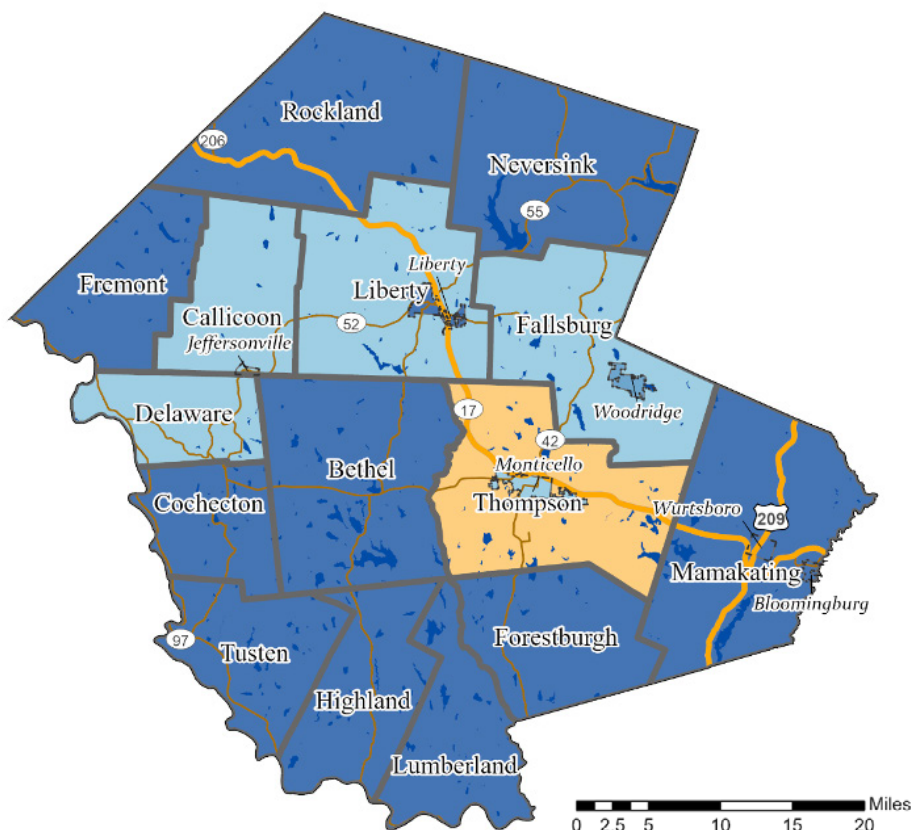
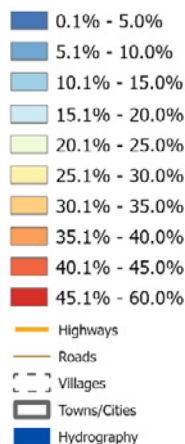
Source: NYSDOL CES accessed 1/13/2023



Thompson is home to the largest share of financial activity service workers at 32.8 percent. However, Fallsburg, Liberty, Callicoon, and Delaware also have notable shares.

*Figure 4.53. Financial Activities Employment by Town/Village as a Share of Sullivan County Total 2019*

Source: US Census Bureau, Longitudinal Employer Household Dataset (LEHD), 2019



<sup>21</sup> U.S. Bureau of Economic Analysis, "CAGDP2 Gross domestic product (GDP) by county and metropolitan area 1" (accessed Friday, January 19, 2024).

# Chapter 6

## Natural and Ecological Resources

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# 1 / Introduction

## WHAT IS NATURAL INFRASTRUCTURE?

Natural infrastructure refers to “naturally occurring landscapes and/or nature-based solutions that promote, use, restore, or emulate natural ecological processes.”<sup>22/23</sup> They provide important ecological services such as storm-water management, diverse habitats etc.. that strengthen our resilience against extreme weather events and changing weather patterns.

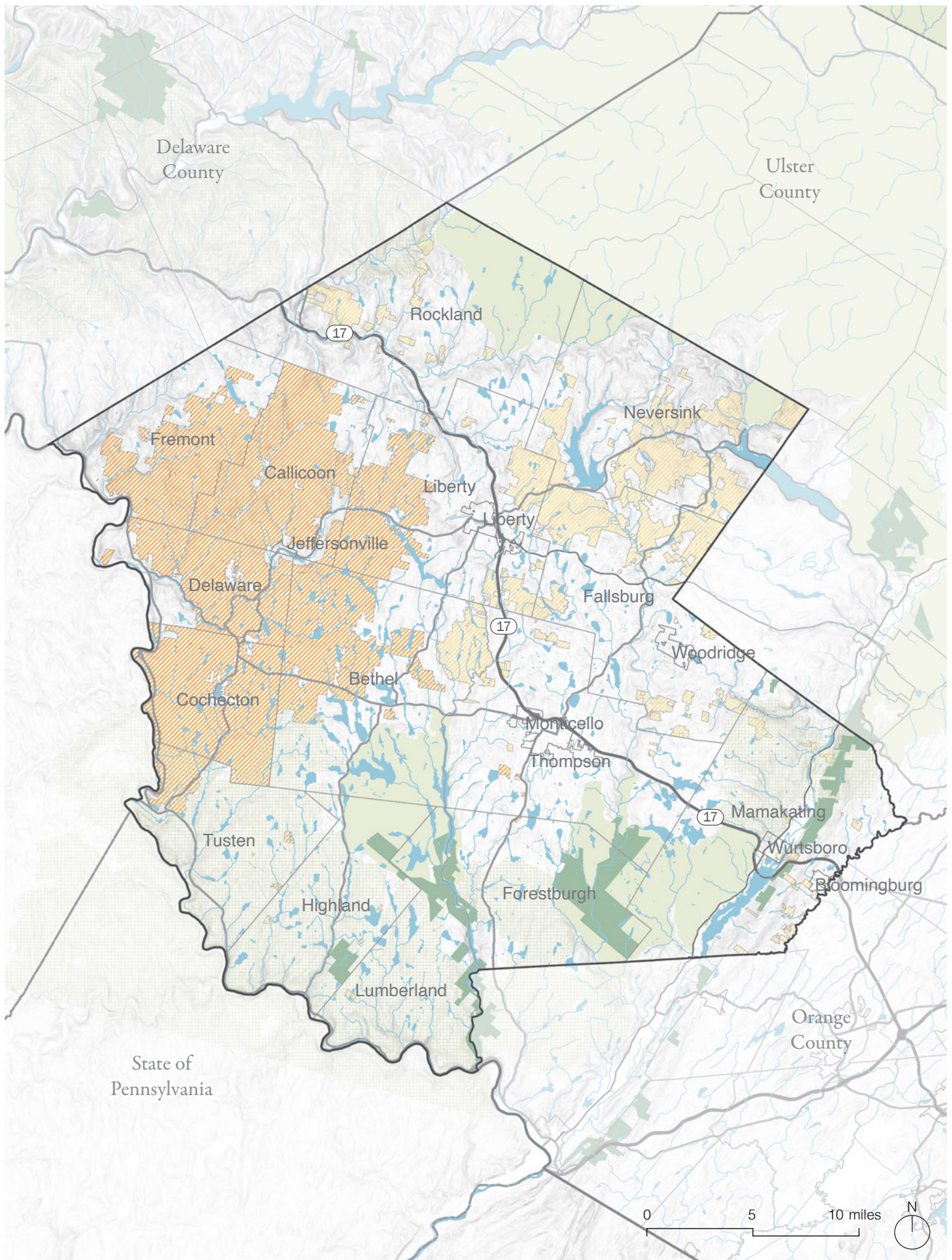
Sullivan County is unique for the quality and quantity of its forests, rivers, lakes, wetlands and farmland. Not only do they hold inherent value due to their natural beauty and biodiversity, but they also provide important benefits to the county and the region by providing habitat to wildlife, supporting the tourism and farming economies, managing stormwater and mitigating the impacts of severe weather events, filtering ground and surface drinking water, sequestering carbon, and providing an ecological buffer for invasive species. In this chapter we will discuss the function of Sullivan County’s open spaces and natural systems as Natural Infrastructure and highlight how natural infrastructure supports resiliency throughout the county. We will also discuss the challenges and opportunities facing this natural infrastructure in Sullivan County today.

Sullivan County has a responsibility to protect the unique benefits of its natural infrastructure for the well-being and quality of life of its residents and its economy. While many organizations in Sullivan County have begun this important work, jurisdictions within the county must ensure that natural infrastructure is maintained in the same way that a community would maintain its roads, sewers, and power lines. In Sullivan County, this means providing supportive structures to reduce the burden of conservation for farmers and private landowners, fomenting smart growth around existing population centers to minimize the effect of sprawling development on natural infrastructure, and adopting sustainable infrastructure practices to reduce strain on existing natural infrastructure. By ensuring the health of its natural infrastructure today, Sullivan County will be better prepared to address emerging challenges in the future.

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22 Natural infrastructure strengthens our climate resilience. Environmental Defense Fund. (<https://www.edf.org/ecosystems/natural-infrastructure-strengthens-our-climate-resilience#:~:text=What%20is%20natural%20infrastructure%3F,or%20emulate%20natural%20ecological%20processes.>)

23 Multiple Benefits of Natural Infrastructure in Agricultural Landscapes. Environmental Defense Fund. (<https://www.edf.org/sites/default/files/content/Benefits-Natural-Infrastructure-Agricultural-Landscapes.pdf>)





## 2 / Existing Conditions

Sullivan County Resiliency Plan



**Figure 5.1 Sullivan County  
Agricultural Districts and Forestlands**

### LEGEND



#### AGRICULTURE

-  Agricultural District 1
-  Agricultural District 4

#### FORESTS

-  Matrix Forest Blocks
-  Forest Linkage Zones
-  DEC Forest Lands

#### WATER

-  Waterbodies
-  Streams / Tributaries

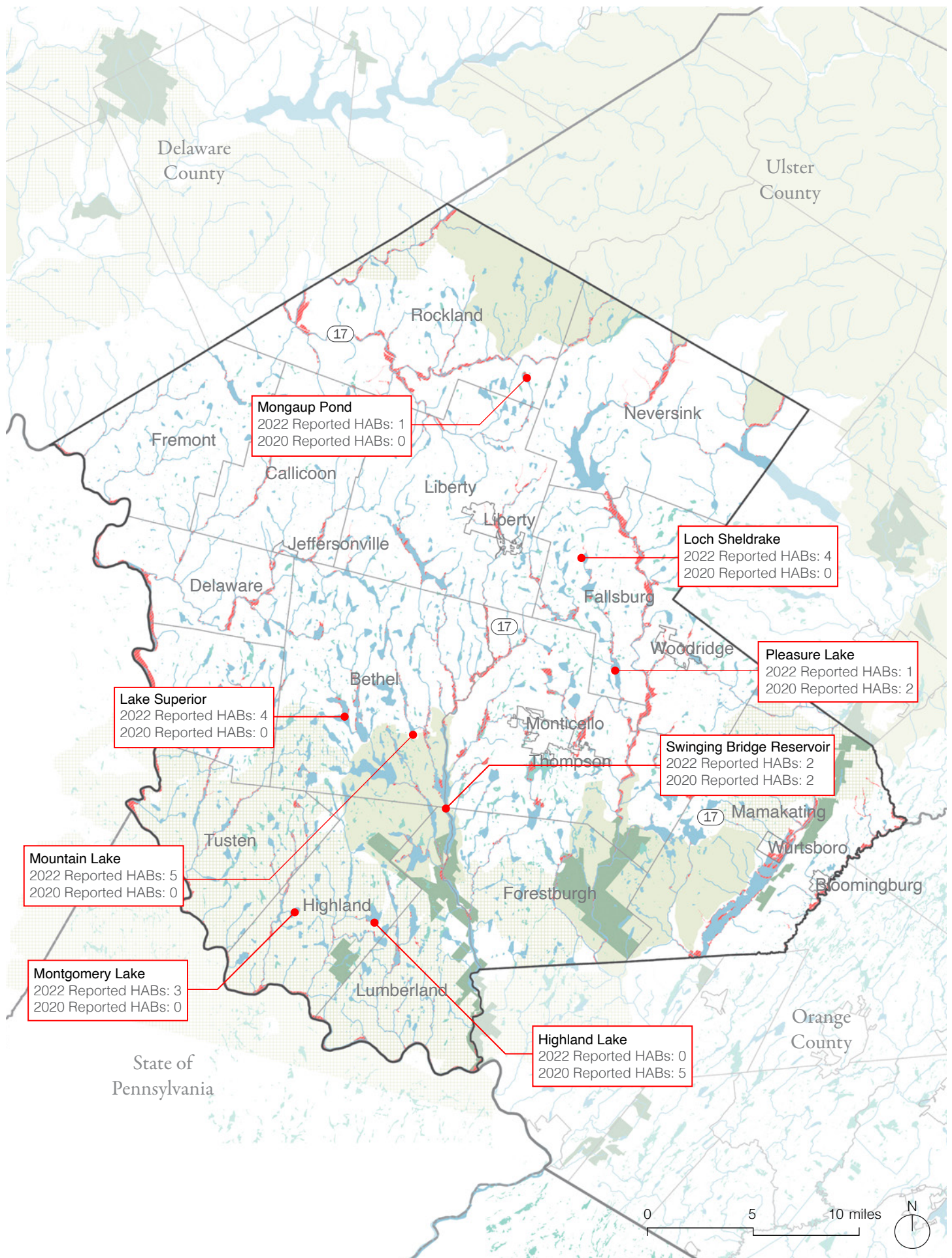
From the Upper Delaware Scenic and Recreational River in the southwest of the county to the Catskill Mountains in the North, to the bucolic agricultural lands in the west to the Neversink River Valley and wetlands in the east, Sullivan County's natural infrastructure is ubiquitous and diverse. The diversity of this infrastructure provides a diversity of benefits for the county. For example, the shade offered by the tree canopy of forested areas adjacent to streams and rivers helps to keep water temperatures sufficiently low for trout, an important resource for the fly fishing and tourism industry. Naturally occurring wetlands and riparian zones slow and absorb flood-waters, protecting settled areas of the county. Vegetation in the county's forests stores carbon as it grows, filtering the air and reducing pollution throughout the county.

While natural infrastructure in Sullivan County clearly benefits the resiliency of the county, it also has positive effects for the rest of New York State and the region. Natural infrastructure does not obey political boundaries, and many of Sullivan County's greatest assets are shared with bordering counties – for example, the 700,000 acres of Catskill Park falls not just within Sullivan County, but also within Delaware, Greene, and Ulster Counties. 90.4% of Sullivan County falls within the Delaware River Watershed, meaning that water and runoff throughout the majority of the county (excepting portions of Neversink, Fallsburg, Thompson, and Mamakating) affects water quality down-river in Orange County, Pennsylvania, New Jersey, and Delaware, while also supplying drinking water for 17 million people downstream. The regional aspect of natural infrastructure can also be seen through the benefits enjoyed by more distant parts of the American Northeast. Catskill Park serves as a buffer protecting northern regions of New York State from invasive species.<sup>24</sup> The forests of Sullivan County also behave as an enormous carbon sink for New York State, storing carbon in every plant through the processes of photosynthesis. Sullivan County is world-renowned for the quality of its water due to the filtering properties of forested and riparian areas, supplying New York City from the Neversink and Rondout Reservoirs, holding 34.9 billion and 49.6 billion gallons of water respectively.

Through discussions with local and regional stakeholders in Sullivan County, we have been able to identify several current and emerging challenges to the natural infrastructure of Sullivan County. Protection of Sullivan County's natural infrastructure is paramount to supporting the county's environmental resilience, and threats to environmental resilience will go on to challenge the community and economic resilience of the county due to the interconnectedness of the county's natural infrastructure.

All of the challenges discussed below are related to changing weather patterns directly or indirectly. In Sullivan County, changing weather patterns are exemplified by a greater frequency and severity of severe weather events, wetter, milder winters with wild temperature swings, and hotter, drier summers with heightened risk of drought. This is illustrated by recent events such as Hurricane Irene (2011), Hurricane Ida (2021), and recent forest fires in nearby Minnewaska State Park (2022).





While the threats and challenges discussed above represent a sample of the most prescient issues related to natural infrastructure in Sullivan County, this is not a comprehensive list of every existing and potential issue. Any threat to the health of natural infrastructure in Sullivan County should be considered a threat to the overall health of the county. For example, industries in Sullivan County such as tourism and agriculture rely on the quality of its natural infrastructure. Public health in Sullivan County is bolstered by the benefits of natural infrastructure associated with outdoor recreation, clean air, and water. The interconnectedness of natural infrastructure highlights its complexity, requiring a comprehensive strategy for its protection moving forward.






## 3 / Rivers and Floodplains

*Sullivan County Resiliency Plan*



**Figure 5.2. Sullivan County Agricultural Districts and Forestlands**

### LEGEND

#### WATER

-  Waterbodies
-  Streams / Tributaries
-  Wetlands
-  Flood Zones A, AE, and X500
-  Waterbodies with Reported HABs

#### FORESTS

-  Matrix Forest Blocks
-  Forest Linkage Zones
-  DEC Forest Lands

Rising water temperatures pose a direct threat to Sullivan County's aquatic habitats. As water temperatures rise, the county's lakes, rivers and streams become unsuitable for trout, one the most important species for fly-fishing in the area. Aquatic habitat is a bellwether of environmental change in Sullivan County due to the interconnectivity of its natural infrastructure, as changes in forestland and riparian zones will be reflected in its temperature, biodiversity, and water quality. For example, forest cover in riparian areas provides shade which helps to keep the temperature of streams and rivers cool. Changes in the management of developed land in Sullivan County are also reflected in its aquatic habit, as pollution from farms, roadways, and settled areas is collected in stormwater runoff and deposited in waterways.

The permeability of natural infrastructure including forestland, farmland and riparian zones serves to protect aquatic habitat during severe weather events as well. By allowing rainwater to percolate through the soil into the county's groundwater reserves, permeable surfaces allow for purification of water which recharges the county's drinking water supply and discharges safely into aquatic habitats. The prevalence of permeable surfaces in Sullivan County also reduces strain on the county's manmade storm drain infrastructure, reducing maintenance costs for the county, and protects aquatic habitat from the negative effects of discharge from manmade storm drain infrastructure, which unnaturally disrupts aquatic habitats by churning natural waters with rapid release of stormwater into streams and rivers.

Mismanagement of agricultural land can be particularly damaging to aquatic habitat. Coupled with higher temperatures, fertilizer in agricultural runoff creates the conditions to allow for hazardous algal blooms (HABs), which damage both the biodiversity of aquatic habitats by blocking underwater plants from the sun, and water quality and drinkability with the release of toxins. Runoff related to winter road management can also be detrimental to Sullivan County's aquatic habitats and surface drinking water sources, with road salt increasing habitat salinity and toxicity.<sup>25</sup> The Sullivan County Department of Public Works has made efforts and completed training over the past few years to reduce the quantity of salt used, including the application of a salt brine solution prior to winter storms which reduces the need for salting by as much as 75% in less severe storms. In addition to the positive environmental impacts, salt reduction has reduced the cost of winter road management for the county.

Riparian habitat, or vegetated areas surrounding streams and rivers in Sullivan County, is an important aspect of natural infrastructure, particularly in the management and filtering of stormwater. As changing weather patterns have





Sullivan County Resiliency Plan

**Figure 5.3. Village of Wurtsboro Floodplain**

#### FORESTS

- Matrix Forest Blocks
- DEC Forest Lands

#### INFRASTRUCTURE

- Linear Energy Infrastructure
- Energy Infrastructure
- Medical Facilities
- Telecommunications Infrastructure

#### WATER

- Waterbodies
- Streams / Tributaries
- Wetlands
- Flood Zones A, AE, and X500



resulted in increased frequency of severe weather events in Sullivan County, riparian zones act to slow and filter stormwater as it reaches the county's streams and rivers, reducing risk of flooding. For example, a wooded riparian buffer of 10-20 meters has the ability to remove up to 97% of suspended solids, 94% of phosphorous, 91% of nitrogen, and 97% of nitrates from infiltrated water before it reaches the waterway.<sup>26</sup> This is particularly important in Sullivan County due to the prevalence of floodplains in village and hamlet centers. (Wurtsboro provides an example in the map above) Reduction in flooding creates a clear benefit for residents and businesses in Sullivan County by avoiding flood damage and maintaining regional mobility. Riparian zones also stabilize the riverbanks where they are located, a concern discussed during our conversation with the Commissioner of Public Works, as roads in Sullivan County often run alongside its rivers and streams and are therefore susceptible to erosion.

Invasive species are a major threat to the environmental resiliency of Sullivan County's riparian zones. By crowding out native understory species and preventing the growth of saplings in riparian zones, Japanese knotweed contributes to a decline in biodiversity, transitioning the riparian ecosystem from tree-dominated forest to knotweed-dominated shrubland.<sup>27</sup> This mainly occurs through the ditching in roadside areas containing knotweed and general ignorance of knotweed as a problem plant species. Per EPA best practices, while any vegetated riparian barriers are useful, woodland and forest barriers are the most effective, with preferred filtration and stormwater mitigation properties. Riparian forests also reduce water temperature by providing shade for Sullivan County's streams and rivers, an important benefit for the cold-water trout population, and a driver for the fly-fishing industry in the county.

Japanese knotweed also has the potential to increase soil erosion in riparian zones, impacting local rivers and decreasing the effectiveness of riparian areas in stormwater management and flood prevention as discussed above. Continuous erosion of riparian areas can result in active embankment failures, a growing issue in Sullivan County according to the Department of Public Works.

## 4 / Aquifers

Aquifers are an important aspect of natural infrastructure in Sullivan County, particularly due to the significant reliance of the drinking water supply on groundwater. The quality of water in Sullivan County's aquifer is particularly high, due to the filtration benefits of the county's forests, riparian zones and open spaces.

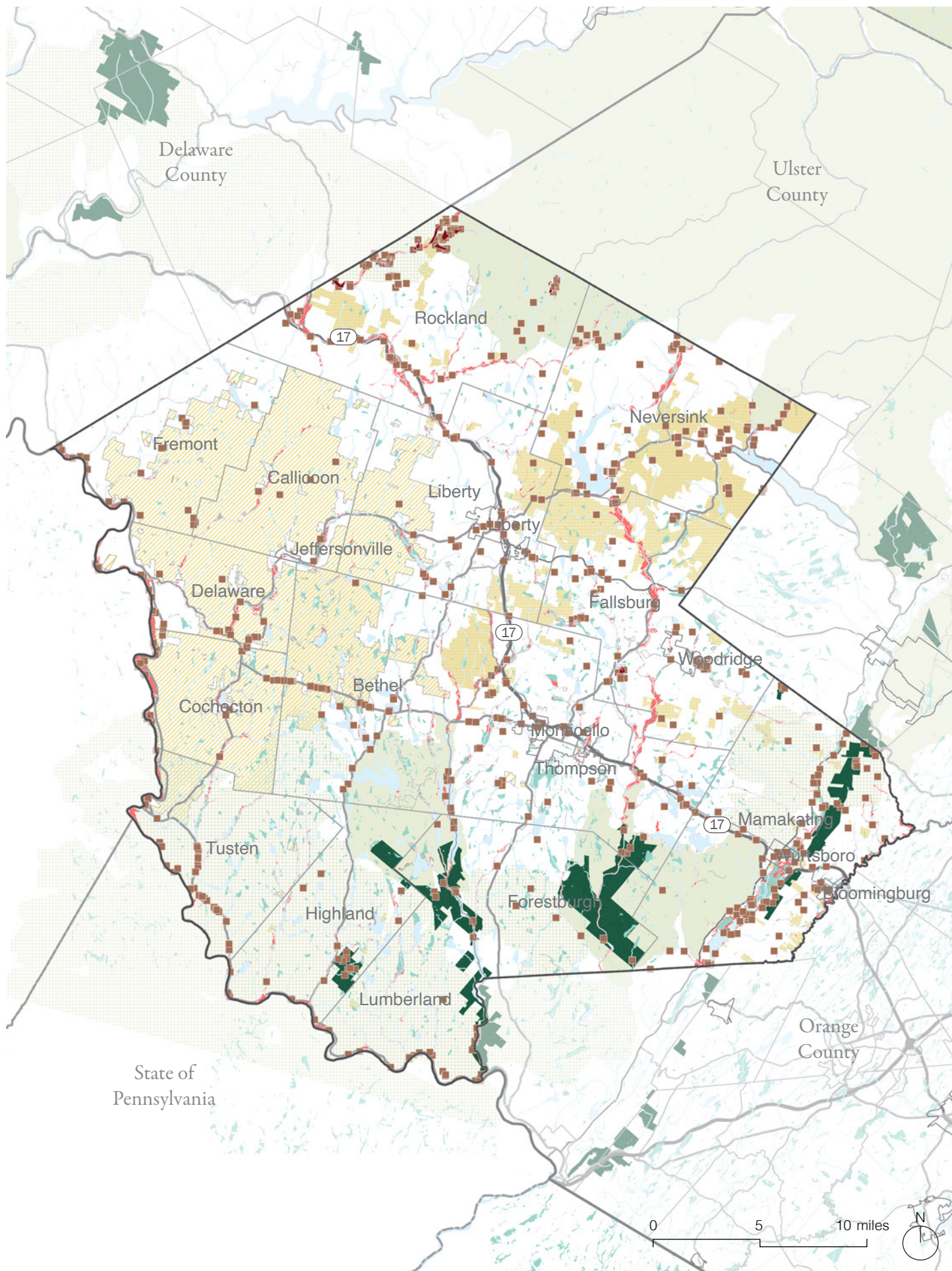
Several factors may affect the quantity and quality of groundwater in Sullivan County. While aquifers can recharge over time during periods of wet weather, rapid withdrawal of groundwater for various uses threatens to deplete this resource. This is particularly concerning in Sullivan County due to the significant swing of population between the winter and summer months. A low water table due to depletion can negatively affect water levels in the county's lakes and streams, important drivers of the tourist economy.

Conversely, a high water table in the tourist off-season threatens aquifers due to the proximity of the water table to potentially damaging practices such as agriculture, septic waste systems, industrial uses, and unintentional contamination from accidents such as chemical spills.

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26 Stormwater Best Management Practice: Riparian/Forested Buffer. United States Environmental Protection Agency. (<https://www.epa.gov/system/files/documents/2021-11/bmp-riparian-forested-buffer.pdf>)

27 Wilson, M., Freundlich, A., Martine, C. Understory dominance and the new climax: Impacts of Japanese knotweed (*Fallopia japonica*) invasion on native plant diversity and recruitment in a riparian woodland. In *Biodivers Data J.* (November 13, 2017) (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5740475/>)





## 5 / Working Lands

Sullivan County Resiliency Plan

Figure 5.4. Sullivan County Forests, Agriculture, and Invasive Species

### LEGEND

#### INVASIVE SPECIES

- Invasive Species Sighting

#### AGRICULTURE

- Agricultural District 1
- Agricultural District 4

#### FORESTS

- Matrix Forest Blocks
- Forest Linkage Zones
- DEC Forest Lands
- DEC Trails

#### HYDROLOGY

- Waterbodies
- Streams / Tributaries
- Flood Zones A, AE, and X500

When properly managed, farmland can also be considered an important part of natural infrastructure in Sullivan County. Farmland in Sullivan County is primarily used for the production of livestock and field crops, but also often includes forested areas integrating with the vibrant tree cover throughout the county. Fields and pastures contribute to natural infrastructure by providing important permeable surfaces necessary for environmentally resilient stormwater management. Farming is able to flourish in Sullivan County, due in part to the quality of its soil and water. Natural infrastructure like two-stage ditches, saturated buffers, and vegetated ditches can also help to offset the negative impacts of farming on the county's natural resources, such as the generation of algal blooms related to the use of synthetic fertilizers.

Farmland contributes to the economy of Sullivan County while also generating many of the same positive effects as natural infrastructure for the county. As such, it is susceptible to many of the same threats and challenges as natural infrastructure. For example, with an increase in occurrences and variety of invasive species, there is more pressure placed on crops and animals that become prone to competition and disease. Species like Japanese Knotweed compete with crops for nutrients and block out their sunlight, while species like spotted lantern fly damage fruit trees and crop plants alike. Issues like drought and fire also present major threats to the economic output and natural infrastructure benefits of agricultural land.

## 6 / Forestland

There are several specific areas where Sullivan County excels when it comes to natural infrastructure. According to the Hudson Valley Forest Condition Index (2019), there are more than 30,000 acres of forestland in Sullivan County which fall into the top 1% of all forests in the region, achieving high scores for their size, local connectedness, habitat diversity, lack of manmade stressors and carbon sequestration.<sup>28</sup> New York State has recognized the importance of uninterrupted forestland for more than a century, protecting much of the northern portion of the county in 1885 with the creation of the Catskill Forest Preserve. These forests filter the water which fills Sullivan County's lakes, reservoirs, rivers, streams, and wells. Most of Sullivan County falls within the Delaware River watershed, with a small part of the county in the East falling into the Lower Hudson watershed.

Sullivan County's forests are facing many challenges related to changing weather patterns, invasive species, and inefficient development patterns. As temperatures increase in the county, habitat suitability for different species has begun to change. While plants and animals which thrive during milder winters and hotter summers are beginning to find Sullivan County suitable, plants and animals used to colder winters and milder summers are beginning to find Sullivan County less suitable. Under the previous version of the USDA Plant Hardiness Zone Map published in 1990, Sullivan County was entirely in Zone 5b, indicating annual average extreme minimum temperatures between -10 and -15 degrees Fahrenheit. The current map, published in 2012, shows that the southern portion of the county is now located in Zone 6a, indicating annual average extreme minimum temperatures between -5 and -10 degrees Fahrenheit.



An increased growing season related to milder winters benefits invasive species like the Southern Pine Beetle, Emerald Ash Borer, and Hemlock Woolly Adelgid, allowing them to extend their range north into the Catskills. Severe changes in temperature throughout the winter associated with warming temperatures damage trees, making it easier for invasive species to gain a foothold in the county's forests. Improved breeding conditions for insects also generate public health challenges associated with tick and mosquito transmitted illnesses such as Lyme Disease and West Nile Virus. Invasive species in Sullivan County destroy and crowd out local native species, resulting in a reduction of biodiversity. More biodiverse natural systems are more environmentally resilient as different species can withstand different challenges. An example of a challenge related to a lack of biodiversity is the increase in deer population due to the lack of peak predators in the area – overpopulation of deer in Sullivan County harms forest regeneration as few seedlings can survive grazing deer. The New York State Management Plan for White-Tailed Deer considers Sullivan County to be in a vulnerable area with low to moderate tree canopy regeneration debt, meaning that limitation of the seedling population in the county could lead to an eventual reduction in tree canopy. Lesser et al. (2018) predict an increase of seedling density up to 15% throughout the county with a 25% reduction in deer abundance. Additionally, overpopulation of deer can lead to economic losses for farmers due to crop damage, as well as a safety concern related to an increase in automobile accidents related to deer contacts.<sup>29</sup>

Forest fires are a growing threat to Sullivan County's natural infrastructure as exemplified by the Wurtsboro Fire in 2022, which affected 55 acres, and highlighted by the Napanoch Point Fire and Stony Kill Fire in Minnewaska State Park fire in the same year in nearby Ulster County.<sup>30</sup> While common causes of forest fires such as campfires and lightning strikes are more likely to cause fires in drought conditions, there are many emerging challenges in Sullivan County which contribute to increased forest fire risk. A longer growing season for healthy trees results in a larger amount of leaf litter generated during the fall. Invasive species and diseases which negatively affect the health of trees result in a higher rate of leaf litter and branches fallen from trees during the summer months. Dead leaves and branches serve as a dangerous additional source of fuel for forest fires. Additionally, vines which benefit from the warmer weather and associated increased growing season form "ladder fuels" which allow forest fires to reach the forest canopy more rapidly and make forest fires more difficult to fight. Not only do forest fires affect environmental resiliency by destroying habitat, destabilizing soil, and releasing stored carbon back into the atmosphere, they present severe threats to property and vital built infrastructure as well as the health and safety of the community in Sullivan County.

During our stakeholder interviews, inefficient development patterns were repeatedly identified as a driver of issues related to forest fragmentation in Sullivan County. In addition to affordability issues in major metropolitan areas, changing weather patterns in other parts of the world stand to drive growth in Sullivan County as coastal and southern climates become less suitable for residential development. 83% of land in Sullivan County is privately owned, hamstringing the ability of local government to prevent sale of open space and forestland to developers. Given current patterns of development, damage to Sullivan County's natural infrastructure is at risk of acceleration. For example, the American Farmland Trust has projected Sullivan County to lose 3,100 acres of cropland, pasture and woodland associated with farms by 2040 at current rates of

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29 Management Plan for White-Tailed Deer in New York State, 2021-2030. New York State Department of Environmental Conservation. (May 2021) ([https://www.dec.ny.gov/docs/wildlife\\_pdf/deerplan21.pdf](https://www.dec.ny.gov/docs/wildlife_pdf/deerplan21.pdf))

30 Herbert, G. Upstate NY wildfire grows to 270 acres; National Guard, Army added to response. Syracuse.com. (September 1, 2022) (<https://www.syracuse.com/state/2022/09/upstate-ny-wildfire-continues-national-guard-army-added-to-response.html>)

development.<sup>31</sup> Natural infrastructure contained within agricultural lands is at the highest risk for development due to proximity to existing manmade infrastructure such as roads and power lines. Forest fragmentation is one of the main impacts of real estate pressure, as additional roadways, housing, and industry split larger undisturbed forests into smaller pieces. Fragmentation results in expansion of forest edge areas and destruction of core forest areas, affecting microclimate, levels of predation and proliferation of invasive species. True interior forest conditions only occur at least 200-300 feet inside the non-forest edge. The uniquely undisturbed quality of Sullivan County's forests is a major driver for tourism in the county, and therefore real estate development and forest fragmentation pose major economic resiliency challenges. Forest fragmentation and deforestation related to development also leads to higher rates of soil erosion, clogging Sullivan County's built stormwater infrastructure and natural waterways, resulting in increased flooding.

## 7 / Recent and Ongoing Projects and Initiatives

Thus far, this chapter has highlighted the unique strengths of Sullivan County related to its natural infrastructure, as well as many of the challenges to natural infrastructure in the county. While the protection of land through the creation of federal, state, county and municipal parks and reserves is an obvious benefit to the natural infrastructure of the county, it is due to the hard work and dedication of the residents and organizations in Sullivan County that the county has such a wealth of natural infrastructure to protect.

### BEST PRACTICES

Due to the high percentage of privately owned land in Sullivan County, best practices in the preservation and conservation of its natural infrastructure are often carried out by private individuals and organizations. These include for profit organizations like summer camps, hunting and fishing clubs in addition to non-profit organizations. Not only do these organizations support the environmental resiliency of the county through conservation and preservation, but they are also an important aspect of the economy in Sullivan County. Non-profit organizations like the Delaware Highlands Conservancy offer legal help for the creation of conservation easements, as well as education for local landowners interested in forestry on their own private property. Catskill Mountainkeeper advocates for the protection of the natural infrastructure of the Catskill region at the

state level, and works to promote tourism, agriculture, and conservation at the regional level. The Catskill Regional Invasive Species Partnership (CRISP) works in conjunction with many other groups to research and educate about invasive species in the area. Grants are also available for invasive species management through CRISP for private organizations and landowners who develop a plan for control of high priority species. Friends of the Upper Delaware River (FUDR) focuses on protection of the watershed through research, education, and economic revitalization.

## LEGISLATION

The 2016 Delaware River Basin Conservation Act is an opportunity for the county to obtain additional funds for the reinforcement and expansion of its natural infrastructure. Through the establishment of the Delaware Watershed Conservation Fund and the facilitation of the National Fish and Wildlife Foundation, grant funds are issued for the conservation and restoration of fish and wildlife habitat associated with the Delaware River and its tributaries. Private philanthropic groups such as the Bezos Earth Fund have also offered matching funds for grants awarded through the Delaware Water Conservation Fund. In 2022, Sullivan County was awarded \$317,335 for the purchase and cleanup of 38 acres of land in the Town of Delaware to create Callicoon Riverside Park.<sup>32</sup> Another source of federal funding for open space conservation are Conservation Innovation Grants provided by the United States Department of Agriculture for the development of conservation and pilot projects related to preservation of farmland.<sup>33</sup>

Monetary incentives are also available for private landowners seeking to protect their forestland or open space. The New York State Conservation Easement Tax Credit offers up to \$5,000 annually on up to 25% of local school district, town, and county taxes in exchange for a conservation easement on their property.<sup>34</sup> The Regenerate New York Forestry Cost Share Grant Program provides reimbursements of up to \$100,000 for private landowners with at least 5 acres looking to undertake regenerative forest projects such as reforestation, competing vegetation control or deer exclosures.<sup>35</sup>

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32 <https://www.fws.gov/program/delaware-river-basin-restoration>

33 [https://cig.sc.egov.usda.gov/sites/default/files/2021-07/NRCS-CIG\\_FarmBill2018\\_Factsheet.pdf](https://cig.sc.egov.usda.gov/sites/default/files/2021-07/NRCS-CIG_FarmBill2018_Factsheet.pdf)

34 <https://www.dec.ny.gov/lands/26428.html>

35 <https://www.dec.ny.gov/lands/119950.html>





Delaware River | Coalition for the Delaware River Watershed

# Chapter 7

## Infrastructure Systems

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# 1 / Introduction

Sullivan County is home to a mixture of centralized and decentralized infrastructure throughout the county, responding to the varied patterns of development across the county. While many of the county's towns and villages provide water infrastructure, most rural development utilizes well-water, septic systems, and natural stormwater management. While a majority of County residents purchase their electricity through the default rate offered by NYSEG, the growing number of community solar projects in the county provide utility customers with the alternative of purchasing renewable energy at a competitive rate, and supporting the county's energy transition. This dichotomy allows Sullivan County the flexibility to maintain its rural character while also supporting thriving main street communities like Monticello and Liberty.

As a new set of challenges emerges, including changing weather patterns, real estate pressure, and population growth, the county must undertake anticipatory strategies to ensure the resiliency of existing conditions, and to prepare the county for sustainable patterns of growth in the future. This chapter will assess resiliency challenges related to electricity, broadband, telecommunications, water, sewer, and stormwater infrastructure, as well as opportunities to bolster their resiliency in the face of acute and chronic issues.

Changing weather patterns in Sullivan County have resulted in warmer, wetter winters and hotter, drier summers, as well as increased frequency and severity of severe weather events and flooding. Warm, wet winters extend the growing season for vegetation, increasing power line tree contacts, while also raising the water table to dangerous levels for groundwater systems. Hot, dry summers result in increased power consumption and low water tables, causing groundwater systems to fail.

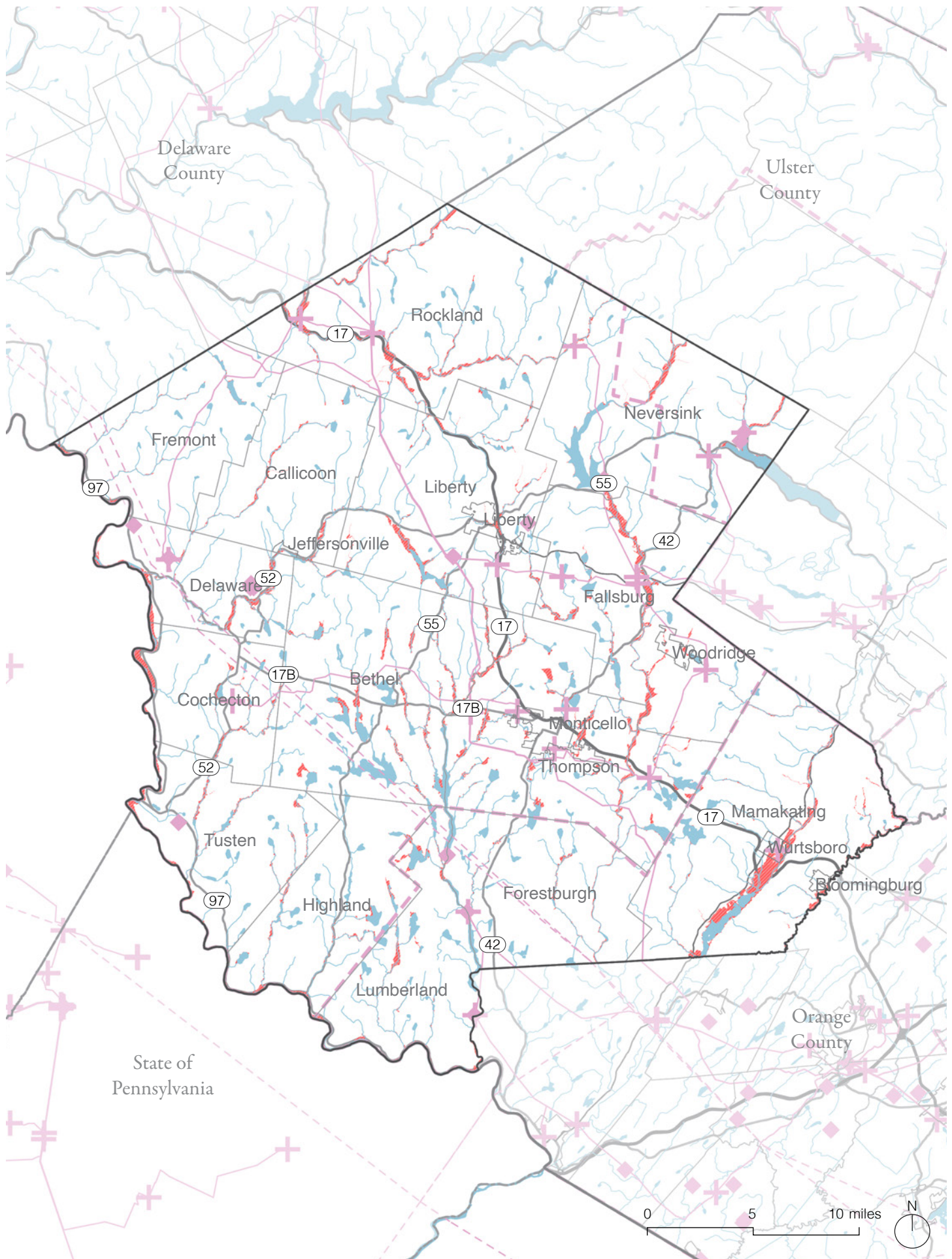
Man-made factors also contribute to the heightened risk to critical infrastructure in Sullivan County, including low density settlement patterns, aging or insufficient infrastructure and housing stock, and rapid population growth. Frequent and prolonged power and internet outages have been identified as a critical issue in Sullivan County, particularly in towns like Tusten and Highland. Regardless of the cause, utility and telecommunications outages are serious threats to the community, economy, and environment and steps must be taken to ensure their resiliency.

## 2 / Electricity

### OVERVIEW

Electricity in Sullivan County is provided by three different providers: Orange and Rockland Utilities, Inc., New York State Electric & Gas (NYSEG), and Central Hudson Energy Group. The Towns of Forestburgh, Mamakating and Lumberland are supplied by Orange and Rockland, and portions of the town of Neversink are supplied by Central Hudson, with NYSEG being the predominant provider, supplying all remaining County households.<sup>36</sup> Reliability of the power grid is a challenge to community and economic resiliency across the County. Frequent power outages and failures are common: for example, the Town of Tusten and the Town of Highland experienced over 100 power failures during the winter storms of 2018. While energy providers have responded to acute issues, (for example, NYSEG completed a 15-mile circuit upgrade in parts of the Yulan 204 circuit













**Figure 6.1. Sullivan County Critical Energy Infrastructure**

## LEGEND

## ENERGY INFRASTRUCTURE

-  Provider Coverage Areas
-  Electricity Transmission Lines
-  Substations
-  Power Plants
-  Natural Gas Liquid Pipelines

## HYDROLOGY

-  Waterbodies
-  Streams / Tributaries
-  Flood Zones A, AE, and X500

in 2021 to enhance reliable electricity for over 1,900 residents)<sup>37</sup> frequent 30 second outages experienced in the Village of Monticello throughout the summer of 2022 highlight the continued need for preventative maintenance. NYSEG failed to meet performance targets for each year from 2018 to 2021, with users in 2021 experiencing more than one power outage per year on average, with outage durations averaging more than 2 hours.<sup>38</sup> NYSEG must take further steps to ensure the resilience of electricity infrastructure in Sullivan County, including regular vegetation management, which they have outsourced to private contractors while reducing internal linemen and tree trimming teams.<sup>39</sup>

### CURRENT HAZARDS AND CLIMATE IMPACTS

In NYS as well as Sullivan County, disruptions to electricity service are overwhelmingly caused by storm events. After storms, the next three major causes for power outages statewide were equipment failures, tree contacts, and accidents or events not under the utility's control.<sup>40</sup> These three categories combined to account for approximately 80 percent of all non-storm interruptions in NYS in 2021.

As discussed in the introduction to this chapter, changing weather patterns can impact electricity distribution infrastructure in several ways. Primarily, increased frequency of extreme weather events with more severe precipitation and severe wind have resulted in the most frequent disruptions to electricity service in Sullivan County. For example, the Sullivan County Hazard Mitigation Plan indicates that Sullivan County averages 4 severe wind events per year, with an average annual cost of damage upwards of \$100,000. The five severe wind events with the highest reported loss in dollars have all occurred since 2010.

Increased frequency of tree contacts can be attributed to a combination of factors, including an increased growing season resulting in more vegetation, invasive species which weaken existing vegetation, and wider temperature fluctuations and increased frequency and severity of storms resulting in downed trees. These factors all represent threats to environmental resiliency in Sullivan County's significant forested area. Current vegetation management strategies have limited success in preventing tree contacts, as Central Hudson reports that 68% of tree contact interruptions in their district were caused by limbs and trees from outside the designated clearance zone. Central Hudson also reports a continued increase in tree contacts year over year, supporting the findings above.<sup>41</sup> The increased growing season also contributes to the growth of vines which can cause conductors to short resulting in a portion of the equipment failures described above. Disinvestment from vegetation management by the power company threatens to exacerbate issues related to tree contacts and vines. However, most lines run along town, county or state roadways, and the vast majority of NYSEG's failures were due to their lack of maintaining their equipment along these right of ways.

Another major cause of equipment failures in Sullivan County is the age of electricity infrastructure and housing stock. Orange & Rockland identifies the biggest cause for equipment failure in their system to be conductor/cable failure, typically caused by age and deteriorated cable connections, which over time cause overheating.<sup>42</sup> Older electricity infrastructure designed for a constant capacity must also be updated to handle more advanced, renewable but intermittent energy sources such as wind and solar, whose output is affected by environmental circumstances.

37 "NYSEG upgrades electric system in part of Sullivan County" Mid Hudson News, June 28, 2021

38 2021 Electric Reliability Performance Report. NYS Department of Public Service, June 2022.

39 Somar Hadid, "NYSEG: Service and rate concerns around Sullivan" River Reporter, September 30, 2020

40 16 CRR-NY 97.5NY-CRR identifies accidents or events not under utility's control including house fires not caused by the utility's service, crane contacts, automobile accidents, gun fire contacts, sabotage, customer tree fellings, etc.. (2021 Electricity reliability report, PG2)

41 2021 Electric Reliability Performance Report. NYS Department of Public Service, June 2022.

42 New York State Department of Public Service 2021 Electric Reliability Performance Report, 25

While longer term power outages like those discussed above are generally the result of acute impacts of climate change and equipment failure; brownouts and short-term power outages like those experienced in Monticello in 2022 are often the result of system capacity issues. Increased temperatures due to climate change and heat island effects result in increased demand for air conditioning and consequently increased energy demand. Continuing projected increases in temperature and development will exacerbate this capacity issue, in conjunction with the increasing population in Sullivan County. According to the 2021 ACS, 85.9% of housing units in Sullivan County were built prior to the year 2000. The aging housing stock continues to rely on firewood and fossil fuels for heating purposes. Some electric infrastructure poles in use are as old as 80 years. In certain areas, the overhead lines exhibit up to fifteen splices within a 100-foot length, leading to energy loss caused by overheating of the wires at these connection points.

The potential impact of older housing stock on the grid becomes pronounced when considering the upgrade of heating systems to air source heat pumps without prior diligence in enhancing the thermal envelope of the house. A prudent approach involves prioritizing energy efficiency measures to "reduce the load first" before transitioning to alternative heating sources. This not only results in a more efficiently heated and cooled house but also alleviates strain on the grid. Which, in turn, promotes the health of the occupants.

Due to the rural nature and dispersed development patterns of Sullivan County, the electrical grid has been developed in a piecemeal nature, with expansion occurring at a similar pace to development. This pattern combines with capacity issues to create significant costs related to expansion of the system. For example, the construction of the Resorts World Catskills casino required a \$1.5 million private infrastructure investment to expand local network capacity. This generates an economic resiliency issue as other large businesses who may be looking to move to Sullivan County could be discouraged by this added cost. The piecemeal expansion of the system has resulted in a heightened degree of complexity, particularly in areas of Sullivan County with higher density. This complexity affects the ability of the County to feasibly establish microgrid infrastructure, a potential solution to the energy infrastructure issues described above.<sup>43</sup>

## RECENT AND ONGOING PROJECTS AND INITIATIVES

### a. System Improvements

In its 2020 Rate Order<sup>44</sup>, the New York State Public Service Commission authorized NYSEG to allocate \$27.2 million to two new projects related to vegetation management throughout their system. The first focuses on circuits which have not been trimmed in over five years, and the second focuses on dangerous trees falling outside of the company's right-of-way – an important sector as demonstrated by Central Hudson's findings above. While the New York State Department of Public Service's (NYSDPS) 2021 Electric Service Reliability Performance Report finds that NYSEG "does not appear to be utilizing these programs efficiently,"<sup>45</sup> the funding and programs present an opportunity to benefit community resiliency in Sullivan County if conducted efficiently.

While the NYSDPS report was critical of NYSEG's approach to vegetation management, it found that NYSEG has been proactive in the improvement of their system to combat issues related to age and poor condition. In 2015, NYSEG instituted the Circuit Breaker Replacement Program to replace circuit breakers in

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43 Booz Allen Hamilton. Village of Monticello Microgrid Feasibility Study Microgrid Project Results and Final Written Documentation, p. 84. New York State Energy Research and Development Authority (April 8, 2022)

44 Case 19-E-0378, Order Approving Electric and Gas Rate Plans in Accord with Joint Proposal, with Modifications, p. 82. State of New York Public Service Commission (November 19, 2020)

45 2021 Electric Reliability Performance Report, p. 3. NYS Department of Public Service (June 2022)



poor condition, having replaced 430 circuit breakers under the program to date. In 2019, NYSEG instituted the Distribution Line Deficiency Program to inspect and repair distribution lines in poor condition. NYSEG is also considering solutions like the application of reflective tape to its utility poles to mitigate traffic accidents, another frequent cause of disruptions in Sullivan County. This program would be a benefit to community resiliency in Sullivan County as a potential traffic safety benefit.<sup>46</sup>

### **b. Microgrid Study and Opportunity**

In 2015, the County worked with engineering firm Booz Allen Hamilton (BAH) to develop microgrid feasibility studies through the NY Prize Microgrid Competition. Sponsored by the New York State Energy Research and Development Authority (NYSERDA), NY Prize sought to improve local electrical distribution system performance and resiliency in normal operating configuration and provide power for essential services during times of electrical grid outages. BAH completed feasibility studies for the Village of Monticello and the Town of Liberty in 2016.

Since Sullivan County does not have infrastructure for the delivery of natural gas, both project designs relied upon a mix of solar energy generation, battery storage and diesel generators as backup to maintain critical operations (government facilities and essential public services) during long term grid emergencies. The Village of Monticello study specified construction of 1MW of solar power with an additional 200 kW from the diesel-fueled backup generators. This generation capacity would have enabled the County Government Center, the Monticello Village office and the local senior center, which serves as a heating and cooling center for area residents, to remain operational during a prolonged power outage. While the plan was deemed technically feasible, with the added benefits of diversifying power sources and reducing emissions during peak demand events, the project was not considered commercially viable due to high initial capital costs (\$6.1 million), the village's complex electricity delivery system, and low existing electricity prices, which reduced the estimated revenue from electricity sales.

Similarly, the Town of Liberty study included construction of 600 kW of solar energy, with battery storage and diesel generators for backup, combined with an existing 70kW solar array, to power six critical facilities and four adjacent load groupings of mixed residential and commercial facilities. Here again, the project was deemed technically feasible, with considerable environmental and resiliency benefits, but high initial capital costs (\$4.9 million) and low existing electricity prices made the project commercially unviable.

While neither project was chosen to proceed to the design phase, the two NY Prize studies are valuable both as proof of concept for community microgrids in rural settings, and for the vulnerabilities they revealed about electric service in Sullivan County, particularly in Monticello. In the intervening years, energy technology and public policy have facilitated a more robust transition to renewable energy under CLCPA (Climate Leadership and Community Protection Act). Resiliency efforts have focused on system-wide grid hardening required by the NYS Public Service Commission and implemented by the 3 utilities serving Sullivan County, to reduce the occurrence and duration of power outages (such as NYS PSC 2020 Rate Order for NYSEG). Solar and battery storage technology have improved

dramatically in terms of efficiency and lower cost per kWh, and community and utility scale solar projects are proliferating.

### **c. Sustainable Energy – Solar & Hydro**

While Sullivan County is experiencing significant service challenges, the County has taken significant steps to ensure the use of sustainable sources of electricity. As of March 2022, there were 3 solar facilities on county owned land in Bethel and Liberty, producing nearly 3 million kWh/year. Two of these facilities are owned by the county, and the third is based on a power purchase agreement with Tesla. This agreement will expire after a period of 20 years, after which the county and the provider may come to an agreement to upgrade the solar array and renew the agreement. In addition to projects on county land, private solar output in the county from projects installed since 2010 currently totals about 53 million kWh/year, with an additional 23.5 million kWh/year in the pipeline per NYSEDA's database.<sup>47</sup> In 2016, the Sullivan County Industrial Development Agency instituted a payment in lieu of taxes (PILOT) program to encourage the development of community solar in Sullivan County. This grants a 20-year period of tax abatements on sales, mortgage and real estate taxes related to acquisition, construction, installation, financing and value of solar installations.<sup>48</sup> Over the coming years, the solar output of Sullivan County can be expected to grow as technology advances and older systems with lower output begin to be upgraded.

In 2022, Sullivan County entered a remote metering agreement with Gravity Renewables to purchase hydroelectric power from its Goodyear Lake Hydroelectric Generating Station in Otsego County, New York. While the cost of natural gas, NYSEG's traditional source of electricity, fluctuates with the market depending on supply and demand related to outside forces like winter heating, hydro power allows the county to anticipate energy costs as a consistent source of electricity.

### **d. New York State Climate Smart Communities**

In 2017, Sullivan County became the 6th county in New York State to receive a bronze certification in the New York State Climate Smart Communities (CSC) Program, which prioritizes the county for CSC grants and other state funding programs. This program incentivizes the use of renewable energy alongside several other sustainable practices. The county's certification expired on September 30, 2022. Within Sullivan County, the Towns of Bethel and Tusten have also achieved bronze certification. Various projects within Sullivan County have been awarded CSC grants since 2016, totaling over \$5.2 million in matching funds.

### **e. Retrofitting County Facilities**

The county has also taken and continues to take significant steps in the retrofitting of county facilities to improve energy efficiency and reduce strain on Sullivan County's existing and future electricity infrastructure. Projects include replacement of HVAC systems with high efficiency rooftop units, replacement of aging boilers and conversion from fluorescent to LED exterior lighting at the Government Center in Monticello, and the implementation of solar energy systems at the Robert B. Travis Building and the Community Services campus at Sunset Lake in Liberty.<sup>49</sup>

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47 <https://data.ny.gov/Energy-Environment/Solar-Electric-Programs-Reported-by-NYSEDA-Beginn/3x8r-34rs>

48 "Community Distributed Generation Program" Article 300 Section i in Uniform Tax Exemption Policy. County of Sullivan Industrial Development Agency (December 12, 2016)

49 [sullivanny.us/Departments/SustainableEnergy/SustainabilityInitiatives](https://sullivanny.us/Departments/SustainableEnergy/SustainabilityInitiatives)

# 3 / Telecommunications and Internet

## TELECOMMUNICATIONS

The transition from landline to cellular telephones is as ubiquitous in Sullivan County as it is anywhere else in the United States, emphasizing the importance of a strong cellular network to bolster community and economic resiliency. While Sullivan County's river valleys and mountains are incredibly valuable to the county for their economic and infrastructural benefits, they also result in spotty cell phone coverage. The telecommunications providers in Sullivan County include Verizon, AT&T, Sprint, and T-Mobile.

## Current Hazards and Climate Impacts

Cellular coverage is a challenge related to health and safety in Sullivan County. An analysis of FCC cellular coverage data<sup>50</sup> shows major gaps in the coverage of the two largest providers in Sullivan County, Verizon, and AT&T, with approximately 3% of the county lacking voice coverage and approximately 8% of the county as a whole lacking data coverage. Voice dead zones are focused in the northern and southern portions of the county, with data dead zones scattered throughout. This is exemplified in a rural forestland town like Forestburgh, where 13.6% of the town lacks access to voice, and 28.2% of the town lacks access to cellular data.

Actual cell service coverage is likely even less comprehensive than the FCC data suggests. According to a crowdsourced study carried out by Senator Chuck Schumer's office in 2016, there were a reported 597 cell phone dead zones in Sullivan County, the most out of any county in the state.<sup>51</sup> Cell phone dead zones present serious challenges in Sullivan County. Due to the topography of the county, cell phone dead zones are not restricted to remote unpopulated areas. Access to medical and emergency services through the 911 system is a prescient issue for senior citizens, one of Sullivan County's most vulnerable populations. The importance of outdoor recreation for the tourism industry in Sullivan County emphasizes the need for uninterrupted access to emergency services, due to the safety concern for tourists engaging in outdoor activities.

Verizon lists several factors which negatively affect cell service and strength of signal. Quantity and density of users can cause signal strength to diminish, leading to dropped calls and weak data service. At the current rate of growth, signal congestion may become an issue if infrastructure is not regularly expanded and upgraded. Severe weather and vegetation are also listed as causes of service disruption and signal loss. Due to climate change, Sullivan County has seen an increase in frequency and intensity of severe weather events, and warmer winters have resulted in a longer growing season for regional flora, causing an increase in vegetation. Terrain is also a major factor in the disruption of cellular service. The dynamic topography of the County, encompassing the Catskills, the Upper Delaware River lowlands, various ridges, and valleys are challenges for cellular connections. There is also currently a ban on cell towers along the Upper Delaware River corridor to preserve scenic vistas, thus creating dead zones throughout the corridor. This prohibition was delineated in the 1988 River Management Plan, which is currently being contested by the Upper Delaware Council and Sullivan County's river-adjacent municipalities.<sup>52</sup> The importance of comprehensive cell service in Sullivan County has increased over time with the transition from landline to mobile.

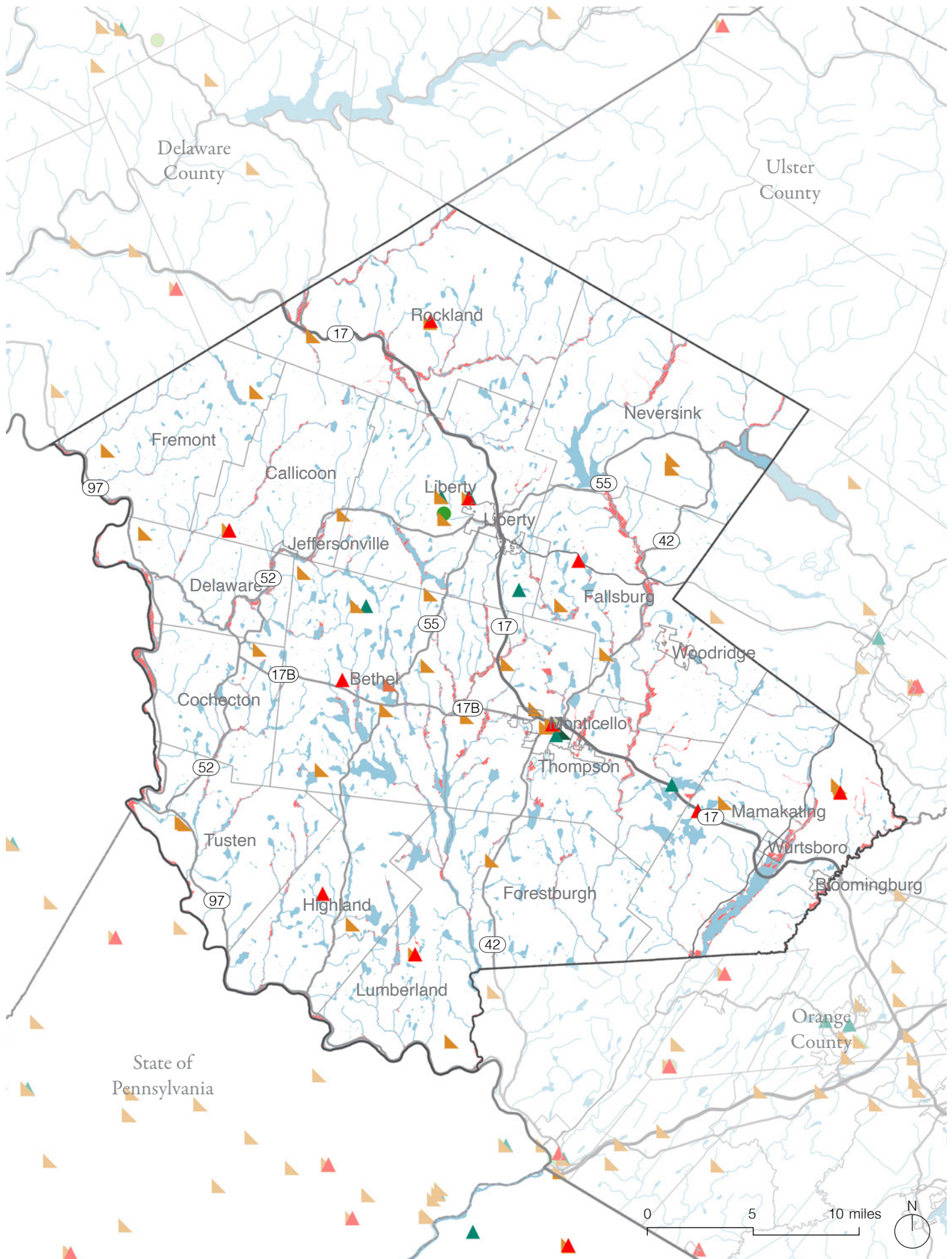
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50 Coverage as of May 15, 2021

51 "Call for help: Sullivan needs better cell phone service" Times Herald-Record, Middletown, NY. (July 20, 2017)







52 Peter Becker, "'Necessary evil': Council to revisit Upper Delaware ban on cell towers" Pocono Record, July 9, 2022








LEGEND

AC ROAD CLASSES

-  Microwave Service Towers
-  Cellular Towers
-  FM Transmission Towers
-  Land Mobile Broadcast Towers
-  TV Analogue Transmitters
-  Paging Transmission Towers

HYDROLOGY

-  Waterbodies
-  Streams / Tributaries
-  Flood Zones A, AE, and X500

Potential vulnerabilities for telecommunications infrastructure include disrupted service due to extreme-heat-related power outages, compromised cable-provided services due to storm-damaged utility lines, and flooding of utilities operating centers during extreme storms, resulting in reduced or disrupted service.

## INTERNET

The main internet providers in Sullivan County are Spectrum, ViaSat, HughesNet, and Verizon, with Spectrum providing the most coverage and highest internet speed throughout all 21 municipalities in the County.

According to the New York State PSC Broadband Map, there are currently 2,281 “unserved” households (4.39%) in Sullivan County, defined as “locations with no fixed wireless service or wired service with speeds of less than 25Mbps download available.”<sup>53</sup> Many consumer advocacy groups have documented flaws in the FCC data that informs the NYS PSC estimates of broadband coverage, which measure technically feasible access as defined by providers, regardless of cost or adequate connection speed. This conclusion was acknowledged by the FCC in 2021. In the County’s own survey on internet access for students at the county’s 17 public schools, undertaken during and immediately after the pandemic 2020-2021, five schools reported that a range of 10.9% to 23.6% of their total enrollment did not have access; the county-wide average was 8.03% of all public school students in the County. In 2021, Hudson Valley Pattern for Progress estimated 17% of Sullivan County households (4,889 households) had no internet service at all in 2019.<sup>54</sup> Affordability is also a critical issue. Connection to wired internet service is often cost prohibitive for local businesses and residents as connection fees can range from \$20,000 to over \$100,000.

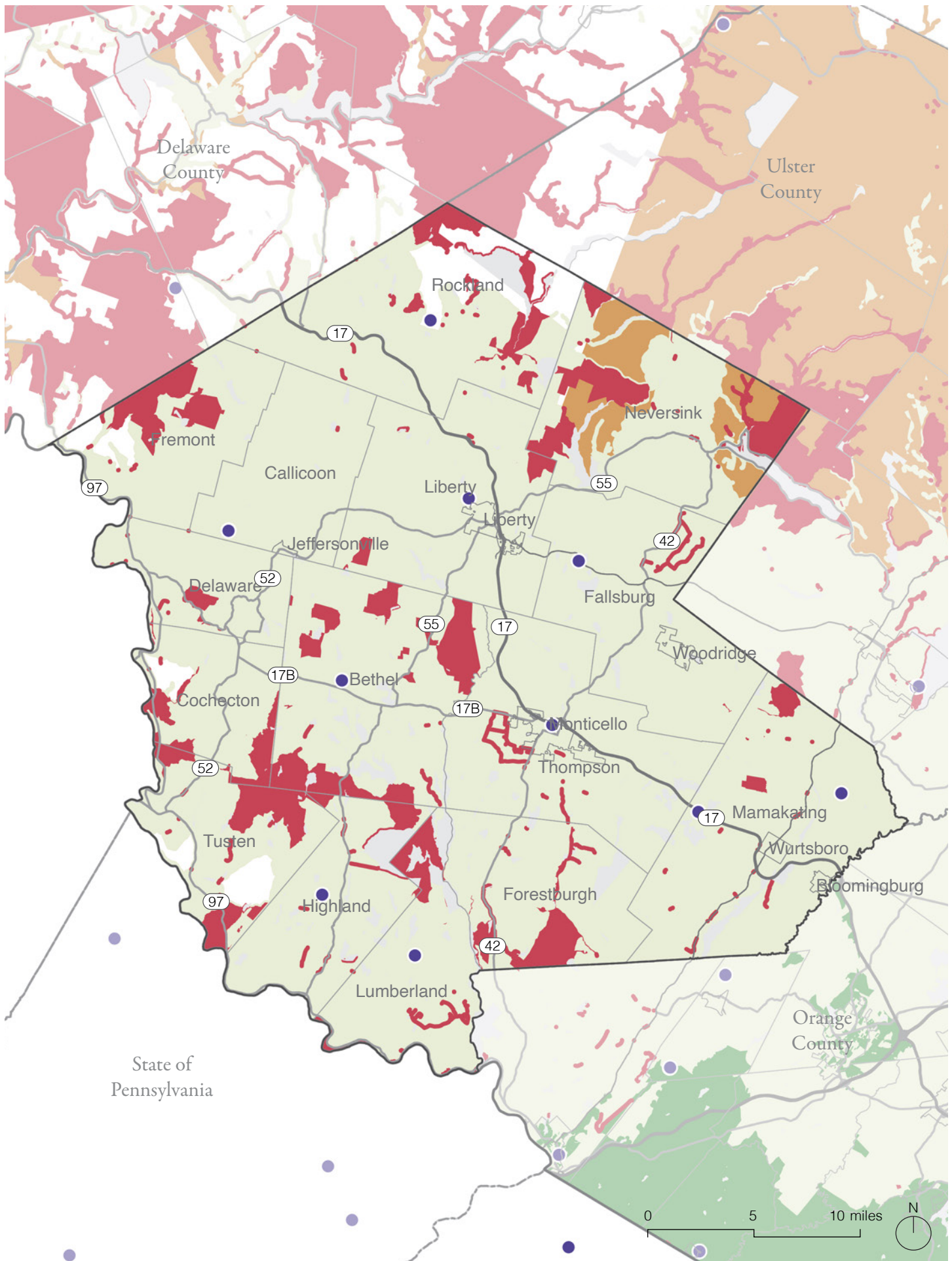
In addition, while the FCC defines “broadband” as 25Mb download/3Mb upload, industry analysts have shown that remote learning and remote working require greater internet capacity and speed. Interactive activities such as synchronous instruction and streaming video require much faster connection speeds, particularly for uploads, to avoid audio and video lag time, choppy or frozen connections or the inability to log on at all.

The County is exploring a number of strategies and technologies (wireless and fiber), including public/private partnerships to deliver affordable, high quality, 100/100 Mbps broadband connectivity across the County, prioritizing the most underserved households.

53 New York State PSC Broadband Map. New York State Public Service Commission. (August 11, 2022)

54 Hudson Valley Pattern for Progress (2021) The Pathway Forward, Pg 31, <https://www.pattern-for-progress.org/wp-content/uploads/2021/06/Pattern-Plan-Forward-FINAL.pdf>



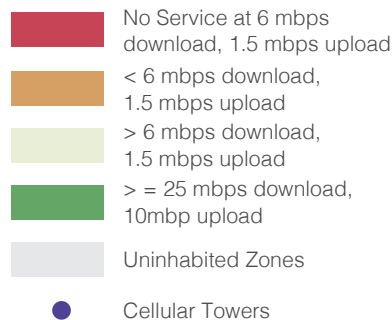




**Figure 6.3. Sullivan County  
Broadband Speed and Cellular  
Towers**

## LEGEND

## BROADBAND INFRASTRUCTURE



### Current Hazards and Climate Impacts

Lack of comprehensive internet coverage presents significant economic challenges for Sullivan County due to the changing landscape of work. In the aftermath of the pandemic, the proportion of students, workers and local businesses operating remotely has increased, emphasizing the importance of internet access. From an equity perspective, internet access allows residents of Sullivan County with mobility restrictions access to goods and services through online marketplaces, telemedicine, and educational institutions. From an economic resiliency perspective, the cost prohibitive nature of privately-funded internet connection fees can discourage businesses from selecting Sullivan County as a destination – a high opportunity cost in jobs and tax revenue. Internet access is also incredibly important to allow residents of Sullivan County to access the emerging virtual job market which has retained its importance in the aftermath of the COVID-19 pandemic.

### Recent and Ongoing Projects and Initiatives

The Upper Delaware Council (UDC), a partnership of local, state, and federal governments along the Upper Delaware Scenic and Recreational River is currently assessing the feasibility of revisions to UDC policies restricting the construction of cell phone towers in the Delaware River Valley, originally intended to preserve the natural character of the area. Revision of these policies would assist Sullivan County in combatting issues related to cell phone dead zones along the Delaware river in the towns of Fremont, Delaware, Cohecton, Tusten, Highland, and Lumberland.

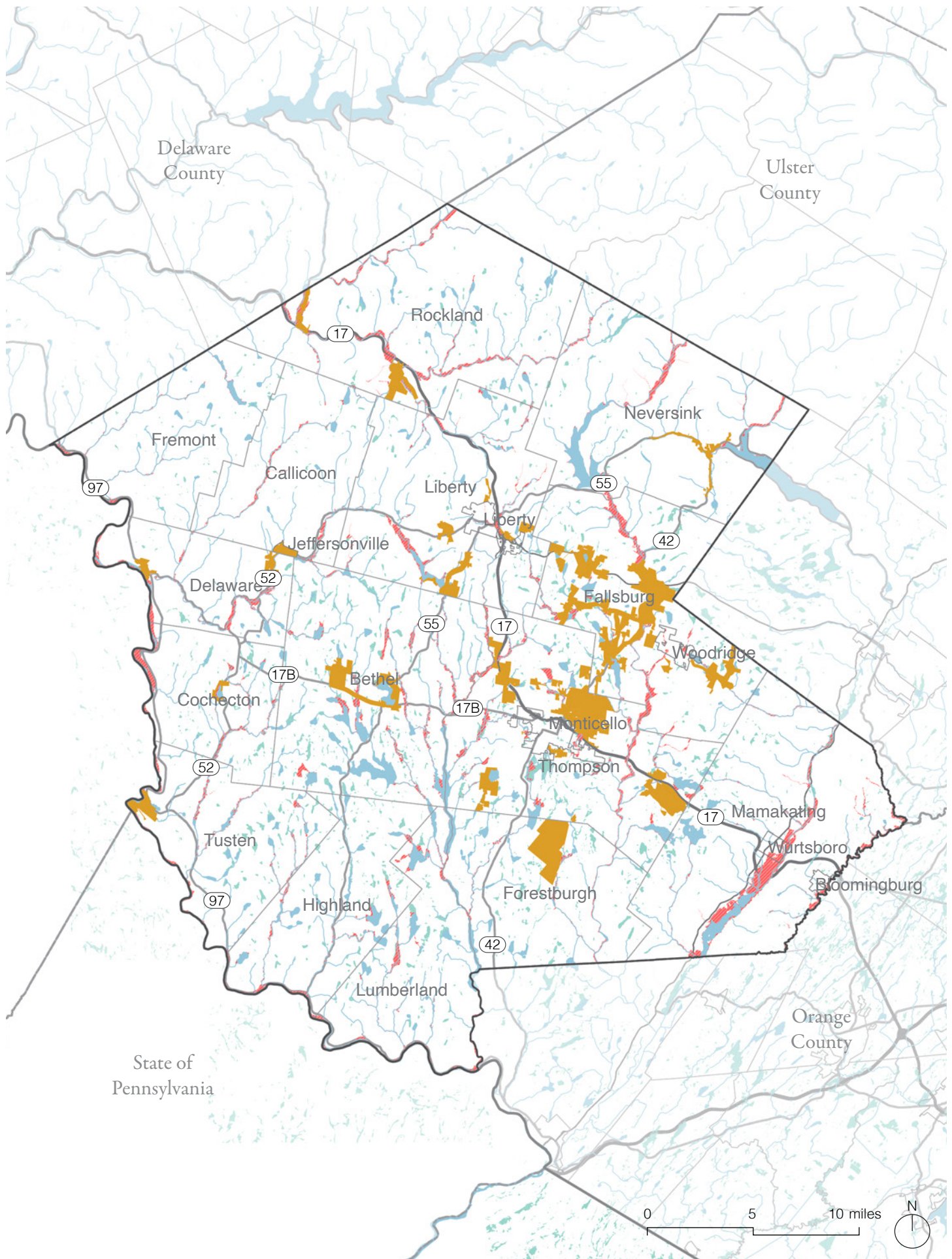
## 4 / Water Infrastructure

Water infrastructure in Sullivan County can be split into 3 different categories: Drinking Water, Wastewater and Stormwater. While each of these systems faces unique challenges related to environmental, community and economic resiliency, all three are interrelated and interdependent. As discussed in the natural infrastructure chapter, the built infrastructure described here also interacts and benefits from its relationship with Sullivan County's robust natural infrastructure.

### DRINKING WATER

As of 2015, public water systems in Sullivan County served 44,516 users, accounting for 59.5% of the county population. Of these users, 36,289 (81.5%) received service from groundwater facilities, while 8,227 (18.5%) received service from surface water facilities. Sullivan County is also a major supplier of drinking water for New York City via the Delaware Aqueduct, with the Neversink and Roundout Reservoirs capable of holding 84.5 billion gallons of water. Sullivan County's surface water facilities supply 86.07 million gallons of water daily. As of 2022, there are 83 community water systems in Sullivan County, defined by New York State as a "public water system that serves the same people year-round."<sup>55</sup> The largest of these systems are in the Village of Monticello (8000 users), Town of Fallsburg (7850 users), and Village of Liberty (3900 Users).

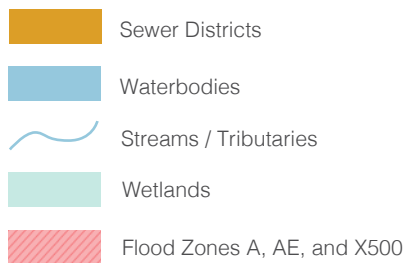
The Town of Fallsburg presents an example of a robust municipal water system in Sullivan County. The Fallsburg Consolidated Water District is comprised of 3 separate water systems serving various hamlets throughout the town, with 10 storage tanks, 18 wells and 3 pump stations. The system covers approximately 35% of the town's land area and serves approximately 55% of its residents. Fallsburg





**Figure 6.4. Sullivan County Sewer Districts**

## LEGEND



regulates land use within its borders in relation to its municipal water supply system, with R-1 and B-1 zoning districts requiring a minimum lot size of 0.5 acres within the water supply district and a minimum lot size of 3 acres without the water supply district.<sup>56</sup>

Significantly more prevalent in Sullivan County than community water systems are non-community water systems, totaling more than 500. This category includes uses like schools, government buildings, businesses, industry, and seasonal residential uses. Many of these systems are well water systems and are typically significantly smaller than community water systems. The division between community and non-community water systems in Sullivan County allows for flexibility in the system in dealing with the significant changes in seasonal population. The quality of Sullivan County's groundwater is one of its most important assets, as it allows for a thriving rural character based on the use of well water.

## WASTEWATER

Sullivan County currently has 25 public sewer systems feeding 12 secondary wastewater treatment plants handling 6.9 million gallons per day, and 10 tertiary wastewater treatment plants handling 8.9 million gallons per day. Secondary treatment plants use wastewater treatment strategies such as lagoons, trickling, biological or intermittent sand filters and chemical coagulation. Tertiary treatment plants use wastewater treatment strategies such as polishing ponds, microscreens, activated carbon columns and nitrification. Most households in Sullivan County are not on these wastewater systems and use septic system. In addition, some residential communities use package plants -- small, prefabricated wastewater treatment systems -- to handle wastewater from multiple residences. These systems are less expensive than full-scale, custom-designed systems, but require diligent maintenance, and can be problematical in seasonal communities where inflow and wastewater processing are highly variable and often completely shut down during the winter months. As the number of these plants increases, appropriate monitoring by the Department of Health becomes more difficult.

## STORMWATER INFRASTRUCTURE

Stormwater infrastructure is incredibly important in Sullivan County, as it has several direct impacts on the environmental, community and economic resiliency of the county. Legacy stormwater infrastructure in the county focuses on the impacts of severe weather and flooding on the populated areas of the county, aiming to move runoff away from these areas as quickly as possible. Modern stormwater infrastructure incorporates "green infrastructure" techniques such as rain gardens to slow the redistribution of stormwater to mitigate potential damage to aquatic habitats and to allow for soil percolation to recharge the county's groundwater supply – a vital piece of natural infrastructure. Stormwater infrastructure is primarily managed at the municipal level in Sullivan County, with the county managing stormwater infrastructure surrounding county roads.

Stormwater infrastructure is incredibly important to the economic resiliency of Sullivan County, particularly in areas prone to frequent flooding. Due to historic valley settlement patterns in Sullivan County, many of the county's villages, hamlets and town centers where local business is concentrated are located within floodplains. For example, repeated flooding occurs on Restaurant Row in the Town of Bethel, downtown Livingston Manor in the Town Rockland, the hamlet of Kohlertown in the Town of Delaware, and the downtown area of the Village of Wurtsboro. In response, the 2021 Sullivan County Hazard Mitigation Plan recommended introducing additional storm drains and improving overflow pipelines and weirs to these dense areas. Major roads, including County Road



14, County Road 164, Route 141, and Rt 55, experience regular flooding, where culvert expansions and closed stormwater drainage systems have been recommended. There are two very small municipal separate storm sewer system (MS4) areas in Mamakating along County Road 64 and County Road 65.

Sullivan County has 21 industrial facilities which have been issued Multi-Sector General Permits (MSGP), allowing for direct discharge of stormwater to the county's surface waters. This permit ensures the management of stormwater pollutants at each facility and requires inspection of the facilities to determine compliance with the permit. In Sullivan County, these businesses are primarily classified as "Construction Sand and Gravel" facilities.

## **CURRENT HAZARDS AND CLIMATE IMPACTS**

Sullivan County's drinking water, wastewater and stormwater infrastructure faces several challenges related to climate change which stand to impact the environmental, community and economic resiliency of the county and the region. Increased pressure from real estate is one of the primary challenges to all three forms of water infrastructure, as Sullivan County's population grows due to regional cost and climate concerns. Additionally, the age of Sullivan County's water infrastructure poses potential challenges for the county, as older clay or concrete pipes have an expected lifespan of about 50 years.

### **Drinking Water**

The 2008 Open Space Plan identifies four priority areas for protection related to water consumption, where key waterbodies, aquifers and private wells are concentrated. These include the Bethel/White Lake Priority Area, Fallsburg/Thompson Priority Area, Neversink Priority Area, and Liberty Priority Area.<sup>57</sup> Threats related to destruction of natural infrastructure (see natural infrastructure chapter) may negatively affect water quality in the county through decreased natural filtration properties. A reduction in the quality of Sullivan County's water resources presents an economic resiliency challenge due to its negative effects on agriculture, and a community resiliency challenge due to its negative effects on public health in the county.

Uncontrolled growth also threatens to increase the amount of polluted runoff which may contaminate sources of water in the county. While the use of well water allows for maintenance of the rural character of the county, the uncontrolled expansion of well water extraction in areas of new growth threatens to deplete the county's groundwater resources, one of its greatest strengths, and the source of drinking water for most of its residents. Private ownership and maintenance of wells makes it difficult for regulation, exacerbating issues related to contamination or groundwater depletion.

Drinking water is particularly susceptible to fluctuations in the depth of the water table, affected by use and replenishment. Due to climate change, Sullivan County is experiencing wetter winters and drier summers, resulting in a high water table in the winter and a low water table in the summer. This corresponds inversely with the fluctuations in the population of Sullivan County related to the seasonal and tourist population. The highest population and therefore the highest stress on groundwater in Sullivan County occurs during the summer, a time when the water table is the lowest due to a lack of replenishment. This threatens the environmental resiliency of Sullivan County, affecting residents and businesses that rely on the availability of water during the summer months.

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57 "Water Resources – Consumption" in *Conserving Open Space & Managing Growth: A Strategy for Sullivan County*, New York, pp. 41-44. Sullivan County Division of Planning and Environmental Management (December 2008)

As described above, age is a concern for more comprehensive drinking water systems in Sullivan County, with infiltration being a concern with older systems. As pipes deteriorate, stormwater and groundwater (in the case of a high water table) is able to infiltrate the system, contaminating drinking water with polluted runoff or septic infiltration.

### **Wastewater**

While drinking water systems are negatively affected by a low water table, wastewater systems are negatively affected by a high water table. Septic systems function by separating wastewater from solid waste, discharging the wastewater into a leach field which allows water to permeate through the soil and recharge the water table after filtration. When the water table is high, septic systems threaten to contaminate groundwater due to insufficient percolation through soil prior to infiltration, particularly in on-site wells. High water tables also threaten to cause septic system failure through shifting soils or waterlogging, causing septic system failure, a serious community resiliency threat in Sullivan County. Septic system failure also presents an economic threat in Sullivan County as home and business owners are generally responsible for the cost of repair.

Rapid growth is an added concern for wastewater management, as the county's wastewater treatment facilities are already operating near capacity. For example, one of the larger facilities in the county, the South Fallsburg Wastewater Treatment Plant, experienced an average peak flow of 3.08 million gallons during the month of July between 2011 and 2015, with an operating capacity of 3.26 million gallons. The 2018 Fallsburg comprehensive plan also identifies infiltration and inflow as an issue contributing to capacity issues.

Age is also a concern for more comprehensive wastewater systems in Sullivan County, with infiltration being a concern with older systems. As pipes deteriorate, stormwater and groundwater (in the case of a high water table) is able to infiltrate the system, reducing capacity, and in severe cases, causing the systems to reach capacity and failure. Aging wastewater systems also have the potential to cause flooding due to pipe failure. Flooding is a threat to environmental, community and economic resiliency in Sullivan County due to its negative effects on natural infrastructure, access to services, resident safety, homes and business.

### **Stormwater**

As climate change results in more frequent and more severe extreme weather events, Sullivan County's built stormwater management systems experience more frequent and intense strains. Manmade stormwater management of heavy rainfall has negative effects relative to environmental resiliency in the county, as drains which discharge directly into streams and rivers have the potential to disrupt aquatic habitat. This disruption has a knock-on effect on Sullivan County's economic resiliency due to the importance of its rivers and streams to the fly-fishing and tourism industries. Aging stormwater systems also have the potential to cause flooding due to pipe failure.

Increasing development and the resulting forest fragmentation have resulted in increasing stormwater infrastructure costs for the county as well, an impact on economic resiliency. When forested areas are cleared for uses such as real estate development or solar, erosion occurs more rapidly, generating more runoff and more sediment than the original forested land use. Additional runoff causes more frequent flooding, requiring larger stormwater capacity, while additional sediment clogs stormwater drains and pipes more quickly, generating a more consistent need for maintenance and eventual replacement.

## RECENT AND ONGOING PROJECTS AND INITIATIVES

Due to an agreement between the two municipalities, the water supply systems of the Town and the Village of Liberty have been integrated, ensuring the resiliency of the water supply systems in the face of a shutdown of one system or the other.<sup>58</sup> Similar programs help the other municipalities in Sullivan County to manage costs and mitigate risks related to aging infrastructure. For example, while the Hamlet of Harris is included within the borders of the Town of Thompson, it has an independent sewer system, pumping its wastewater to the Village of Monticello for treatment.<sup>59</sup>

In Sullivan County, Infiltration and Inflow code enforcement and corrective measures related to plumbing deficiencies in private properties will be critical to free up flow capacity at municipal plants.<sup>60</sup> Additionally, in 2021, the town of Fallsburg was awarded a grant of \$50,000 to identify sources of inflow and infiltration and to develop recommendations for improvements to the wastewater system.<sup>61</sup>

According to the 2021 Sullivan County MS4 Annual Report, demonstration rain gardens and a demonstration rain barrel have been installed at Lake Superior State Park in the Town of Bethel to promote water conservation awareness. Green infrastructure solutions like these work to slow the redistribution of runoff into the county's lakes and streams, preserving the aquatic habitats which help to drive the county's environmental and economic resiliency.

As discussed above, protection and maintenance of the natural infrastructure which filters surface and groundwater in Sullivan County is imperative. As a major source of drinking water for the City of New York, the New York City Department of Environmental Protection has acquired significant land surrounding the Neversink and Roundout Reservoirs, placing conservation easements to ensure the continued function of this natural infrastructure.

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58 "How Thompson is Tackling Aging Sewer and Water Systems" Town of Thompson (October 6, 2020)

59 2018 Fallsburg Comprehensive Plan, 109-110

60 "Governor Hochul Announces \$23 Million in Water Quality Grants" (December 27, 2021)

61 "Water Resources – Consumption" in *Conserving Open Space & Managing Growth: A Strategy for Sullivan County*, New York, pp. 41-44. Sullivan County Division of Planning and Environmental Management (December 2008)





Neversink Reservoir | Flickr: Jeffs4653

# 5 / Healthcare & Emergency Services

Community and Economic Resiliency in Sullivan County is intrinsically tied to the health and wellbeing of its residents. Community Resiliency is based on the ability of the county to ensure the health and wellbeing of its residents, while Economic Resiliency relies on the ability of the county to maintain a robust and healthy workforce. Healthcare infrastructure and emergency services are important resources which reinforce health, wellbeing, and quality of life for residents of Sullivan County. As such, it is imperative to resiliency in Sullivan County that this important infrastructure is supported and sustained.

## HEALTHCARE

Sullivan County is home to just two medical centers, the 154-bed Garnet Health Medical Center – Catskills facility in the hamlet of Harris<sup>62</sup> in the Town of Thompson, and a satellite facility with 15 beds in the hamlet of Callicoon<sup>63</sup> in the Town of Delaware. The Harris facility is accessible via MOVE Sullivan Route A and the Delaware Township Area route, however the Callicoon facility is not accessible by public transit. According to the Commissioner of DHHS, if the Garnet Healthcare facilities in Sullivan County were to close, more than 10% of residents in the county would be more than an hour drive from a medical center.

Sullivan County’s relative health outcomes rank 60th out of 62 counties in New York State in the 2023 County Health Rankings.<sup>64</sup> In our interview with the Department of Health and Human Services, the commissioner attributed this ranking to a particularly high opioid death rate due to overdose. This is reflected in the County Health Ranking data, with the county ranking last in the state in Length of Life, a metric combining life expectancy, premature age-adjusted mortality, child and infant mortality.

## EMERGENCY MEDICAL SERVICES

There are 17 EMS agencies in Sullivan County, which primarily rely on the work of EMS volunteers. The commissioner of DHHS highlighted several difficulties related to EMS coverage in Sullivan County. First, due to the volunteer nature of the majority of EMS positions in Sullivan County, agencies often have difficulty maintaining consistent staffing. Second, there are no trauma centers in Sullivan County, meaning that EMS must transfer the most severe cases to the nearest trauma center in Middletown, NY. Third, certain services such as Catskills Hatzalah are only available during the summer, meaning that services are additionally limited throughout the rest of the year.

## FIRE SERVICES

The Sullivan County Bureau of Fire oversees 40 fire departments throughout the county, including emergency response and fire coordination. Most fire departments in Sullivan County are volunteer departments, with the Monticello Fire Department being the only fire department with paid responders during daytime hours in the county. The bureau also provides training services for public health and DPW, and hosts events for other county organizations. The Fire Bureau reported that the largest challenges to the county they face are related to severe weather, forest fires, and seasonal population growth in the county. An increasing rate of natural disasters has led to increasing flooding, ice storms, and tree contacts

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62 “About Garnet Health Medical Center – Catskills, Harris Campus” Garnet Health. <https://www.garnethealth.org/locations/garnet-health-medical-center-catskills-harris-campus>

63 “About Garnet Health Medical Center – Catskills, Callicoon Campus” Garnet Health. <https://www.garnethealth.org/locations/garnet-health-medical-center-catskills-callicoon-campus>

64 “2023 New York Data” County Health Rankings & Roadmaps. <https://www.countyhealthrankings.org/explore-health-rankings/new-york-data-and-resources>

138 Resilient Sullivan

leading to power outages and fires. Increasing population density and an increasing number of structures have led to an increased number of alarms throughout the year. During the tourist season in the summer, the population of Sullivan County jumps from approximately 75,000 to approximately 300,000. Tourism activities like camping coincide with the driest part of the year, increasing the risk of brush and forest fire. Due to the rural nature of the county and rapid growth, many of the fire districts in the county do not have access to fire hydrants, or existing water systems do not have the capacity to support their existing fire hydrant systems. Fire departments in Sullivan County often resort to the use of mini-pumping systems to use water from lakes, streams, and other natural water bodies in the county to put out fires. To improve coverage during alarms, fire departments in Sullivan County engage in a mutual aid program as outlined by the 2008 Sullivan County Mutual Aid Plan.

### **CURRENT HAZARDS AND CLIMATE IMPACTS**

Access to primary care is a major public health concern in Sullivan County. Several factors challenge access for residents of Sullivan County, particularly for vulnerable populations. Residents of Sullivan County without access to an automobile experience many of the same issues discussed in the Transportation chapter in the context of healthcare. Cost is an issue for many residents of Sullivan County as many jobs in the county's largest industries like tourism do not provide benefits. Due to the availability of healthcare through healthcare.gov, there are relatively few uninsured residents of Sullivan County, however underinsurance continues to be an issue. The impacts of a lack of affordable housing in Sullivan County discussed throughout this plan also reach the primary care system. Expansion of the primary care system in Sullivan County has proved difficult due to a lack of affordable housing for medical professionals in the county. Similarly, many volunteer firefighters and EMTs who leave the county for college or other job opportunities are not able to return later in life due to the lack of affordable housing.

### **RECENT AND ONGOING PROJECTS AND INITIATIVES**

Bridge Back to Life is a mobile medical services organization with a focus on substance abuse issues. Beginning in 2022, the organization's mobile treatment unit moves around the county providing medical assistance, Narcan trainings and telehealth. The organization aims to expand its coverage and services in the future to include more frequent visits to rural locations and to provide mental health services like therapy.

In 2022, Garnet Health – Catskills was awarded a \$100,000 grant through the Rural Health Network Development Program to establish the Sullivan Transportation Health Access and Reliability Taskforce (STHART), with the goal of increasing transportation options for Sullivan County residents in need.<sup>65</sup>



# Chapter 8

## Transportation

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# 1 / Introduction

Throughout our research and our discussions with stakeholders, Sullivan County's rural character repeatedly arose as one of its greatest assets. Rural character provides a basis for the agriculture and tourism industries, and the unique natural infrastructure of Sullivan County relies on an abundance of open space. Our review of zoning regulations and existing plans throughout the county revealed the intent in much of the county to preserve the same rural character through regulation of land use and creation of state, county, and municipal parks.

While the benefits of rural character to the economy of Sullivan County are undeniable, we must consider the impacts of this development pattern on the residents of the county. Sullivan County has a higher rate of poverty and a higher rate of residents over the age of 65 than both the New York State and United States average, generating transportation and mobility concerns critical to assessing resiliency. The rural character of Sullivan County creates dependence on personal automobiles for transportation to access healthy food, jobs, healthcare, and social services, yet, 9% of the County's households do not have access to a car. (2020 ACS) Mobility alternatives like walking, bicycling, and public transportation play an important role in ensuring equitable access to these community resources, and Sullivan County has taken the first steps towards improving access through the implementation of MOVE Sullivan bus service over the last decade. Mobility challenges for all residents of Sullivan County are exacerbated by the increasing frequency and severity of storm events in Sullivan County, and their impacts on mobility infrastructure such as roads and bridges. In addition to personal transportation, maintenance of Sullivan County's road network is needed to support commerce and emergency services. At the same time, low density of population translates to a high cost-per-person for infrastructure. Privately developed infrastructure, such as private roads and water systems in residential communities, has the potential to revert to municipal administration, adding to the fiscal burden of towns and villages or the County.

In conjunction, these challenges drive the need for a County-coordinated transit system that communicates service disruptions, provides efficient mobility options that connect to all areas of the County, and enables residents to make informed transit decisions in times of need.

Overall, resiliency planning provides the opportunity to improve the safety and efficiency of roadways in areas most prone to risks and hazards, and it also makes the case for continued investments in alternative transportation to support a diversity of mobility needs.

This section outlines key existing conditions of the County's transportation network—along with related circulation and mobility opportunities, in preparation for future recommendations related to opportunities for improved resiliency.

## 2 / Roads & Highways

### ARTERIAL ROADS

Arterial Roads/State Routes are the County's higher-capacity roads that carry traffic over longer distances, between important centers of activity. U.S. Route 209 spans north-south along the County's eastern extent. Interstate 84 (I-84) to the south of the county, and Interstate 87 (I-87) to the east of the county provide connectivity to the region.

The County has 9 State Routes:

- Route 17 (Future I-86) is the main access route to reach Sullivan County (with connections to I-84 and I-87) and the main evacuation route to exit. Route 17 provides direct access to Wurtsboro, Rock Hill, Monticello, Liberty, Parksville, and Livingston Manor. The majority of Route 17 is four lanes (two lanes in each direction). Plans to convert the highway to I-86 will add a third lane. Construction is expected to begin on the highway upgrade in spring 2024.<sup>66</sup>
- Routes that traverse the County include Route 55, Route 17B, Route 52, Route 42, Route 97, Route 42.
- Routes with less coverage (i.e. connecting routes or routes that are on the edge of the County) include Route 52A, Route 55A, Route 206.
- Both the Village of Liberty and Village of Monticello serve as key transit nodes in the County due to the merging of arterial routes in these locations.

### COUNTY AND LOCAL ROADS

The Sullivan County Division of Public Works is responsible for maintaining over 400 miles of County roads and more than 100 bridges.<sup>67</sup> The County sets comprehensive capital planning projects, prepared by in-house engineering staff, to continually maintain and reconstruct County roads and bridges. Since 2012, Sullivan County completed a range of road and related water management projects. For example, in 2023, the county completed the Hamlet of Kohlertown Flood Reduction Project, intended to reduce flooding at the intersection of Beechwood Road and NY-52 via the creation of a direct pipeline from a stream to the west of Kohlertown to the eastern branch of Callicoon Creek.

The maintenance of local town/village owned roads poses additional challenges and vulnerabilities. In many communities, limited budgets make roadway upkeep difficult. Due to costs, more intensive roadway expansion or upgrades (i.e. road elevation or stormwater management) can be particularly difficult to realize without external funding. In more rural communities, unpaved roads present additional challenges related to access in severe weather and maintenance. The Hazard Mitigation Plan cites that 15% of roads in Tusten are unpaved dirt and Callicoon has 20 miles of unpaved roads. Unpaved roads in Tusten that serve as throughways are consistently maintained and remain accessible throughout the year.

For example, Grassy Swamp Road, extending from SR 97 down to the cul de sac at the Delaware River, poses a significant challenge in terms of erosion and washouts during severe rain events. To address this issue, it would be beneficial for the Town of Tusten to engage a competent engineering company in exploring non-traditional methods for water interception along the road. One potential approach involves evaluating the feasibility of installing catchment basins perpendicular to the road at strategic points. This design would intercept water flow on the road, directing it toward a retention pond for effective management.

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<sup>66</sup> <https://www.governor.ny.gov/news/governor-hochul-announces-major-milestone-transformative-conversion-state-route-17-interstate>  
<sup>67</sup> Barton & Logudice, P.C. "Multi-Jurisdictional Hazard Mitigation Plan Update" p. 36. Sullivan County Division of Planning & Environmental Management. (October 2012)



The Commissioner of the Department of Public Works indicated to us that the quality of county roads has improved over the past few years due to increased funding from the legislature. This has allowed the department to maintain and replace county roads at a more regular rate than in past years, with the current goal to repave 35 miles of county road per year.

### COUNTY BRIDGES

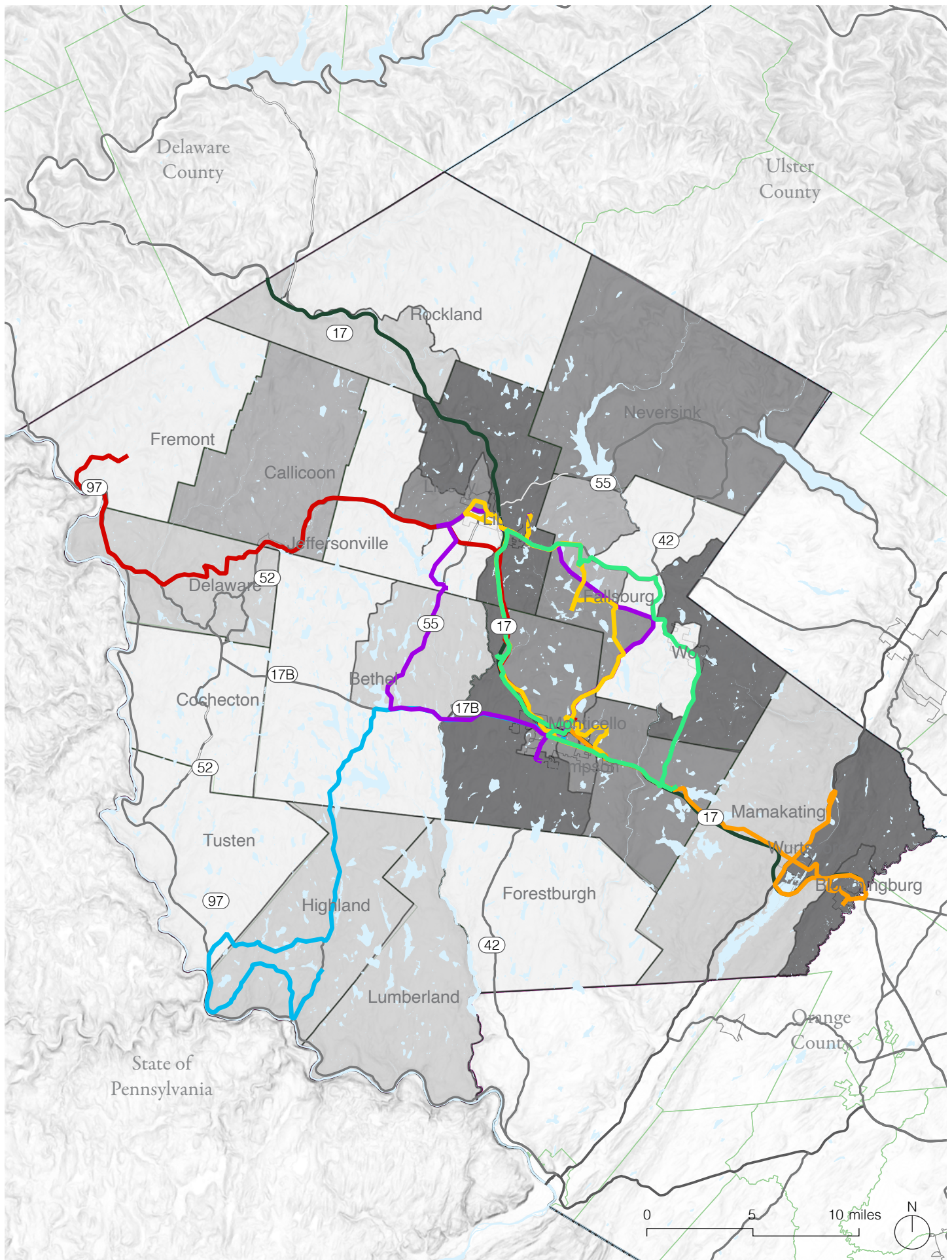
As infrastructure that provides critical transit linkages across streams and rivers, bridges also present varying degrees of transit vulnerability across the County – largely based on the structure’s age and condition. Some bridges are undersized, some are prone to ice jams due to their orientation, and others collect sediment and debris which can cause flooding issues. Along with roadway enhancements, the County has recently invested in various bridge updates since the 2012 Hazard Mitigation Plan, but challenges remain due to increased flooding events. The Department of Public Works supported this concern, highlighting the issue particularly in areas with steep watersheds. While the department would like to be replacing 8-10 bridges per year throughout the county, they are only able to replace 2-3 per year at this time due to lack of funding. In the case of a natural disaster, FEMA and New York State will provide funding for the reconstruction of damaged roads and bridges, however the costs of severe weather events affecting county property and not designated disasters fall to the county. In certain severe instances, the county has also committed to assisting towns in repairing damage.

## 3 / Pedestrian and Bicycle Infrastructure

Although the rural nature of Sullivan County makes viable pedestrian and bicycle infrastructure (i.e. painted bike lanes) opportunities relatively limited, such improvements are an important consideration for key community centers. Monticello, South Fallsburg, and Liberty are all examples of communities where the proportion of households without a vehicle is at least three times the County average of 9%.

Diversification of transportation systems and infrastructure helps to ensure that all residents, including non-drivers, have viable mobility options – both for day-to-day needs, but also in moments of adverse circumstances or emergencies when road travel might be inhibited. Pedestrian and bicycling infrastructure both play a major role in improving mobility and access for residents of Sullivan County, while also promoting the health of the environment as zero-emission active transportation modes.

Sidewalk infrastructure in Sullivan County is focused in the Villages of Monticello and Liberty, with very limited sidewalk infrastructure elsewhere throughout the county. For example, there are just 6.4 miles of state-owned sidewalk in Sullivan County, with 4.9 miles of those sidewalks falling within the borders of incorporated villages. Monticello is an example of a local community that has incorporated pedestrian and bicycle infrastructure goals into its local planning through Complete Streets policies.<sup>68</sup> Pedestrian infrastructure in Monticello, particularly in the central area, includes well-maintained sidewalks, crosswalks and pedestrian crossing signals at key intersections, and safe buffer distances from the street. Communities linked on the County’s public bus routes generally have the density and physical fabric to support non-vehicular transportation options, including the central areas of: Monticello, Liberty, Fallsburg, and South Fallsburg.



## 4 / Public Transportation

Sullivan County Resiliency Plan

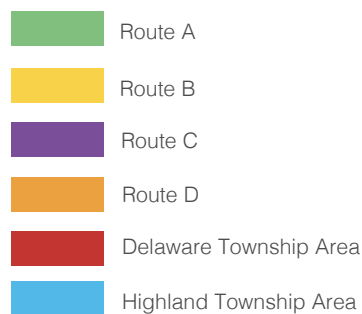
Figure 7.1. MOVE Sullivan Routes vs. Population

### LEGEND

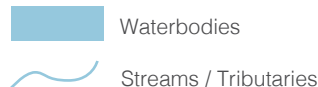
#### POPULATION



#### MOVE SULLIVAN ROUTES



#### HYDROLOGY



Sullivan County has two key transportation services: the County's Public Transportation System (MOVE Sullivan), and the ShortLine Bus Company.

Move Sullivan offers the following services:

- Daily fixed Route Shuttle Buses (Routes A-D) which primarily function to connect the County's population centers. The loop routes are free to all riders. The service was expanded in 2022 to 42 total stops in 18 communities with key additions that include Bethel, Wurtsboro, and Bloomingburg. Service generally runs from 6am to 6pm with headway every two hours at best. Despite limited service, recent expansion is important for intra-County mobility.
- Two additional fixed-route buses that operate only once a week: The Highland Township Area Route and the Delaware Township Area Route.

A demand-response service for seniors and veterans is operated through the Sullivan County Office for the Aging.

ShortLine, owned by Coach USA, has a station in Downtown Monticello and provides daily round trip service to Orange and Westchester Counties with transfers available to New York City and the wider region. See below for a comprehensive list of ShortLine routes serving Sullivan County:<sup>69</sup>

- Monticello-Liberty
- Monticello-Middletown
- Monticello-Binghamton
- Middletown-Kerhonkson (includes Wurtsboro)
- Monticello-Sullivan County Community College

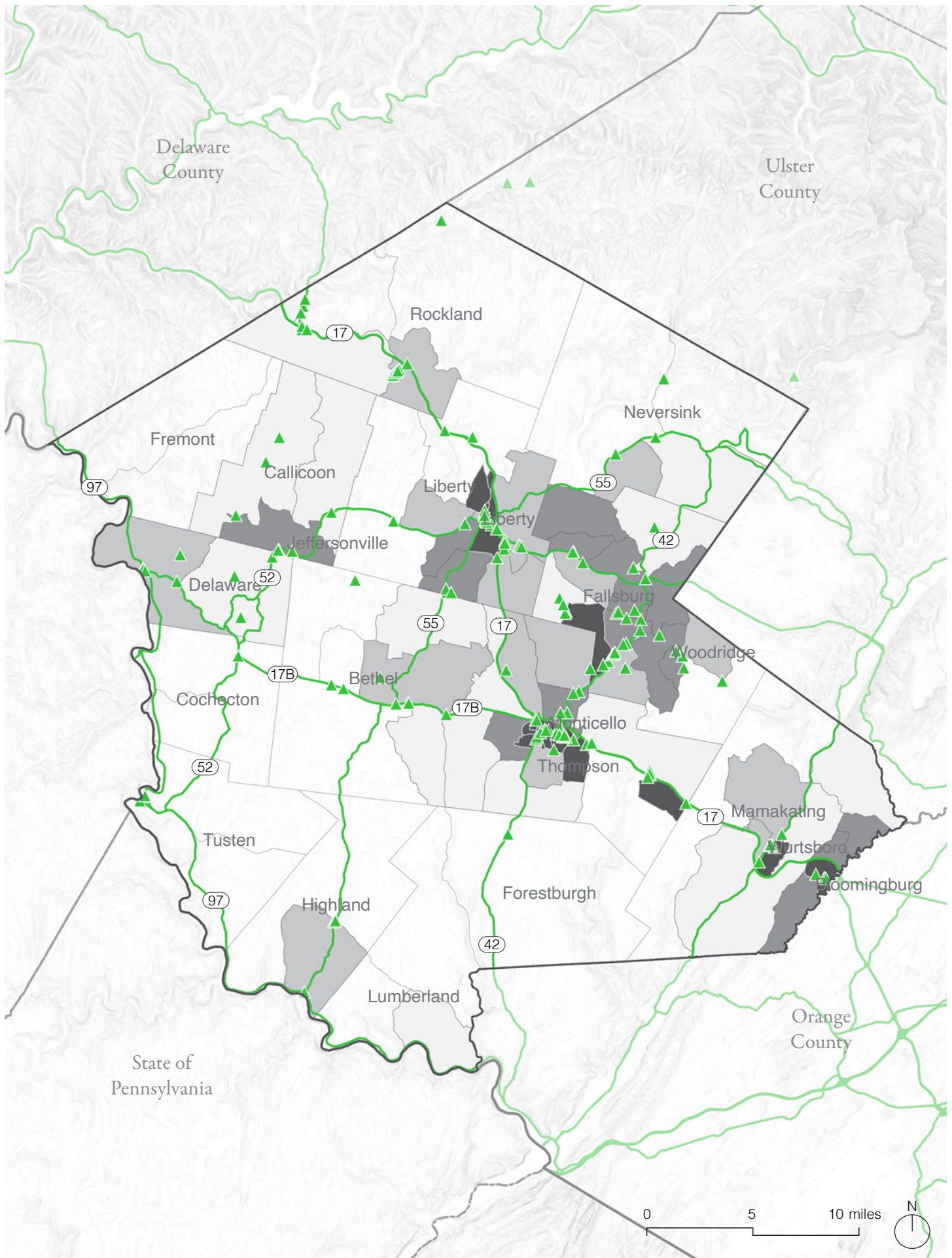
In light of changing weather patterns, disruption of local public transportation services is an added challenge, emphasizing the need to bolster public communications and alerts, and to consider for service flexibilities that limit the adverse impacts of needed detours or re-routing.

## 5 / Current Hazards & Climate Impacts

### EQUITY CONSIDERATIONS

Although recent improvements, including the initiation of MOVE Sullivan in 2019, have been undertaken in response to the 2015 Sullivan County Coordinated Transportation Services Plan, access to public transit continues to be an issue, with bus frequency and operating limitations ultimately remaining barriers to countywide mobility. With 9% of county households lacking access to a car (2020 ACS), the dispersed nature of Sullivan County and lack of adequate public transit leads to an undue burden for these households to access basic needs. Low-income and elderly residents of Sullivan County are two demographic groups who are most likely to lack automobile access, generating equity concerns related to the lack of public transit. Mobility issues also prevent services from reaching those in need of home services, such as at-home care, snow clearance, and lawn mowing. Additionally, mobility restrictions for elderly and disabled residents of Sullivan County prevent these populations from taking advantage of the pedestrian and bicycle infrastructure present in some population centers. By providing fast and reliable service, widespread public transit stands to address several equity concerns in the county:










Sullivan County Route 55 | Flickr: Doug Kerr






*Sullivan County Resiliency Plan*

**Figure 7.2. Sullivan County Food Stores vs. Transit Need**

LEGEND

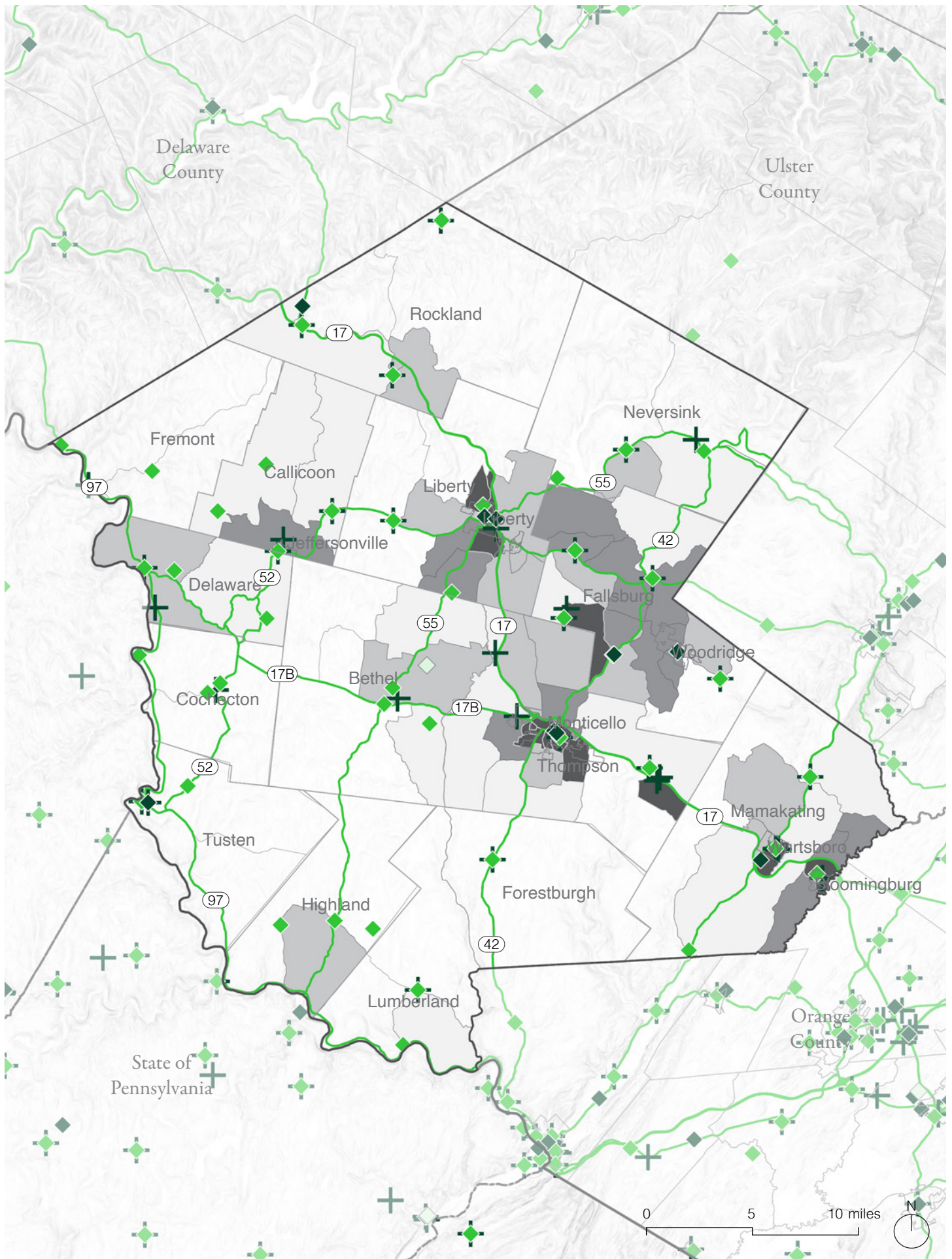
-  Food Stores
-  Major Roads

GREATEST TRANSIT NEEDS

-  1 Low
-  2
-  3
-  4
-  5 High

**Food Deserts:** Grocery stores in Sullivan County are few and far between, with minimal pedestrian access. The inability to access affordable, healthy food is a threat to public health in the County, resulting in increased rates of obesity and heart disease. During our interview with the Sullivan County Division of Community Resources, the commissioner identified transit-related issues as the largest driver of food insecurity in Sullivan County, followed by affordability issues.












Liberty Route 17 | Wikipedia






Sullivan County Resiliency Plan

Figure 7.3. Critical Resources vs. Transit Need

LEGEND

-  Fire Stations
-  Local Law Enforcement
-  Local EOC
-  Medical Facilities
-  Major Roads

GREATEST TRANSIT NEEDS

-  1 Low
-  2
-  3
-  4
-  5 High

**Access to Primary Care:** Access to medical care in Sullivan County can be difficult due to the dispersed nature of medical facilities throughout the county. Individuals who visit their primary care provider regularly are less likely to experience chronic health issues, thus increasing productivity and decreasing medical cost burden for patients. Access to medical care is an equity issue especially important for elderly residents of Sullivan County due to their increased frequency and importance of primary care visits. Transportation to medical appointments may be covered by Medicaid through Medical Answering Services, however coverage is not guaranteed, and significant planning and notice is necessary to take advantage of this service. For further information related to access to primary care, please refer to the healthcare infrastructure & emergency services section of the infrastructure chapter.



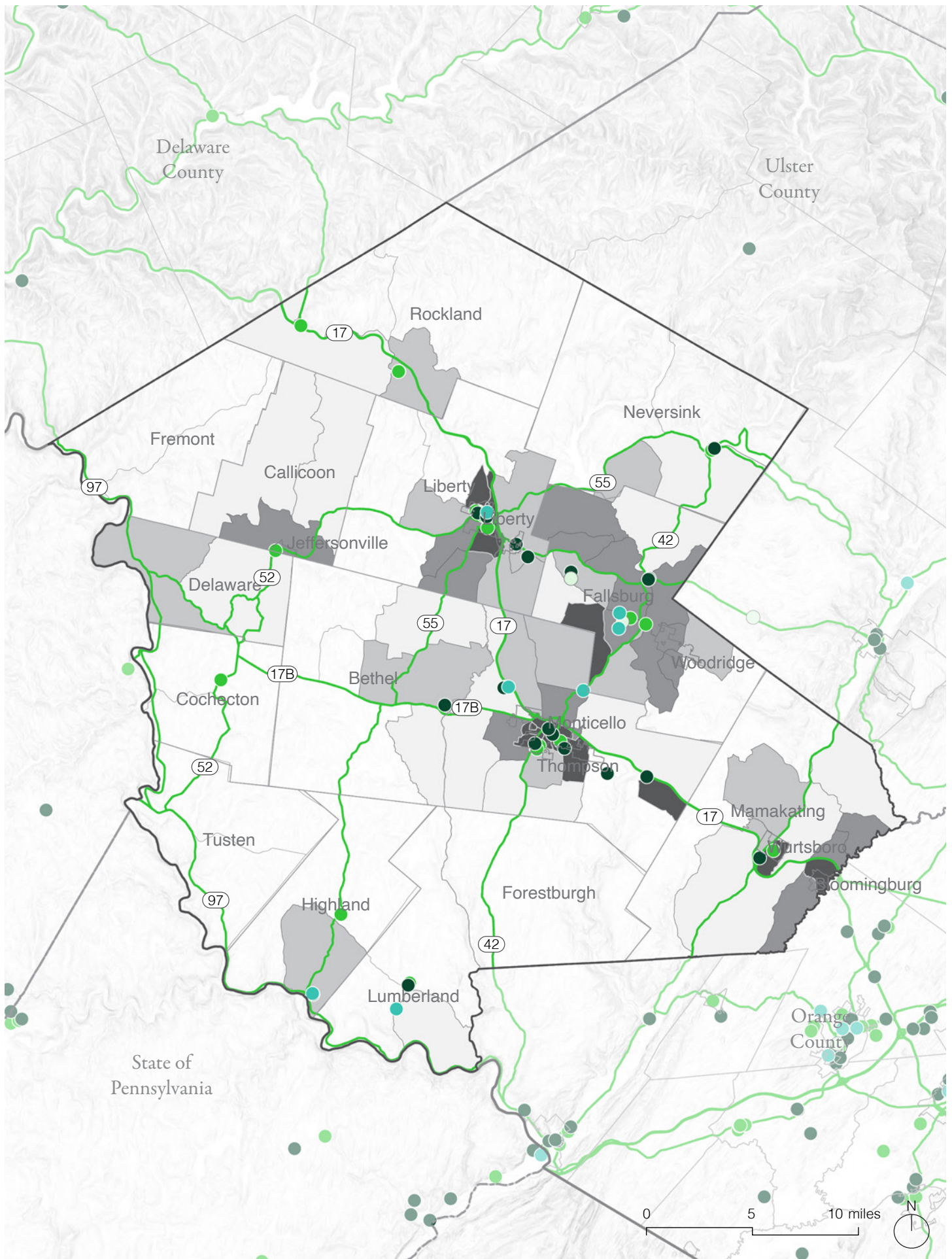
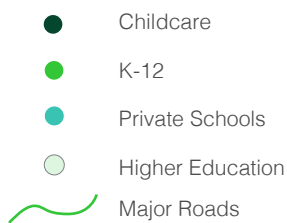
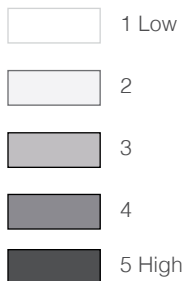


Figure 7.4. Educational Facilities vs. Transit Need

## LEGEND



## GREATEST TRANSIT NEEDS



**Access to Social Services:** Access to the support provided by social services in Sullivan County is particularly important for vulnerable populations like elderly and low-income residents. Social services cover a wide range of opportunities for residents at all economic levels of the Sullivan County community, including schools, libraries, food banks, post offices, social workers, churches and more. Not only are social services important to provide support for vulnerable populations, but they are also vital to maintaining both quality of life and the social and community fabric of the county.

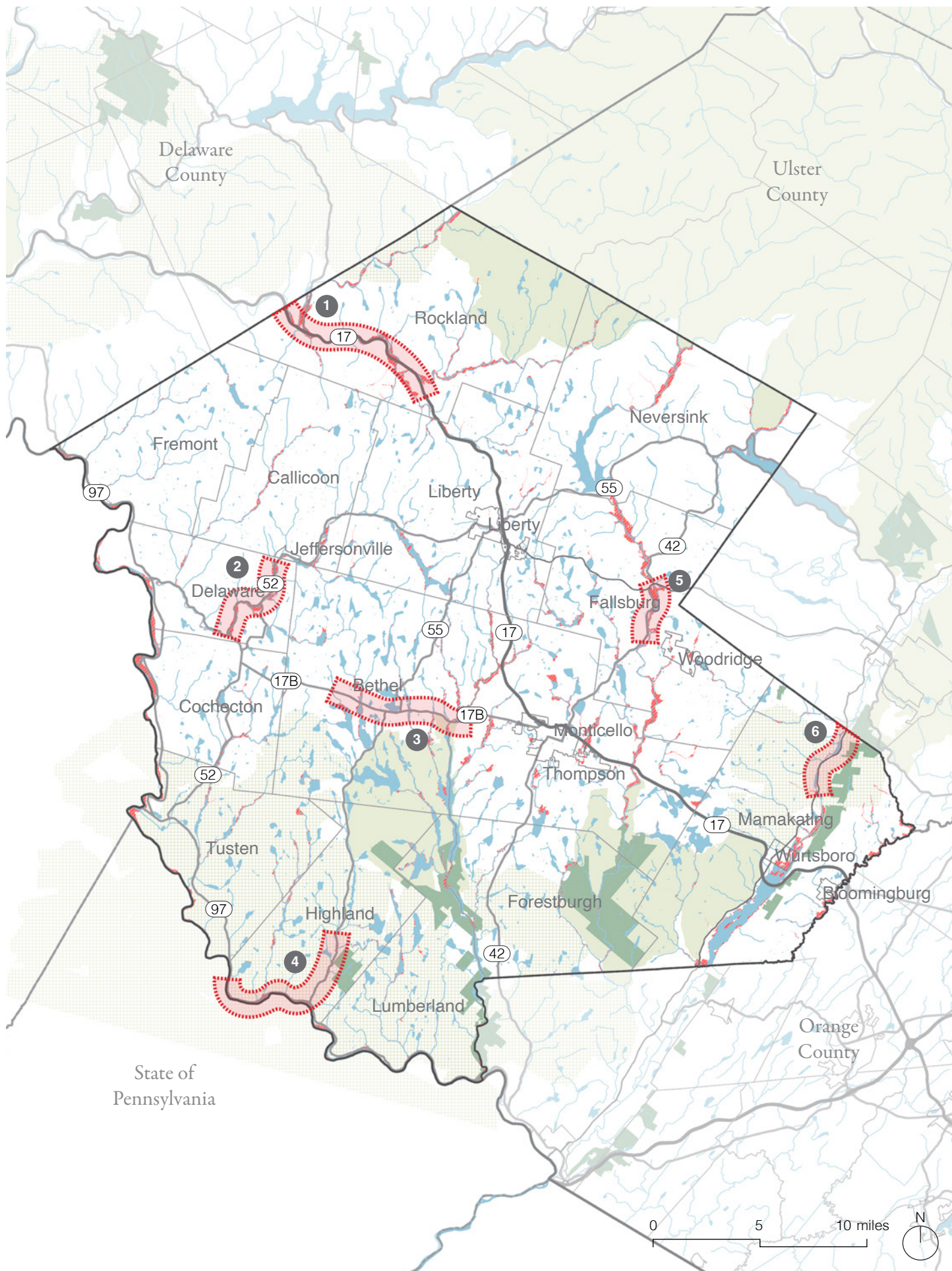
After running throughout the COVID-19 pandemic to ensure job access for essential workers in Sullivan County, recent service improvements for MOVE Sullivan in 2022 included the addition of 18 new stops and the removal of bus fare. While low ridership has been highlighted to explain a lack of further service expansion, increased connectivity within the county will provide a catalyst for economic growth – particularly in the opportunity to connect people to jobs and services throughout the county. Finally, increased connectivity with inter-county transit will help local businesses maintain a stable employee base from within and without Sullivan County, bolstering the economy for years to come.

## 5 / Roadway Locations Prone to Flooding

In Sullivan County, the most urgent environmental risks are flooding and severe storms with frequent flooding. Although flooding risks are present County-wide, some areas such as the Callicoon Creek Watershed (Callicoon, Youngsville, Delaware, Village of Jeffersonville) have already experienced significant damage from previous incidents. Across the County, the increased frequency of flooding can inundate crucial roadways and transportation. The 2021 Hazard Mitigation Plan also highlighted the Towns of Delaware, Highland, Lumberland, Forestburgh, Bethel and Rockland, as well as the Village of Monticello, all as having reported an increase in frequency and intensity of flood events in the last 5-10 years. Increased localized heavy downpours that cause previously unseen flooding patterns pose serious safety risks for residents and restrict access for personal and commercial traffic.

A more resilient roadway and transportation system should respond to risks that could result in disruptions or breaks in safe travel. Disruptions can range from localized occurrences that impact a single arterial roadway to weather emergencies that can have County-wide adverse impacts.






**Figure 7.5. Sullivan County Roads at Flood Risk**

LEGEND

ROADS AT FLOOD RISK

-  Zone Boundary
- 1** NYS Route 17  
Town of Rockland
- 2** NYS Route 52  
Town of Delaware and Village of Jeffersonville
- 3** NYS Route 17B  
Town of Thompson
- 4** NYS Route 55 and 97  
Town of Highland
- 5** NYS Route 42  
Town of Fallsburg
- 6** US Route 209  
Town of Mamakating

HYDROLOGY




-  Waterbodies
-  Streams / Tributaries
-  Flood Zones A, AE, and X500

Figure 7.5 shows the FEMA floodplain along with the network of the County's key arterial roadways, highlighting areas of possible travel disruption during significant floods. The following areas correspond with the ID (#) locations on the map.

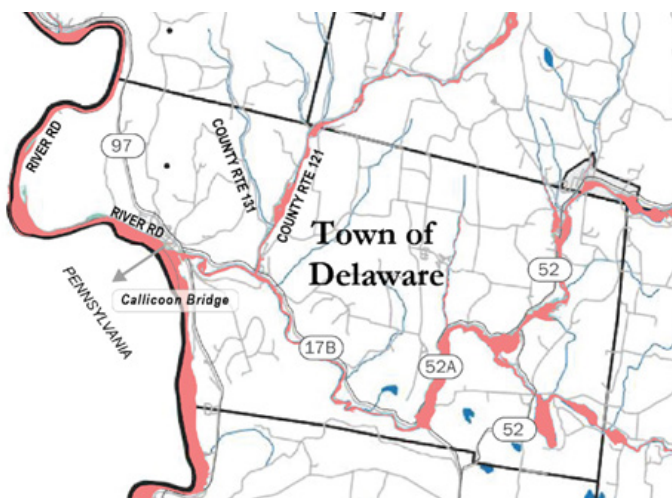
1. State Route 17 – Town of Rockland
2. State Route 52 – Towns of Delaware and Jeffersonville
3. State Route 17B – Town of Thompson
4. States Route 55 and 97 – Town of Highland
5. State Route 42 – Town of Fallsburg
6. US Route 209 – Town of Mamakating

Although the County has achieved a number of roadway improvement projects over the last decade, these examples are meant to highlight locations where the risks of flooding and resulting travel disruptions are high. These flood-prone examples were selected based on locations where the floodplain inundates land surrounding higher-volume arterial roads. Although it is recognized that stormwater management and infrastructure around these roads varies, vulnerabilities remain in the face of increased storm events and flooding.

In addition to key arterial roadways and State Routes outlined above, local town roads are also at risk of flooding, affecting emergency preparedness and incident responses. The Sullivan County Hazard Mitigation Plan identified seven municipalities reporting an increased frequency and intensity of floods in the last 5 – 10 years, with more frequent and heavier cloudburst events leading to unprecedented flood patterns. The Hazard Mitigation Plan identified the following communities as priority areas to address future flooding: Beaverkill/Willowemoc, Callicoon Creek Watershed, Ten Mile River/East Branch of Ten Mile River/Beaver Brook Tributaries, Basha Kill/Pine Kill/Shawangunk Kill, NYC Watershed/Neversink River, and Mongaup River. Local roadways in these areas will likely continue to experience flooding risks.

As an example, Figure 7.6 demonstrates the vulnerability of the roadway network and circulation in the Town of Delaware. Key arterial roadways and access points (Route 17B, Route 52, Route 52A, Route 97, and County Route 121) are in close proximity to the floodplain and have varying degrees of flooding vulnerability. Additionally, the Callicoon bridge is an example of a vital access point that connects Sullivan County to the region (Pennsylvania), over the Delaware River. This access point is also vulnerable to flooding. In such instances, local efforts could work to clearly communicate road detour options when flooding events are possible. The current Hazard Mitigation Plan identifies local road and bridge enhancement strategies to mitigate for vulnerable infrastructure. These proposed actions are listed by assigned priority scores, expected timeframe, estimated costs, and lead agencies involved.

**Figure 7.6. Local Roadway Flooding Risk Example – Town of Delaware**





## 6 / Other Environmental Vulnerabilities

In addition to flooding, the 2020 Sullivan County Hazard Mitigation Plan also highlights roadway risk and vulnerabilities related to weather events: windstorms, snow, and/or ice – all of which can impact roadway safety and functioning. On both the County and municipal level, significant resources are dedicated to the removal of snow and ice – for example, the county appropriates more than \$2 million for snow removal annually. Ice storms are believed to pose an increasing problem as the climate warms – and ice can be more expensive to mitigate, due to the quantities of salt required on roadways. Unpaved dirt roads in rural areas of the County can be more susceptible to ice heaving during freeze thaw cycles.

Downed trees and powerlines can also be a consequence of ice storms' impact on the roadway system. The removal of such trees or powerlines across roadways requires response from the County or local municipalities, depending on roadway jurisdiction. As with the other severe weather issues discussed above, ice storms have the potential to restrict access to jobs, food, healthcare, and emergency services for residents of Sullivan County. Winter road mitigation techniques like salting and sanding pose a threat to Sullivan County's natural resources, as these materials make their way into the county's water bodies and stormwater management systems, the importance of which are discussed in the natural infrastructure and built infrastructure chapters.

## 7 / Recent and Ongoing Projects and Initiatives

After dedicating \$12 million for road and bridgework in 2022, Sullivan County has dedicated approximately \$20.5 million to transportation infrastructure upgrades in 2023. This includes the paving of 31.7 miles and surface repairs to 26 miles of county roads, as well as the maintenance or replacement of 7 bridges across the county. Recently, the Department of Public Works has also transitioned from Hot Mix Asphalt (HMA) to Warm Mix Asphalt (WMA), which reduces fuel consumption and emissions in the production of materials and improves worker safety and emissions in the paving of roads.

### **ROUTE 17 EXPANSION (I-86)**

Upgrades to Route 17 between Orange County and Sullivan County are expected, with the objective to construct a third lane in each direction and to enhance key interchanges. Such upgrades would transform the State Route into an extension of federal Interstate 86 (I-86). Expansion seeks to improve congestion that has increased in recent decades related to regional growth. The expansion would either work with the basic existing footprint of the roadway or would involve a more significant capital-intensive widening. While the environmental review of this effort will evaluate impacts associated with the project, an added benefit could be the opportunity to upgrade stormwater management and infrastructure. However, further environmental study will explore how construction might disturb environmentally sensitive areas or the potential for other adverse impacts. In late 2022 a draft environmental impact statement (EIS) on this upgrade was initiated. Construction related to the highway expansion is expected to commence in spring 2024.<sup>70</sup>

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70 "Governor Hochul Announces Major Milestone on Transformative Conversion of State Route 17 into Interstate 86" (October 5, 2022)  
154 Resilient Sullivan



### SULLIVAN O&W RAIL TRAIL

The County's recent O&W Rail Trail Feasibility Study envisions a continuous recreational trail that will attract visitors and connects businesses and amenities in 9 hamlets and 2 villages. This will enhance economic development, streetscape and community renewal projects in its host towns and villages, and provide health and quality of life benefits to residents and visitors. Preferred trail alignment attempts to connect existing pathways (25 miles in total) with new segments.

Recently, Sullivan County was awarded a \$100,000 grant through the New York State Climate Smart Communities program to develop a bicycle and pedestrian master plan which could further capitalize off the Sullivan O&W Rail Trail. The effort's intention is to improve the safety, comfort, and convenience of alternative transportation modes.



Sullivan O&W Rail Trail | Sullivan O&W Rail Trail Facebook

# Chapter 9

## Recommendations

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The recommendations are organized under five goals, each of which is supported by its own set of strategies. Each strategy includes a planning context, recently planned and supporting projects and initiatives, and key resources including best practice examples and potential partnerships to advance each strategy.

GOALS	STRATEGIES
<b>HOUSING</b>	
Ensure housing availability and affordability by supporting strategic growth in Sullivan County that avoids sprawl and promotes safe, walkable communities.	Expand affordable housing/infill/rehab projects/address blighted properties.
	Build/renovate to Living Building or Enterprise Green standards for health and climate resiliency.
	Improve neighborhood amenities for safe outdoor activities/walking.
	Address need for heating and cooling in anticipation of more severe heat waves in the near future.
	Address homelessness and access to interim and supportive housing.
<b>FARMING AND FARMLAND</b>	
Ensure the economic viability of farmland conservation by supporting farmland owners, and agriculture and associated activities.	Promote/support succession plans for farms who are retiring/match with young farmers.
	Expand farm mentorships and beginner farmer programs.
	Address housing needs of farm workers.
	Support Farmers Markets, Farm to Table and Buy Local Initiatives.
	Anticipate Climate-related vulnerabilities and opportunities.
<b>FOOD, JOBS, HEALTH AND SERVICES</b>	
Improve access to healthy food, healthcare, jobs, and emergency services.	Improve access to childcare to facilitate workforce availability.
	Explore Health Home interventions.
	Address food insecurity.
	Address opioid/drug crisis.
<b>NATURAL RESOURCES</b>	
Recognize and protect the role of natural infrastructure both as an economic driver and ecological resource in Sullivan County.	Complete a County-wide Natural Resources Inventory and Risk Analysis identifying challenges and opportunities associated with the health and productivity of natural systems.
	Anticipate the effects of extreme weather due to increased rainfall and larger storms at specific locations near waterbodies throughout the County.
	Enhance recreational access to natural areas through development and improvement of trail networks, park amenities, educational resources, and interpretive signage.
<b>UTILITIES</b>	
Ensure access to quality and reliable electrical, telecommunications, and internet utilities throughout the County, and prepare for emerging challenges by modernizing both water and solid waste infrastructure.	Conduct a grid capacity evaluation for increasing electricity demand that supports electrification trends and climate-related needs such as air conditioning.
	Support beneficial electrification of County facilities.
	Address need for alternatives for County solid waste options with the anticipated closure of Seneca Meadows.
	Improve the county's telecommunications and internet access, with a focus on expanding the extensive ad hoc communications networks created during COVID.
	Coordinate updates to the Sullivan County Hazard Mitigation Plan and Sullivan County Emergency Management Plan.
	Install a network of electric vehicle (EV) charging stations for the County fleet and promote increased EV usage throughout the County.
	Conduct a countrywide comprehensive potable and wastewater infrastructure assessment to establish current conditions and future improvements.



# Goal 1 / Housing

Ensure housing availability and affordability by supporting strategic growth in Sullivan County that avoids sprawl and promotes safe, walkable communities.

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## STRATEGY 1 /

Expand affordable housing/infill/rehab projects/address blighted properties.

### Context

Availability and maintenance of affordable housing is a major concern for many different cities across the United States and to an even greater extent in the New York Metropolitan region. Sullivan County has the 9th highest number of Asset Limited, Income Constrained, Employed (ALICE) households (i.e., working households without the resources to afford quality housing) in New York State. The County should work with municipalities to ensure high quality housing for low-income individuals, availability of affordable housing should increase, and affordable housing maintenance should increase in frequency and quality.

### Projects

While there are many policies that enable the strategy, only a few are under the County's purview. Considerations should include:

- Encourage municipal housing policy changes to allow accessory dwelling units and upzoning (allowing additional density, e.g., multi-family housing) in locations in order to increase the feasibility of developing more affordable housing units.
- Provide municipalities with a toolkit on how to preserve and provide affordable housing including:
  - Developing property tax credits, proactively favoring rehab in the disposition of foreclosed properties, eminent domain, receivership, accelerated tax foreclosure, addressing and reducing "lien fields", land banks & property donation, enhanced property identification, negotiated bulk purchase, property "hold," proactive identification of properties suitable for rehab, swap properties, bargain sales, and bridge loans and other financial supports for property identification.
  - To address blight properties, there should be subsidies and incentives to get the problem properties in the hands of new, responsible homeowners. Beautification, code enforcement and judicial remedies, crime and safety programs, and prevention programs could also serve as potential solutions to address blight. These remedies should also include safeguards against gentrification.
- Work with local housing authorities, land trusts, and housing trusts funds to expand and preserve affordable housing.
- Create a county budget line item dedicated to housing trust funds.

### Partners

To increase efforts addressing inadequate housing, Sullivan County should take a proactive role in both planning for and funding infrastructure through the following measures:

- The 2022 Housing Strategy laid out a plan to work with landlords to rehabilitate 240 rental units and to create 80 new rental units for households with very low and extremely low-income levels by 2025. The County should monitor the success of these strategies and build on and extend the most successful programs.
- Expand partnerships with state agencies and regional NGOs to revitalize housing and to provide homeownership, rental and emergency assistance

and community development services.

- Seek out **HUD Community Development Block Grant (CDBG)** funding to support housing development. As a non-urban county, Sullivan County is part of the Statewide CDBG jurisdiction and as such can compete for Statewide CDBG funding, primarily through the HOME grant program. Alternatively, Sullivan could work with unincorporated areas of the county to form a HOME consortium with neighboring non-urban counties who also fall within the statewide jurisdiction (i.e., Greene, Chenango, and Delaware counties) in order to create a more regional collaborative approach to housing development.
- Seek out other Federal funding opportunities for homeowner cost and housing assistance from agencies such as the Department of Health and Human Services funding including, but not limited to, programs such as Low-Income Housing Home Energy Assistance, Transitional Living Program for Youth.

### Resources

- **United for ALICE** provides resources and information to support ALICE (Asset Limited, Income Constrained, Employed) individuals and families facing financial hardship
- U.S. Department of Housing and Urban Development's Office of Policy Development and Research (PD&R)
- **The Habitat for Humanity** offers insights and strategies for increasing the supply and preserving affordable housing options through advocacy and community engagement efforts.
- **The U.S. Department of Housing and Urban Development (HUD)** "Barriers to the Rehabilitation of Affordable Housing: Volume 1, Structural" provides insights into the barriers to affordable housing in the United States

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## STRATEGY 2/

Build/renovate to Enterprise Green standards for health and climate resiliency.

### Context

The Enterprise Green Communities standards provide an approach to affordable housing that emphasizes the health (especially respiratory and heart health) and comfort of building occupants. The criteria address eight topic areas: integrative design, location and neighborhood fabric, site improvements, water conservation, energy efficiency, materials, healthy living environment, and operations and maintenance. They are applicable to new construction, substantial rehab, and moderate rehab multifamily and single-family projects. Building and renovating to these standards will help make the County's affordable housing more resilient to climate effects like high heat days, heat waves and extreme precipitation events, and contribute to County goals for safe, walkable communities.

While the Enterprise Green criteria are specifically concerned with affordable housing models, the guidelines provide cost-effective strategies that can be applied to any building, including the use of healthy building materials, attention to ventilation, and the elimination of combustion appliances and fossil fuels. Independent studies of the increased upfront costs of compliance Enterprise Green have indicated an increased cost of 2% per dwelling unit over the cost of conventional construction techniques. In addition, many of the Enterprise Green standards are being integrated into the standard building code.

### Projects

In order to provide assistance to communities and developers who wish to follow these guidelines, the County could do the following:

- Create toolkit for communities wishing to include green standards in their building codes including:

- Types of programs, policies and ordinances that will encourage responsible land use development, material and resource conservation, energy conservation, water conservation and management, and indoor air quality. For example, municipalities can establish a stormwater fee/credit program to help incentivize smart development in regards to water runoff.
- References to other organizations with programs related to the regenerative built environment. Examples include the US Environmental Protection Agency’s “Sustainable Design and Green Building Toolkit for Local Governments” or “Tribal Green Building Toolkit”.
- Follow the recommendations of the Sullivan County Land Bank Corporations Sustainable Construction Policy adopted in 2020 that provides recommendations for sustainable materials and practices as well as a “red list” of items that are prohibited from use in construction.
- Guide developers and municipalities to committed designers and builders that promote certification in Enterprise Green standards.

## Resources

- Stormwater fees implemented by local municipalities incentivize property owners who adopt stormwater management practices to reduce runoff and improve water quality.<sup>71</sup>
- **The Sustainable Design and Green Building Toolkit for Local Governments** is a program provided by the Environmental Protection Agency (EPA) to assist municipalities in implementing sustainable building practices.<sup>72</sup>
- Sullivan County Land Bank's Sustainable Construction Policy aims to establish guidelines for building and renovating real property to assist the Sullivan County Land Bank (SCLBC) in implementing practices that achieve cost-effective, energy-efficient, and resilient housing structures.<sup>73</sup>
- **Enterprise Green Community Standards** by Enterprise Community Partners focuses on promoting sustainability and resilience in affordable housing developments and communities.

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## STRATEGY 3 /

Improve neighborhood amenities for safe outdoor activities/walking.

### Context

Cars are the primary form of transportation in Sullivan County. Many roads do not accommodate other users of the road such as cyclists and pedestrians. Many roads do not have crosswalks or good pedestrian signals or walkways. Additionally, many roads fail to make a smooth transition between the road and offroad resulting in harder landing off the road and large shifts of momentum which can cause increased damage to cars and the person who is driving them. Bike lanes are rarely found in rural neighborhoods and counties, although cycling routes are a key contributor to local tourism.

Sullivan County had a high vehicular accident rate relative to population in the past year, making unsafe roads a pressing issue. Safer roads improve livability for residents and continue to attract outdoor recreation-based tourism.

To improve walkability, Sullivan County should perform an assessment of the walkability of streets and the accessibility of key community assets including schools, worksites, businesses, parks, recreational facilities, trails, college campuses,

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71 <https://extension.psu.edu/what-is-a-stormwater-credit>. Accessed April 10, 2024

72 <https://www.epa.gov/smartgrowth/sustainable-design-and-green-building-toolkit-local-governments>. Accessed April 10, 2024

73 “Sustainable Construction Policy Adopted-2-20-2020.pdf,” Sullivan County Land Bank Corporation, accessed April 10, 2024, [https://sullivancountylandbank.org/wp-content/uploads/Sustainable\\_Construction\\_Policy\\_Adopted-2-20-2020.pdf](https://sullivancountylandbank.org/wp-content/uploads/Sustainable_Construction_Policy_Adopted-2-20-2020.pdf).





Walking School Bus | National Center for Safe Routes to School

hospitals. The county should also consider improving the quality and consistency of data collected to address research gaps and utility to promote walking and county walkability. For example, as part of the upcoming bike and pedestrian master plan, create a GIS dataset of sidewalks, signaled crosswalks, bike and pedestrian paths in conjunction with community assets such as schools, places of worship, parks and recreation areas, grocery stores, and other community locations.

## Projects

Sullivan County should focus on supporting the safe, efficient, and easy-to-use integration of public transit and transit-oriented development in areas of greater density such as village and employment centers. The county should also consider implementing Safe Routes to School or similar walk-to-school programs to ensure that streets are safe for the most vulnerable population, children. Both are described in the section that follows:

- In order to support municipalities to improve road safety and implement safe street technologies the County could:
  - Provide municipalities with other organizational programs that can give technical assistance in regards to safe streets. Examples include the United States Department of Transportation Roadway Safety Professional Capacity Building Program, Safe Routes to School, and Complete Streets. Provide municipalities with a current Bicycle/Pedestrian Plan, a tool that can be utilized when developing projects to improve pedestrian and bicyclists safety.
  - Work with municipalities in conducting a road safety audit and establish a local road safety plan.
- Implement safe streets technologies to improve road safety on county roads. Partnering with state and local officials to create connections. This could include:
  - Speed management techniques such as appropriate speed limits, speed safety cameras, and variable speed limits.
  - Direct improvements to pedestrian crosswalks such as enhancing crosswalk visibility, establishing longer leading pedestrian intervals at crosswalks, constructing medians and pedestrian refuge areas in high density areas, installing pedestrian hybrid and rapid flashing beacons, installing road diets and establishing designated walkways.
  - Direct improvements to pedestrian walkways, shared use paths and sidewalks such as establishing a connected network of walking paths, widening roadway shoulders and creating and improving new walkways.
  - Direct improvements to bicycle lanes such as reallocating space in the right of way through the establishment of road diets and installing separate marked lanes that utilize vertical elements. Vertical elements include flexible delineator posts, curbs, or vegetation.
  - Improvements to roadway departures such as improving and enhancing curved roadways, adding rumble stripes on two lane roads, installing median barriers, shared lane markings (SLMs), and increasing width of road edge lines.
  - Safe intersection features such as installing stop lights with backplates and retroreflective borders, having appropriately timed yellow change intervals, establishing thoughtful corridor access management, creating left-and-right turn lanes at two-way stop-controlled intersections, reducing left-turn conflict intersections, installing roundabouts, and installing countermeasures at stop-controlled intersections, yellow change intervals
  - Pedestrians/Bicycles: Leading Pedestrian Intervals, Medians and Pedestrian Crossing Islands in Urban and Suburban areas, Pedestrian Hybrid Beacons, Road Diets/Reconfigurations, Walkways
  - Crosscutting: Local Road Safety Plans, Road Safety Audits

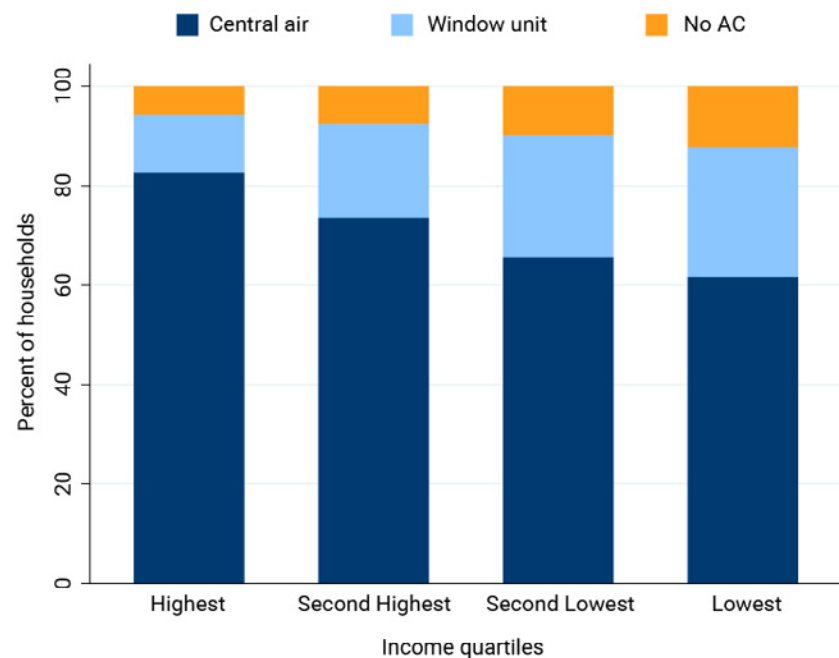
USLMITS2, a web-based Federal Highway Administration tool to support engineering studies for setting reasonable, safe, and consistent speed limits for specific segments of roads.

- Technical assistance can be acquired through the Roadway Safety Professional Capacity Building Program (RSPCB - Technical Assistance (dot.gov)) offered by the United States Department of Transportation.
  - Such as improvements and addition of warning signage, flashing beacons, retroreflective sheeting on sign posts, and removal of obstructions that limit sight distance.
  - Establishing lighting on roadway segments, intersections and pedestrian crossings.
- In 2022, the County secured funding through the NYS Climate Smart Communities Grant Program, Title 15 of the EPF through the New York State Department of Environmental Conservation, to cover 50% of the costs of a consultant to help develop a comprehensive, countywide pedestrian and bicycle master plan. The Plan will focus on connecting our town and village centers for residents through alternative transport to common destinations for work, school, shopping and essential services. The resulting plan will include strategies to:
  - Reduce GHG emissions by identifying safe connections that reduce vehicle trips;
  - Help disadvantaged County residents overcome transportation barriers that prevent their participation in the workforce, training, counselling and job placement services.
  - Support healthy and active transportation by creating safer and more convenient routes for walking and bicycling for everyday activities
  - Identify key development and planning strategies to create new, walkable communities;
  - Promote equity by focusing on disadvantaged and underserved communities and by emphasizing safety and convenience for pedestrians, cyclists and people with disabilities;
  - Foster meaningful public engagement through customized strategies to cultivate the participation of the County's underserved populations and disadvantaged communities in the planning process.

Graph of lack of AC amongst low-income households | Brookings Metro

### Lack of AC is most prevalent among low-income households

Household AC status by income quartile



## Resources

- The US Department of Health Office of the Surgeon General offers resources and guidance on incorporating walking-friendly designs into neighborhood planning to promote physical activity and improve public health.
  - The US DOT Federal Highway Administration provides information and resources on proven safety countermeasures for improving road safety and reducing traffic-related injuries and fatalities.
  - The US DOT Federal Highway Administration Handbook for Designing Roadways for the Aging Population
- 

## STRATEGY 4 /

Address need for heating and cooling in anticipation of more severe weather in the near future.

### Context

Aging housing stock is often not sufficiently weather sealed and insulated to retain heat during New York winters. In addition, extreme heat has become a problem in the United States, even in northern states such as New York. Heat mortality globally is rising. Recent trends have shown increasing numbers of extreme heat events in the region. At the same time, utility costs are increasing and residents are struggling to pay their energy bills. This strategy focuses on increasing public access to resources that deal with extreme weather conditions and educating the public on the impacts of extreme weather conditions.

One of the ways to address heat is to have public and private spaces where air conditioning is installed. However, there are still many inequalities when it comes to cooling systems. Lower-income households and renters, and other socially vulnerable populations are less likely to have air conditioning. Many of these communities also cannot afford the higher electricity costs or higher rents associated with air conditioning, exacerbated by poorly weather-sealed and insulated housing stock.

Policymakers should consider short-term and long-term strategies to reduce the impact of extreme heat and cold through grants to weather proof existing housing as well as increasing accessibility to air conditioning. This can be achieved both through programs to provide home energy retrofits with air source heat pumps for cooling as well as by establishing public cooling centers (which could double as warming centers in winter), particularly in lower-income neighborhoods where residents are less likely to have personal air conditioning units. Fountains, mists, and water parks should also be incentivized in town and village centers. Green roofs and cool roofs should also be incentivized.

### Projects

The County could do the following:

- Encourage the incorporation of public cooling centers and ambient cooling measures in any new government facilities or public space renovations.
- Conduct public outreach on heat dangers and location of cooling centers.
  - Establish a county wide Heat Action Plan as well as encouraging municipalities to develop a local Heat Action Plan.
  - Develop a timely alert system that is activated during seasons of extreme temperature. This system should also include a map identifying the locations of public water stations, cooling centers and indices like the Forecasts of Wet Bulb Globe Temperature.
  - Collaborate with municipalities to create informational materials that include general information about how citizens can protect themselves against heat, including information about and a map identifying the locations of public cooling centers and ambient cooling features. Materials should be publicly available especially for vulnerable



communities such as community facilities, senior care centers and child care centers as well as on the County and municipal websites for download.

- Establish a program to provide energy retrofits for residential and commercial properties that address insulation and other measures to help the thermal envelope protect occupants from heat, as well as encouraging installation of air source heat pumps that provide winter heating and summer cooling.
- Promote programs to cross-train home health workers and medical employees to identify clients who may be eligible for funding for energy efficiency retrofits and air conditioning installation of Residential Air Source Heat Pump and Central Air Condition.
  - There are many elderly residents of Sullivan County who are regularly visited by home-health care workers. The County should consider promoting a program to cross-train these workers to identify clients who may be eligible for funding for energy efficiency retrofits and air conditioning installation programs.
- Encourage towns to adopt passive sustainable building strategies for new construction such as siting of buildings to promote passive heat gain in winter and cooling in summer, high albedo roofs, adequate mechanical ventilation, and healthy indoor materials to support health and comfort.
- Long-term planning for hamlet and village areas as well as large scale commercial developments can provide guidelines for reducing paved areas, increasing shade planting and including pocket parks and shaded sidewalks to alleviate urban heat islands.

## Resources

- **The Overheated and Underserved: Heat Vulnerability in New York City's Most Underserved Communities Report** highlights the disproportionate impact of extreme heat on underserved neighborhoods in New York City, outlining recommendations to address heat-related vulnerabilities and improve resilience in these communities.<sup>74</sup>
- **The New York State Environmental Public Health Tracking (EPHT) Program's Vulnerability Index** assesses community vulnerability to extreme weather events.
- **New York State Department of Health** offers a detailed report on Sullivan County's Vulnerability Index, evaluating its susceptibility to various environmental and weather-related hazards.<sup>75</sup>
- **The Building Performance Institute (BPI)** provides references for individuals seeking information on the Healthy Home Evaluator certification program.

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## STRATEGY 5 /

Address homelessness and access to interim and supportive housing.

### Context

Homelessness is a growing problem across the United States, with numbers of the unhoused increasing by 12 percent between 2022 and 2023. According to the United States Secretary of Housing and Urban Development, 18 individuals per 10,000 people are homeless. In 2019, according to the Homeless Shelter Directory, Sullivan County, NY had an estimated 162 homeless individuals, greater than the national rate. In 2023, it is likely that the number of homeless individuals in Sullivan County is around 200. Those who are homeless experience higher rates of illness and have a shorter life expectancy than the general population

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74 "Overheated Underserved: Expanding Cooling Center Access," New York City Comptroller, accessed April 10, 2024, [<https://comptroller.nyc.gov/reports/overheated-underserved/>](<https://comptroller.nyc.gov/reports/overheated-underserved/>).

75 "New York State Climate and Health Profile Report," New York State Department of Health, accessed April 10, 2024, [https://www.health.ny.gov/environmental/weather/vulnerability\\_index/docs/sullivan.pdf](https://www.health.ny.gov/environmental/weather/vulnerability_index/docs/sullivan.pdf).

due to multiple different factors such as exposure to diseases, lack of access to healthy foods and healthcare. Homelessness compounds and is compounded by multiple challenges including mental and physical illness, the ability to maintain employment, and access to resources. Additionally, homelessness can contribute to municipal socioeconomic problems such as increased municipal economic costs, social instability, increased crime, and incarceration costs. Lack of housing can also cause homeless individuals to take refuge in public spaces, thereby diminishing use of public spaces by other citizens.

The development of additional affordable housing, including the allowance of ADUs on selected properties will assist in creating permanent housing options for transitional housing and/or to prevent homelessness.

Additionally, homelessness can be reduced by improving the quality of life for individuals experiencing homelessness through offering the necessary support to secure housing and maintain jobs. Conditions that support the transition away from homelessness include:

- Safety needs protection from elements, security, order and law
- Community and belongingness
- Self-reliance, independence, and self-respect through workforce / job training and the opportunity to advance

In addition, access to information and resources that provide holistic opportunities to transition out of homelessness and sustain housing stability, such as the following should be considered by the County:

- Healthy food and safe drinking water
- Stable and safe shelter that allows for protection from extreme weather conditions such as rain snow, cold and heat
- Information about safe sex, prevention from sexually transmitted diseases, and planned parenthood
- Affordable physical and mental healthcare
- Resources that help with drug use and related crime
- Work training and temporary employment that will work alongside individuals who can't obtain work
- Designating safe public areas that these individuals can spend the day or night in with staff that can handle a range of mental disorders and drug issues.

## Projects

- Prevent homelessness through the support of homeless intervention and support programs.
  - Create instruction and support regarding home maintenance, renters' rights and responsibilities, pathways to home ownership.
- Address Homelessness through Gateway and Interim Housing
  - This strategy aims to shelter highly vulnerable long-term homeless individuals in Sullivan County who are fearful of accessing traditional shelter and services to improve the health, wellbeing, and overall social integration of the homeless. The program includes room and board, along with access to case managers that work with residents to connect them with income, public benefits, health services, shelter, counseling, therapy, and permanent housing.
- Promote best practices for transitional housing including:
  - Partnering with local organizations to create barrier facilities with supportive case management that supports a small manageable number

of residents, that continues for 2 years in order to prevent a return to homelessness that often happens within a year of leaving a shelter. These facilities ideally will have access to:

- Safe and clean personal services such as showers, laundry, locker facilities, phone services, mailing address, housing referrals, and food and snacks.
- On-site access to health services, to ensure that individuals have direct access to quality medical care.
- Employment workshops designed to teach clients life and work skills, giving them the ability to find and maintain full-time employment.
- Assist local organizations in establishing access to a rapid re-housing programs with local organizations that focus on finding permanent housing solutions for individuals within 60 days of admission into the center. Individuals will receive monetary assistance for deposits and rent payments. This program ideally will help individuals find housing within 60 days of admission.
- Create and maintain a central source website that catalogs available services for the homeless or those at risk of becoming homeless in Sullivan County. Promote local organizational programs that currently supply resources to the homeless such as the Sullivan County Federation for the Homeless and Sullivan County Catskills Emergency Financial Assistance Program, as well as community organizations that provide food, shelter, clothing, health/mental health care, and/or employment or supportive services for homeless or at-risk individuals and families.

### Resources

- **The Sullivan County NY Homeless Shelter Directory** offers a directory of homeless shelters specifically within Sullivan County, New York, providing information and resources for those in need of assistance.
- **The Sullivan County Federation For the Homeless** provides assistance to individuals and families through soup kitchens, food pantries, and housing and utility program to people living with HIV/AIDS.
- **Sullivan County's Department of Family Services Emergency Assistance (EA)** program offers support individuals and families facing immediate financial hardship in Sullivan County, New York.
- **The Food Assistance Program** offered by Sullivan County Cornell Cooperative Extension aims to alleviate food insecurity by providing resources, education, and support to individuals and families in need within Sullivan County, New York.



# Goal 2 / Farming and Farmland

Ensure the economic viability of farmland conservation by supporting farmland owners, and agriculture and associated activities.

Local food production contributes to community resiliency and the health of County residents. Farming is hard work with little financial return for most family farms, yet it is vital to the history and culture of Sullivan County. Maintaining the industry when many family farmers are reaching retirement age is a complex challenge. There are significant barriers to entry from lack of knowledge and education about the realities of the way of life to a lack of financial capital for purchase. The following strategies touch on the things the County can do to support the industry.

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## STRATEGY 1 /

Promote/support succession plans for farmers who are retiring/match with young farmers.

### Context

One of the biggest challenges for the agricultural industry in Sullivan County is that farmers are reaching retirement age with few young farmers to replace them. The county should promote/support succession plans for farmers who are retiring/match with younger individuals interested in horticulture, farming, or agriculture.

### Projects

- Conduct public outreach in regards to succession planning
  - Encourage farmers to work on succession plans for the outcome of their farm after retirement or injury using tools such as the Sustainable Agriculture Research & Education foundations' Land For Good farm succession planning workbook,<sup>76</sup> which provides an outline of the considerations involved in succession planning including existing conditions assessment, clarification of vision, values & goals, involvement of family and advisors, and final implementation. The guide can get farmers thinking about what the next steps are to enact a transfer.
- Establish a fund to compensate farmers for the gap between agricultural versus other use of their properties.
  - Development pressure in Sullivan County is extreme as individuals and organizations seek to acquire farmland for development purposes. Based on anecdotal information from farm visits made during the development of this plan, the money offered to farmers for commercial development transactions is often significantly greater than the amount expected if the land were to continue to be used for farming—the expected rate of return is that much higher for a recreational camp or other commercial use. This might be addressed through access to a fund or incentive package such as through fellowship with the Northeast Farmers of Color Land Trust or the New York Farmland Access Fund—an American Farmland Trust program that helps new farmers to “purchase, permanently protect, and transition farmland with affordable access to a diverse new generation of farmers.”<sup>77</sup>

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76 “Farm Succession Planning: Where Do I Start Workbook,” Land For Good, accessed April 10, 2024, <https://landforgood.org/wp-content/uploads/LFG-Farm-Succession-Planning-Where-Do-I-Start-Workbook.pdf>.

77 “New York Farmland Access Fund to Bridge Affordability Gap for BIPOC and New Generation Farmers,” American Farmland Trust, accessed April 10, 2024, <https://farmland.org/new-york-farmland-access-fund-to-bridge-affordability-gap-for-bipoc-and-new-generation-farmers/>.

- Work with New York State, the Cornell Cooperative and other regional and non-regional organizations to establish and promote web portals to link new farmers to necessary services. These services are not limited to farm opportunities or land opportunities available in the county as well as provide resource links for consultants such as those in legal and financial services and grant opportunities and financial assistance from local banks and credit unions.

### Resources

- FarmLINK advertises opportunities for individuals interested in working at farms, connecting them with job openings and employment opportunities within the agricultural sector.
- The Agrarian Trust promotes and facilitates the conservation and stewardship of agricultural land through land access, tenure, and support programs.

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## STRATEGY 2 /

Expand farm mentorships and beginner farmer programs.

### Context

Subsidized, accrediting training and assessment should be provided through a network of training providers for the agricultural industry. Surveys of mentee farmers in New York State found that some did not receive the desired mentorship that would enable them to run their own farms in the future. Mentorship programs can be expanded to introduce more and a broader diversity of people to the industry, and to ensure that the mentorships are meaningful in terms of career development.

### Projects

- Work with New York State and other regional and non-regional resources to support and expand the Beginner Farmer Program Mentorship Cohort, a 12-month farmer-to-farmer mentorship opportunity facilitated by Cornell Cooperative Extension Sullivan County (CCESC). The program focuses on individual learning opportunities through mentor-mentee interactions on the phone, via zoom, and in person on the farm, as well as farming workshops and networking events. The program serves 10 beginner farmers each year, with 5 additional slots for veterans. Mentees receive a \$10,000 stipend for the 12-month commitment, in four quarterly \$2,500 installments.
- Utilize resources such as the **Hudson Valley Apprenticeship Program Plan** and **SARE Farm-Mentor Toolkit** to develop meaningful mentorship programs with professional development trajectories.

### Resources

- **The Sullivan County Cornell Cooperative Extension Agriculture Mentorship Program** offers guidance and support to individuals interested in agriculture, assisting them in developing skills, knowledge, and connections within the farming community.
- **The Hudson Valley Regional Apprenticeship Program Plan**, provided by New Entry Sustainable Farming Project, offers a structured apprenticeship program aimed at training new farmers in sustainable agriculture practices in the Hudson Valley region.
- **The Sustainable Agriculture Research and Education (SARE) Toolkit** to Create a Great Farm Mentorship is a toolkit designed to assist agricultural organizations and individuals in establishing effective farm mentorship programs, providing guidance and resources for mentor-mentee relationships in the farming community.



Sullivan County Farming Mentorship | Cornell Cooperative Extension Sullivan County

### STRATEGY 3 /

Address housing needs of farm workers.

#### Context

Farmers are generally expected to provide housing for seasonal/harvest workers; however, given the small size of farms and high costs of construction it can be difficult for farmers to build appropriate units.

#### Project

- Assist farmers in applying for **NYS Farmworker Housing Program** loans to purchase, construct, or improve farmworker housing.
  - In existence since 1995, the Farmworker Housing Program is a low-cost loan program that provides financing assistance to improve existing or construct new housing for seasonal and/or year-round farm workers, and this can be coupled with workforce development training in construction, especially for young people who are marginalized due to race, income, and education. Zero energy modular (ZEM) housing should be considered as a need-based incentive and as with all housing initiatives, farmworker housing should be built to Enterprise Green standards with attention to health materials and systems.

#### Resources

- **The Building Green, and Affordably (BGA) Foundation's Zem Program** focuses on enhancing occupant health by implementing better materials in construction projects, as showcased through case studies and research.

Zero Energy Modular Home as a part of The Efficiency Vermont ZEM Program | Vermont Housing and Conservation Board





## STRATEGY 4/

Support Farmers Markets, Farm to Table, and Buy Local Initiatives.

### Context

Most grocery stores do not source food locally, which puts more strain on the supply chain and raises prices. If local farmers cannot sell, they might in turn decrease their potential yields. Decreasing potential yields could in turn cause problems for the community as there could be future food shortages, which would disrupt the sustainability of the food production system. Local food systems should be incentivized for all stakeholders in a comprehensive strategy to encourage symbiotic relationships between farmers and consumers and farmers and businesses.

### Project

- Continue to support the **Cornell Cooperative Sullivan County Buy Local Initiatives** such as the Farmers Market promotion project, Farm to Institution planning, Sullivan Fresh, and Pure Catskills, through monetary, marketing and other in-kind efforts.
  - Any “shop local” program will require a social media campaign and could benefit from a loyalty points program to encourage repeat shops that will establish relationships between the buyer and seller. Shopping locally can also be incentivized by increasing the value of the dollar that a consumer spends through subsidies; e.g., consumers in programs like SNAP will be offered more money if they spend their money on farmers goods instead of purchase in a grocery store. Potential tie-ins such as cooking classes and farm visits could be offered to build on the program and make consumers feel more connected to the producers.
  - Promote the Sullivan Fresh Market on the Move initiative, which provides a traveling farmers market to identified county food deserts.

### Resources

- The **Sullivan Fresh Program**, offered by Sullivan County Cornell Cooperative Extension, aims to promote local agriculture and healthy eating habits by providing education, resources, and support for farmers markets, community gardens, and fresh food access initiatives in Sullivan County.
- 

## STRATEGY 5 /

Anticipate climate-related vulnerabilities and opportunities.

### Context

Sullivan County is heavily at risk due to factors related to changes in climate and pressures with increased development. These factors greatly affect producers in the agriculture and fisheries sector that rely on specific climate conditions. Changes in weather, specifically temperature and precipitation, can cause unpredictable variable seasons and soil conditions shifting the variety of crops that can be grown and when to plant. In 2023 the United States Department of Agriculture updated the plant hardiness zone shifting Sullivan County up a zone due to consistently warmer conditions. Trees are most vulnerable due to how long they take to grow and their reliance on seasonal changes.

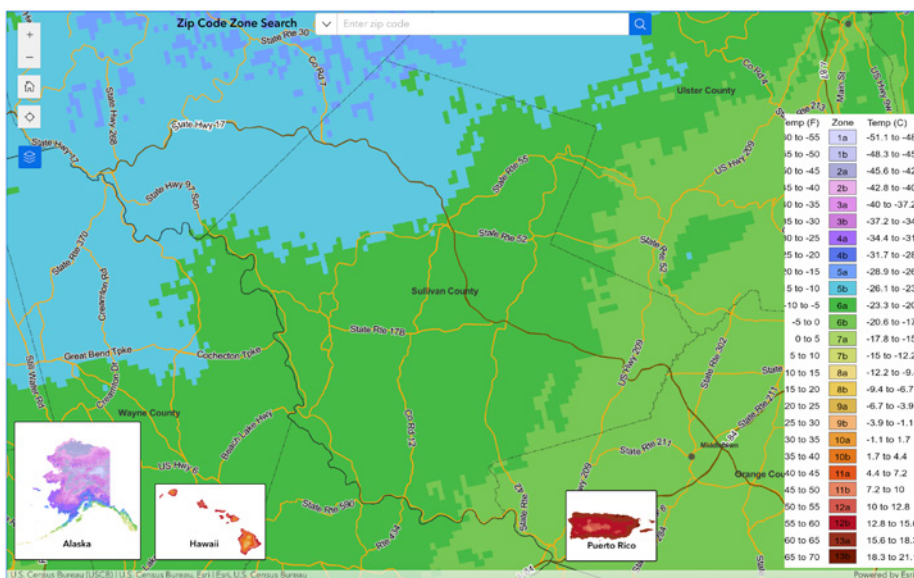
## Projects

- Create a fund to compensate for farm-site environmental conservation activities.
  - As learned on our site tours, it often happens that farmers have to make a choice between conservation and immediate financial gain. Example: a farmer is offered a flat fee per tree for a grove of trees on a ridge; however, these trees maintain the high ground, retaining rainwater and preventing erosion and flooding down the hill into the land use below. A fund should be established to compensate farmers for conservation activities benefiting the greater good at a financial loss to farmers themselves.
- Continue to support farming organizations such as Sullivan County Cornell Cooperative Extension Office in public outreach efforts to train producers and farmers on methods/investments to compensate for growing season changes including new technologies and best practices for crop selection as well as sowing, fertilization, and harvesting methods to adapt to changing environmental conditions.

## Resources

- The United States Department of Agriculture (USDA) Plant Hardiness Zone Map offers valuable data for gardeners and farmers to determine the suitable plant species for specific regions based on climate conditions.

2023 USDA Plant Hardiness Zone Map where farmers can determine which perennial plants are most likely to thrive at a location | USDA.gov



# Goal 3 / Jobs, Food, Health and Services

Improve access to healthy food, healthcare, jobs, and emergency services.

## STRATEGY 1 /

Improve access to childcare to facilitate workforce availability.

### Context

Work from home conditions during the COVID19 pandemic brought the critical importance of childcare access to the forefront of social consciousness. The absence of safe and consistent childcare prevents many people from reentering the work force. While some families are able to access professional care, others rely on friends, family and neighbors to watch the children if they cannot afford formal care or if they work non-traditional hours or do shift work. The following strategies seek to improve access to childcare by identifying childcare deserts, supporting families, and developing new professional facilities.

### Projects

- Identify childcare deserts
  - In order to understand the extent of the issue, a brief demographic study should be performed to identify areas in the county where there are concentrations of children, but no professional child care facilities. Knowing the location of these deserts will allow the County to focus resources to the areas most in need.
- Support and formalize family, friend, and neighbor (FFN) childcare by providing technical assistance for small providers to access formal licensing and remove barriers to entry.
- Many families rely on FFN childcare if they do not have other options. FFN care is often unpaid and keeps the provider out of the labor force. The County should work to support and formalize FFN childcare by providing technical assistance for these informal providers to become certified and operate as a commercial concern through programs such as those run by the NYS Office of Child Care Services or the National Association for the Education of Young Children. This ensures that the providers have the training necessary to provide a safe environment for the children as well as enabling them to develop a business of their own.
- Seek out funding for childcare facilities and facility development programs.
  - The County can support professional childcare providers as well as employers who wish to create in-house childcare programs to apply for and access funding.

### Resources

- The US Department of Health and Human Services' Head Start Program offers strategies and guidance to support family child care providers in creating high-quality early childhood education environments, enhancing their ability to nurture and educate young children effectively.

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## STRATEGY 2 /

Explore Healthy Home interventions.

### Context

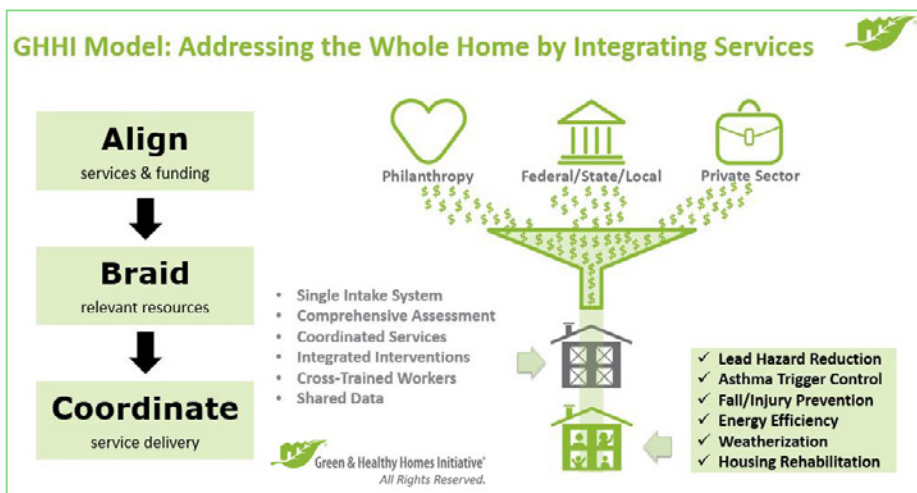
Much of Sullivan County's housing stock was built in the early 1900s. According to the HAC Rural Housing Portal, 37.6% of housing units in Sullivan County are deemed inadequate, defined as having at least one of the following conditions: 1) lacking complete plumbing facilities, 2) lacking complete kitchen facilities, 3) with 1.01 or more occupants per room, 4) selected monthly owner costs as a percentage of household income greater than 30 percent, and 5) gross rent as a percentage of



household income greater than 30 percent. As it ages, the building deteriorates and many begin to experience problems with mold, poor ventilation, failing heating and cooling systems, and leaking roofs. These conditions can be detrimental or even fatal to resident health. The impacts of climate change projected for the Mid-Hudson region – intense precipitation events, coastal storms moving inland, high heat days and more frequent heat waves, will exacerbate these conditions.

The goal of this strategy is to create healthy home interventions to correct housing conditions including mold, lead, poor ventilation, and malfunctioning combustion appliances that contribute to poor health. The focus should be emphasized on marginalized communities, especially low-income communities, communities of color, and communities that do not have English as their primary language.

Green & Healthy Homes Initiative Model  
Diagram I Green & Healthy Homes Initiative



### Projects

- Apply for **HUD Healthy Homes Initiative** funding
  - As a local government, Sullivan County is eligible to apply for a Healthy Homes Grant. The Healthy Homes Initiative provides funding to counter environmental hazards in the home that contribute to childhood diseases and injuries to millions of children each year.
- Follow **Healthy Homes Demonstration Action** template to establish Hazard Assessment and Mitigation program:
  - Develop low-cost methods for hazard assessment and intervention
  - Build local capacity to educate residents and mitigate hazards
  - To maximize efficiency, the program should have a single intake system, comprehensive assessment, coordinated services, integrated interventions, cross-trained workers, and shared data. In addition to the benefits of having healthy homes and communities, the program will also result in the creation of new local jobs.
- Develop/deliver public-education programs
  - Grant resources should also be directed to creating educational materials and courses regarding the negative effects of in-home environmental hazards. These should be translated for non-English speaking residents and tailored to target different audiences such as parents, caregivers, and landlords.

### Resources

- The program provided by **Green & Healthy Homes Initiative** focuses on improving the health, safety, and quality of housing for low-income families through comprehensive interventions addressing environmental hazards and energy efficiency.

- **The Healthy Homes Program** through US Department of Housing and Urban Development aims to address housing-related health hazards and promote safe and healthy living environments for families, particularly those with low incomes.
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## STRATEGY 4 /

Address food insecurity.

### Context

Food insecurity has serious consequences on the health, development, and well-being of children, and has negative effects on the health care system and economy. More than one in ten Sullivan County residents did not have access to a reliable source of food in 2019 according to the Mid-Hudson Health Assessment for Sullivan County. The USDA's food access research atlas identifies the villages of Ellenville, Liberty, and Monticello as being both low-income and having low-access to food (i.e., living in a "food desert").

### Projects

- Engage low-income and food insecure community members to take part in development, oversight, and running of new programs. Lived experience will provide insights strictly academic and policymakers lack.
- Oppose rollbacks on SNAP benefits.
- Expand farmers market involvement in public assistance programs and thereby also strengthening local food system hubs that support food workers, farmers and vendors.
- Consider providing school meal reimbursement rates for meal providers using local and sustainable food products.
- Consider working with food banks to transition from charity to cooperative models that help people earn a living, share resources, and stay connected to promote belonging and dignity.
- Support the work of A Single Bite, a local non-profit addressing food access and healthy nutrition.

### Resources

- **The Regional Food Bank of Northeastern New York** works to alleviate hunger and food insecurity by sourcing and distributing nutritious food to partner agencies serving individuals and families in need across 23 counties in northeastern New York.
  - Mid-Hudson Region Community Health Assessment 2019-2021
  - **The Sullivan Catskills Food Security Coalition** works to address food insecurity in the Sullivan County area by coordinating efforts among local organizations, advocating for policy changes, and implementing programs to ensure access to nutritious food for all residents.
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## STRATEGY 5 /

Address opioid/drug crisis.

### Context

Sullivan County had the highest overdose rate of any county in New York State in 2021. As such, it was able to take part in the HEALing Community Study sponsored by Columbia University that allowed for better data collection, wider research and more capital investment in harm reduction and preventive services, including the installation of Naloxone boxes for overdose treatment in select areas of the County. The study, closed in December of 2023, collected a detailed baseline of information that will be the basis for crisis-response and policy decisions.

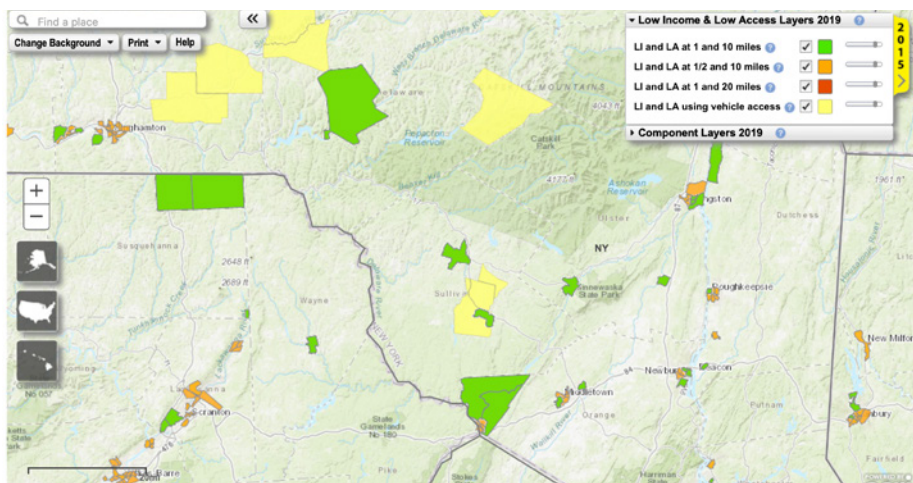
## Projects

- Acknowledge the links between housing, jobs, and food insecurity and drug use by supporting holistic services to users and continuing participation in Unite US referral network that directs individuals to needed services of any kind.
- Utilize evidence-based methods developed by the Substance Abuse and Mental Health Services Administration (SAMHSA) to respond to all aspects of the opioid crisis to efficiently focus resources:
- Creating an inventory of related services across agencies and programs and identifying priorities based on success rates
- Prepare a resource/feasibility analysis
- Develop a communications plan
- Implement sustainability actions
- Continue to follow and improve upon (using the SAMHSA guidance) the County's Workplan to Promote Well-Being and Prevent Mental and Substance Use Disorders.
- Pursue funding to continue to stock existing and expand placement of Naloxone boxes in additional communities with high overdose rates.
- Engage community members in recovery to take part in development, oversight, and running of new programs.

## Resources

- Hudson Valley Care Coalition
- The Sullivan County Drug Task Force aims to combat substance use by coordinating resources, implementing prevention strategies, and providing support to those affected.
- The Hope Not Handcuffs Opioid Program provides individuals struggling with opioid addiction access at any nearby police station in Sullivan County for treatment and support services.
- Sullivan County Community Health Improvement Plan 2022-2024

Low-income census tracts where a significant number or share of residents is more than 1 mile (urban) or 10 miles (rural) from the nearest supermarket in Sullivan County | USDA Economic Research Service





# Goal 3 / Natural Resources & Infrastructure

Changes in the environment in regard to extreme weather conditions such as larger rain events, warmer winters, longer heatwaves in the summer and loss of key habitat due to societal development, invasive species and zone changes cause overarching concerns to health, safety, and climate resiliency. Sullivan County faces vulnerability from natural resources due to:

- Flooding which creates contamination hazards for potable drinking water for both private individual wells and public water systems.
- High heat and invasive species endanger the health of our water resources, destroy the cold-water refuge of brook trout and in turn harms recreation and tourism.
- Changes in hydrology interfere with the functions of private septic systems and wastewater treatment facilities which causes contamination issues for both surface and groundwater.
- Loss of forested land from deforestation and degradation increases greenhouse gas emissions, disrupts natural water cycles, increases soil erosion and harms habitat important for the lifecycle of wildlife.
- New development can have enduring negative effects on water quality, forest fragmentation and species migrations.

Sullivan County must recognize and protect the role of natural infrastructure both as an economic driver and ecological resource. By addressing natural resources as assets belonging collectively to the County and its residents, we can identify future projects that will assist in:

- Identifying both the natural and anthropogenic risks associated with important natural resources and benefit water features.
- Identifying habitat and recreational resource improvements that will enhance benefits to residents and visitors and to preserve the functions and values of natural ecosystems.
- Aligning the County's planning initiatives with respect to new development, infrastructure improvements, agriculture, and cultural services so that they are consistent with natural resource preservation and access.

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## STRATEGY 1 /

Complete a County-wide Natural Resources Inventory and Risk Analysis identifying challenges and opportunities associated with the health and productivity of natural systems.

### Context

Natural infrastructure provides a suite of important ecological services that serve to regulate and preserve the natural landscape. These services are complex and highly interrelated, and are specific to the climate, soils, and slopes found in Sullivan County. They provide habitat for wildlife and associated life cycles, support the tourism and farming economies, manage stormwater and soil erosion, mitigate the impacts of severe weather events, filter groundwater and surface water, sequester carbon, and provide ecological buffers around sensitive or critical areas by reducing fragmentation and thereby favoring the native species over invasives.<sup>78</sup>

A potential avenue for ridge management and preservation of existing mountain features is partnering with conservation groups to prevent unsuitable development and maintain the integrity and biodiversity of sloped areas through Critical Environmental Area (CEA) designations, creation of conservation easements, and continued monitoring and maintenance. Effects of natural infrastructure on groundwater and surface water is particularly significant for Sullivan County given that groundwater is the primary source of potable water and surface waters need

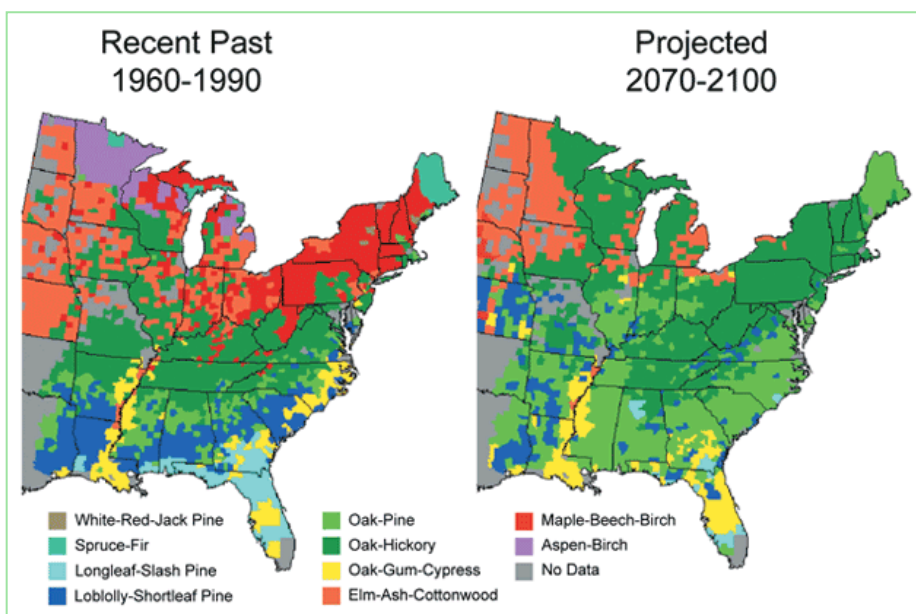
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78 The Nature Conservancy, 'Recommended Shale Development Practices: Ecological Buffers' (Accessed April 17, 2024), <https://www.nature.org/media/centralapps/recommended-shale-practices-ecological-buffers.pdf>.

to be maintained to ensure proper and regular recharge of existing groundwater aquifers. Disturbances to natural systems can have cascading effects on local ecosystems, putting the stability and functionality of these benefit streams at risk. Natural systems includes the atmosphere, waterbodies, landmasses, minerals, vegetation, and wildlife in relation to commercial and industrial use, aesthetic value, scientific interest, and cultural value. And because changes in climate and its associated influence cannot be fully predicted, the County and local governments are perpetually obligated to respond to community infrastructure needs (power, transportation, waste management, etc.) and climate hazards (flooding, fire, erosion, water quality, algal blooms, and invasive species).

Through advanced planning, training, and investment in emergency response systems we can better address public health and safety rather than attempting to mitigate the effects through intervention after the fact. When sustaining the functions of natural systems, preservation generally represents a far lower level of effort than restoration or replacement with mechanical systems.

The maps show current and projected forest types. Major changes are projected for many regions. For example, in the Northeast, under a mid-range warming scenario, the currently dominant maple-beech-birch forest type is projected to be completely displaced by other forest types in a warmer future | National Assessment Synthesis Team



### Description

To understand how best to respond to these pressures and to minimize their effect on the landscape, it is recommended that County complete the resource inventory to be overlain by County planning maps. A wealth of spatial information has been collected for Sullivan County and is provided in the 2024 Resilient Sullivan: Existing Conditions and Analysis. These data can be systematically assembled into a comprehensive GIS-based format to allow for:

- Analysis and identification of all areas associated with each specific risk to the natural landscape (flood, fire, forest fragmentation, species losses, water quality losses, etc.);
- Identification of response mechanisms and resources to address recovery from hazards as they occur;
- Identification of recreational assets and projects for expansion and improvement of access;
- Coordination of all local, County, and regional planning to minimize the effects on natural systems and to align future project work for greater overall efficiency;
- Identifying high-value or sensitive ecosystems (unfragmented forest core, stream corridors, wetlands) for priority preservation.

The inventory should be an expansion of existing data and prepared by a team of ecologists in collaboration with local governments, major stakeholders, State regulators, and relevant NGOs. Project reporting, recommendations, and mapping should be oriented to an audience of non-experts and configured to promote good decision-making and efficient resource allocation. Recommendations for future project work should include brief scopes-of-work, approximate budgetary needs, partner lists, and potential funding sources. The proposed projects should address:

- Flood suppression and flood plain protection, including development restrictions, infrastructure planning, and habitat management practices within the riparian corridor;
- Fire risks, response and suppression strategies, access and communications for firefighters and emergency response teams, training and equipment needs, and coordinating multi-jurisdictional response procedures;
- Mitigating the spread of invasive species through physical removals, organic pesticides and herbicides, aggressive planting of native species, soil and stockpile management practices;
- Stormwater runoff management practices within municipalities, agricultural zones, and along riparian systems to protect water quality at wetlands, lakes, and streams;
- Study of current use of septic treatment systems and possible risks to groundwater associated with dense development, increased rainfall, or inadequate maintenance. Properly designed and maintained septic systems actually help preserve groundwater resources rather than using a central sewage system that sends the treated effluent to a river.

It is also recommended to solicit neighboring counties for involvement in mapping and project development work to better address regional issues, assure regional buy-in, and to coordinate limited funding resources.

## Plans and Policies

### Sullivan County 2020 Comprehensive Plan

The Sullivan County 2020 Comprehensive Plan<sup>79</sup> is a long-term master plan developed by the County to establish a clear vision based on community input and on-the-ground research. The plan identifies policy areas important to the different municipalities within the county and includes strategies and action plans to promote sustainable growth and resiliency. One such policy area is Policy Area I – Open Space and Natural Resource Management,<sup>80</sup> which identifies creating a county-wide natural resource inventory and adopting a county-wide open space plan as some of the strategies to effectively balance conservation and development at the local level to provide for sustainable growth. The 2008 document *Conserving Open Space & Managing Growth: A Strategy for Sullivan County*<sup>81</sup> is an earlier outcome of that strategy and serves as a roadmap to preserve natural resources and promote sustainable growth within the county. The following strategies and actions outlined in the open space plan are geared toward creating a natural resource inventory and assessing risks associated with natural hazards, climate change, and preserving habitat in the face of new development:

- Recreation & Cultural Resources Strategy #2: Improve existing public recreational facilities and identify opportunities for the development of new ones.
  - Corresponding action: Inventory existing county-owned and managed recreational facilities and develop a county-wide parks master plan to guide future improvements.

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79 Sullivan County, New York, 'Sullivan County 2020 Comprehensive Plan' (Accessed February 15, 2024), <https://sullivanyny.us/Departments/PlanningEnvironmental/PlansandStudies/SullivanCounty2020ComprehensivePlan>.

80 Sullivan County, New York, 'Sullivan County 2020 Open Space Goals' (Accessed February 15, 2024), <https://sullivanyny.us/sites/default/files/departments/DPEM/Sullivan2020/OpenSpaceGoals.pdf>.

81 Sullivan County, New York, 'Final Open Space Plan' (Accessed February 15, 2024), [https://sullivanyny.us/sites/default/files/departments/DPEM/Resources/Final\\_OS\\_Plan%20%282%29.pdf](https://sullivanyny.us/sites/default/files/departments/DPEM/Resources/Final_OS_Plan%20%282%29.pdf).



## CASE STUDY

### Dutchess County Habitat Mapper

The Dutchess County Habitat Mapper, by Hudsonia Ltd and Marist College, produced maps and reports on significant habitats to inform land use planning, policymaking, and conservation efforts from 2001-2020. Refer to page 203 in the Appendix to read the full case study.

### Sullivan County Hazard Mitigation Plan

The Sullivan County Hazard Mitigation Plan<sup>82</sup> is a tool that will assist in effectively reducing future disaster damages, public expenditure, private losses, and community vulnerability to natural, technological, and man-made hazards. Various strategies have been identified to assist with creating a natural resource inventory and assessing risks associated with natural hazards, climate change, and preserving habitat in the face of new development:

- Goal: Coordinate a Comprehensive Countywide Mitigation Program
  - Strategy: Improve hazard data through studies, research, and mapping to enhance information related to the impacts of hazards and related risks, vulnerability, and losses.
- Goal: Protect life and Property
  - Strategy: Identify mitigation opportunities to protect, upgrade and strengthen existing structures from all-hazards through acquisition, elevation, relocation, and retrofit.
- Goal: Preserve or Restore Natural Systems
  - Strategy: Provide technical assistance to communities and stakeholders in the application and implementation of mitigation projects that preserve or restore natural systems.
  - Strategy: Maintain and encourage ongoing relationships between County and State agencies and other partners to play an active and vital role in preservation and restoration of vulnerable natural systems.

### Neversink Watershed Management Plan

Sullivan County, in partnership with Friends of the Upper Delaware River and Trout Unlimited, are developing a comprehensive, non-regulatory Neversink Watershed Management Plan (NWMP), a guidance document that profiles the entire Neversink watershed, outlines resource management goals and recommendations, and identifies pilot sites for project implementation. The effort is supported by a \$500k federal grant award from the Delaware River Basin Restoration Program, administered by the US Fish and Wildlife Service and the National Fish and Wildlife Foundation. This plan will act as a tool for municipalities, conservation organizations, community members, and other partners to develop and work towards a shared vision and goals that benefit the watershed and all of its stakeholders.<sup>83</sup> The model can be extended to include other locations and watersheds within Sullivan County.

### Projects

- Establishing natural resources mapping that can overlay on the County's planning maps
- Partner with key stakeholders in developing and conducting a County-wide Natural Resources Inventory and Risk Analysis

### Partners

- Sullivan County
- Friends of the Upper Delaware River (FUDR)
- Trout Unlimited (TU)
- Open Space Institute (OSI)
- Upper Delaware Council
- Sullivan County Planning

### Resources

The **Delaware Watershed Conservation Fund**, administered by NFWF in partnership with USFWS, provides funding opportunities to support projects aimed at creating natural resources inventories within the Delaware River Basin. Specifically, the fund offers grants for projects focused on conservation planning,

82  
83

Sullivan County, New York, 'Sullivan Mitigate NY' (Accessed February 15, 2024), <https://sullivan.mitigateny.org>  
"Neversink Valley Watershed Management Plan Underway," Sullivan County Democrat, accessed February 13, 2024, <https://www.scdemocratonline.com/stories/neversink-valley-watershed-management-plan-underway,84977>.

habitat mapping, and data collection to better understand and manage natural resources. Grant amounts are project-specific, typically \$20,000 to \$100,000.

The National Fish and Wildlife Foundation (NFWF) offers additional funding opportunities for projects focused on creating natural resources inventories in the Delaware River Watershed through grant programs such as:

- Five Star and Urban Waters Restoration Grant Program
- Conservation Partners Program
- Acres for America
- Bring Back the Native Fish

Support is typically provided for projects aimed at assessing, monitoring, and restoring wildlife populations, habitats, and ecosystems. Grant amount is project-specific, typically \$20,000-\$50,000.

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## STRATEGY 2 /

Anticipate the effects of extreme weather due to increased rainfall and larger storms at specific locations near waterbodies throughout the County.

### Context

In order to qualify for flood insurance under the National Flood Insurance Program (NFIP), local governments are required to implement a set of building and zoning codes which restrict development within flood zones as mapped by the Federal Emergency Management Agency (FEMA). New York State also regulates discharges and stormwater management in order to protect the health and safety of waterbodies. Assessments related to both of these regulatory priorities are based on a set of regionally defined “design storms,” which are derived from decades of rainfall data collected from a network of measuring stations. The design storms are intended to provide a consistent level of safety and protection of resources without imposing undue spatial and cost burdens on property owners. The general practice is to define a design storm “depth” (in inches) based on a set of “recurrence intervals” (in years) or “exceedance probabilities” (in percentages), which describe the probability that the design storm is likely to occur within a given year. The storm depth to be used reflects the level of protection deemed necessary for the application or infrastructure.

Two dominant factors play a role in delineating the extents of flood zones. Land cover (and slope) affect the rate at which rainwater “runs off” over the surface toward locations downhill, is retained on the surface, or infiltrates through soils to recharge groundwater. New development invariably introduces hard surfaces from which rainwater runs off at a high rate, thus increasing the pressure on downstream systems to manage the contributing “run-off,” and diminishing the hydrologic response times observed at receiving water bodies. Increased run-off rates and high flow velocities also convey high quantities of sediment, contaminants from roadways, and nutrients, especially from farmlands and lawns where fertilizer and pesticides are applied. Some of these nutrients reach ponds and lakes where they collect and cause eutrophication, which has detrimental consequences including low dissolved oxygen levels, loss of species diversity, and harmful algal blooms. These effects are amplified during warmer temperatures.

The second factor influencing flood risk assessment and delineations is the expected frequency of larger rain events. Because rainfall patterns are evaluated based on the historical record, changing climate conditions and higher frequency of extreme events are not adequately represented in past observations. State and federal regulators are assessing this issue using the latest climate models and projections, but those assessments have not been incorporated within the regulatory standards. This leaves it up to local planners to implement higher standards (larger rainfall depths) in order to anticipate health and safety risks in the future. Generally, retrofitting improvements to drainage systems and flood

protections in order to increase their performance capacities is more costly and challenging than designing them to a higher standard at the outset, and far more challenging to implement on private land.

### Description

Assembling a set of alternative benchmarks for designing and constructing rainwater management practices that anticipate a future climate with more extreme weather events and higher seasonal temperatures is recommended. A study of known flood zones (performed as part of the Natural Resources Inventory and Risk Assessment) should evaluate the additional risks to health and safety that are likely under future flooding in developed areas, and identify capacity improvements to infrastructure that are necessary to diminish those risks. In some cases this may involve hydrologic stream modeling and new delineations of flood zones where risks are highest, such as at “problematic culverts”. The study should also identify water bodies that have in the past experienced unhealthy conditions, such as harmful algal blooms (HABs), eutrophication, fish kills, invasive species, and loss of protective barriers. In recent years, cyanobacterial blooms have caused closures and reduced activities at several Sullivan County lakes and recreational areas. In August 2022, the County suspended swimming and paddleboat rentals at Lake Superior State Park in Bethel for more than a week due to a significant bloom. Per the NYS DEC HABs information pages, in addition to White Lake, other water bodies in Sullivan County have experienced cyanobacterial blooms over the past three years, including Loch Sheldrake, Montgomery Lake, Mountain Lake, Lake Louise Marie, Rio Reservoir and Swinging Bridge Reservoir. The annual HABs count for Sullivan County has increased from five in 2020 to 12 in 2022. The causes or sources behind these dysfunctions should be identified and quantified, and remedies recommended to prevent further harm in the future. This work may involve assessments of contributing areas, nutrient source studies, and surface water and groundwater quality testing. Mitigations may include working with farmers and owners of treated lawn areas to reduce chemical inputs and implement runoff management strategies, creation of buffers and/or retention systems, treatment forebays, and constructed wetlands. This research may also reveal that failing or inadequate septic systems are a factor in HABs incidence. In general, locations of HABs in Sullivan are not in areas of significant farm activity.

### Plans and Policies

The Sullivan County 2020 Comprehensive Plan<sup>84</sup> (see Strategy #1 above) describes actions to be taken by the County to assess existing infrastructure and plan for improvements to minimize damages from flooding.

- **Open Space and Natural Resource Management** – Water Resource Management: Help balance water usage needs, future growth and developmental impacts through a regional comprehensive analysis of available water resources and predicted future demands. This includes inventorying available water resource data, identifying data gaps, and developing a comprehensive county-wide water resource management plan.
- **Water Resources – Flooding Strategy #3:** Help municipalities and landowners implement appropriate stream maintenance practices, repair damaged stream banks, preserve wetlands, and restore floodplains.
  - Corresponding action: Help municipalities inventory existing infrastructure and evaluate its capacity to manage peak flows.
- **Water Resources – Flooding Strategy #4:** Improve the safety and maintenance of public dams.
  - Corresponding action: Develop a comprehensive inventory of existing publicly owned dams in Sullivan County.
  - Corresponding action: Assess the condition and functionality of existing dams and their role in flood mitigation efforts.



## CASE STUDY

### Callicoon Creek Flood Control Study

The Callicoon Creek Flood Control Study, with the US Army Corps of Engineers and NYS DEC, assessed flood risks, using modeling and stakeholder engagement to propose mitigation strategies. The focus was on safety, property protection, and community resilience, considering ecological impacts. Refer to page 203 in the Appendix to read the full case study.

The **Sullivan County Hazard Mitigation Plan**<sup>85</sup> (see Strategy #1 above) also describes strategies for addressing flood hazards including flood-prone transportation infrastructure, flood-prone structures - both private and public, and high hazard dams.

The New York State Department of Environmental Conservation (DEC) is the primary regulator for protection of waterbodies and sets standards and guidelines for stormwater management in the state. The DEC provides a wealth of guidance and resources for implementing sustainable land management practices in rural and developed areas.

### Projects

The **Kohlertown Flood Reduction Project**<sup>86</sup> was initiated in 2019 and funded in part by the Climate Smart Community Grant Program under Title 15 of the Environmental Protection Fund administered by NYS DEC and by Sullivan County. The project included collaboration with the US Army Corps of Engineers (USACE) for floodplain modeling and resulted in construction of new stormwater management infrastructure to preserve natural resources, mitigate flood risks, and promote sustainable floodplain management, aiming to safeguard both human communities and ecological integrity.

The award-winning **Town of Highland River Access Project**,<sup>87</sup> funded through a combination of state grants, local resources, and partnerships with agencies such as NYS DEC, the New York State Department of Transportation (NYS DOT), the National Park Service (NPS), and NFWF, focused on improving and preserving natural resources along the town's waterways. This initiative involved efforts such as riparian buffer restoration, invasive species management, and the creation of sustainable river access points. The primary intent was to enhance recreational opportunities, protect water quality, and promote ecological resilience, fostering a deeper connection between the community and its natural surroundings.

### Partners

- NYS DOT
- Sullivan County DPW

### Resources

The New York State Department of Environmental Conservation (NYS DEC) provides funding opportunities for flood control and planning through various grant programs and initiatives aimed at enhancing resilience to flooding events and mitigating flood risks. Some of the key funding opportunities offered by NYS DEC in this area include:

- **Environmental Protection Fund (EPF):**<sup>88</sup> NYS DEC administers the EPF, which funds projects supporting initiatives such as floodplain restoration, stormwater management, and flood risk assessment and planning.
- **Climate Smart Communities Grant Program:**<sup>89</sup> NYS DEC offers grants through the Climate Smart Communities program to support local government efforts to address climate change impacts, including flooding. These grants may fund projects such as floodplain mapping, development of flood risk reduction plans, and implementation of green infrastructure to manage stormwater.

85 Sullivan County, New York, 'Sullivan Mitigate NY' (Accessed February 15, 2024), <https://sullivan.mitigateny.org>

86 "Sullivan County DPW Launches Design for Long-Awaited Kohlertown Flood Reduction Project," Sullivan County Government News, accessed February 15, 2024, <https://sullivanny.us/news/dpw-launches-design-long-awaited-kohlertown-flood-reduction-project>.

87 "Town of Highland Refurbishes River Access," Sullivan County Democrat, accessed February 14, 2024, <https://www.scdemocratonline.com/stories/town-of-highland-refurbishes-river-access,107431>.

88 "Environmental Protection Fund," New York State Department of Environmental Conservation, accessed February 14, 2024, <https://dec.ny.gov/environmental-protection/fund>.

89 "Grants for Climate Action," New York State Department of Environmental Conservation, accessed February 14, 2024, <https://dec.ny.gov/environmental-protection/climate-change/resources-for-local-governments/grants-for-climate-action>.

- **Flood Mitigation Assistance (FMA) Program:**<sup>90</sup> NYS DEC collaborates with the Federal Emergency Management Agency (FEMA) to administer the FMA program, which provides funding for flood mitigation projects in high-risk areas. Eligible projects may include flood control infrastructure improvements, acquisition and relocation of flood-prone properties, and flood hazard mitigation planning.
- **Hazard Mitigation Grant Program (HMGP):**<sup>91</sup> NYS DEC works with FEMA to implement the HMGP, which provides funding for hazard mitigation projects to reduce the risk of future flooding and other natural disasters. These grants support a wide range of flood control and planning activities, such as elevation of structures, construction of flood barriers, and development of floodplain management regulations.
- **Community Development Block Grant (CDBG) Program:**<sup>92</sup> NYS Office of Community Renewal (OCR) administers CDBG funds allocated by the U.S. Department of Housing and Urban Development (HUD) to support community development projects, including those related to flood control and planning. These grants may fund infrastructure improvements, drainage system upgrades, and other measures to reduce flood risks in eligible communities.

The First Street Foundation does independent research and climate modeling to assist planners, local governments, and scientists with identifying the consequences of climate change on local communities and resources using their topographic and risk assessment data of natural areas. Their work helps to identify areas of risk for flooding, extreme heat, high wind, and wildfires. Their “Risk Factor” tool is one of several efforts to incorporate climate modeling into risk-rating to identify the potential severity of future risks. These services can be useful in providing a perspective on climate projections and future risks that have not been addressed by FEMA’s mapping, which is based on historical data<sup>93</sup>. Their assessments should be reviewed at specific locations to confirm the topography of adjacent lands, slopes, and natural features such as wetlands that mitigate flood risk.

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## STRATEGY 3 /

Enhance recreational access to natural areas through development and improvement of trail networks, park amenities, educational resources, and interpretive signage.

### Context

Sullivan County’s tourist economy and summer residents are highly dependent on the recreational offerings of the county’s natural assets. Promoting access to these assets for visitors of all abilities and backgrounds will ensure the steady stream of visitors and investment in properties for seasonal use. Existing trail networks should be mapped and surveyed for maintenance needs, and trails modified to reduce the number of barriers to people with disabilities. Trail heads should provide parking, maps, and, where feasible, potable water and emergency boxes. Intersections with roadways or railways should be configured for safe passage with clear instructions. Stakeholders should contribute to programming of rest areas, picnic shelters, toilet facilities, and other amenities to enhance user experiences. New trails may be programmed to create greater internal connectivity and circulation as well as connections to trail networks in neighboring counties.

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90 “Flood Mitigation Assistance,” Federal Emergency Management Agency (FEMA), accessed February 14, 2024, <https://www.fema.gov/grants/mitigation/flood-mitigation-assistance>.

91 “Hazard Mitigation Assistance,” Federal Emergency Management Agency (FEMA), accessed February 14, 2024, <https://www.fema.gov/grants/mitigation/hazard-mitigation>.

92 “Community Development Block Grant,” New York State Homes and Community Renewal, accessed February 14, 2024, <https://hcr.ny.gov/community-development-block-grant>.

93 “First Street Foundation,” accessed February 14, 2024, <https://firststreet.org/>.

Public understanding and stewardship of natural areas is enhanced through education and engagement, youth programming and collaboration with schools, guided tours, and interpretive signage. Establishing a structure for training engagement specialists and nature guides to lead programs that inform visitors of the value of natural systems, ecology and interdependence of habitats, the role of native ecosystems, and pressures from invasive species is recommended. Signage and printed maps are also valuable tools and help connect people with their environment. Online reporting systems could be developed to allow users to report both species sightings and maintenance needs and can be combined with online trail maps with GPS location, recorded nature guides, common species lists with images, and other educational materials. Carefully crafted citizen science projects, perhaps focused on wildlife and bird counts or invasive species identification, could also engage public understanding of stewardship.

### Plans and Policies

Both the NYS DEC and the New York State Office of Parks, Recreation & Historic Preservation (OPRHP) offer examples of high quality educational and recreational programming for State parks and natural areas, as well as guidelines and designs for trails and other park amenities.

- **OPRHP – Standards and Guidelines for Trails in NYS Parks:**<sup>94</sup> This document provides comprehensive guidelines for trail planning and design in New York State parks. It covers various aspects of trail development, including site selection, trail layout, surfacing, grading, drainage, and signage.
- OPRHP also publishes **Trail Signage Guidelines for the New York State Park System**<sup>95</sup> which reviews trail information that is used as a basis for producing trail signage, and then presents sign design standards and guidelines for State Park trails.

### Projects

The **Callicoon Riverside Park Plan**,<sup>96</sup> under development in partnership with Trust for Public Land (TPL), New York State Department of Environmental Conservation (NYS DEC), and the **Catskill Regional Invasive Species Program (CRISP)**,<sup>97</sup> focuses on providing residents of Sullivan County access to the Delaware River. The overarching intent is to create a vibrant park space that not only provides recreational opportunities but also protects and celebrates the ecological richness of the area, fostering community engagement and environmental stewardship. Future plans include developing a recreation center, and partnering with municipalities and the DEC to expand programming in the established parks not run by the County, and assisting communities establish local waterfront revitalization programs.

Future projects should utilize grant funding from the variety of resources mentioned below to assist municipalities in funding and establishing community-focused projects that would enable efficient usage of available funds and foster the strategy.

### Partners

- Town officials
- NYS DEC
- National Park Service
- NYS DOT
- Move Sullivan

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94 "Trails Technical Standards and Guidelines," New York State Parks, Recreation & Historic Preservation, accessed February 14, 2024, <https://parks.ny.gov/documents/recreation/trails/TrailsTechnicalStandardsandGuidelines.pdf>.

95 "Trails Technical Signage Guidelines," New York State Parks, Recreation & Historic Preservation, accessed February 14, 2024, <https://parks.ny.gov/documents/recreation/trails/TrailsTechnicalSignageGuidelines.pdf>.

96 "Callicoon Riverside Park Conceptual Plan," The Trust for Public Land, accessed February 15, 2024, <https://www.tpl.org/wp-content/uploads/2020/10/NY-Callicoon-Riverside-Park.pdf>.

97 "Catskill Regional Invasive Species Partnership," accessed February 15, 2024, <https://www.catskillinvasives.com>.



## Resources

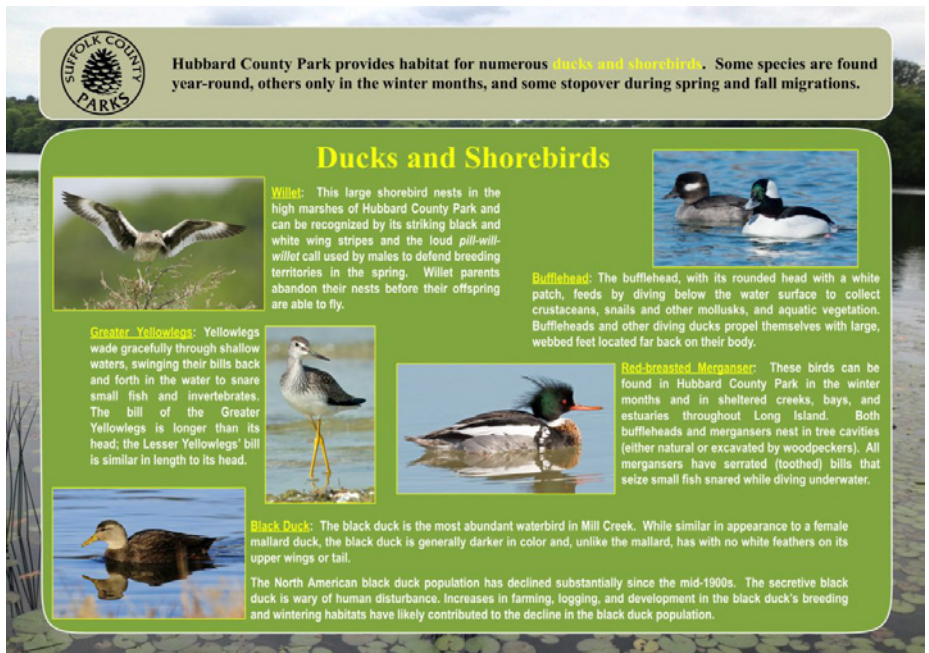
The New York State Department of Environmental Conservation (NYS DEC) offers funding opportunities for projects aimed at natural areas recreation, including trails, parks, signage, education, and recreational site development, through the Climate Smart Communities Grant Program.<sup>98</sup> This program supports local government efforts to address climate change impacts and promote sustainable community development, including enhancing recreational opportunities in natural areas. Funding provided through the Climate Smart Communities Grant Program may be used for a variety of purposes related to natural areas recreation, such as:

- Trail construction, maintenance, and improvement projects.
- Development of parks, green spaces, and recreational facilities.
- Installation of signage and interpretive materials to enhance visitor experience and education.
- Implementation of educational programs and outreach activities focused on climate change resilience and environmental stewardship.
- Planning and design studies for new recreational sites or improvements to existing sites to enhance accessibility, sustainability, and resilience to climate change impacts.

Under Title 11 of the Environmental Protection Fund (EPF), the New York State Department of State (NYS DOS) provides funding opportunities for projects aimed at natural areas recreation, including trails, parks, signage, education, and recreational site development. These funding opportunities are typically administered through the Local Waterfront Revitalization Program (LWRP) and the Community Impact Grant Program (CIG).

- **Local Waterfront Revitalization Program (LWRP):**<sup>99</sup> The LWRP provides funding to municipalities and local governments to support waterfront revitalization efforts, including projects related to natural areas recreation along waterfronts. This may include developing or enhancing trails, parks, signage, and educational programs to promote public access and enjoyment of waterfront areas.

Interpretive signage in Suffolk County Parks |  
Land Use Ecological Services, Inc



<sup>98</sup> "Climate Smart Communities Program," accessed February 15, 2024, <https://cfareources.ny.gov/climate-smart-communities-program>.  
<sup>99</sup> "Local Waterfront Revitalization Program," New York State Department of State, accessed February 15, 2024, <https://dos.ny.gov/local-waterfront-revitalization-program>.

- **Community Impact Grant Program (CIG):**<sup>100</sup> The CIG program offers grants to support projects that enhance community vitality, economic development, and quality of life in New York State. Eligible projects may include those aimed at improving recreational opportunities in natural areas, such as developing or upgrading trails, parks, interpretive signage, and educational programs.

The National Fish and Wildlife Foundation (NFWF) and the National Oceanic and Atmospheric Administration offer several grant programs that support projects aimed at enhancing natural areas recreation, including the development of trails, parks, signage, education programs, and recreational site development in New York State. Some of these grant programs include:

- **Five Star and Urban Waters Restoration Grants Program:**<sup>101</sup> This program provides grants for projects that engage partnerships between community groups, government agencies, and businesses to improve water quality, restore habitat, and enhance recreational opportunities in urban and suburban areas. Projects may include the development of parks, trails, and educational programs that promote outdoor recreation and environmental stewardship.
- **Community-based Restoration Program:**<sup>102</sup> NFWF's Community-based Restoration Program supports projects that engage local communities in the restoration and enhancement of natural areas, including parks, trails, and recreational sites. Grants may be awarded for projects that improve public access, develop interpretive signage, and enhance recreational opportunities in priority conservation areas.

Reinstein Woods Nature Preserve Trails I  
Friends of Reinstein Woods



100 "Grant Applications," New York State Department of Environmental Conservation, accessed February 15, 2024, <https://dec.ny.gov/get-involved/grant-applications>.

101 "Five Star and Urban Waters Restoration Grant Program," National Fish and Wildlife Foundation, accessed February 15, 2024, <https://www.nfwf.org/programs/five-star-and-urban-waters-restoration-grant-program>.

102 "Community-based Restoration Program," National Oceanic and Atmospheric Administration (NOAA) Fisheries, accessed February 15, 2024, <https://www.fisheries.noaa.gov/tags/community-based-restoration-program>.

# Goal 5 / Utilities

Ensure access to quality and reliable electrical, telecommunications, and internet utilities throughout the County, and prepare for emerging challenges by modernizing both water and solid waste infrastructure.

Overarching health, safety and climate vulnerability considerations relating to utilities, communications, water and solid waste:

- Reliable electrical, telecommunications and internet are necessary for notification, recovery and resilience to natural disasters.
- Grid reliability affects the County's ability to mount effective disaster response.
- Reliable, climate-hardened utilities are necessary to support strategic planning/smart growth principles as well as revitalization of existing communities.
- Overall water quality and quality of drinking water in relation to modernizing various infrastructure systems.

## GRID CAPACITY ANALYSIS

**Focus:** Grid capacity analyses assesses the overall capacity and capabilities of the entire electrical grid or a specific portion of it.

**Objective:** The primary goal is to evaluate the ability of the grid to meet the current and future electricity demand, considering factors such as load growth, new developments, and changes in energy consumption patterns.

**Scope:** It encompasses a broad assessment of the entire grid infrastructure, including power generation, transmission, and distribution systems.

## STRATEGY 1 /

Conduct a grid capacity evaluation for increasing electricity demand that supports electrification trends and climate-related needs such as air conditioning.

### Context

Sullivan County grapples with a dual challenge of short-term power outages and long-term resilience issues in its energy infrastructure. While extended outages result from acute impacts of climate conditions and equipment failure, brownouts and short-term disruptions, like those observed in Monticello in 2022, stem from system capacity issues. Rising temperatures and population growth, compounded by aging housing, strain the grid.

Building and transportation electrification will increase Sullivan County's electric load over time while its energy supply becomes more renewable in years to come. Understanding how this increased load and integration of distributed energy resources may affect grid capacity and energy delivery, as well as what opportunities are available when integrating customer-owned and utility-operated batteries, EV chargers, smart appliances and solar generation, is paramount to safely and reliably delivering electricity, especially at times of peak electric demand in the community.

The county's rural and dispersed development further complicates matters, leading to a piecemeal electrical grid expansion. This expansion, coupled with capacity challenges, incurs significant costs. These costs pose an economic resiliency concern, potentially dissuading large businesses from investing in Sullivan County. Additionally, grid efficiency and reliability improvements must be designed to accommodate a population that more than triples during the summer months when second home owners and vacation communities are in residence.

Ultimately, high capital costs hamper the feasibility of establishing microgrid infrastructure around the county, posing a barrier to addressing the overarching energy infrastructure issues. The county faces a critical juncture in balancing immediate capacity needs with long-term sustainable solutions.

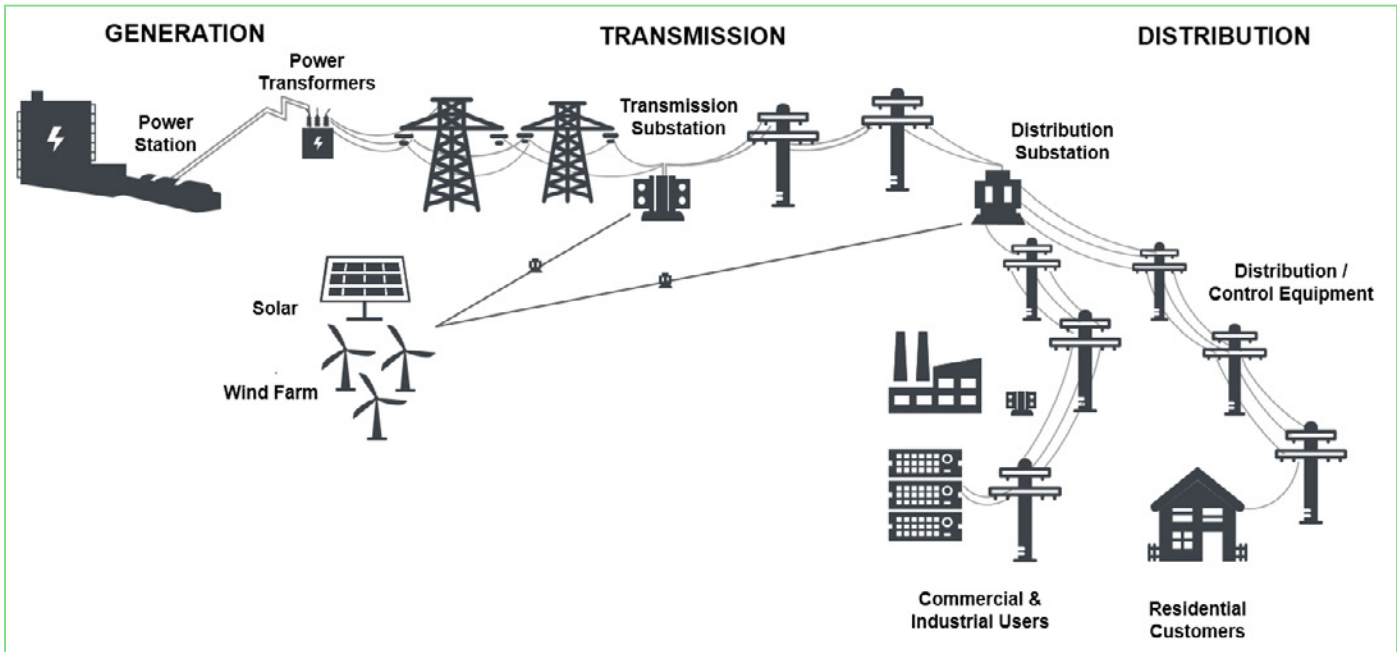
### Description

Conducting a county-wide grid capacity analysis should identify a full range of grid challenges—both existing and anticipated, in relation to increasing electricity demand. This will help the county tailor investments and actions that will ultimately reduce the prevalence of power outages. Such a comprehensive assessment involves public-private sector collaboration, data-driven decision-making, and a commitment to sustainable and resilient energy infrastructure.



Load forecasting is an important component of this analysis. Load forecasting utilizes historical data and predictive modeling to forecast electricity demand over short-term and long-term periods. This modeling should include thorough forecasting of population growth, economic development, and electricity needs related to both electrification and climate change trends. For example, demand and capacity modeling should account for electricity uses that include:

- Applications such as electric vehicle charging and electric heat pumps.
- Air conditioning needs as average summer temperatures and the incidence of high heat days increase due to climate change. Predictive modeling must include relevant climate projections.



Electric Power Grid Diagram | Shorehill Capital, Power Grid Components Inc

This effort will require careful collaboration with local utility providers to gather data on current grid performance, identify potential bottlenecks, and discuss strategies for improvement.

The aim of a detailed grid capacity assessment is to help guide potential interventions/investments. There are two key intervention areas that would result:

1. Identification of infrastructure that needs replacement and/or upgrades, for example:
  - Upgrade and modernize existing infrastructure, including transmission lines, substations, and distribution networks.
  - Incorporate advanced technologies to enhance the grids efficiency and capacity.
2. Identification of strategies to reduce demand on the electric grid and plan for a more distributed system includes:
  - Expanding on-site renewable energy sources such as solar.
  - Emphasizing localized micro grids and distributed energy systems that can maximize the use of renewable energy. This strategy is most relevant for rural municipalities that are more isolated than municipal hubs but can produce energy locally (i.e. renewable energy sources such as solar panels and wind turbines). A distributed energy system can reduce the frequency of outages by drawing power from multiple sources, rather than a centralized power system.
  - Promotion of retrofits to enhance building energy efficiency such as improvements to insulation and windows.

## CASE STUDY

### FCRTA Electrical Grid Analysis Study

The Fresno County Rural Transit Agency (FCRTA) conducted an Electrical Grid Analysis Study to assess the impact of increased electrification on the electric grid system, focusing on rural communities. Despite being an economic hub with vast farmlands, Fresno County faces unique challenges, with residents earning lower incomes than the state average. Refer to page 203 in the Appendix to read the full case study.

- Influencing consumer behaviors through demand responsive programs that encourage consumers to adjust their electricity usage during peak periods. This programming needs to take into consideration the seasonality factor of a large proportion of the housing units.

Grid capacity analysis is an ongoing process that requires continuous monitoring, evaluation, and adaptation to evolving energy landscapes and demands. It is a critical component of effective energy planning to ensure a reliable and resilient electrical grid.

### Plans and Policies

- SC 2014 Climate Action Plan (CAP) and 2022 update
- SC Hazard Mitigation Plan
- Other policies
  - In 2016, the Sullivan County Industrial Development Agency (IDA) instituted a payment in lieu of taxes (PILOT) program to encourage the development of community solar in Sullivan County.
  - The County adopted the Climate Smart Communities Pledge in 2010. In 2017, Sullivan County became the 6th county in New York State to receive a bronze certification.
  - In its 2020 Rate Order,<sup>103</sup> the New York State Public Service Commission authorized NYSEG to allocate \$27.2 million to two new projects related to vegetation management throughout their system.

### Projects

- **Major Solar Investments:** As of March 2022, there were 3 solar facilities on county owned land in Bethel and Liberty, producing nearly 3 million kWh/year. Two of these facilities are owned by the county, and the third is based on a power purchase agreement with Tesla.
- **2015 Microgrid Study and Opportunity:** In 2015, the County worked with consulting firm Booz Allen Hamilton (BAH) to develop microgrid feasibility studies through the NY Prize Microgrid Competition.
- In 2016 Sullivan County entered an operating agreement with Gravity Renewables to purchase hydroelectric power from its Goodyear Lake Hydroelectric Generating Station in Otsego County, New York. With the addition of this resource, 77% of the grid-delivered electricity for County operations came from renewable energy in 2023.
- In 2015, NYSEG instituted the **Circuit Breaker Replacement Program** to replace circuit breakers in poor condition, having replaced 430 circuit breakers under the program to date.
- In 2019, NYSEG instituted the **Distribution Line Deficiency Program** to inspect and repair distribution lines in poor condition.

### Partners

- NYSERDA
- Utility Companies: Orange and Rockland Utilities, New York State Electric and Gas (NYSEG), Central Hudson Energy Group
- SC Office of Sustainable Energy
- SC DPW
- Cornell Cooperative Extension
- SC Community Resources and community partners in action for climate change justice and other related advocacy efforts.
- Consulting resources

### Resources

- **New York Public Service Commission (PSC):** PSC is responsible for regulating utilities in New York. The PSC website provides regulatory

information, reports, and documents related to grid infrastructure and capacity.

- **New York State Energy Research and Development Authority (NYSERDA):** NYSEDA offers energy-related data, research reports, and programs that can assist in understanding energy trends and informing grid capacity analysis
- **New York Independent System Operator (NYISO):** NYISO is responsible for managing the state's electricity grid. Their website provides access to grid data, reports, and publications that can be valuable for capacity analysis. For example, NYSIO operates a document library with useful reports and fact sheets: <https://www.nyiso.com/library>
- Powering Sullivan Resource Book<sup>104</sup>

## CASE STUDY

### **Beneficial Building Electrification Plan | City of Longmont, CO**

Longmont's Beneficial Building Electrification Plan, sparked by the 2020 Climate Action Recommendations Report, offers actionable strategies to reduce GHG emissions from buildings.

It prioritizes environmental, economic, grid, and equity benefits in alignment with City Council's mandate. Refer to page 204 in the Appendix to read the full case study.

## STRATEGY 2 /

Support beneficial electrification of County facilities.

### Context

Beneficial electrification refers to converting building systems that use fossil fuels (gas, oil, or propane) to high-efficiency electric equipment powered by increasingly clean and renewable electricity. Building electrification, combined with improved energy efficiency, is essential to building decarbonization and wider climate action, generally coming in second only to renewable energy and/or transportation electrification when it comes to reducing GHG emissions.

Examples of beneficial electrification initiatives include transitioning to electric vehicles, electrifying heating systems, and utilizing electric appliances powered by clean energy sources. Overall, the concept underscores the idea that electrification, combined with building retrofits to improve energy efficiency, mechanical ventilation and use of healthy materials, when strategically implemented, can bring about a range of positive outcomes for the environment, economy, and society.

This strategy works in tandem with the strategy to conduct a grid capacity analysis to ensure electricity demand is met. Ultimately, building electrification helps to foster grid resilience.

### Description

Sullivan County should consider initiating a beneficial electrification program for its facilities, with the goal of reducing carbon emissions, enhancing energy efficiency, and promoting sustainability. When supported by renewable energy sources such as solar and Battery Energy Storage Systems (BESS), such facilities would also become more resilient to power outages in the future. In order to achieve such upgrades, a number of targeted investments should be considered that are general electrification strategies:

- **Electrification of Heating Systems:** Retrofit County buildings with electric heating systems, such as heat pumps, to replace traditional fossil fuel-based heating systems.
- **Comprehensive Energy Retrofits:** Improve building envelope for maximum energy efficiency with robust mechanical ventilation, water conservation measures, and replacement of red-listed materials, paints and finishes with healthy alternatives.
- **Conversion to Electric Appliances:** Transition kitchen appliances, water heaters, and other equipment in county facilities to electric alternatives.
- **Renewable Energy Integration:** Install solar panels on county buildings to generate clean, renewable electricity locally. Exploring partnerships with local renewable energy providers to source additional green power.

104 "Sullivan County Sustainable Energy Program, 'Powering Sullivan Resource Book 2019 Edition' (Accessed January 18, 2024), <https://sullivanny.us/sites/default/files/departments/sustainableenergy/Powering%20Sullivan%20Resource%20Book%202019%20Edition.pdf>."



## CASE STUDY

### **Beneficial Electrification of Space Conditioning in Schools | Cherokee, Oklahoma**

In Cherokee, Oklahoma, Alfalfa Electric Cooperative (AEC) and Western Farmers Electric Cooperative (WFEC) champion ground source heat pumps (GSHPs) for building resilience. AEC's efforts have transitioned Cherokee's three schools from natural gas to electric GSHP systems over two decades. Refer to page 204 in the Appendix to read the full case study.

Additionally, grid-connected energy storage systems can help the viability of this integration.

- **Energy Storage Solutions:** Energy storage systems can store excess energy generated during peak times and utilize it during periods of high demand or during grid outages.
- **Smart Building Technologies:** Implement smart building technologies, including energy management systems and occupancy sensors, to optimize energy usage and enhance overall building efficiency.
- **Public Outreach and Education:** This effort should engage with the community to raise awareness about the benefits of electrification and encourage residents to adopt similar practices in their homes.

## Plans and Policies

- SC Climate Action Plan and 2022 update. The CAP set GHG reduction goals for County operations and outlined a series of recommendations for Energy, Transportation, Materials Management, Land and Water Use, Public Health and Emergency Management.
- SC Hazard Mitigation Plan
- Solar Policies
  - The County has championed the development of solar projects in the community, through educational outreach and presentations to municipal governments to support adoption of the Unified Solar Permit and advocacy through the Sullivan County IDA for development of a Solar Uniform Tax Exemption Policy to foster CDG projects.
- The County's Fleet Efficiency Policy, adopted in 2017, calls for reduction of fuel use by right sizing fleet vehicles and procuring the most fuel efficient vehicle in its class.
- The County's Benchmarking Policy, adopted in 2017, requires annual benchmarking of energy use and associated GHG emissions for all occupied County facilities.

## Projects

### **Retrofitting County Facilities**

- The county has also taken and continues to take significant steps in the retrofitting of county facilities to improve energy efficiency and reduce strain on Sullivan County's existing and future electricity infrastructure. Projects include replacement of HVAC systems with high efficiency rooftop units, replacement of aging boilers and conversion from fluorescent to LED exterior lighting at the Government Center in Monticello, and the implementation of solar energy systems at the Robert B. Travis Building and the Community Services and Public Health campus in Liberty.

### **Sullivan County Facilities Master Plan – (Underway)**

- Although there have been delays in this project, the effort will develop a Facilities Master Plan for all County facilities in anticipation of future needs based on staff, programs, and target populations as well as associated energy needs and potential for buildout/procurement of renewable energy resources. This effort should also consider electrification potential at each facility and related capital costs.

## Renewable Energy for County Operations

- County Solar
  - The County's 2.4 MW solar array in Liberty powers the Care Center at Sunset Lake, Shared Health Clinic, and six other County facilities.
  - 14.96 kW solar demonstration project at the County's Mobility Management facility in Bethel.
- County Hydro
  - The County has an operating agreement with Gravity Renewables to purchase 4,000,000 kWh of electricity per year from a small, refurbished hydro-electric plant in upstate NY. The SC Government

Center and Annex, the new Public Safety Complex (SC Jail, Sheriffs and Road Patrol) and the SC Courthouse receive the renewable energy credits from this hydroelectric plant. With completion of this project, the County achieved 77% of electricity for County operations from renewable sources in 2023.

### Partners

- NYSERDA
- SC Division of Public Works
- SC Division of Planning and Community Development
- SC Community Resources and community partners in action for climate change justice and other related advocacy efforts.
- Consulting resources

### Resources

- **NYSERDA Clean Energy Communities (CEC):** Provides resources and guidance for communities looking to adopt clean energy initiatives, including electrification.
- **NYSERDA FlexTech Program:** Offers technical assistance and funding for energy studies, helping municipalities assess the feasibility of electrification projects and identify energy-saving opportunities.
- **NY-GEO Electrify Your Building Campaign:** Provides resources and information on electrifying buildings, with a focus on geothermal heating and cooling systems.
- **NY-BEST Energy Storage Roadmap:** Offers an Energy Storage Roadmap that can be valuable for municipalities looking to integrate energy storage into electrification projects.
- **Property Assessed Clean Energy (PACE)** financing programs in New York State provide a mechanism for property owners, including municipalities, to finance energy efficiency and electrification projects.

## CASE STUDY

### Zero Waste Program | San Francisco, California

San Francisco's Zero Waste Program aims to divert all waste from landfills through extensive recycling, composting, and reuse initiatives. This comprehensive effort has led to one of the highest waste diversion rates in the United States. Refer to page 205 in the Appendix to read the full case study.

## STRATEGY 3 /

Address need for alternatives for County solid waste options with the anticipated closure of Seneca Meadows

### Context

Sullivan County exports all of its collected waste to Seneca Meadows, New York's largest landfill, which is currently scheduled to close by 2025. Although Seneca Meadows operation might be extended beyond 2025 if an expansion agreement is reached, the county should think strategically about more sustainable solid waste operations. Sullivan County has been dependent on Seneca Meadows as Sullivan County no longer has an active landfill.

Although other landfills could potentially handle the county's trash, it is essential to proactively consider more environmentally sustainable alternatives. In addition to the production and landfilling of this waste, the transport of the County's MSW, Construction and Demolition (C&D) waste, and recyclables results in significant GHG emissions from the combustion of diesel fuel. Those emissions have serious impacts on respiratory and heart health, ground level ozone, and acid rain. The aim of reducing reliance on landfills aligns with the objectives of zero-waste advocates throughout the state. Achieving this goal will require a concerted effort from various factors and will not happen overnight. New York State has set an ambitious target of reducing landfill waste by 85 percent by 2050, and it is advisable for the county to contribute its efforts towards realizing this goal.

## CASE STUDY

### Construction and Demolition (C&D) Recycling Ordinance | Austin, Texas

Austin has a Construction and Demolition Recycling Ordinance that requires contractors to divert a certain percentage of construction and demolition waste from landfills. The program encourages the recycling of materials like concrete, metal, and wood from construction projects.

## Description

While a determination is made regarding the potential for exporting county waste to landfill sites beyond 2025, there should be an emphasis on establishing sustainable alternatives. At its core, these sustainable alternatives rely on more robust recycling and composting of organic materials. The promotion of recycling, composting, and waste reduction should consider the following:

### Recycling

- Expand curbside recycling services and/or consider new satellite transfer stations.
- Expand outreach and advertisement of recycling drop-off sites at the county's transfer stations; Further establish comprehensive waste reduction and recycling programs to divert recyclable materials from landfills.
- Support for uses such as "repair cafés", materials exchange opportunities (textiles, etc.), "unbuilding" (aka "thoughtful demolition"), meaningful extended producer responsibility policies.
- At the County level and for local governments, green purchasing policies that specify products that include significant recycled materials, minimize packaging waste, and are low emissions/low environmental impact in their life cycle analysis.

### Composting

- Expand composting programs for organic waste, including food scraps and yard waste. Collection should target facilities such as restaurants, schools, catering companies and larger businesses that have large amounts of food scraps, reducing volumes that go to landfill
- Create programs that keep organic waste within the community to improve local soil health and reduce greenhouse gas emissions produced from hauling materials.
- Conduct local outreach to promote the use of compost in landscaping and gardening such as leaving the leaves in fall.
- Establish a farm network to give farmers increased access to organic waste.
- Collaborate with tree cutting companies to mulch up material and leave in environment or possibly distribute to local gardeners or garden companies.

### Waste Reduction

- Construction and Demolition (C&D) Recycling: Implement programs to recycle construction and demolition waste, promoting the recovery of materials such as wood, metal, and concrete.

Collaborate with private sector companies and organizations to explore innovative waste management solutions, including technologies for materials recovery and recycling.

## Projects

- In 2023 Sullivan County launched a Food Scrap Recycling Pilot Program. Currently, this is open to residents only (not business) and accepts a wide range of food scraps. Food scraps can be dropped off at Sullivan County Recycling and Transfer Station locations during regular business hours. There is no charge for drop off. To facilitate participation, starter kits (one countertop pail and one medium-sized bin for storage) are available for purchase at all Sullivan County Recycling and Transfer Stations. If the pilot program is successful, the County intends to apply to the State to construct its own composting facility at the Monticello landfill site.
- Organics Management Plan Pilot program





Sullivan County Food Scraps Recycling Program Flyer | Sullivan County Department of Solid Waste & Recycling

## Partners

- NYSERDA
- NYSDEC
- SC Division of Public Works/Solid Waste Management
- Public Schools
- SC Municipalities

## Resources

- **U.S. Environmental Protection Agency (EPA) - Sustainable Materials Management and Sustainable Management of Food:** The EPA's Sustainable Materials Management (SMM) program offers resources, tools, and case studies to help communities adopt sustainable waste management practices. Through the Sustainable Management of Food initiative, the EPA also provides information and resources on composting.
- **The Recycling Partnership** is a non-profit organization that collaborates with communities and businesses to improve recycling programs. They provide resources, tools, and technical assistance to enhance recycling efforts.
- **Empire State Development (ESD): Green Innovation Grant Program:** ESD offers grant programs that may support sustainable waste management projects and initiatives in municipalities.
- **New York State Association for Reduction, Reuse, and Recycling (NYSAR3):** NYSAR3 is a professional organization that supports waste reduction, reuse, and recycling initiatives. It offers networking opportunities, conferences, and resources for local governments.
- **NYSERDA - Municipal Waste Reduction and Recycling Program:** The New York State Energy Research and Development Authority (NYSERDA) provides resources and funding opportunities for municipalities, including counties, to implement waste reduction and recycling programs.
- **NYS Office of General Services** has an extensive list of vetted green products for state bid: <https://ogs.ny.gov/greenny>

## STRATEGY 4 /

Improve the county's telecommunications and internet access, with a focus on expanding the extensive ad hoc communications networks created during COVID.

### Context

Telecommunication and internet access are foundational to county resiliency because they enable effective communication, support emergency response efforts, maintain critical services, and contribute to the overall well-being and connectivity of communities during times of crisis.

In Sullivan County, cellular coverage poses a significant challenge with major gaps identified. About 3% of areas lack voice coverage, 8% lack data coverage, with voice dead zones concentrated in northern and southern areas and scattered data dead zones. Forestburgh, a rural town, experiences 13.6% without voice and 28.2% without data. In addition to impacts on residents' quality of life, this also has negative impacts on tourism. Dynamic topography, climate change, and tower restrictions contribute to disruptions, with a ban along the Upper Delaware River corridor creating dead zones.

Although many individuals access the internet via mobile phones, household access to broadband internet remains critical. Further data presented in the existing conditions chapter also highlights that significant internet access issues and affordability challenges that act as a barrier. Internet access is incredibly important to allow residents of Sullivan County to access the emerging virtual job market.

Recent local investments have created a great deal of momentum to improve internet access around the county. The county is currently exploring options for service infrastructure, through public/private partnership, using a combination of wireless and fiber broadband technology.

### Description

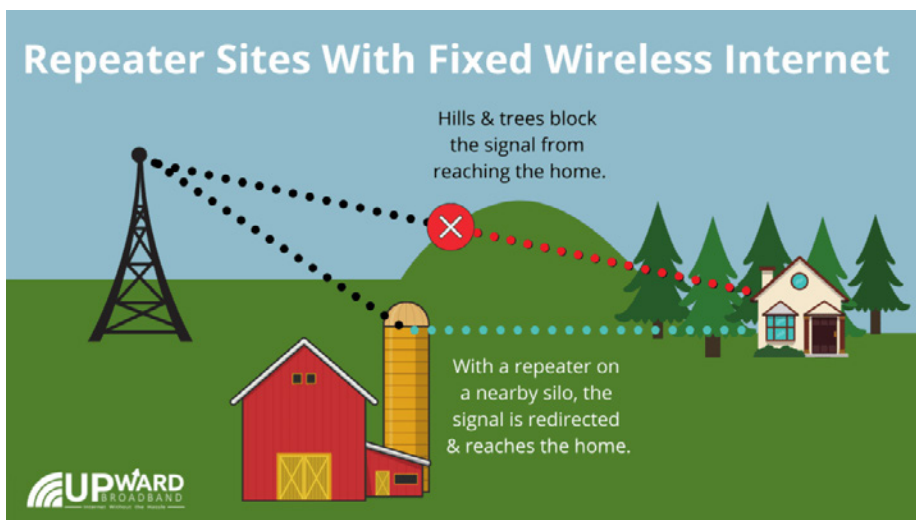
Although improving cellular service and broadband internet access are related, the strategies to improve each of these conditions in Sullivan County are unique.

### Wireless Broadband

As the County develops options to deliver affordable wireless broadband service to underserved communities, the process will be guided by a strategic planning effort to target areas of the county that are in greatest need, and to consider partnerships and hybrid technologies to achieve the network's coverage and affordability goals. Other considerations include:

- Infrastructure planning and technologies that maximize coverage, such as the use of repeater sites.
- Long term viability through continuity of funding and potential partnerships and investments.
- A mechanism for ongoing evaluation of the network's performance. This effort should involve an active feedback loop that solicits input from customers.
- The resiliency and scalability of the service, and its ability to support emergency communication needs during crises
- Continued coordination with private internet providers to improve service options and affordability.

Repeater Sites and Wireless Access Points  
Diagram I Upward Broadband



### Mobile Phone Service

Although there are emerging technologies such as satellite communication that can be used to provide coverage in remote or isolated areas, the affordability of this remains a barrier. The topography and landscape of Sullivan County is generally the greatest barrier to better cell service.

The county should continue to advocate for more cell phone towers that target areas with blackout service. In particular, the county should advocate that the Upper Delaware Council (UDC) revisits relevant policies that currently restrict the construction of cell phone towers in the Delaware River Valley. Although such restrictions were originally put in place with the preservation of natural character in mind, this issue must be nuanced with population needs. Revision of these policies would assist Sullivan County in combatting issues related to cell

## CASE STUDY

### Greenlight Community Broadband | Wilson, North Carolina

The city of Wilson built its own fiber-optic network, Greenlight Community Broadband, offering high-speed internet to residents.

This publicly owned network expanded broadband access in the region.

phone dead zones along the Delaware river in the towns of Fremont, Delaware, Cocheton, Tusten, Highland, and Lumberland. In the instance of any potential new towers, the County should work with municipalities to create designs that have minimal visual impacts on the surrounding environment.

In addition to advocating for this policy change and seeking new towers in underserved areas, the county should also continue to coordinate with private providers to improve service options and affordability.

### Plans and Policies

- The Upper Delaware Council (UDC) is currently assessing the feasibility of revisions to UDC policies restricting the construction of cell phone towers in the Delaware River Valley, originally intended to preserve the natural character of the area.
- United States FCC's Accelerating Wireless Broadband Deployment by Removing Barriers to Infrastructure Investment (2018): The Federal Communications Commission (FCC) introduced a comprehensive policy to accelerate wireless broadband deployment. The policy focuses on removing barriers to infrastructure investment, streamlining regulations, and promoting the deployment of 5G technologies.

### Partners

- SC Division of Public Works
- Collaboration with major cell service providers: Verizon and AT&T
- Collaboration with private internet providers: Spectrum, ViaSat, HughesNet, and Verizon

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## STRATEGY 5 /

Coordinate updates to the Sullivan County Hazard Mitigation Plan and Sullivan County Emergency Management Plan.

### Context

The county's Emergency Management Plan was last updated in 2007 and its Hazard Mitigation Plan was most recently updated in 2021. The Hazard Mitigation Plan is scheduled to be updated in 2025.

Below summarizes what each plan typically includes:

#### Hazard Mitigation Plan

- Focuses on identifying and assessing potential hazards and vulnerabilities within a community.
- Develops strategies and actions to reduce or mitigate the impact of these hazards.
- Aims to prevent or lessen the damage and disruption caused by disasters before they occur.
- Typically involves risk assessments, hazard mapping, and the implementation of mitigation measures- These include upgrades & improvements to infrastructure such as roads, bridges, and drainage features, and equipment upgrades to ensure continuity of operations at critical facilities

#### Emergency Management Plan

- Addresses the preparedness, response, and recovery aspects of dealing with disasters and emergencies.
- Specifies roles and responsibilities of various agencies and organizations involved in disaster response.
- Includes procedures, protocols, and coordination mechanisms for responding to different types of emergencies.
- Focuses on the immediate actions taken during and after an emergency to save lives, protect property, and support affected communities.



Emergency management is often described as a cycle with four phases: preparedness, response, recovery, and mitigation. As a hazards management process, however, these phases are integrated and are not entirely distinct from one another.

### Description

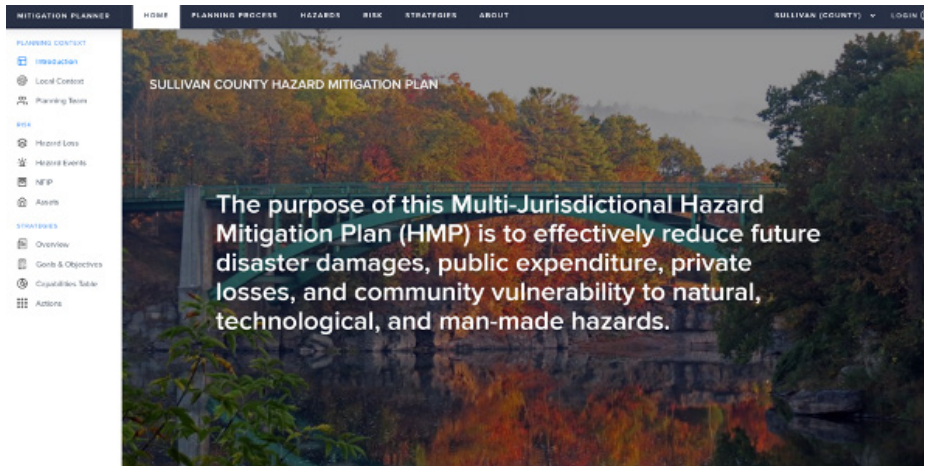
The county is positioned to update both its Emergency Management Plan and Hazard Mitigation Plan in order to reflect the most recently available data, best practices, as well as other county and municipal goals. Hazard mitigation plans and emergency management plans serve distinct purposes, but they can be closely related and may include some overlapping elements. While these plans have different objectives, they are closely related and often work in tandem to enhance a community's overall resilience to disasters. Combining them into a single comprehensive emergency preparedness plan can be beneficial in many cases, as it ensures that mitigation measures are integrated into the broader emergency management framework. In practice, many communities develop an overarching emergency management plan that encompasses hazard mitigation as one of its components. This approach ensures that mitigation efforts are seamlessly integrated into the planning and response processes. However, it's essential to maintain a clear distinction between the two components to ensure that both aspects receive the necessary attention and resources.

Although it is not necessary for these planning efforts to be integrated into a combined document, outcome strategies and recommendations should be coordinated to maximize impact. Additionally, it could be advantageous for the County to strategize standalone companion documents that are easy and effective for distribution/dissemination. For example, a companion document could target flooding hazards and mitigation strategies with key maps.

### Projects

- Previous studies include the 2007 Comprehensive Emergency Management Plan and the 2021 Sullivan County Hazard Mitigation Plan.

Sullivan County Hazard Mitigation Plan Website | Sullivan County



### Partners

- New York State Division of Homeland Security and Emergency Services (DHSES)
- SC Municipalities
- NYS Department of Health (NYSDOH)
- Cornell Cooperative Extension
- FEMA
- Various private and non-profit entities
- Consulting resources

## CASE STUDY

### Dane County Natural Hazard Mitigation Plan | Dane County, WI

The 2022 plan from Dane County Emergency Management emphasizes hazard mitigation as integral to emergency management.

While not formally titled an Emergency Management Plan, it addresses preparedness, response, recovery, and hazard mitigation. Refer to page 205 in the Appendix to read the full case study.

## Resources

- **New York State Division of Homeland Security and Emergency Services (DHSES):** DHSES plays a central role in emergency management and hazard mitigation planning in the state. They provide guidance, technical assistance, and funding opportunities to help communities develop and update their hazard mitigation plans.
  - DHSES also offers an online toolkit that provides templates, guidance documents, and resources to assist communities in hazard mitigation planning.
- **FEMA Hazard Mitigation Assistance (HMA) Program:** Communities in New York can apply for federal Hazard Mitigation Assistance grants through FEMA. These grants can help fund the development and implementation of hazard mitigation plans.
- **Emergency Management Institute (EMI):** EMI, operated by FEMA, offers online courses and training programs related to emergency management planning, incident command, and disaster response. These resources are available to emergency management professionals and community leaders.
- **New York State Department of Environmental Conservation (DEC):** DEC offers resources related to natural hazard mitigation, including information on floodplain management and flood risk reduction.
- **New York State Office of Emergency Management (OEM):** OEM works to coordinate state and local efforts in disaster preparedness, response, and recovery. They offer resources and training to help communities develop effective emergency management plans.

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## STRATEGY 6 /

Install a network of electric vehicle (EV) charging stations for the County fleet and promote increased EV usage throughout the County.

### Context

Currently, the County's vehicle fleet includes nine hybrid vehicles, but does not have fully electric vehicles. With the support of grants and other incentives, the County should coordinate electrifying its fleet and installing a network of EV charging stations at key facilities. As the electrification of the county fleet and public transit becomes a priority in the future, this will need to be met with adequate charging infrastructure and a grid system that can support the demand.

Publicly accessible Electric Vehicle (EV) chargers are relatively limited in Sullivan County. According to web-based dashboards of EV charging stations, there are three publicly accessible fast charging (Level 3) stations in the county (located in Roscoe, Monticello, and Liberty). While there are additional options for destination chargers (Level 1 and Level 2) that work best for overnight charging, these are not practical for visitors. Sullivan County's lack of EV charging infrastructure is a barrier to supporting larger trends of increasing electric vehicle usage.

### Description

Investing in EV infrastructure will help the county achieve its resiliency and sustainability goals by promoting lower carbon footprints through the use of renewable energy over fossil fuels.

The county should consider the following approaches, in coordination with municipalities, to expand county-wide EV charging infrastructure:

- Install a network of EV charging stations for the County Fleet, phasing out the use of gas-powered vehicles with EV. Consider EV Fleet Management Software to support this investment.
- Provide EV charging stations for public use at all County facilities with over 10 parking spaces. Further, advocate for municipalities to do the same in

## CASE STUDY

### **Suffolk County, New York**

Suffolk County on Long Island is driving electric vehicle adoption, installing charging stations at parks, government sites, and transport hubs. Residents are encouraged through incentives, spurred by a May 2021 Executive Order to transition all fleet vehicles to electric by 2030. A 2021 Electric Vehicle Feasibility Study guides this transition. Refer to page 206 in the Appendix to read the full case study.

public parking facilities and advocate for municipal zoning reform that also requires EV chargers in developments of a certain size.

- Assist companies and municipalities to install a network of EV chargers, including Level 3 chargers that cater to visitors/tourists. These should target downtowns, recreational areas, or shopping centers and can be part of broader economic development strategizing.
- Conduct public outreach describing benefits of EV vehicles and FAQ-style content such as what types of home improvements are necessary for charging stations and how to preserve battery life.

Any county planning efforts to site EV charging stations for county vehicles and public transit must be done alongside the effort to phase an upgrade to electrify the fleet. The county should identify EV charger investments as a component of tourism and broader economic development.

## Plans and Policies

### **Electric Vehicle Infrastructure Reimbursement Program:**

The Electric Vehicle Infrastructure Reimbursement Program was established by the Sullivan County Legislature in 2017 to encourage the development of a robust network of electric vehicle charging stations throughout the County. Local municipalities and public library districts were eligible to apply for reimbursement of up to 50% of the costs associated with the installation of Electric Vehicle Supply Equipment (EVSE) for public use, with a maximum award of \$5,000.

The program ran for two years and resulted in EVSE installations in the Town of Thompson and the Town of Bethel. With the introduction of NYS programs and incentives to support municipally owned EVSE, the County's Office of Sustainable Energy transitioned to providing informational resources about funding and technical assistance to help municipalities secure publicly accessible EVSE for their communities.

## Partners

- SC Division of Public Works
- NYSERDA; NYPA
- Municipalities
- SC Transportation Department & Move Sullivan
- SC Office of Sustainable Energy

## Resources

- **New York State Energy Research and Development Authority (NYSERDA):** NYSERDA provides funding and technical assistance for EV-related initiatives. They offer grants and incentives to support EV adoption, charging infrastructure deployment, and research projects. Counties can explore NYSERDA's programs, such as the Drive Clean Rebate and Charge Ready NY, which provide financial incentives for EV purchases and charging infrastructure installation.
- **New York Power Authority (NYPA):** NYPA is committed to advancing EV adoption in New York State. They offer programs to assist public entities, including counties, in electrifying their fleets and installing charging infrastructure. Counties interested in transitioning their government fleets to electric vehicles can explore NYPA's fleet electrification programs.
- **Federal Highway Administration (FHWA) - Alternative Fuel Corridors:** The FHWA designates alternative fuel corridors, including EV charging corridors, which receive federal recognition and support. Counties along these corridors can benefit from federal resources for EV charging infrastructure development.



## SMART GROWTH PRINCIPLES

Smart growth principles are a set of planning and development strategies aimed at creating sustainable, livable, and well-connected communities. These principles encourage efficient land use, transportation options, environmental stewardship, and the enhancement of community life.

Smart Growth also prioritizes investments in infrastructure like water and wastewater systems, roads, and utilities to support the growth and vitality of communities.

## STRATEGY 7 /

Conduct a countywide comprehensive potable and wastewater infrastructure assessment to establish current conditions and future improvements.

### Context

Water infrastructure in Sullivan County can be split into three different categories: Drinking Water, Wastewater and Stormwater. While each of these systems faces unique challenges, all three are interrelated and interdependent. As discussed in the natural infrastructure existing conditions chapter, built infrastructure also interacts and benefits from its relationship with Sullivan County's robust natural infrastructure.

Due to the dispersed, rural nature of Rural Agricultural Municipalities in Sullivan County, most properties rely on private water and septic systems. While independent water systems provide benefits for users by avoiding issues related to centralized systems, independent systems are also more likely to be severely affected by water table issues related to climate change and seasonal population fluctuation in Sullivan County. The age and condition of such systems is a concern since breakdown over time can cause contamination in the surrounding environment, especially in denser development areas.

In Rural Suburban Municipalities, limited municipal water and sewer coverage results in a mix of centralized and decentralized systems, both relying on availability and quality of groundwater. These municipalities often maintain municipal water and sewer infrastructure, covering portions of their jurisdiction. In an effort to stimulate growth within the confines of centralized infrastructure, Rural Suburban Municipalities are implementing a strategy that promotes denser development in areas that have centralized water and sewer access. This strategic approach, when coupled with zoning regulations, presents an opportunity to foster efficient infill development in proximity to Sullivan County's existing villages and hamlets. Expanded municipal services provide the opportunity to extend coverage areas to new developments that are otherwise surrounded by private water management systems.

### Description

Developing and implementing a strategy for upgrading county-wide water and wastewater infrastructure will first require a study that lays the groundwork for careful planning, resource management, and collaboration with various municipal stakeholders. The challenges and opportunities of both Rural Agricultural Municipalities and Rural Suburban Municipalities will have to be considered. For example, smart growth strategies that encourage development in and around village and hamlet centers served by centralized systems will have to consider the existing capacity and future demand based on development trajectories.

A comprehensive study and needs assessment should focus on the long-term perspective of county growth and development to ensure sustainability and resilience of these infrastructure systems. To establish a strategy for such updates, a comprehensive study could include the following components:

- **Needs Assessment** - Evaluate the current condition of water and wastewater infrastructure in the county, including water and sewer lines, wastewater treatment plants, and storage facilities. Identify existing deficiencies, vulnerabilities, and areas where capacity is inadequate. Stakeholder engagement should help to inform this needs assessment.
- **Data Analysis** - Collect and analyze data related to water quality, demand and usage patterns, and known sewage issues. Mapping and other analysis tools should highlight existing infrastructure and pinpoint areas in need of improvement.
- **Regulatory Compliance** - Review local, state, and federal regulations governing water and wastewater infrastructure to ensure compliance. Determine any upcoming changes in regulations that may impact

infrastructure requirements.

- **Financial Assessment** - Estimate the cost of necessary improvements and expansion projects.
- **Prioritization** - Establish clear priorities for recommended improvement projects based on factors like public health & supply concerns, environmental impact, development goals, and cost-effectiveness. Develop a timeline for implementation, considering available resources and any urgency.

In Sullivan County, Infiltration and Inflow code enforcement and corrective measures related to plumbing deficiencies in private properties will be critical to free up flow capacity at municipal plants.

### Projects

- In 2021, the town of Fallsburg was awarded a grant of \$50,000 to identify sources of inflow and infiltration and to develop recommendations for improvements to the wastewater system.
- In 2021 demonstration rain gardens and a demonstration rain barrel were installed at Lake Superior State Park in the Town of Bethel to promote water conservation awareness. Green infrastructure solutions like these work to slow the redistribution of runoff into the county's lakes and streams, preserving the aquatic habitats which help to drive the county's environmental and economic resiliency.
- Protection and maintenance of the natural infrastructure which filters surface and groundwater in Sullivan County continues to be imperative. As a major source of drinking water for the City of New York, the New York City Department of Environmental Protection has acquired significant land surrounding the Neversink and Roundout Reservoirs, placing conservation easements to ensure the continued function of this natural infrastructure.
- Within the last two decades, due to an agreement between the two municipalities, the water supply systems of the Town and the Village of Liberty have been integrated, ensuring the resiliency of the water supply systems in the face of a shutdown of one system or the other. Similar programs help the other municipalities in Sullivan County to manage costs and mitigate risks related to aging infrastructure. For example, while the Hamlet of Harris is included within the borders of the Town of Thompson, it has an independent sewer system, pumping its wastewater to the Village of Monticello for treatment.

### Partners

- SC Division of Public Works/Solid Waste Management
- NYSEDA
- NYS DEC
- SC Municipalities

### Resources

- **USDA Rural Development:** The U.S. Department of Agriculture (USDA) Rural Development programs can provide grants, loans, and technical assistance for water and wastewater projects in designated rural areas.
- **New York State Consolidated Funding Application (CFA):** The CFA process allows communities to apply for multiple state funding opportunities, including those related to water and wastewater projects. Various state agencies participate in the CFA, such as EFC and NYSDEC.
- **New York State Department of Environmental Conservation (NYSDEC):** NYSDEC offers various grant programs related to water quality improvement, wastewater management, and source water protection. The Water Quality Improvement Program (WQIP) and the Intermunicipal Water Infrastructure Grant Program are potential sources of funding.

## CASE STUDY

### **Franklin County Water and Wastewater Systems Study | Franklin County, MA**

The 2022 Franklin County Water and Wastewater Systems Study assessed 15 wastewater and 18 water systems, evaluating capacity, condition, and vulnerability to climate hazards. Tasks and costs for improvements were categorized as immediate, short-range, and long-range, with estimated costs provided. The study highlights changing regulatory and environmental needs for effective system operation. Refer to page 206 in the Appendix to read the full case study.

- **Environmental Facilities Corporation (EFC):** The New York State Environmental Facilities Corporation provides funding and low-interest loans for water and wastewater infrastructure projects, including capacity studies. The Clean Water State Revolving Fund (CWSRF) and Drinking Water State Revolving Fund (DWSRF) programs are among the funding options.
- **Community Development Block Grants (CDBG):** For communities that receive federal Community Development Block Grants, these funds can be used for a variety of community development activities, including water and wastewater projects.





# Appendix

## Case Studies

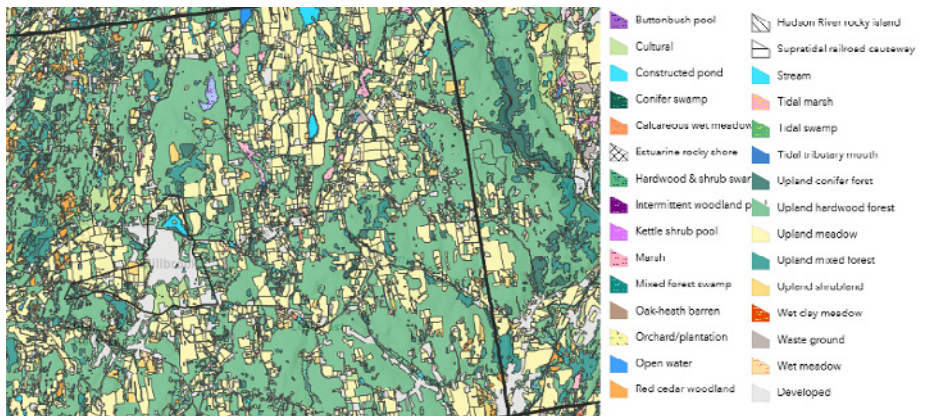
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## Dutchess County Habitat Mapper

The Dutchess County Habitat Mapper is a collaborative effort between Hudsonia Ltd and a group of GIS students and their instructor at Marist College,<sup>105</sup> In 2001-2020, Hudsonia created town wide maps showing significant habitats for twelve Dutchess County towns plus the City of Poughkeepsie, along with reports describing the habitats, their ecological significance, their importance to the human community, and recommendations for conservation. The habitat information is intended to inform town wide and site-specific land use planning, policymaking, land management, and siting, design, and environmental reviews of land development projects.

In 2021-2022, Don Meltz and his GIS students at Marist College published the data contained in the habitat maps to an online platform to enable easy public access. This online map is provided as a way to visualize the habitat data alongside other GIS data. Similar Natural Resource Inventories have been prepared for Columbia County, Greene County, Chemung County, Broome County, Tompkins County, and for numerous towns and municipalities throughout New York state.

Screenshot from Dutchess County Habitat Mapper | Hudsonia Dutchess County Habitat Mapper



## Callicoon Creek Flood Control Study

The Callicoon Creek Flood Control Study,<sup>106</sup> conducted in collaboration with the US Army Corps of Engineers (USACE) and the New York State Department of Environmental Conservation (NYS DEC), aimed to assess flood risks and develop strategies to mitigate them along Callicoon Creek. This study involved hydraulic modeling, land use analysis, and stakeholder engagement to identify effective flood control measures. The primary intent was to enhance public safety, minimize property damage, and improve community resilience to flooding events while considering the ecological impact of flood control interventions.

## Reinstein Woods Nature Preserve

Reinstein Woods Nature Preserve<sup>107</sup> in Depew, Erie County, covering 286 acres has undergone a series of enhancements such as a new comprehensive wayfinding and interactive signage system, engaging education programs and continuous expansions to its trail network in recent years, introduced with the aim of increasing access and visitor engagement, thereby making it a hub for environmental education and exploration.

<sup>105</sup> "Hudsonia Ltd., 'Dutchess County Habitat Mapper'" (Accessed February 13, 2024), <https://www.hudsonia.org/dutchessmapper>.

<sup>106</sup> "Report on East Branch Callicoon Creek," U.S. Army Corps of Engineers (Accessed February 15, 2024), [https://eastbranchcallicooncreek.files.wordpress.com/2014/07/acoe-callicoon\\_reportoct2010.pdf](https://eastbranchcallicooncreek.files.wordpress.com/2014/07/acoe-callicoon_reportoct2010.pdf).

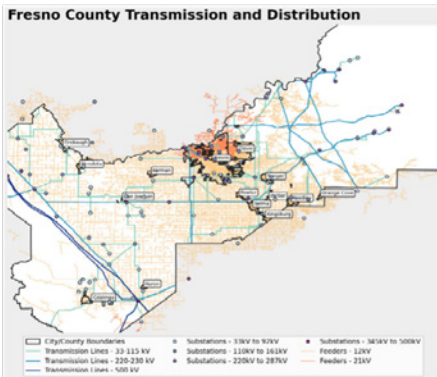
<sup>107</sup> "Reinstein Woods Nature Preserve," accessed February 15, 2024, <https://reinsteinwoods.org>.



## Suffolk County Park Enhancements

In 2023, Suffolk County initiated a significant endeavor aimed at enriching the visitor experience within its parks.<sup>108</sup> This initiative involved the installation of over 200 interpretive signs strategically placed along trails and at key sites across the county's park system. These signs serve to inform visitors about the rich history, diverse ecology, and recreational opportunities available within the parks. Additionally, the county introduced an array of new educational programs, including guided hikes, nature walks, and workshops covering various topics such as birding, fishing, and kayaking, further enhancing the educational aspect of park visits. Furthermore, Suffolk County expanded its trail network by creating new routes, notably including a 2-mile loop trail winding through the pine barrens of Heckscher State Park and a 1-mile nature trail at Belmont Lake State Park. This comprehensive effort aims to foster greater appreciation for Suffolk County's natural heritage while providing visitors with engaging and educational experiences in its parks.

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Fresno County Transmission and Distribution  
| FCRTA

## FCRTA Electrical Grid Analysis Study

The Fresno County Rural Transit Agency (FCRTA) prepared an Electrical Grid Analysis Study to identify the impacts of the anticipated increased electrification on the electric grid system and the unique challenges faced by rural communities serviced by the transit agency.

At approximately 6,000 square miles, Fresno County is the sixth largest county in the in-land area within California and is an economic hub within the San Joaquin Valley. Its vast farmlands and valley weather patterns make it an agricultural powerhouse for the nation. Although Fresno County contains much larger population centers than Sullivan County, it has vast amount of rural land and rural communities that face unique challenges. Fresno County residents earn 32% less than the California state average, resulting in a County poverty rate 10% higher than that of the rest of the state.

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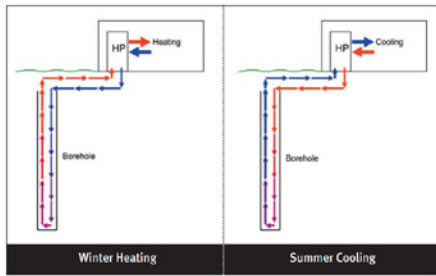
## Beneficial Building Electrification Plan | City of Longmont, Colorado

This Beneficial Building Electrification Plan<sup>109</sup> is in response to Longmont City Council's 2020 approval of the Climate Action Recommendations Report, which includes the recommendation to convene an advisory committee and develop the initiative. The Plan includes actionable strategies that the City can pursue to equitably reduce GHG emissions from the building sector in fulfillment of the City Council's mandate. Priorities that guided the plan were improving environmental impacts, local economic benefits, electric grid benefits, and equity considerations.

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108 "Suffolk County Parks Department," accessed February 15, 2024, <https://suffolkcountyny.gov/Departments/Parks>

109 "Building Electrification," Edison International, accessed January 19, 2024, <https://www.edison.com/innovation/building-electrification>.



Heating and Cooling Systems Diagram | National Rural Electric Cooperative Association

## Beneficial Electrification of Space Conditioning in Schools | Cherokee, Oklahoma

Ground source heat pump (GSHP) technology is one example of beneficial electrification that counties and municipalities are considering when investing in more resilient buildings and civic spaces. Alfalfa Electric Cooperative (AEC), a distribution co-op based in Cherokee, Oklahoma, and its generation and transmission co-op Western Farmers Electric Cooperative (WFEC), have promoted GSHPs for decades in both residential and commercial applications. Over the past two decades, AEC has helped convert the heating and cooling systems of all three Cherokee schools from natural gas to electric GSHP technology.<sup>110</sup>

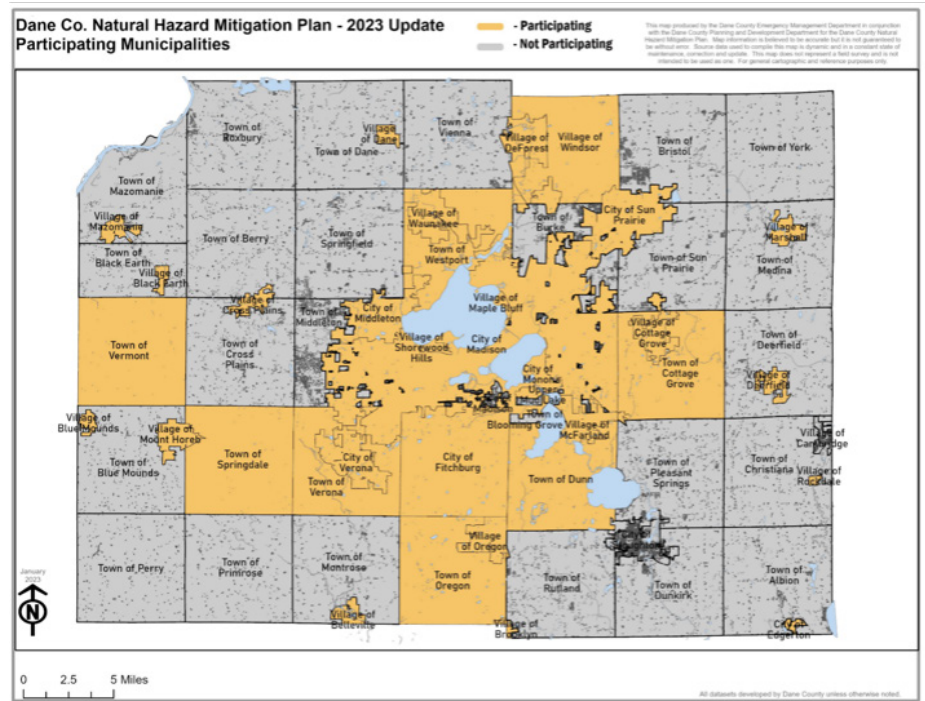
## Zero Waste Program | San Francisco, California

San Francisco has set a goal to achieve zero waste by diverting 100% of its waste away from landfills. The city has implemented a comprehensive program that includes extensive recycling, composting, and reuse initiatives. San Francisco's efforts have led to one of the highest waste diversion rates in the United States.

## Dane County Natural Hazard Mitigation Plan | Dane County, Wisconsin

This plan was prepared by the Dane County Emergency Management Department in 2022. Although the plan does not formally present the document as including an Emergency Management Plan, the document is written in a way that centers hazard mitigation as a key component of emergency management.<sup>111</sup> In doing so, preparedness, response, and recovery are all elements that are discussed alongside hazard mitigation.

Map of Dane Co. Natural Hazard Mitigation Plan Participating Municipalities | Dane County Hazard Mitigation Plan 2022



<sup>110</sup> "Beneficial Electrification: Ground Source Heat Pumps and Schools," National Rural Electric Cooperative Association, accessed January 18, 2024, <https://www.cooperative.com/programs-services/bts/Documents/TechSurveillance/TS-Beneficial-Electrification-GSHP-and-Schools-April-2018.pdf>.

<sup>111</sup> "Dane County Hazard Mitigation Plan 2022," Dane County Emergency Management, accessed January 29, 2024, <https://em.countyofdane.com/documents/pdf/2022-Hazard-Mitigation-Plan/DCNHMP22---1---DC-Section-.pdf>.

## Suffolk County, New York

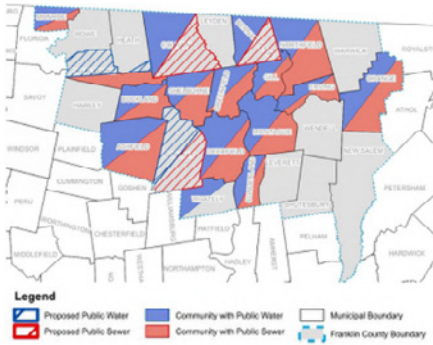
Suffolk County on Long Island has been actively promoting electric vehicle adoption and charging infrastructure.<sup>112</sup> The county has installed charging stations at various public locations, including parks, government facilities, and transportation hubs. In addition, the county provides information and incentives to residents to encourage the use of electric vehicles. This effort was catalyzed by a May 2021 Executive Order to convert all Suffolk County fleet vehicles from fuel operated to electric by 2030. A Electric Vehicle Feasibility Study was issued in 2021 outlining a strategy for this effort, including the provision of adequate EV charging facilities.

## Franklin County Water and Wastewater Systems Study | Franklin County, Massachusetts

In 2022, the Franklin County Water and Wastewater Systems Study conducted an assessment of 15 public wastewater systems serving 13 communities and 18 public water systems serving 15 communities within Franklin County.<sup>113</sup> The study utilized direct communication with the responsible districts or departments, document reviews, and operator feedback to evaluate each system's capacity, physical condition, performance issues, operational challenges, and vulnerability to climate change hazards like flooding and drought. The report provides a comprehensive list of system tasks, associated costs, and recommendations to help Franklin County communities plan for sustainable infrastructure improvements, explore collaboration opportunities, and seek funding sources for implementation.

Tasks identified in this report are divided into three categories: immediate tasks, short-range tasks and long-range tasks. Opinion of probable costs (OPCs) were developed for various projects and remedial measures identified in a survey of existing facilities.

The study identified that changing regulatory needs, environmental changes, industry changes, as well as aging infrastructure all contribute to the overall needs of Water and Wastewater Systems to be able to continue to operate effectively.



Public Water and Sewer Map | Franklin County Water and Wastewater Systems Study

112 "Suffolk County Electric Fleet Implementation Plan," Suffolk County Government, accessed January 19, 2024, <https://www.suffolkcountyny.gov/Portals/0/formsdocs/publicworks/PDF/Electric%20Fleet%20Implementation%20Plan%20FINAL%2008-06-21.pdf>.

113 "Franklin County Water and Wastewater Study Executive Summary Conclusion," Franklin Regional Council of Governments, accessed January 29, 2024, [https://frcog.org/wp-content/uploads/2022/07/Franklin\\_County\\_Water\\_Wastewater\\_Study\\_ExecSum\\_Conclusion.pdf](https://frcog.org/wp-content/uploads/2022/07/Franklin_County_Water_Wastewater_Study_ExecSum_Conclusion.pdf).



