



Albany County Climate Resiliency Plan

2022

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Introducing the Plan

The Albany County Climate Resiliency Plan is the County's roadmap to prepare for, adapt to, and build resilience to climate change.

It assesses the risks and vulnerabilities of critical county-wide systems – from infrastructure and housing to natural resources and the economy – to changing climate conditions like flooding and sea level rise, increasing temperature, and more frequent and severe storm events.

With these risks and vulnerabilities in mind, the Plan identifies projects and strategies to build resilience, to help us adjust how we live, work, and play, and to keep us all safe from the impacts of climate change now and into the future.





How is climate change affecting Albany County today?

Climate change in Albany County is happening now. Temperatures are warming. High-heat days and heat waves are becoming more frequent. Precipitation is increasing too, along with the frequency and intensity of precipitation events. Sea level rise is happening along the Hudson River, and the county is experiencing more extreme weather events – from ice storms to thunderstorms to hurricanes and Nor’easters.

These climate events impact all sectors. They flood homes, make roads impassable, and force businesses to close. They overwhelm infrastructure, put stress on sensitive ecosystems, and threaten public health. Albany County has seen these impacts firsthand – from severe flooding during Hurricane Irene (2011), to power outages and closures as a result of the December 2020 Nor’easter, to county-wide extreme heat events every summer.

These climate impacts will continue to affect Albany County and they are likely to increase in frequency, severity, and duration in the future.

To plan for this changing climate, the Albany County Climate Resiliency Plan proactively assesses climate-related risks, identifies vulnerable areas and communities, and proposes a wide-ranging set of strategies and solutions to build resilience and prepare the county and its residents for the impacts of climate change.

» **Temperatures are warming.¹**

+2.4 °F
over the past century

» **Precipitation is increasing.¹**

+9.9 in
over the past century

» **The Hudson River is rising.²**

+1.0 ft
over the past century

1 Data from New York State ClimAID, 2014 Supplement, Updated Climate Projections Report. Based on observed trends per decade from 1901 to 2012.

2 Data from Scenic Hudson (scenichudson.org).



⌘ **Hurricane Irene**
Colonie, August 2011



⌘ **Prolonged Heat Event**
Albany County, June 2021



⌘ **Tropical Storm Henri**
City of Albany, August 2021



⌘ **Strong Storm Event**
City of Albany, August 2021



⌘ **Nor'easter**
Guilderland, December 2020

How will climate change affect Albany County in the future?

Higher temperatures, increased precipitation, and sea level rise are all but guaranteed for Albany County's future. Summers are expected to become more intense and winters milder.

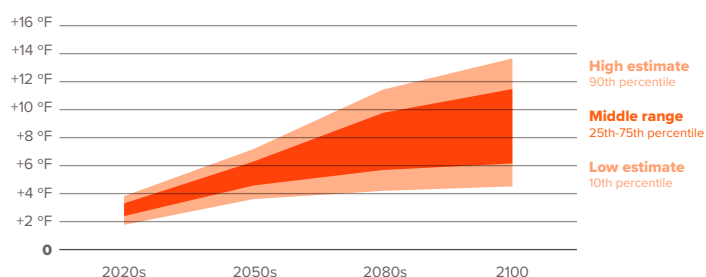
Annual temperatures¹ are projected to increase by 1.7–3.7 °F by the 2020s, 3.5–7.1 °F by the 2050s, 4.1–11.4 °F by the 2080s, and 4.4–13.6 °F by 2100. The total number of hot days (days over 90 °F) per year and the frequency and duration of heat waves (three or more consecutive days with maximum temperatures at or above 90 °F) are also expected to increase. By the 2050s, Albany County could see anywhere from 22 to 50 hot days per year, compared to a historical average of 10 hot days per year. In contrast, the total number of cold days (days at or below 32 °F) per year is expected to decrease as average temperatures rise. By the 2050s, Albany County could see anywhere from 98 to 125 cold days per year, a notable reduction compared to the historical average of 155 cold days per year.

Annual precipitation¹ is projected to change by -1–10% by the 2020s, 2–15% by the 2050s, 3–17% by the 2080s, and -1–26% by 2100. Much of this additional precipitation is projected to occur during the winter months. During the late summer and early fall, in contrast, total precipitation is projected to reduce slightly.

The height of the Hudson River at the Troy Dam² is also expected to increase 1–9 inches by the 2020s, 5–27 inches by the 2050s, 10–54 inches by the 2080s, and 11–71 inches by 2100.

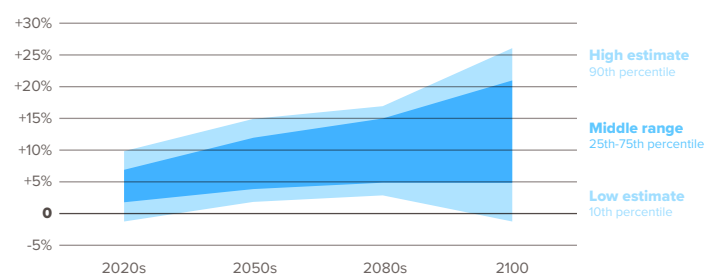
Temperature

Change from mean annual temperature of 47.6 °F¹



Precipitation

Change from mean annual precipitation of 38.6 in¹

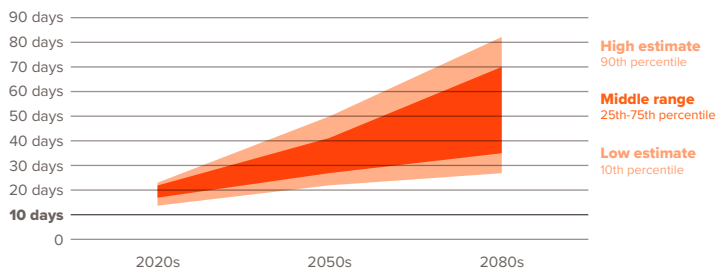


All data on this page from New York State ClimAID, 2014 Supplement, Updated Climate Projections Report for Climate Region 5 (Albany).

- 1 Baseline data are from the 1971 to 2000 base period.
- 2 Projections are relative to the 2000 to 2004 base period.

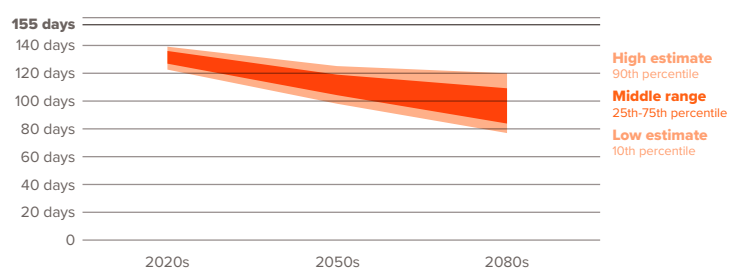
Days over 90 °F

Number of days over 90 °F per year (baseline = 10 days)¹



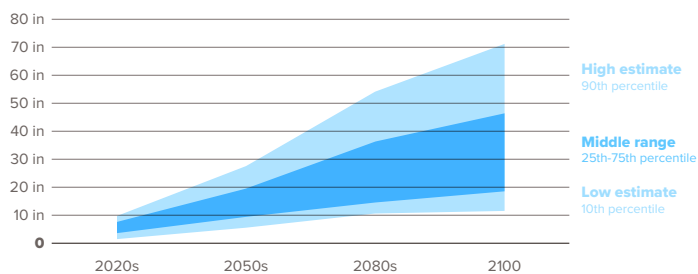
Days below 32 °F

Number of days below 32 °F per year (baseline = 155 days)¹



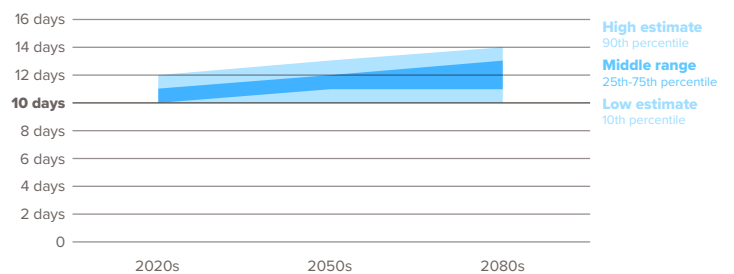
Sea Level Rise, Hudson River

Sea level rise on the Hudson River at Troy Dam (baseline = 0 in)²



Days over 1 inch of Rainfall

Number of days over 1 inch of rainfall (baseline = 10 days)¹



How can Albany County build climate resilience?

There's broad consensus that to slow the pace of climate change, greenhouse gas (GHG) emissions need to be dramatically reduced. This is climate change **mitigation**: addressing the root cause of climate change by reducing greenhouse gas emissions. This can be done in many ways from transitioning away from fossil fuels and shifting to renewable energy sources to using energy more efficiently and increasing the use of public transportation and electric vehicles.

With the passage of the Climate Leadership and Community Protection Act (2019) and the recent adoption of the Scoping Plan (2022), New York State has codified a framework for achieving net-zero greenhouse gas emissions by 2050.

But, even if emissions are aggressively cut, the impacts of climate change will continue to persist for generations to come, as greenhouse gases, particularly carbon dioxide, can remain in the atmosphere for hundreds (and sometimes thousands) of years.

That's why – on top of mitigation – preparing for the impacts of climate change also requires **adaptation**, or protecting against the risks that are already present and preparing for increased risks in the future.

Climate adaptation can involve many things from planting trees to reduce extreme heat in cities to upgrading the electric grid to better withstand extreme weather to flood-proofing or relocating housing and infrastructure in flood-prone areas.

As we take steps to mitigate and adapt to climate change, we should also prioritize those among us who are most vulnerable, including people of color, people living on low incomes or in poverty, and people who are elderly, young, or disabled. This is **climate justice**. It involves putting at-risk communities first in line for funding for pre-disaster planning, investing in measures to keep vulnerable populations safe during climate events, ensuring that climate solutions (like wind, solar, and other clean energy projects) bring help, not harm, to vulnerable communities, and expanding low-income households' access to things like energy efficiency and public transit.

Pursuing mitigation and adaptation together, while keeping climate justice at the core, is key to building **climate resilience**. Resilience refers to the ability of a system to withstand disturbances, recover quickly, and still maintain its basic structure and function. In essence, resilience is the capacity of a system or society to “bounce back” from a disturbance and to continue to provide critical goods and services. A climate resilient society has the capacity to learn from and anticipate future climate events; it is prepared for and can quickly and equitably recover from disturbances; and, instead of resisting change, it employs innovative measures and strategies to adapt to new realities.

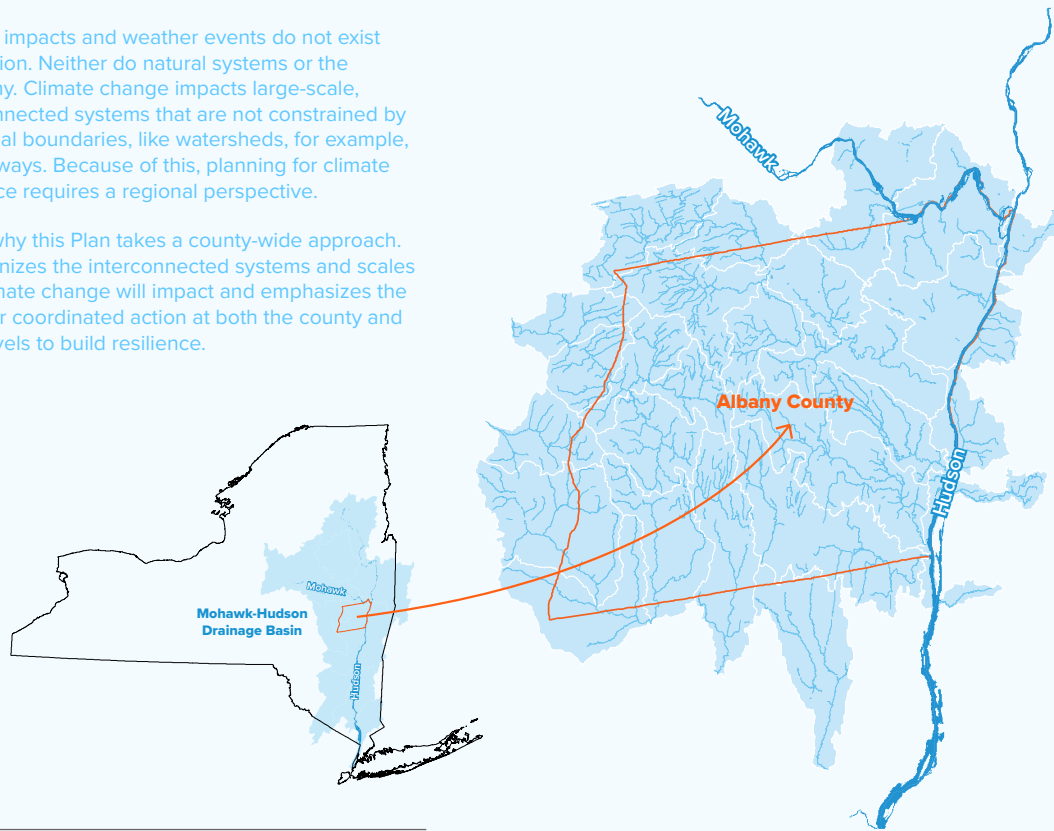
Albany County has a critical role to play in safeguarding the well-being of all in our community by planning for and building climate resilience county-wide.



The Importance of the County-wide Approach

Climate impacts and weather events do not exist in isolation. Neither do natural systems or the economy. Climate change impacts large-scale, interconnected systems that are not constrained by municipal boundaries, like watersheds, for example, or roadways. Because of this, planning for climate resilience requires a regional perspective.

That's why this Plan takes a county-wide approach. It recognizes the interconnected systems and scales that climate change will impact and emphasizes the need for coordinated action at both the county and local levels to build resilience.



The watersheds in Albany County are part of the much larger Mohawk-Hudson Drainage Basin, which extends through much of the eastern portion of the state from the North Country, to the Mohawk Valley and the Capital Region, and into the Hudson Valley.

What is the purpose of this Plan?

Purpose and Goals

The Albany County Climate Resiliency Plan aims to improve the ability of municipalities and other public and private stakeholders to prepare for, adapt to, and minimize impacts from flooding, sea level rise, and other extreme weather events.

The goals of this Plan are to:

- **Take a holistic view of climate change and consider a range of climate impacts** from sea level rise and flooding to extreme precipitation and extreme temperatures to heat waves and drought.
- **Understand the impacts of climate change on Albany County's systems** including the economy, infrastructure, health and social services, natural and cultural resources, housing, and vulnerable populations.
- **Identify projects to build resilience to the impacts of climate change** through various strategies including policy adoption, capital improvements, and community planning and capacity building.



Climate Impacts

Albany County's Future as a Haven for Climate Refugees. Compared to the United States as a whole, Albany County is expected to fare relatively well in the face of climate change. While not immune to climate impacts, Albany County has comparatively less risk to major natural disasters like wildfires, earthquakes, and hurricanes than other parts of the country. It also has abundant fresh water resources and is not located on a coastline.

These factors make Albany County an attractive destination for "climate refugees" who are being displaced from other parts of the country to places where climate risks are comparatively less extreme. Climate refugees might include, for example, people from New York City who are moving upstate to escape rising sea levels, people from the West who are being displaced by earthquakes and wildfires, or people from the Great Plains who want to avoid tornadoes and drought.

Planning for an influx of new people poses challenges but also opportunities for climate havens like Albany County. While this Plan is primarily focused on building climate resiliency for existing residents, it is also important for the County to consider how climate migration will result in the need for increased services (i.e., schools, hospitals, emergency response) and an increased demand for housing in the not-too-distant future.

County Resilience Vision



“ Albany County leads a **proactive and coordinated intermunicipal effort** to anticipate, adapt to, and quickly recover from climate-related disturbances.

The County works collaboratively and transparently across scales and systems to understand the impacts and long-term sustainability of proposed policies, programs, and projects prior to implementation. Albany County prioritizes a high quality of life for all residents, particularly those who have experienced historic disinvestment, by equitably distributing resources, expanding access to nature and affordable housing, improving connectivity between communities, supporting a diversified local economy and workforce, and strategically locating and upgrading critical infrastructure to avoid natural hazards.

Working closely with local communities, Albany County is actively mitigating future climate change by transitioning to renewable energy and a decentralized grid, re-envisioning its transportation network, restoring and preserving natural systems, and growing a new green jobs sector. The County is adapting to climate change by leveraging its world-class educational institutions to advance innovative technologies, educate a new generation of climate leaders, and support a county-wide network of climate resilience demonstration projects.”

How was this Plan developed?

Planning Process

The Albany County Climate Resiliency Plan was developed through a year-long, multi-step planning process, beginning in July 2021. A team of subject-matter experts worked directly with County officials to develop the Plan. The project team was advised by the **Technical Advisory Committee** (made up of technical experts from various local and state agencies) and the **Municipal Working Group** (made up of representatives from local municipalities). Considerable feedback from stakeholders and community members also guided the Plan. The planning process was funded by the New York State Department of State (NYS DOS).

- 01** Establish a **County Resilience Vision** to guide the planning process
[+ See page viii.](#)
- 02** Create a **County Profile** to understand how climate change has and is expected to impact Albany County, and to lay the foundation for the Plan
[+ See page 01.](#)
- 03** Develop an **Asset Inventory** to identify infrastructure, health and social services, natural and cultural, housing, and economic assets in the county
[+ See page 10.](#)
- 04** Conduct a **Risk Assessment** to understand which assets are most vulnerable to climate risk, particularly flood, heat, and social vulnerability
[+ See page 98.](#)
- 05** Identify **Projects and Strategies** to increase community resiliency to climate change
[+ See page 126.](#)

Infuse **Community Feedback**

The Albany County Climate Resiliency Plan is underwritten by community feedback, which was used to help identify needs and opportunities. Community members were kept informed and engaged throughout the planning process via a series of advisory committee meetings, stakeholder interviews, and public events.

An abbreviated list of stakeholders involved in the development of this Plan is shown below:

- Advance Albany County Alliance
- Affordable Housing Partnership
- Albany County Land Bank
- Albany County Sheriff's Office
- Albany County Stormwater Coalition
- Capital District Habitat for Humanity
- Capital District Regional Planning Commission
- Center for Economic Growth
- Five Rivers Environmental Center
- Mohawk Hudson Land Conservancy
- National Grid
- Port of Albany
- Port of Coeymans
- Radix Ecological Sustainability Center
- Redburn
- Red Cross
- Rosenblum
- University at Albany



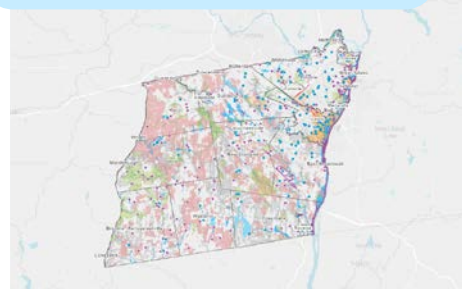
Community Engagement

An important goal of the planning process was to integrate community feedback into the Plan to ensure it:

- Builds on local knowledge, needs, and related initiatives
- Prioritizes public safety
- Balances economic development and conservation-oriented goals
- Proactively identifies a suite of projects and strategies to equitably and effectively **increase resilience to future climate-related events for all community members**



Interactive Mapping Exercise



As part of the engagement process, local municipal officials helped create an interactive map of assets and vulnerabilities in Albany County. This map helped build out the **Asset Inventory** discussed in Chapter 1 and identify potential areas of risk for further exploration in the **Risk Assessment** presented in Chapter 3.

County Profile and Asset Inventory

This chapter provides a snapshot of the physical, social, and economic conditions in Albany County today.

The **County Profile** provides an overview of county-wide demographic, land use, and economic conditions. The **Asset Inventory** follows up with an in-depth look at six areas that are critical to daily life in the county: community planning and capacity, housing, infrastructure systems, health and social services, natural and cultural resources, and economic systems. Within each of these areas, individual assets – like parks, schools, roads, businesses, and ecosystems – are inventoried and mapped. The Asset Inventory has a climate-focused lens and explains how these assets may be impacted by climate stressors in the future.

The vulnerability of each of these assets to climate stressors like flooding and heat stress is further evaluated in **Chapter 3: Risk Assessment and Analysis**.



County Profile

Demographics

Population

In 2020, Albany County's population was 314,848 with a median age of 39. Since the last Decennial Census (2010), the county's population grew by 3.5%. During the same time period, New York State's total population grew by 4.2%.

The largest ethnic groups in the county are white (non-Hispanic) at 67%, Black or African American (non-Hispanic) at 13%, Asian (non-Hispanic) at 8%, and Hispanic or Latino at 7%.

Approximately 13% of households speak a language other than English at home, with Indo-European languages being the most common (5%), followed by Asian and Pacific Island languages (3.9%), and Spanish (2.6%).

Income and Employment

In 2021, the median household income in the county was \$75,232, a 10% increase from the previous year. The poverty rate was 12% and the unemployment rate was 6.7%.

Property Values and Homeownership

In 2021, the median home value in Albany County was \$235,200 – a 2.1% increase from the previous year – and the homeownership rate was 60%.

Commuting Patterns

Most people in the county drive alone to work (62%), and the average commute time is 21.6 minutes. Average car ownership in the county is 2 cars per household. The next most popular way to commute is carpooling (7%) followed by public transit (4%).



Climate Impacts

- **At-risk Populations.** Older, differently-abled, minority, and underprivileged populations often face disproportionate impacts from the effects of climate change.
- **Vehicle Access.** Households without vehicle access often rely on public transit or walking and cycling for daily transportation. This underscores the importance of a robust transportation system that prioritizes alternative and environmentally-friendly transportation modes, in addition to supporting personal car use.



Demographic Snapshot, Albany County



Population¹

314,848

3.5% 10-year increase



Poverty Rate²

12%



Median Age²

39



Unemployment Rate²

6.7%



Median Household Income²

\$75,232

10% 1-year increase



No Vehicle Households²

16,670



Vacant Housing³

9.1%



Households on Food Assistance²

15,519

1 2020 Decennial Census

2 U.S. Census Bureau, 2021 American Community Survey 1-Year Estimates

3 U.S. Census Bureau, 2020 Census Redistricting Data (Public Law 94-171)

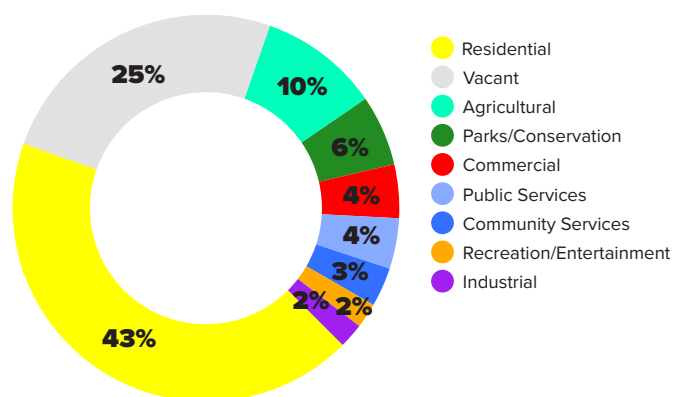
County Profile

Land Use

How land is used, whether for development, agriculture, or conservation, and what types of materials cover the land, whether impervious, forestland, or other, can affect and be affected by climate change. Converting land from natural systems to human uses, like homes, roads, parking lots, and shopping centers, alters its relationship with the environment, leading to downstream impacts on ecosystems and potentially exacerbating climate stressors, like extreme temperatures and precipitation events. Climate stressors also impact Albany County's ability to productively use land for essential resources like food, water, and energy.

The largest share of land use in Albany County (43%) is residential, followed by vacant land at 25% and agricultural land at 10%. Parks and conservation areas account for 6% of the county's land use.

>> Land Use, Albany County



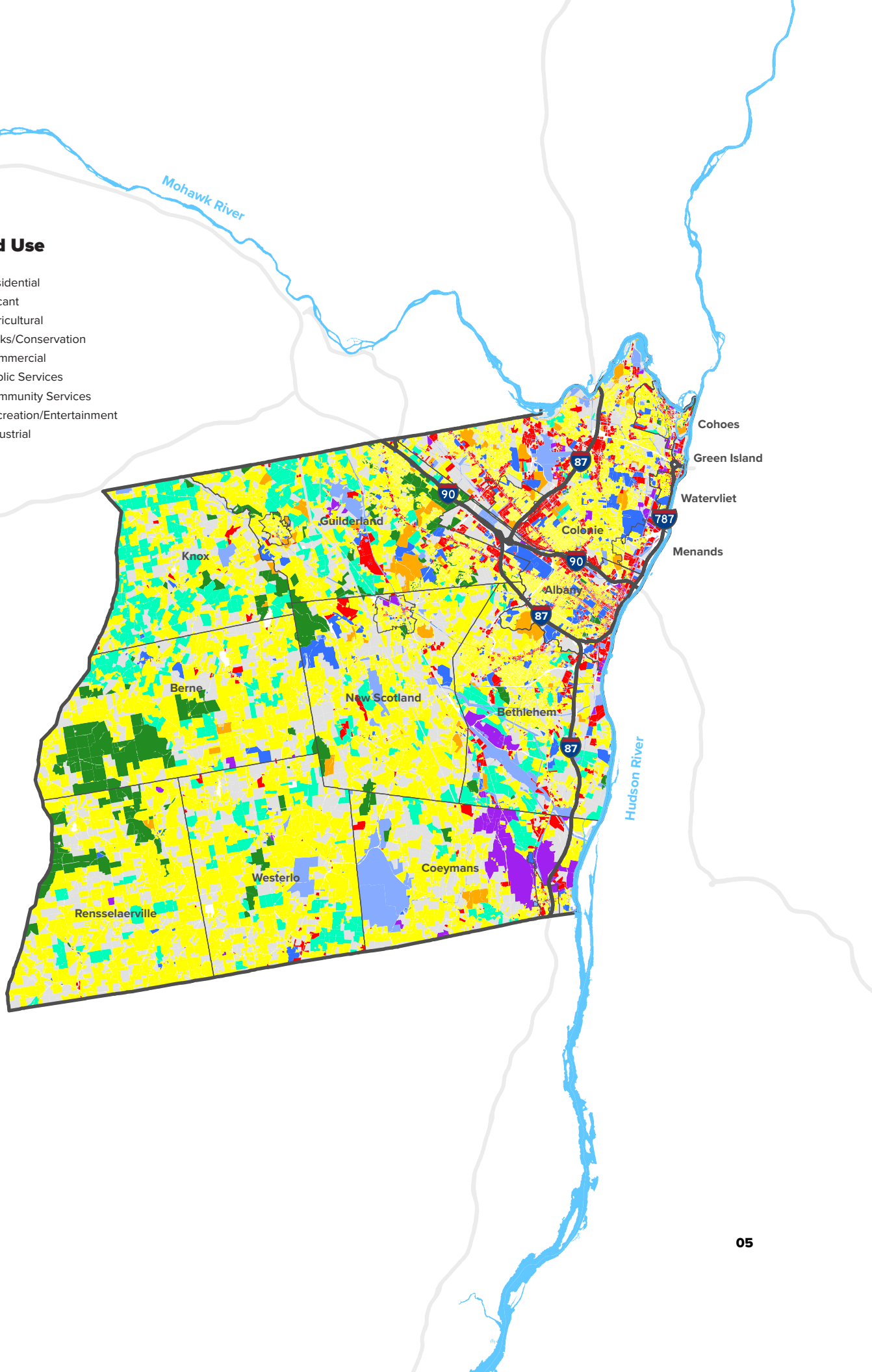
! Climate Impacts

Together, human- and climate-induced impacts on land can have several results including:

- **Reduced carbon sequestration** as forestlands and other natural lands which *absorb* greenhouse gases are replaced by development and other land uses that are sources of greenhouse gas emissions
- **Increased urban stormwater flooding** as a result of increased impervious surface area, which decreases infiltration, increases runoff, and can stress aging pipes and culverts to their design limits
- **Increased stream flash flooding** caused by increased runoff, sedimentation, and bank erosion and reduced riparian vegetation, which can destabilize shorelines and change the hydrologic function of river and stream corridors
- **Impacts to agricultural productivity** as higher temperatures and more extreme storm events affect growing seasons and crop yields

» Land Use

- Residential
- Vacant
- Agricultural
- Parks/Conservation
- Commercial
- Public Services
- Community Services
- Recreation/Entertainment
- Industrial



County Profile

Land Cover

Since the turn of the century, land cover across Albany County has changed significantly.

Developed Land Cover

Considerable development in the county has resulted in an 8% increase in high-intensity development (where more than 80% of surface areas are impervious) as well as a 6% increase in low-density development (where between 20% and 49% of surfaces are impervious). The resulting increase in impervious surfaces in the county reduces infiltration and compounds runoff. **When developed land replaces natural land, this land becomes a carbon source instead of a carbon sink, increasing greenhouse gas emissions.**

The county also saw an increase in land with agricultural cover. Agricultural land can increase greenhouse gas emissions. Runoff from agricultural land cover can also be tainted with chemicals from fertilizers which, in excess quantities, can deplete oxygen in streams and potentially harm aquatic life.

Natural Land Cover

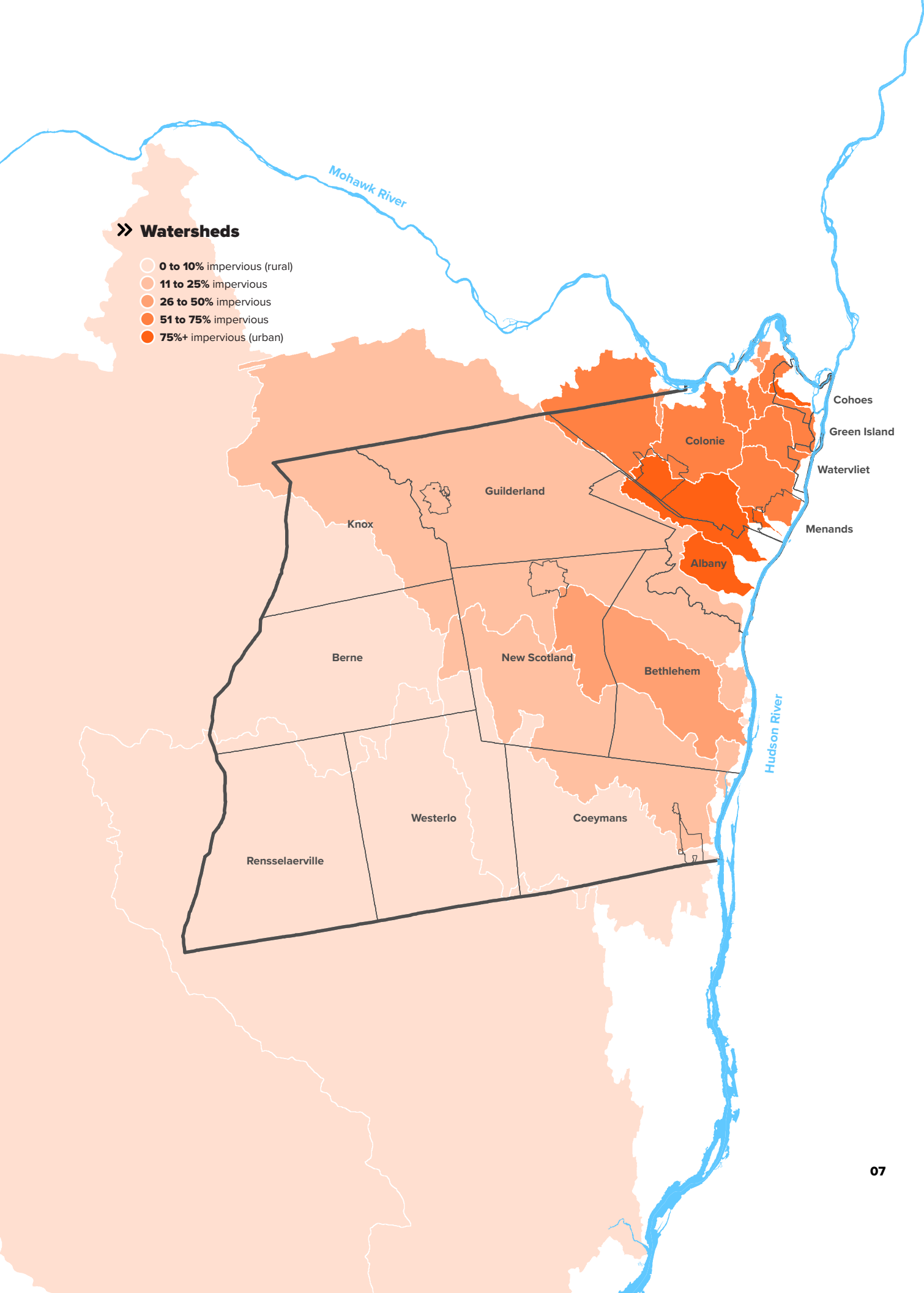
Many classes of natural land cover, including forested land (-4%), shrubland (-7%), woody wetlands (-2%), and open water area (-2%) decreased in the county. When these natural lands are reduced, and especially if they are replaced by developed lands, carbon sequestration and infiltration potential are reduced in turn.

The county did see significant increases (+13%) in emergent wetlands, however. Wetlands have a remarkable capacity to sequester carbon in less land area than other ecosystems, like forests.



Climate Impacts

- **Developed Land.** Developed lands are characterized by a high concentration of impervious surfaces like rooftops, streets, and parking lots which increase stormwater runoff by reducing the ability of rainwater and snowmelt to infiltrate into the ground. Stormwater runoff picks up pollutants and enters water bodies often with little or no treatment. An increase in impervious surfaces therefore results in both greater quantities of stormwater runoff and the acceleration of stormwater pollution.
- **Proliferation of Impervious Surface Areas.** Impervious surface cover is an indicator of the impacts of urbanization and development on water resources. Impervious cover results in multiple stressors to a watershed including increased pollutant loads from stormwater runoff, altered stream flow, decreased bank stability, and increased water temperatures. The more impervious surfaces in a watershed, the greater the chance that water quality will be degraded.



County Profile

Economy

Albany County is home to approximately 230,000 jobs. Between 2016 and 2021, the county lost about 16,500 jobs, a decrease of 7%. During this time period, Albany County had a higher rate of job loss than the Capital Region (-6%), the state (-5%), and the nation (0%). As the number of jobs declined in Albany County, the labor force participation rate increased from 62.2% to 62.7%.

Industry Sectors

Albany County is primarily a service-based economy with a Gross Regional Product of \$33.6 billion. The top five largest industry sectors by employment in Albany County are:

- **Government:** 61,900 jobs (27% of total)
- **Healthcare and Social Assistance:** 34,000 jobs (15% of total)
- **Retail Trade:** 19,500 jobs (8% of total)
- **Professional, Scientific and Technical Services:** 17,100 jobs (7% of total)
- **Accommodation and Finance and Insurance:** 14,000 jobs (6% of total)

Historic Job Growth Trends

Between 2016 and 2021, the top five fastest growing industries in Albany County were:

- **Finance and Insurance:** 900 jobs (+7%)
- **Transportation and Warehousing:** 580 jobs (+9%)
- **Health Care and Social Assistance:** 490 jobs (+1%)
- **Professional, Scientific, and Technical Services:** 340 jobs (+2%)
- **Mining, Quarrying, and Oil and Gas Extraction:** doubled its employment with 260 jobs (+102%)

It should also be noted that the Agriculture, Forestry, Fishing, and Hunting industry increased by 25% between 2016-2021, which translated into 100 jobs during that period.

Projected Job Growth

Projecting into the future, the Healthcare and Social Assistance is the industry with the most anticipated growth through 2026 in Albany County. Through 2026, the top fastest growing industries in Albany County are expected to be:

- **Healthcare and Social Assistance:** 2,100 jobs (+6%)
- **Government Employment:** 980 jobs (+2%)
- **Educational Services:** 800 jobs (+9%)
- **Administrative and Support and Waste Management and Remediation Services:** 700 jobs (+6%)

Occupational Concentration

Albany County has notable strength in the following occupation categories:

- Legal
- Life, Physical, and Social Science
- Community and Social Service
- Business and Financial Operations
- Computer and Mathematical
- Office and Administrative Support

Additionally, 21.6% of the county's workforce has a Bachelor's Degree (1.5% above the national average) and 12.0% hold an Associate's Degree (3.4% above the national average).



Business Survey

As part of Advance Albany County Alliance's business retention and expansion program that was launched in 2021, local businesses leaders were asked to rank how well Albany County's economic development infrastructure supports their business on a scale of 1 (very poor) to 5 (very good). The average rating for each category is provided in the table below.

The results tell us that in the eyes of local business leaders, **Albany County's "traditional" economic development infrastructure, like utilities and highways, is generally meeting their needs for business operations.** However, there is work to be done around the elements that directly support a resilient workforce such as housing, child care, and public transportation. The one exception to this is the healthcare system, which received high ratings from the surveyed business leaders.

Category	Rating
Natural Gas	3.81
Broadband Internet	3.79
Electric	3.79
Health Care	3.79
Highways	3.74
Water	3.70
Airline Service	3.65
Sewer	3.63
Public Transportation	3.56
Housing	3.46
Childcare	3.00
Government	2.75

Asset Inventory

Overview

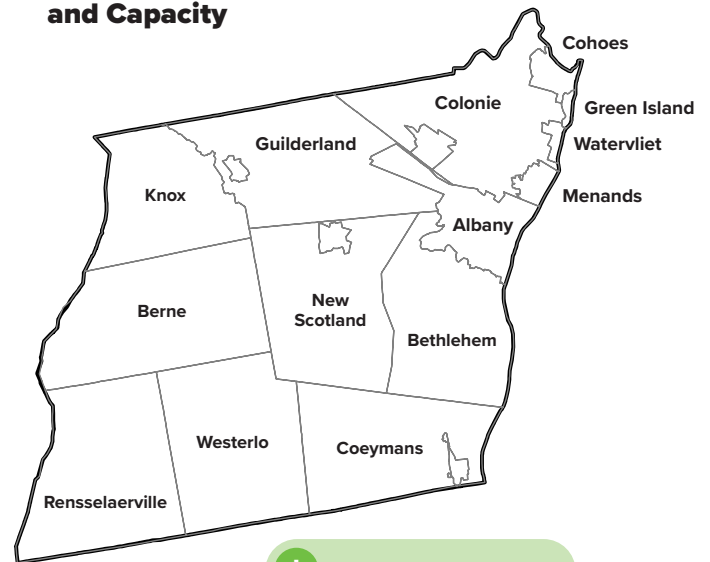
The **Asset Inventory** that follows on pages 12 to 80 takes an in-depth look at the existing conditions of several critical systems in Albany County including:

- Community Planning and Capacity
- Housing
- Infrastructure Systems
- Health and Social Services
- Natural and Cultural Resources
- Economic Systems

These categories align with the Federal Emergency Management Agency’s (FEMA) “Recovery Support Functions,” which identify areas where communities should build resilience and capacity in order to accelerate the process of recovery after climate disasters.

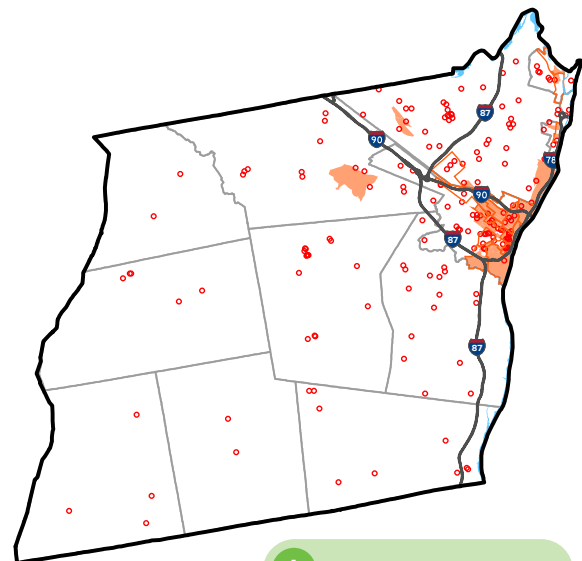
The potential impacts of climate change on each system are noted throughout the Asset Inventory. The level of vulnerability of each system to climate change is explored further in **Chapter 3: Risk Assessment and Analysis**.

>> Community Planning and Capacity



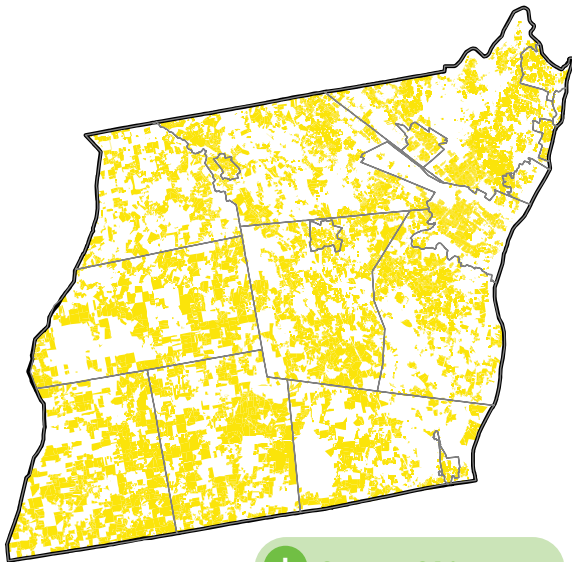
[+ See page 12 for more.](#)

>> Health and Social Services



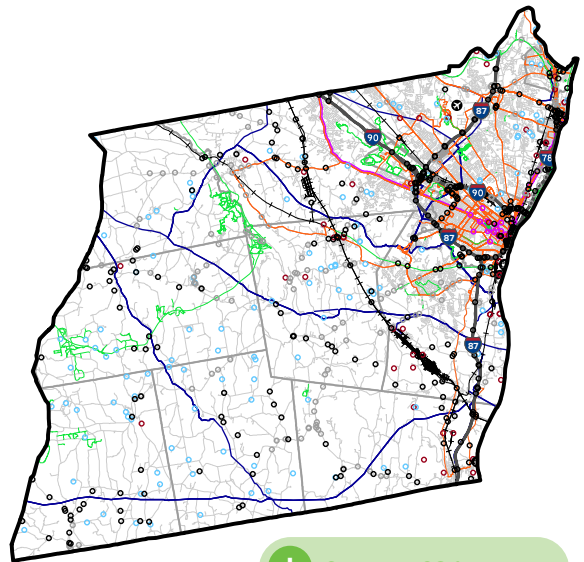
[+ See page 52 for more.](#)

» Housing



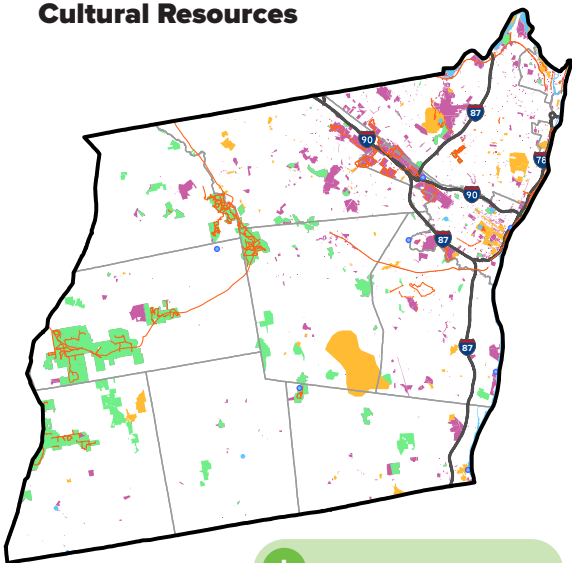
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» Infrastructure Systems



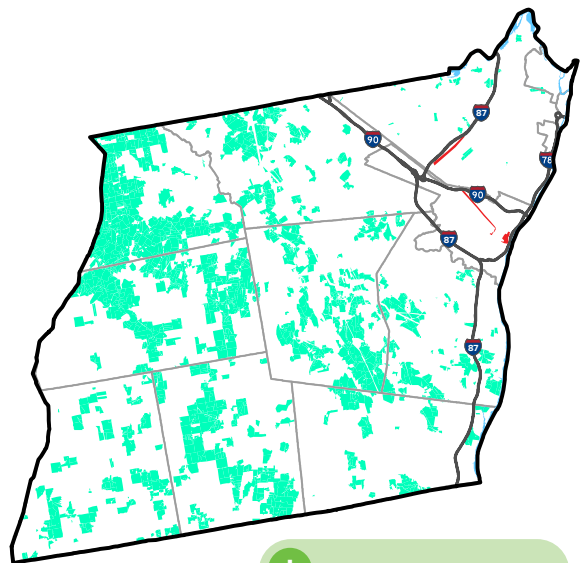
[+ See page 28 for more.](#)

» Natural and Cultural Resources



[+ See page 62 for more.](#)

» Economic Systems



[+ See page 76 for more.](#)

Community Planning and Capacity

Climate-related plan and policy development is critical to building community capacity to promote resilience and ensure effective recovery.

Albany County's ability to mitigate, adapt to, and recover from the impacts of climate change and climate disasters depends on the County's ability to learn from past events, proactively prepare for and anticipate future events, and rapidly and effectively respond to and recover from disturbances. By creating proactive laws and policies that promote climate resilient actions and reduce negative impacts on Albany County's environment, it is possible to not only prevent severe damage but also to slow and mitigate the effects of climate change. Likewise, by creating plans for emergency response and post-disaster recovery, it is possible to ensure that life and property are protected to the greatest extent possible and that resources are deployed equitably and efficiently.



Community Planning and Capacity

Past Planning Efforts

Albany County's commitment to climate resilience and sustainability is evidenced by a long history of environment- and climate-related planning efforts in the County and its local municipalities. These include:

Albany County Multi-Jurisdictional Hazard Mitigation Plan (2018)

Albany County's Multi-Jurisdictional Hazard Mitigation Plan outlines strategies to reduce future damage from disasters, mitigate public expenditures and private losses, and reduce overall community hazard vulnerability. In 2018, Albany County updated its Hazard Mitigation Plan as required by the NYS Department of Homeland Security and Emergency Services (DHSES) and the Federal Emergency Management Agency (FEMA) to remain eligible for federal funding streams to implement the pre-disaster mitigation actions identified in the plan. The 2018 update also included a comprehensive inventory of assets and an assessment of their risk to several hazards, including those posed by climate change. The Albany County Climate Resiliency Plan builds on the findings of the Hazard Mitigation Plan.

Clean Energy Community Designation (2017)

In 2017, Albany County became the first municipality in the Capital Region to earn the New York State Energy Research and Development Authority (NYSERDA) Clean Energy Community designation for its commitment to sustainability.

The County earned this designation by:

- Adopting a benchmarking policy to track and publish energy use for more than 40 County buildings;
- Undertaking a community-based Solarize Albany campaign;
- Establishing an Energy NY Finance Program; and
- Installing electric vehicle charging stations at the Albany County Airport.

The designation enables the County to access additional state funding for clean energy projects.

Albany County Strategic Economic Development Plan (2020)

The Albany County Strategic Economic Development Plan identifies a long-term vision for economic growth in the county and recommends strategies for capitalizing on existing assets and industries, attracting talent and residents, and mobilizing resources so that the County can quickly respond to economic opportunities and threats. It identifies the clean energy industry as a “key growth sector” and emphasizes the county’s potential to become a clean energy hub, noting that it is well-positioned to capitalize on the emerging wind energy industry and that the Port of Albany and the Port of Coeymans offer a potential opportunity to attract offshore wind power manufacturers. The plan also recommends methods for targeting investment in catalytic and critical infrastructure and for ensuring that future development and land-use decisions are sustainable.



Benefits of Climate Planning

- **Building short- and long-term resilience** through the implementation of policies that promote sustainable practices and environmental resource protection
- **Enabling local governments to make effective decisions** in times of crisis through scenario planning for post-disaster situations
- **Building cross-jurisdictional and cross-sector partnerships** to coordinate resilience and recovery efforts, share information and best practices, and pool planning resources in a way that maximizes efficiency and effectiveness
- **Improving recovery outcomes** for individuals and the community through pre-planned resource deployment and recovery strategies

Community Planning and Capacity

Current County-wide Climate Programs

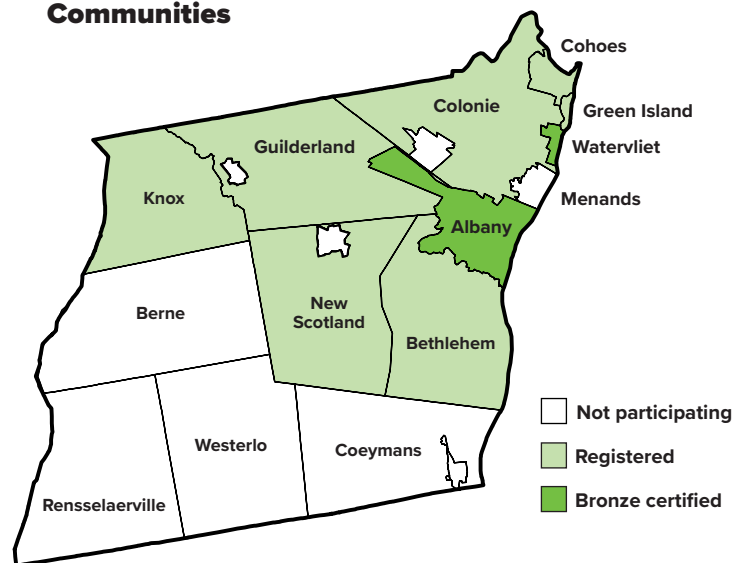
Climate Smart Communities (ongoing)

Albany County joined the State's Climate Smart Communities (CSC) program in 2009. The CSC program helps local governments reduce greenhouse gas emissions, prepare for the impacts of climate change, and save taxpayer money. To date, the County has earned CSC's bronze certification status by completing 30 actions and earning 176 points. Some of these actions include:

- **Completing a greenhouse gas inventory** for government operations to identify opportunities for emissions reductions
- **Planning and implementing additional bicycle and pedestrian facilities** along the Albany County Rail Trail
- **Installing a solar PV system** at the Albany County Hockey Facility
- **Maintaining the Team Green website** to provide climate adaptation and mitigation resources to the community

Albany County's continued participation in the CSC program earns it priority for some State funding programs as well as streamlined access to other resources, training, tools, and expert guidance.

>> Participating CSC Communities



Several other municipalities in Albany County also participate in the CSC program at the local level:

- **City of Albany**, bronze certified
- **City of Watervliet**, bronze certified
- **City of Cohoes**, registered
- **Town of Bethlehem**, registered
- **Town of Colonie**, registered
- **Town of Guiderland**, registered
- **Town of Knox**, registered
- **Town of New Scotland**, registered
- **Village of Green Island**, registered

FEMA Community Rating System (CRS)

FEMA's Community Rating System (CRS) is a voluntary incentive program that recognizes and encourages floodplain management practices that exceed the minimum National Flood Insurance Program (NFIP) standards. Under the CRS program, flood insurance premium rates are discounted in participating communities to recognize that these communities have reduced and/or avoided flood damage to insurable property, strengthened the insurance aspects of the NFIP, and created a comprehensive floodplain management strategy.

As part of the Albany County Climate Resiliency Plan, the Project Team supported the Village of Green Island in assessing whether participation in the CRS program was a good fit for them. All other municipalities in Albany County are also eligible to join the CRS program.

 For more info on CRS, see page 152.



NYS Climate Programs

New York State is a nationwide leader in planning for climate change and establishing aggressive targets for renewable energy adoption and emissions reductions. Several climate policies, programs, and plans exist at the State level, including:

- **Climate Leadership and Community Protection Act (2019)** which mandates and sets benchmarks for carbon emissions reductions and conversion to clean energy sources, including converting the State's electric grid to 100% renewable energy by 2040
- **Community Risk and Resilience Act (2014)** which requires that the effects of climate risk and extreme-weather events be considered for State-funded projects and facility-siting permits
- **New York State Energy Plan (2015)** which established and created a path to achieving several clean energy goals
- **ClimAID (2011, with a 2014 update)** which performed a statewide assessment of potential climate impacts and adaptation strategies

Community Planning and Capacity

Existing Local Policies

The protection and management of natural resources (like water and soil) and ecosystems (like forests, grasslands, wetlands, and other habitats) is an important consideration in mitigating climate change impacts. These natural systems play an important role in air quality (by removing particulate matter from the air), water quality (by filtering water and increasing infiltration), and in water storage and erosion prevention. These benefits are known as “ecosystem services” and their preservation is key to developing healthy and sustainable environments.

Municipalities in Albany County use an array of local policies and laws to protect natural resources and their corresponding ecosystem services from the threats of climate change and development. Such policies can be used to:

- **Direct development** away from hazardous or environmentally sensitive areas.
- **Prevent environmental impacts of development**, such as stormwater runoff, wetland destruction, and other negative effects on ecosystems.
- **Preserve high-value natural resources.**

The following policies represent a selection of environment- and climate-related policies currently in place in Albany County municipalities. These standalone policies are deployed in conjunction with each municipality’s existing zoning code and are used to complement site plan review and subdivision regulations.

01 Floodplain Management

All municipalities in Albany County have a flood damage prevention local law, which requires facilities vulnerable to floods to be constructed in a way that protects against flood damage. These existing flood damage prevention laws are a required component to qualify municipalities for the National Flood Insurance Program. Residents in communities whose floodplain regulations meet or exceed NFIP criteria are eligible to purchase flood insurance policies for their homes or businesses. Structures in FEMA’s Special Flood Hazard Area (which is often designated as Zone A, AE, or AO on Flood Insurance Rate Maps or more commonly known as the 100-year floodplain) are required to purchase flood insurance if they have mortgages from federally-regulated or insured lenders.

02 Stormwater Management

Stormwater management laws regulate new development and redevelopment to control and manage stormwater discharges through the use of green and traditional infrastructure. Several municipalities in the county are regulated Municipal Separate Storm Sewer Systems (MS4s) communities, which require permits for stormwater discharges into water bodies. MS4 communities, because of their urban character and prevalence of open spaces, often have water bodies that are already impaired or that are significantly impacted by stormwater runoff. Controlling runoff is particularly important in MS4 communities.

03 Wetland and Watercourse Protection

Several jurisdictions regulate wetlands in Albany County. Freshwater wetlands greater than 12.4 acres in size, tidal wetlands, and wetlands of unusual importance are regulated by the NYS Department of Environmental Conservation (NYS DEC). The State has established buffer zones around these wetlands where certain activities, including development, are either prohibited or require permit issuance. Federally-defined wetlands are regulated by the Army Corps of Engineers. Wetlands can also be identified at the local level and indirectly regulated through subdivision or site plan review laws, which can be used to protect against development in environmentally-sensitive areas. Municipalities can also adopt laws to protect groundwater recharge areas, watersheds, surface waters, and riparian buffers and to encourage habitat creation and discourage excess impervious surface creation at new development sites.

04 Erosion and Sedimentation Control

Erosion, sedimentation, and vegetation clearing controls can protect development from costly damage, retain valuable soils, protect water quality, and preserve aesthetics. These types of laws can be specifically directed at grading, filling, excavation, and other site preparation activities such as the clear-cutting of trees or the removal of vegetation. They can also address how construction and other activities are carried out by setting standards like limits on the time land can be allowed to remain in a disturbed state and by requiring land stabilization and stormwater management measures.

05 Open Space and Natural Resource Conservation

Municipalities can create open space and natural resource inventories to identify naturally-occurring, scenic, or cultural resources for the purpose of conservation and/or acquisition. Local legislatures can adopt open space inventories as official open space maps.



Zoning for Resilience

Every municipality in Albany County has zoning regulations that can be used to encourage certain types of actions, including climate resiliency. Some examples include:

- **Using special use permit criteria** to require development proposals to provide buffer areas and to implement best management practices for control of non-point source pollution adjacent to streams and wetlands.
- **Establishing overlay districts** to implement standards for riparian buffer protection, floodplain and stormwater management, and habitat protection.
- **Using Planned Unit Developments (PUDs)** to preserve open space and sensitive resources.

Community Planning and Capacity

Existing Local Policies

CONTINUED

06 Environmental Review

In New York State, local environmental review laws allow municipalities to supplement the State Environmental Quality Review Act (SEQR) with additional actions that trigger review and determination of potential adverse environmental impacts prior to implementation. Example actions that require review include zoning changes affecting 25 acres or more and non-residential projects altering 10 acres or more. Local municipalities can also designate Critical Environmental Areas (CEAs) for which the potential impacts of an action on the environmental characteristics of the CEA must be evaluated to determine the significance of the action.

07 Clean Energy

Policies that promote clean energy and energy efficiency can decrease the use of fossil fuels, reduce greenhouse gas emissions, and help accelerate the transition to renewable energy sources. Opportunities exist to incorporate renewable energy into the natural replacement cycles for aging infrastructure systems and to incentivize or remove barriers to entry for locally-produced energy, like rooftop wind and solar or neighborhood-scale solar farms.

08 Complete Streets

Complete streets policies encourage the use of alternative modes of transportation by making streets safer and more accessible for walking, cycling, and using public transit – in effect reducing the need for cars. Complete streets often incorporate more street trees and green infrastructure than traditional streets, which can reduce the urban heat island effect and mitigate stormwater runoff.

09 Architectural Design Controls

Municipalities can regulate many aspects of a building's design and siting and can do so in a way that supports energy- and water-efficient design and construction and access to pedestrian, bicycle, and transit facilities. Architectural design control policies can also be used to incentivize or require climate-certified development or green buildings (e.g., LEED, Passive House) as well as sustainable design, construction, and operations.

10 Historic Preservation

Historic preservation laws protect a community's historic resources, such as buildings or sites on the State and National Register of Historic Places or those identified as locally significant. Compared to new construction, preserving and reusing historic structures can result in significant reductions in carbon emissions and waste production.

» Local Policies

By Community

- Has policy
- Does not have policy

	01 Floodplain Management	02 Stormwater Management	03 Wetland and Watercourse Protection	04 Erosion and Sedimentation Control	05 Open Space and Natural Resource Conservation	06 Environmental Review	07 Clean Energy	08 Complete Streets	09 Architectural Design Controls	10 Historic Preservation
City of Albany	●	●	●	●	●	●	●	●	●	●
Village of Altamont	●	●	●	●	●	●	●	●	●	●
Town of Berne	●	●	●	●	●	●	●	●	●	●
Town of Bethlehem	●	●	●	●	●	●	●	●	●	●
Town of Colonie	●	●	●	●	●	●	●	●	●	●
Village of Colonie	●	●	●	●	●	●	●	●	●	●
City of Cohoes	●	●	●	●	●	●	●	●	●	●
Town of Coeymans	●	●	●	●	●	●	●	●	●	●
Village of Green Island	●	●	●	●	●	●	●	●	●	●
Town of Guilderland	●	●	●	●	●	●	●	●	●	●
Town of Knox	●	●	●	●	●	●	●	●	●	●
Village of Menands	●	●	●	●	●	●	●	●	●	●
Town of New Scotland	●	●	●	●	●	●	●	●	●	●
Village of Ravena	●	●	●	●	●	●	●	●	●	●
Town of Rensselaerville	●	●	●	●	●	●	●	●	●	●
Village of Voorheesville	●	●	●	●	●	●	●	●	●	●
City of Watervliet	●	●	●	●	●	●	●	●	●	●
Town of Westerlo	●	●	●	●	●	●	●	●	●	●

Community Planning and Capacity

Energy Policies

Action at the State level is accelerating the transition to clean energy. Local municipalities are using clean energy and providing opportunities for residents to procure energy from renewable sources. Many local municipalities – with the lead of the County which was designated as a NYSERDA Clean Energy Community in 2017 – have already adopted clean energy policies or participate in clean energy programs.

01 Clean Energy Communities

The NYSERDA Clean Energy Communities (CEC) program encourages local governments through grants and coordinator support to achieve clean energy solutions for their communities by completing high-impact actions like installing LED streetlights or ensuring their vehicular fleets run on clean energy. Communities that complete four actions become designated CECs and can access a points-based grant funding program. Albany County and several local municipalities have earned the CEC designation through their adoption of clean energy strategies. Adopting policies like the Unified Solar Permit, benchmarking, Community Choice Aggregation, and the NYStretch Energy Code can help communities earn the CEC designation.

02 Unified Solar Permit

The New York State Unified Solar Permit is a standardized permit application designed to streamline the approval process for installing solar in communities. Local governments can pass legislation to adopt the Unified Solar Permit, which is used across the state to expedite solar projects and reduce costs.

03 Benchmarking

Local governments can adopt benchmarking policies to require the annual reporting of energy used in municipal or large private buildings. Reporting energy use can help identify opportunities to reduce usage or minimize energy waste.

04 Community Choice Aggregation

Community Choice Aggregation (CCA) allows local governments to choose where and how much of their community's energy comes from renewable sources. CCA's are effective in increasing the percentage of renewable energy in communities and in stabilizing supply rates. Customers also have the option to opt out of the CCA program and maintain service from the existing distribution utility instead. Of late, the CCA program has been stalled due to the volatility of energy prices and the slowness in bringing renewable energy on-line, but the State's Climate Scoping Plan still encourages adoption.

05 NYStretch Energy Code

The NYStretch Energy Code is a voluntary, readily adoptable energy code that calls for higher efficiency standards in new and renovated building construction projects than that required by the 2020 Energy Conservation Construction Code of New York State (2020 ECCCNY). NYStretch amends the 2020 ECCCNY with a standard that is 10-12% more efficient, depending on climate zone and building type. For jurisdictions that adopt it, NYStretch is expected to provide savings of approximately 11% over New York State's minimum code. Presently, none of the municipalities in Albany County have adopted the NYStretch Energy Code.

» Energy Policies By Community

- Designated community
- Participating community
- Has policy
- Does not have policy

	01 Clean Energy Communities	02 Unified Solar Permit	03 Benchmarking	04 Community Choice Aggregation	05 NYStretch Energy Code
City of Albany	Designated community	Has policy	Does not have policy	Does not have policy	Does not have policy
Village of Altamont	Designated community	Has policy	Has policy	Does not have policy	Does not have policy
Town of Berne	Participating community	Has policy	Has policy	Does not have policy	Does not have policy
Town of Bethlehem	Designated community	Has policy	Has policy	Has policy	Does not have policy
Town of Colonie	Designated community	Has policy	Has policy	Does not have policy	Does not have policy
Village of Colonie	Participating community	Does not have policy	Has policy	Does not have policy	Does not have policy
City of Cohoes	Designated community	Has policy	Has policy	Does not have policy	Does not have policy
Town of Coeymans	Participating community	Has policy	Does not have policy	Does not have policy	Does not have policy
Village of Green Island	Does not have policy	Does not have policy	Does not have policy	Does not have policy	Does not have policy
Town of Guilderland	Designated community	Has policy	Has policy	Does not have policy	Does not have policy
Town of Knox	Designated community	Has policy	Has policy	Does not have policy	Does not have policy
Village of Menands	Participating community	Does not have policy	Does not have policy	Does not have policy	Does not have policy
Town of New Scotland	Designated community	Has policy	Has policy	Does not have policy	Does not have policy
Village of Ravena	Does not have policy	Does not have policy	Does not have policy	Does not have policy	Does not have policy
Town of Rensselaerville	Does not have policy	Does not have policy	Does not have policy	Does not have policy	Does not have policy
Village of Voorheesville	Designated community	Has policy	Has policy	Does not have policy	Does not have policy
City of Watervliet	Designated community	Has policy	Has policy	Has policy	Does not have policy
Town of Westerlo	Designated community	Has policy	Has policy	Does not have policy	Does not have policy

Housing

Housing is one of the areas where the effects of climate change are felt most acutely.

Flooding, high winds, and storm events can damage property, temporarily or permanently displace people from their homes, and even cause injury or death. Because housing is often the largest expense for most families, unplanned expenditures for repair or re-homing can create incredible financial strain for those affected. And, while climate-related disasters can have devastating impacts on all families, low-income households and households of color often experience a disproportionate amount of climate-related damage as historic inequities have created current conditions where minority and low-income communities are more likely to live in a floodplain or in areas vulnerable to heat stress.

! Climate Impacts

Climate stressors can result in several impacts on housing in Albany County including:

- **Increased and unplanned expenditures** to repair and rebuild homes and property damaged by climate events, to take mitigation measures to protect homes from future climate events, and to adapt to new climate conditions (like the need to cool houses more frequently in the summer).
- **Greater housing instability** as families may choose or be forced to move to avoid the financial and psychological damage of enduring climate disasters, especially low-income families or families of color who are more likely to experience and less able to recover from climate disasters.
- **Increased strain on resources and the environment** as housing development, especially suburban housing development, increases impervious surface areas in watersheds, disrupts ecosystems, and encroaches on vital natural areas.

Hackett Boulevard, City of Albany »
Flash Flooding, August 2018



Housing

Residential Land Use

Single-family homes make up the majority of residential land use in the county, especially in the more rural and suburban towns where lots are larger. Multi-family units and higher density single-family development is more prevalent in the City of Albany. **The kind of sprawling, low density residential development that predominates in the county draws more heavily on resources and infrastructure, resulting in more greenhouse gas emissions per capita household** than in more compact, higher-density, urban neighborhoods.

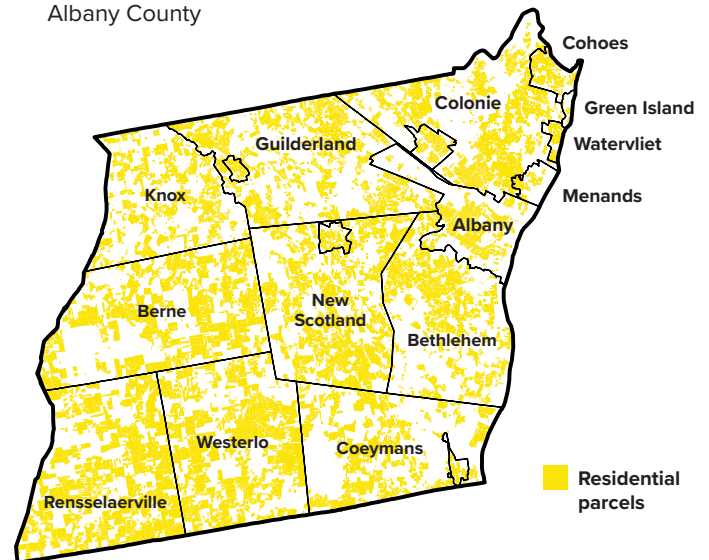
Increased runoff from development as well as rising sea levels and more frequent and intense storm events put residential land at risk of flooding. **Almost 20% of residential land in the county is located in the 100-year floodplain.** Homeowners with mortgages from federally-backed or insured lenders are required to purchase flood insurance in these areas.

! Climate Impacts

Suburban Development. The farther people live from their jobs, schools, and services, the longer they spend commuting in cars, which creates more greenhouse gas emissions. When people have affordable options for housing close to where they work, they can spend less time commuting and reduce their carbon footprint. Another effective way to reduce greenhouse gas emissions is to build affordable places to live close to public transit options.

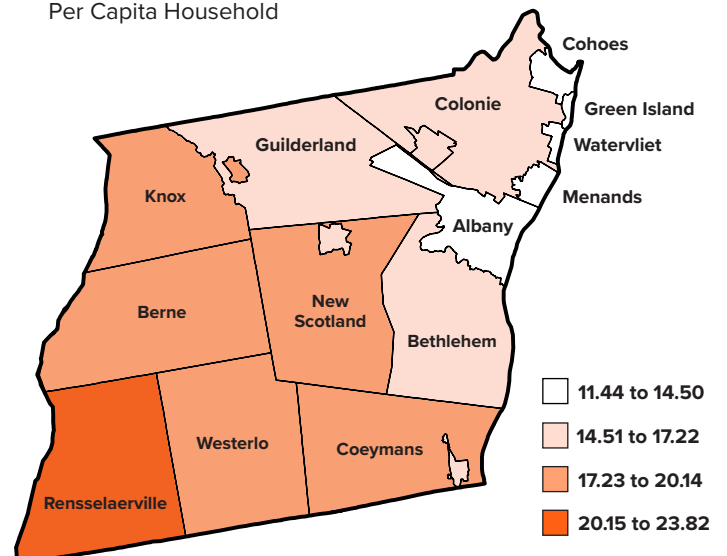
>> Residential Parcels

Albany County



>> Greenhouse Gas Emissions

Per Capita Household



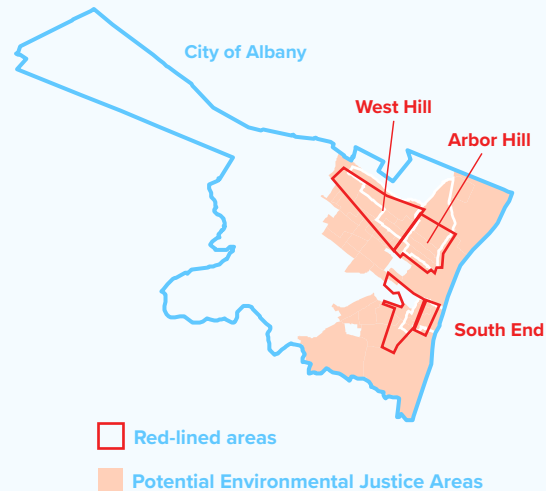


Homeownership Gap: City of Albany

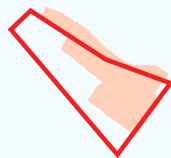
Homeownership patterns in the City of Albany today can be traced back to historic inequities that made and still make it harder for Black residents to own homes and build generational wealth.

In Albany today, only 20% of Black residents own homes, while 69% of white residents do. The median household income in predominantly Black neighborhoods can be up to \$60,000 lower than it is in white neighborhoods. And, despite comprising almost one-third of the city's population, the majority of Black residents live in only three city neighborhoods: West Hill, Arbor Hill, and the South End. In 1938, these three neighborhoods were "red-lined" by the federal government to signal to local banks and realtors that they were too risky for investment.

Today, these neighborhoods have the city's highest poverty rates and the lowest percentages of homeownership. They also align with NYS DEC-identified Potential Environmental Justice Areas (PEJAs) where race and income predispose these populations to disproportionate environmental impacts, including from climate change.



West Hill Census Tract 7



People of color and Hispanics:

90%

Families in poverty:

32%

Area lacking tree canopy:

79%

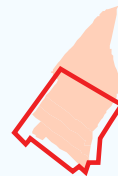
Area of impervious surface:

45%

Area in the 500-yr floodplain:

2%

Arbor Hill Census Tract 2



88%

39%

82%

53%

2%

South End Census Tract 25



92%

58%

94%

59%

47%

Infrastructure Systems

Albany County's infrastructure system provides the basic necessities for daily life, from water, to electricity, to transportation access.

During disasters, the infrastructure system is critical for evacuation and service provision and, post-disaster, as a lifeline for relief and supplies. A changing climate undermines the system's ability to perform reliably, safely, and efficiently. Heavy precipitation, flooding, extreme heat, and changes in average precipitation and temperature could threaten the entire network and have critical ramifications for mobility, service provision, public safety, and economic vitality.

In addition to being affected by climate change, the current state of the transportation system in Albany County is also a major contributor to climate change, with most trips occurring by gas-powered, greenhouse-gas producing, low-density passenger vehicles.



Climate Impacts

Climate stressors can result in various disruptions to the infrastructure system including:

- **Road closures** due to wash-out or debris blockage
- **Bridge damage** due to flooding, foundation erosion, or ice jams
- **Disruptions in service** at airports, ports, and on railways and public transit
- **Infrastructure failures** and increased need for and cost of maintenance and repairs

Central Avenue, City of Albany »
Tropical Storm Henri, August 2021



Infrastructure Systems

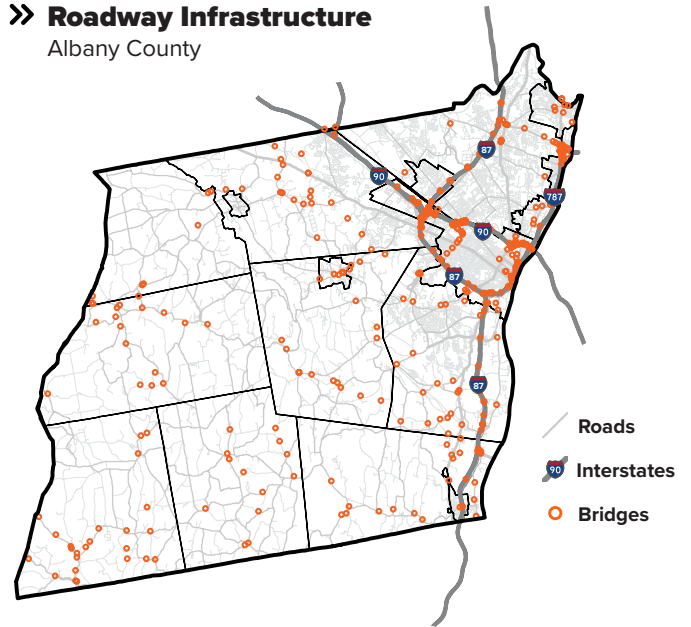
Roads and Bridges

There are over 2,600 miles of roadways and 380 bridges in Albany County that connect the county's towns and villages together and to surrounding communities. The major and most heavily trafficked roadways are I-90, I-87, I-787, and State Route 7. These major roadways are concentrated in the City of Albany and the surrounding suburbs and they see the most traffic, between 40,000 to 70,000 vehicles per day on average. Less busy local and state roads serve the more rural parts of the county.

Flood events, snowstorms, and other weather events that create unsafe conditions on roadways or that stop travel altogether can severely disrupt mobility, economic activity, and daily life in the county.

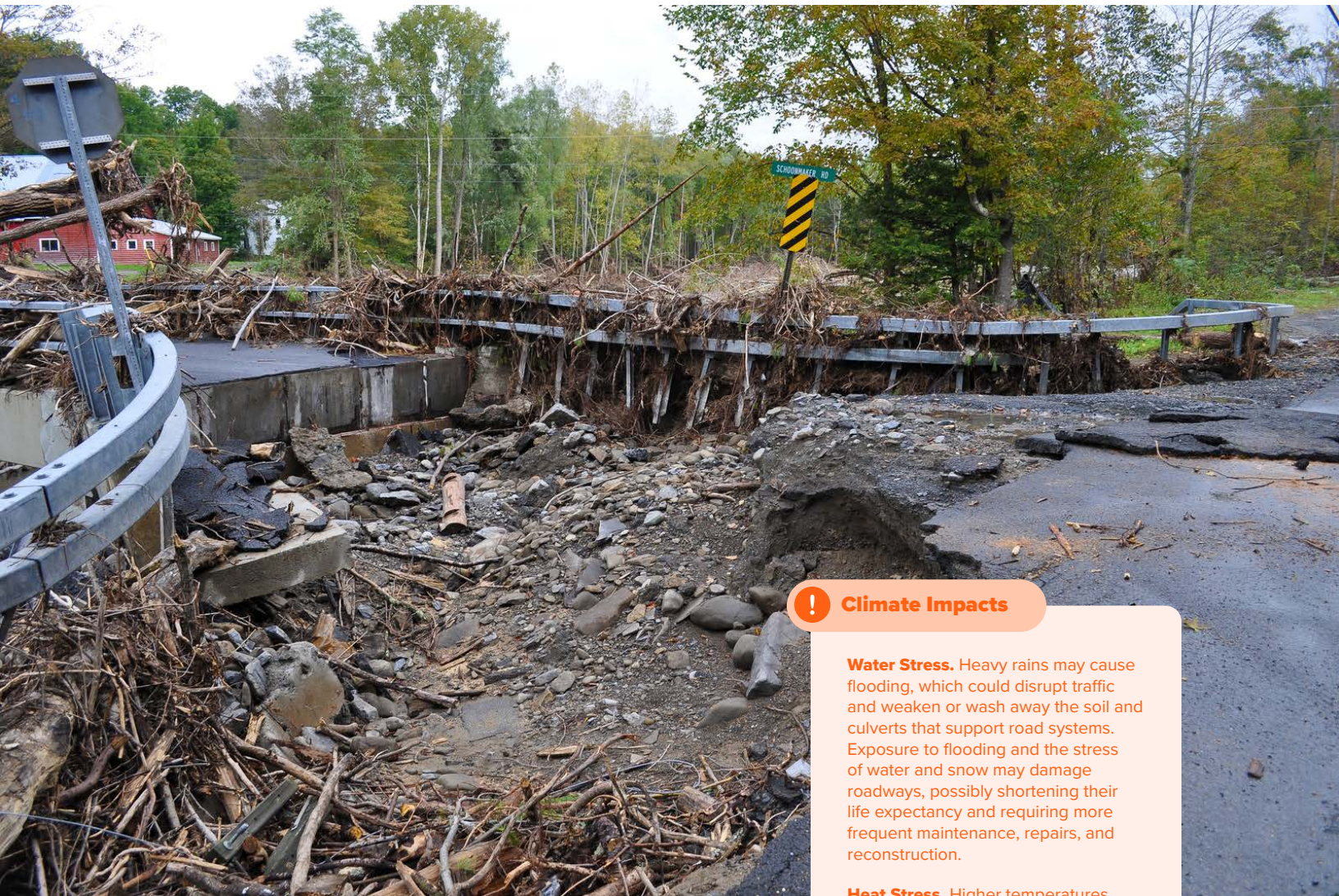
Roadways across the county are aging, most being between 30 and 50 years old, with only a decade or two remaining of their engineered lifespans. State- and locally-owned roadways and roadways in rural areas are in the worst condition, according to a Capital District Transportation Committee (CDTC) report. Age is also a major contributing factor in the worsening conditions of bridges across the county, 44% of which are considered structurally deficient by the New York State Department of Transportation (NYS DOT). Most structurally deficient bridges are located on interstates or private property (e.g., rail yards or industrial sites) and 63 are located in the 100-year floodplain. **Climate stress, including prolonged exposure to water and higher average temperatures, can cause and exacerbate this structural damage, particularly for already-aging infrastructure.**

» Roadway Infrastructure Albany County



CDTC New Visions Plan

The Capital District Transportation Commission's (CDTC) New Visions 2050 Long-Range Transportation Plan recognizes the transportation sector as the largest source (about 40%) of greenhouse gas emissions in the Capital Region. The plan identifies reducing vehicular trips, especially single-occupancy trips, and electrifying buses and passenger vehicles as important steps towards a more resilient transportation system. Making walking, biking, and using transit easier, safer, and more convenient can also help reduce transportation-related greenhouse gas emissions. The plan also emphasizes the need to adapt and evolve the transportation system so that it is better prepared for flooding and other hazards of a changing climate.



⚡ **Damaged Bridge, Berne**
Hurricane Irene, September 2011



Climate Impacts

Water Stress. Heavy rains may cause flooding, which could disrupt traffic and weaken or wash away the soil and culverts that support road systems. Exposure to flooding and the stress of water and snow may damage roadways, possibly shortening their life expectancy and requiring more frequent maintenance, repairs, and reconstruction.

Heat Stress. Higher temperatures can cause pavement to soften and expand, which exacerbates potholes, particularly in high-traffic areas, and can also cause stress on bridge joints. Impacts like these could make it more costly to build and maintain roads and highways.

Infrastructure Systems

Railways

A network of 305 miles of railways provide freight and passenger service in Albany County.

Twenty miles of track are located in the 100-year floodplain, especially along the Hudson River, and may be vulnerable to service disruptions in the case of flood or other storm events and sea level rise. Other climate stressors, like increased average temperatures and exposure to water, may weaken the structural integrity of tracks and bridges and lead to additional service disruptions and increased need for repairs.

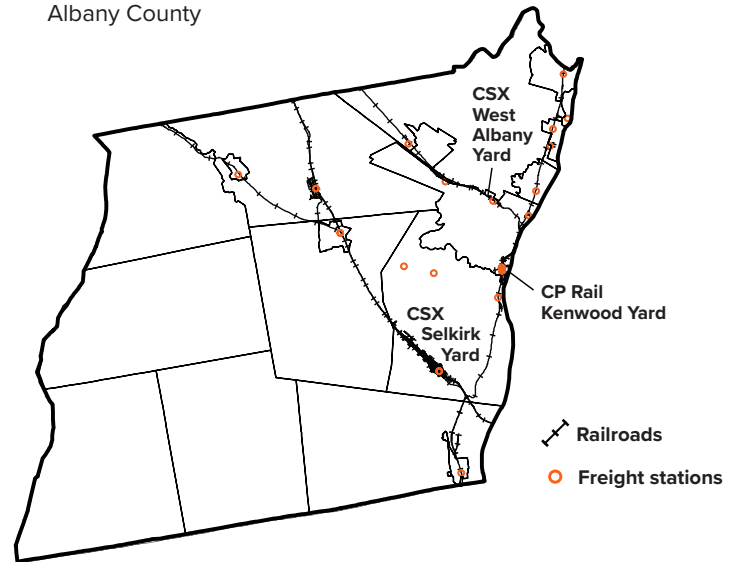
Freight Service

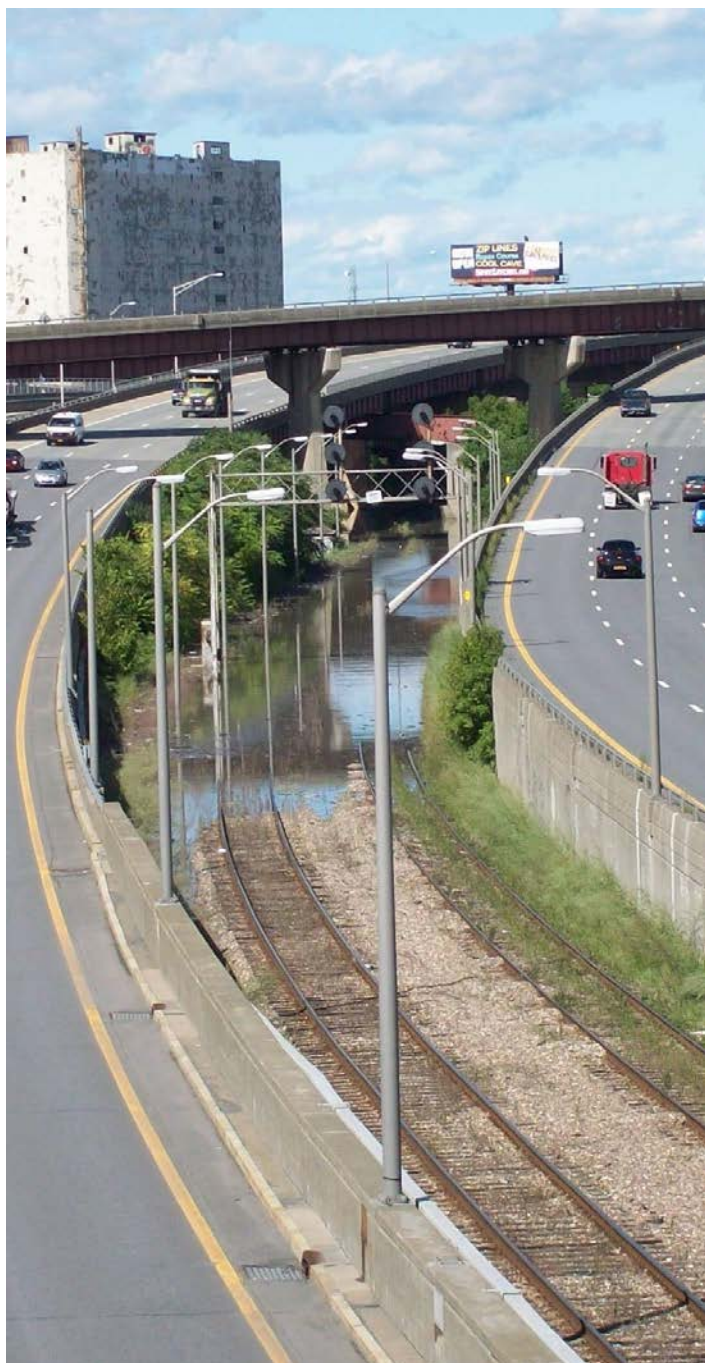
Three Class 1 freight carriers – CSX, Norfolk Southern (NS) and Canadian Pacific (CP) – operate in the Capital Region. They utilize the three rail yards in Albany County at CSX West Albany Yard, CP Rail Kenwood Yard near the Port of Albany, and CSX Selkirk Yard – which is the largest of the three. The Selkirk Yard is an intermodal terminal that is CSX’s major gateway to points east of the Hudson River, including New York City.

Passenger Service

Amtrak shares tracks with the freight carriers to provide passenger service in the county. Several lines connect Albany to New York City, to other upstate cities, including Syracuse, Rochester, and Buffalo, to Cleveland and Chicago, and to Canadian destinations including Toronto and Montreal. These routes connect through the Albany-Rensselaer Station, which is located in Rensselaer County across the Hudson River from downtown Albany. Traffic at this station is largely driven by Amtrak’s Empire Service Line, which is used primarily for commuting between Albany and New York City.

» Railway Infrastructure Albany County





Climate Impacts

Service Disruption. Heavy precipitation could cause tracks to flood, leading to delays and disruption in rail travel and freight transport. Tracks that run below-grade or in underground tunnels are at particular risk of flooding. Flooding and high winds from storm events can leave debris on tracks and may cause damage that requires infrastructure to be rebuilt or raised in the future.

Heat Stress. Higher temperatures can cause rail tracks to expand and buckle. Prolonged heat events may require track repairs or speed restrictions to avoid potential derailments.

« **Flooded Rail Tracks, I-787 Median**
Hurricane Irene, September 2011

Infrastructure Systems

Ports

There are two ports in Albany County: the Port of Albany-Rensselaer which has facilities on both sides of the Hudson River in the Cities of Albany and Rensselaer and the Port of Coeymans, also on the Hudson River in the Town of Coeymans. **Both ports are located in the 100-year floodplain and are subject to changing water levels and sea level rise on the Hudson River.**

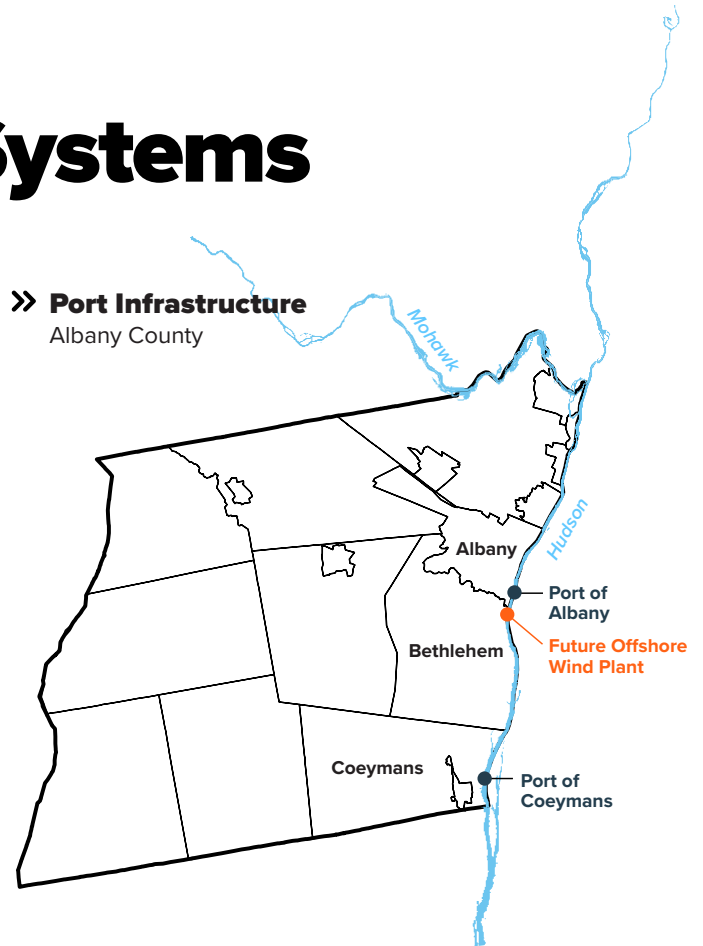
Port of Albany

The Port of Albany is a public, international port with intermodal connections to several railways and interstates and access to international waters via the Hudson River, Erie Canal, and Champlain Canal. It is part of the Inland Distribution Network and is considered a regional distribution hub for the northeastern United States and parts of Canada. It is one of the most active seaports in the state and receives twice-weekly barge service to and from the Port Authority of New York and New Jersey.

Port of Coeymans

The Port of Coeymans is a privately-owned, deep-water marine terminal located 10 miles south of the Port of Albany. It can accommodate ships up to 750 feet in length and provides tug, barge, heavy lift, and break bulk services.

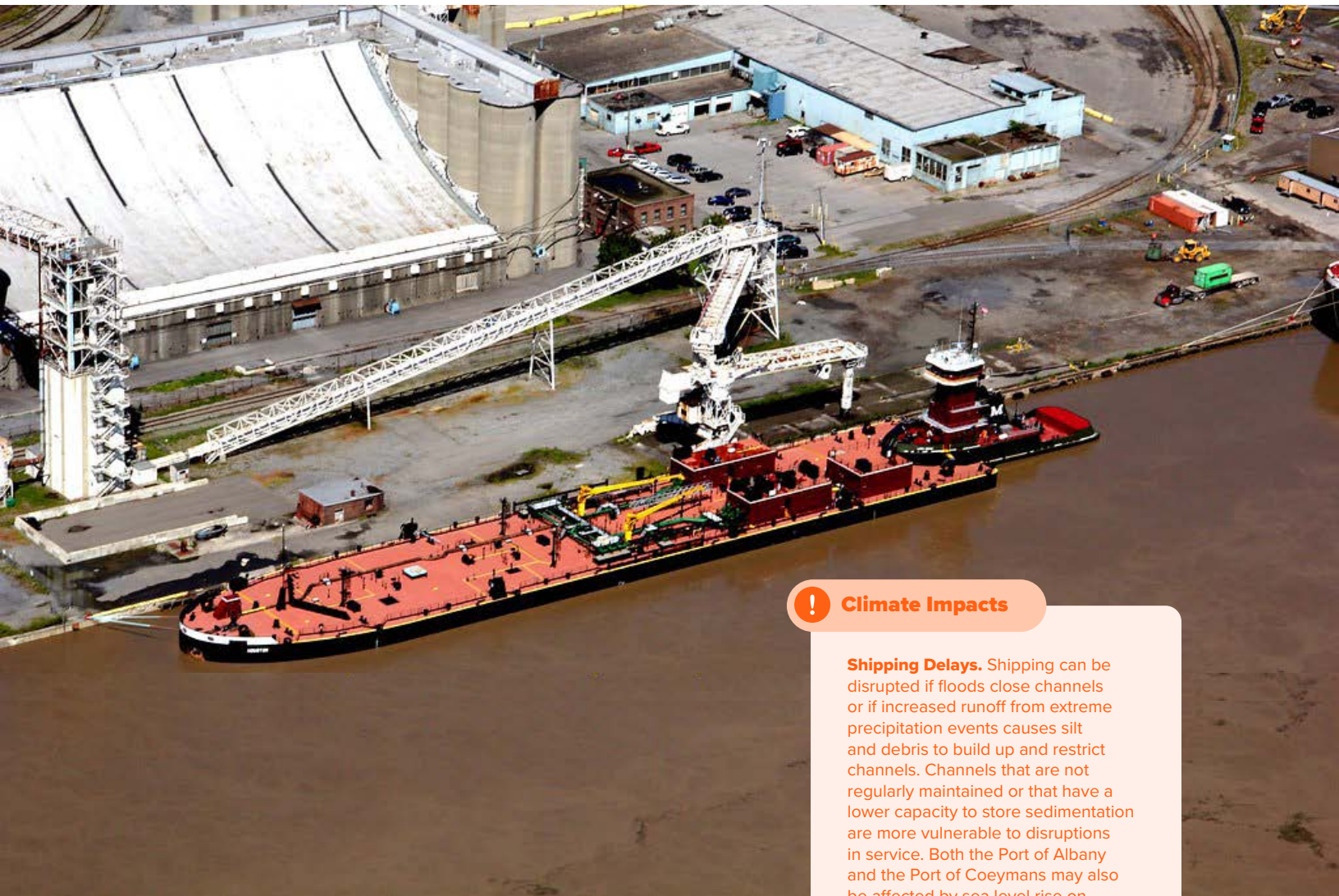
» Port Infrastructure Albany County



Offshore Wind Manufacturing

Offshore Wind Tower Manufacturing at the Ports of Albany and Coeymans.

The Port of Albany is in the process of developing the first offshore wind tower manufacturing facility in the United States at the main port site in the City of Albany and at a recently-acquired site in the Town of Bethlehem. The \$350 million project is part of the State's goal to bring 9,000 MW of renewable wind energy to the Atlantic Coast over the next 15 years. The Port of Coeymans will support wind turbine construction with an \$86 million State contract to build wind tower platforms. The Port of Albany project is expected to create approximately 500 permanent jobs. The Port of Coeymans project is expected to create 230 jobs, about 115 of which will remain locally in the Capital Region.



⚓ **High Waters at the Port of Albany**
Hurricane Irene, September 2011

! Climate Impacts

Shipping Delays. Shipping can be disrupted if floods close channels or if increased runoff from extreme precipitation events causes silt and debris to build up and restrict channels. Channels that are not regularly maintained or that have a lower capacity to store sedimentation are more vulnerable to disruptions in service. Both the Port of Albany and the Port of Coeymans may also be affected by sea level rise on the Hudson River, with these ports needing to adapt to the higher water levels expected in the future.

Infrastructure Systems

Airports

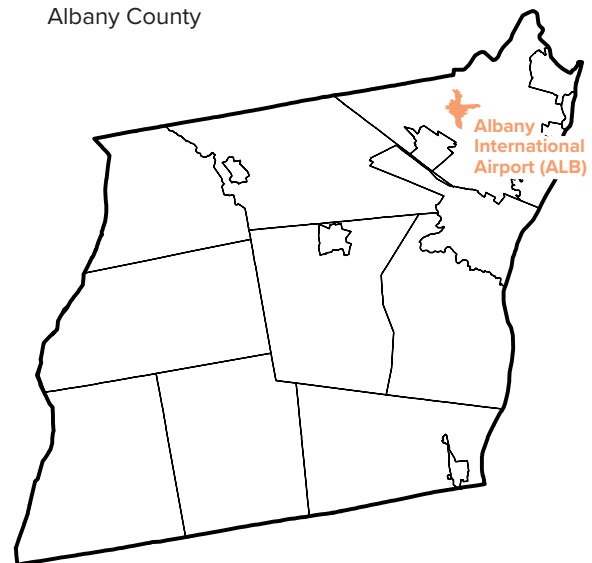
Albany International Airport

The Albany International Airport (ALB) in the Town of Colonie is the major air center for the Capital Region, as well as Northeastern New York and Western New England, and is the only international airport in the Capital Region. Nonstop service is available to 25 different destinations in 13 states, Canada, and Washington, D.C. on several airlines including Southwest, JetBlue, Allegiant, and Frontier. Roughly 1.5 million passengers travel through Albany International annually. The airport is also the region's dedicated hub for cargo operations, handling regularly-scheduled commercial air cargo, including FedEx, UPS, and DHL. **A changing climate, with more frequent and intense snow and rainstorms can increase the potential for delayed or canceled flights.**

Like other modes of transportation, air travel is both affected by and can also cause climate change. The emissions released during flight, particularly carbon dioxide and water vapor contrails, increase greenhouse gases in the atmosphere and contribute to warming. **Per passenger mile traveled, carbon emissions from air travel are greater than all other modes of transportation.** And, while technologies exist today to decarbonize road transport, proven solutions for decarbonizing aviation do not yet exist.

» Airport Infrastructure

Albany County



» Pounds of CO₂e Emitted

Per Passenger Mile Traveled

Plane	0.82
SUV	0.68
Compact car	0.55
Transit bus	0.37
Train	0.13



⚡ **De-icing at the Albany International Airport**
Winter Storm, December 2019

! Climate Impacts

Flight Delays. Storms can force airports to close, delaying flights and leading to cancellations. Disruptions like these may be exacerbated if climate change increases the frequency of storm events.

Aircraft Maintenance. Prolonged heat events can affect aircraft performance and the tarmac, potentially leading to cargo restrictions and flight delays. However, warmer winter weather will reduce the need for plane de-icing.

Infrastructure Systems

Public Transit

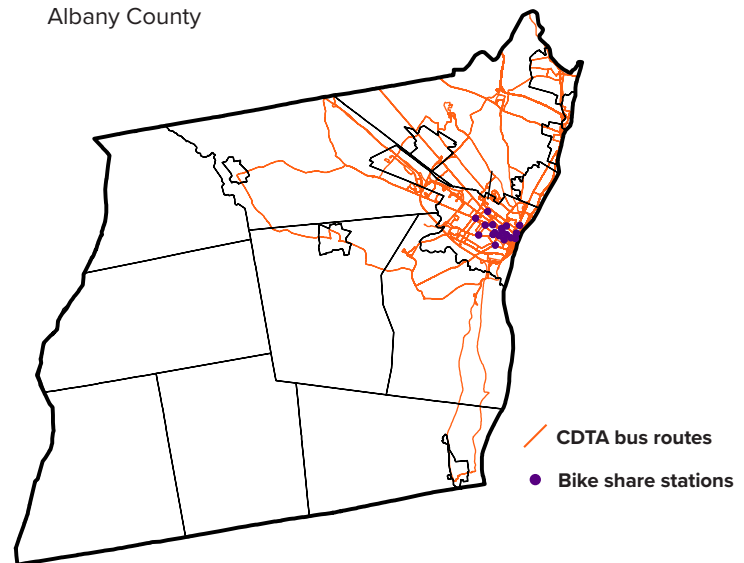
Public bus service is provided in Albany County by the Capital District Transportation Authority (CDTA), whose fleet includes 270 buses that travel on 50 routes between Albany, Schenectady, Troy, and Saratoga and transport 60,000 customers each weekday. CDTA also offers three Bus Rapid Transit lines, branded as 'BusPlus,' (and a fourth is underdevelopment) with limited-stop and more frequent service as well as a free trolley that links Albany's urban neighborhoods to downtown attractions on Thursday, Friday, and Saturday nights. Reduced fare options are available for seniors, differently-abled persons, veterans, students, and for employees of participating businesses. By request, non-emergency service is available through the ACCESS and STAR Programs for seniors who do not own a car or for those who have difficulty using CDTA's fixed routes due to disability or impairment.

Most CDTA riders (70%) are commuters and most of these commuters live in the City of Albany. **Climate-related service disruptions can be particularly troubling for those who rely on public transit and those who may not have access to a private vehicle.**

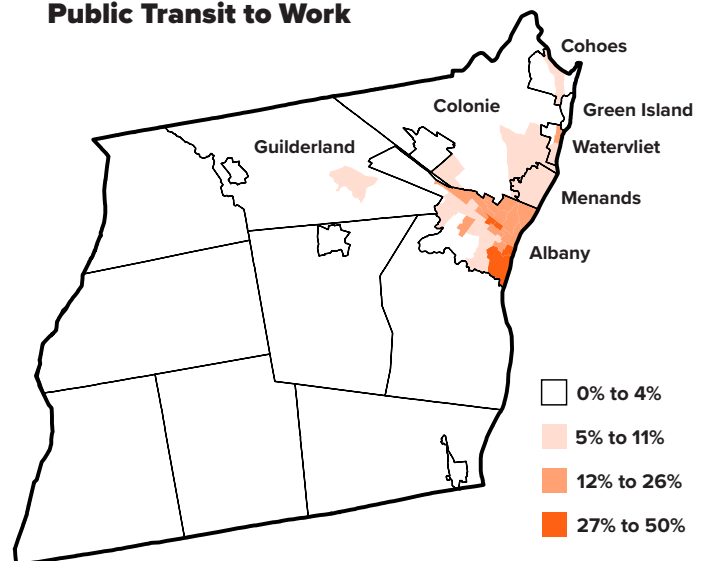
Climate Impacts

Accessibility. A robust public transit system, as well as bikeability and walkability, facilitate dense, compact development where trips to nearby services can be made easily without cars. This kind of "transit-oriented" or "smart growth" development discourages the kind of sprawling, auto-dependent development that results in wasteful land use and impervious surface proliferation. Walkable and bikeable neighborhoods with transit access are most prevalent in the City of Albany and some surrounding suburbs. In these communities, more people are likely to take public transit to work.

» Public Transit Infrastructure Albany County



» Percent of People Who Take Public Transit to Work





⚡ **CDTA Nature Bus Service**
on a 100% electric bus



CDTA Initiatives

Fleet Electrification. In 2020, CDTA became the first upstate transit agency to roll-out electric buses in its fleet. In addition to four all-electric buses, CDTA also has more than 75 electric-diesel hybrid vehicles. The electric buses will eliminate 175 tons of greenhouse gas emissions annually and are a first step towards the State's goal of having zero emission fleets by 2040. The electric buses are less expensive to operate than diesel buses and are also less noisy.

Nature Bus. In partnership with the Mohawk Hudson Land Conservancy, CDTA began offering the "Nature Bus" in 2021 to connect City of Albany communities to natural areas in Albany County like the Pine Hollow Arboretum, the Helderberg-Hudson Rail Trail, and John Boyd Thacher State Park among others. The service is free and runs on Saturdays in the summer and fall.

Infrastructure Systems

Trail & Bike Route Network

Mohawk-Hudson Bike-Hike Trail

The Mohawk-Hudson Bike-Hike Trail is a 40-mile-long, paved, shared-use path connecting Albany and Schenectady Counties along the Hudson and Mohawk Rivers. It is part of the state-wide Erie Canalway and Empire State Trail systems, which connect Albany west to Buffalo and north to Canada.

Albany County Helderberg-Hudson Rail Trail

The Albany County Helderberg-Hudson Rail Trail stretches 9 miles from Pearl Street in the City of Albany to Grove Street in Voorheesville. The trail is fully paved and runs along the old Delaware & Hudson (D&H) Railroad right-of-way.

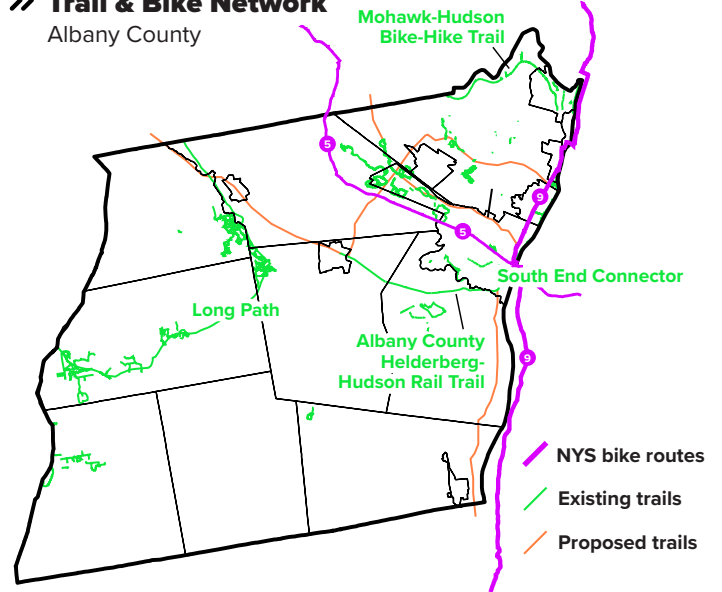
South End Connector

The South End Connector is a 1.5-mile multi-use path that connects the Mohawk-Hudson Bike-Hike Trail as it leaves Downtown Albany with the Helderberg-Hudson Rail Trail near the Port of Albany in the South End. The connector is the first physically separated bicycle path in the City of Albany and was funded in part by NYS DEC's Climate Smart Communities Program.

Albany Pine Bush Preserve Trail System

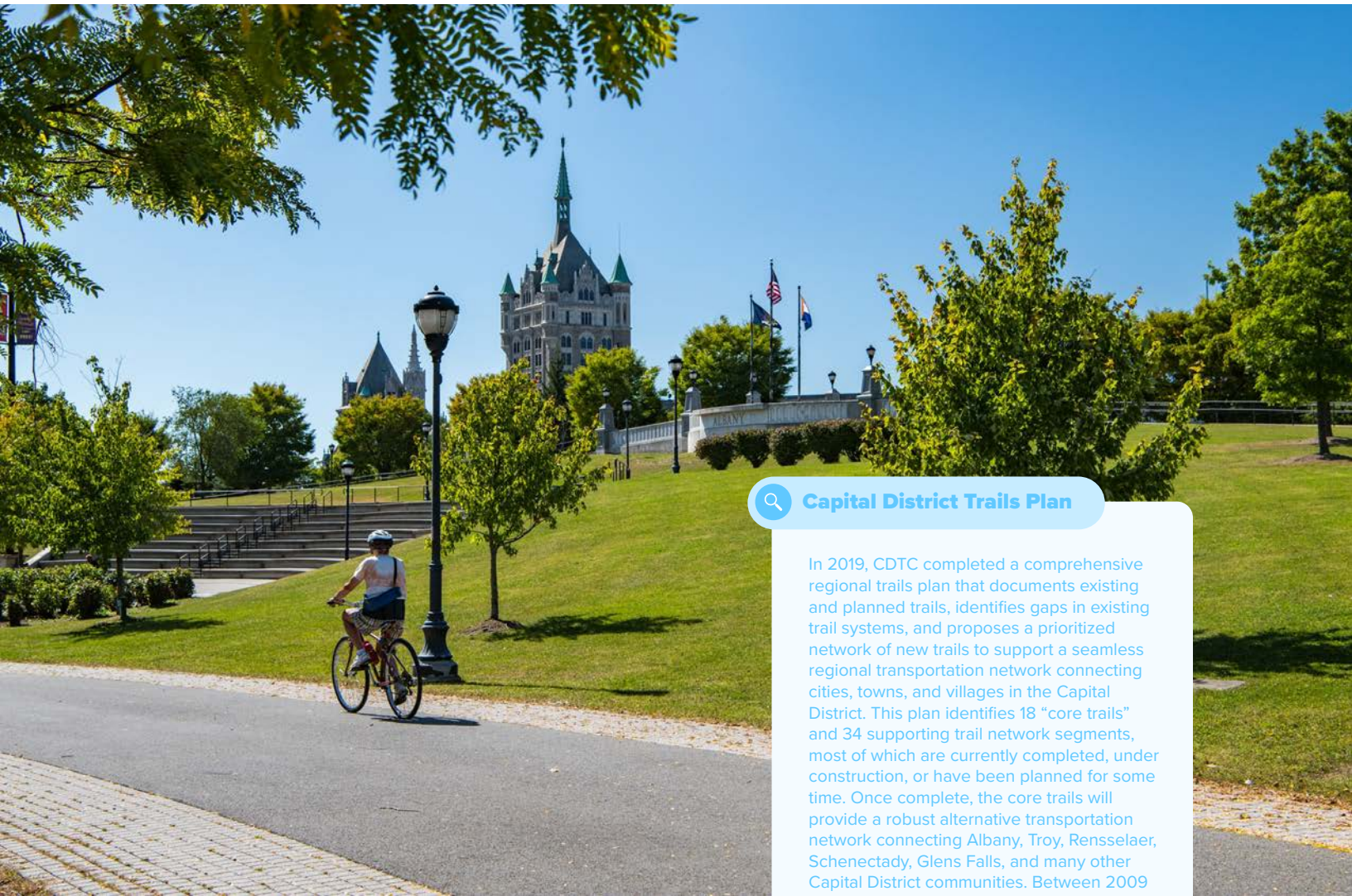
The Albany Pine Bush Preserve has approximately 20 miles of officially marked, multi-use trails which are appropriate for hiking, jogging, nature study, cross-country skiing, horseback riding, mountain biking, or hunting. They vary from wide open sandy trails to narrow grassy woodland paths.

» Trail & Bike Network Albany County



Long Path Trail System

The Long Path Trail System extends 358 miles from John Boyd Thacher State Park to the 175th Street Subway Station in New York City and connects many parks, preserves, and state forest lands along the way.



⚡ **Mohawk-Hudson Bike-Hike Trail**
City of Albany



Capital District Trails Plan

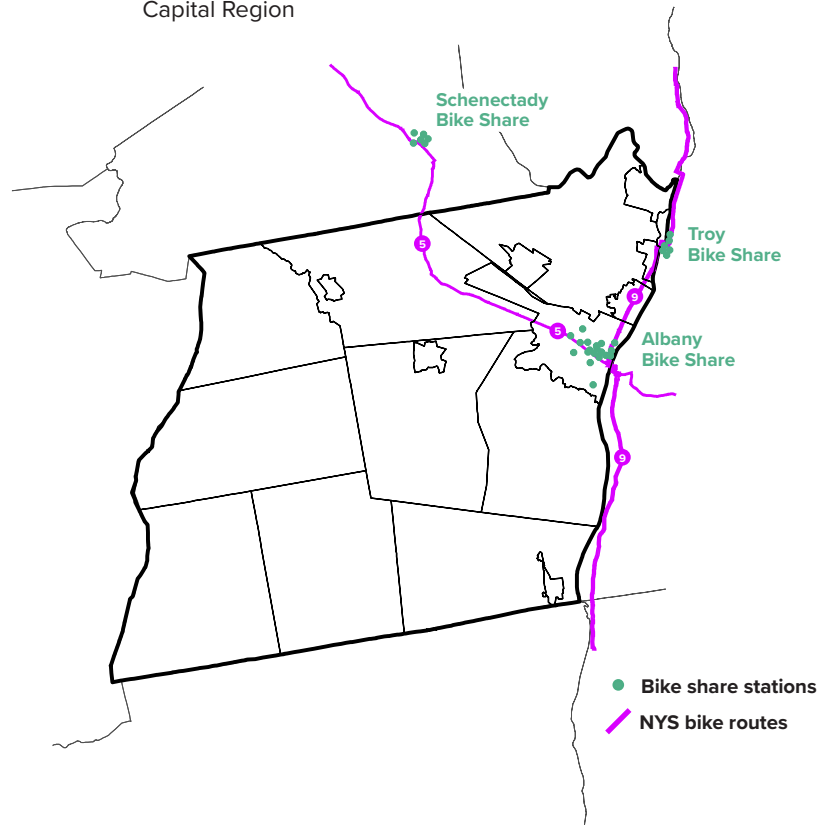
In 2019, CDTC completed a comprehensive regional trails plan that documents existing and planned trails, identifies gaps in existing trail systems, and proposes a prioritized network of new trails to support a seamless regional transportation network connecting cities, towns, and villages in the Capital District. This plan identifies 18 “core trails” and 34 supporting trail network segments, most of which are currently completed, under construction, or have been planned for some time. Once complete, the core trails will provide a robust alternative transportation network connecting Albany, Troy, Rensselaer, Schenectady, Glens Falls, and many other Capital District communities. Between 2009 and 2016, the Capital District’s trail network grew from 74 miles to 118 miles of trails, and nearly 150 miles of trails are expected to be constructed by 2021.

Infrastructure Systems

Bike Share

CDTA in partnership with CDPHP – a community-based, not-for-profit health insurance provider – offers the CDPHP Cycle! bike share program, which provides affordable access to bike rides in the Capital Region. CDPHP Cycle! has over 400 bikes and 80 hubs located throughout Albany, Cohoes, Schenectady, Troy, and Saratoga Springs. Riders can use their smart phone to pay for and unlock a bike from these hubs and ride for an hourly fee.

» Bike Share Network Capital Region





⌘ **CDPHP Cycle! Bike Rack**
Schenectady

! Climate Impacts

Emissions Reductions. Using public transportation or walking or biking reduces greenhouse gas emissions and conserves energy by eliminating trips that would have otherwise been made in private vehicles. Reducing the number of private vehicles on the road also eases congestion and traffic and allows other vehicles to achieve greater fuel efficiency.

Infrastructure Systems

Water Infrastructure

The existing water infrastructure in Albany County, including wastewater treatment plants, stormwater collection systems, and combined sewer systems, was designed on the basis of past hydrologic records and without consideration for the changes in rainfall intensity and variability that will result from climate change. These systems were not built for and are vulnerable to climate stressors like extreme precipitation and drought.

Water Supply

Public water service in Albany County is provided at the municipal level. The County does not own or operate any water supply infrastructure.

The City of Albany, Colonie, Guilderland, Bethlehem, Watervliet, Cohoes, and Green Island independently own, manage, and operate water supply infrastructure, including treatment plants, distribution infrastructure, water mains, and valves. Several reservoirs throughout the county supply raw water including the Alcove Reservoir in Coeymans, the Loudonville Reservoir in Colonie, the Watervliet Reservoir in Guilderland and others. Some municipalities have municipal interconnects which allow water supplies to be exchanged between them and can help increase reliability and resiliency during emergencies.

Albany County's more rural municipalities (Berne, Knox, Rensselaerville, Coeymans, New Scotland, and Westerlo) primarily rely on private wells and underground aquifers. Villages and hamlets within these rural towns, where populations are more concentrated, often have access to public water infrastructure.



Primary Water Supplies

City of Albany: Alcove Reservoir

Town of Colonie (served by Latham Water District): Mohawk River, 5 wells

Village of Menands (purchases water from City of Troy): Tomhannock Reservoir (Rensselaer County)

Town of Guilderland:
Watervliet Reservoir, 3 wells

Town of Bethlehem, Water District #1:
Vly Creek Reservoir, 13 wells, interconnect with City of Albany and Town of Guilderland

Town of Bethlehem, South Albany Water District: 1 well

City of Watervliet:
Watervliet Reservoir

City of Cohoes: Mohawk River

Town of New Scotland (partially served by Clarksville Water District): 2 wells

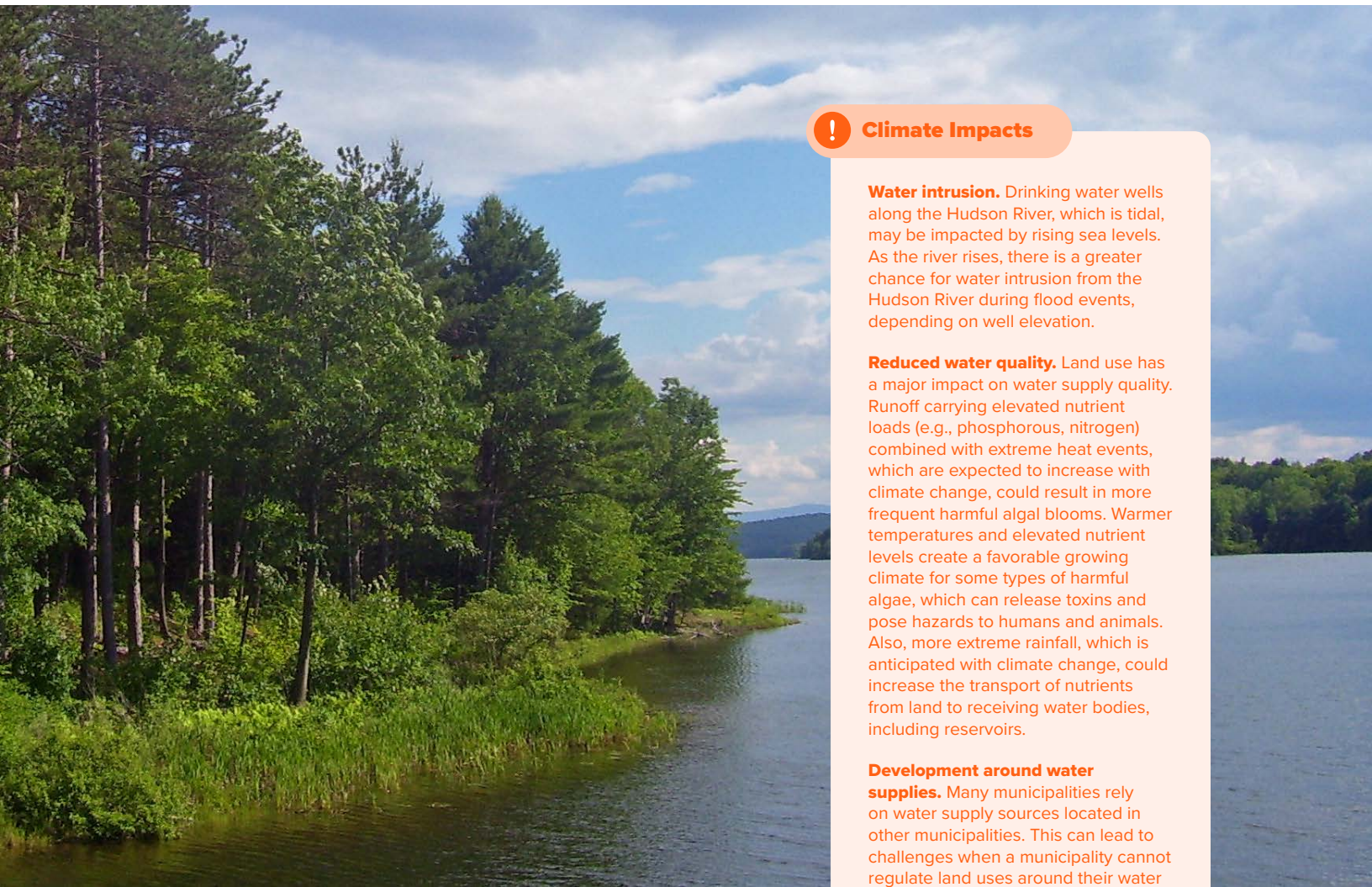
Village of Voorheesville: 3 wells

Town of Coeymans: majority privately-owned wells, Village of Ravena provides some public water infrastructure

Towns of Westerlo, Berne, Knox: privately-owned wells

Town of Rensselaerville: majority privately-owned wells, Hamlet of Rensselaerville supply from Lake Myosotis

Village of Green Island: infiltration galleries under Hudson River



⬆ **Alcove Reservoir**
Coeymans

! Climate Impacts

Water intrusion. Drinking water wells along the Hudson River, which is tidal, may be impacted by rising sea levels. As the river rises, there is a greater chance for water intrusion from the Hudson River during flood events, depending on well elevation.

Reduced water quality. Land use has a major impact on water supply quality. Runoff carrying elevated nutrient loads (e.g., phosphorous, nitrogen) combined with extreme heat events, which are expected to increase with climate change, could result in more frequent harmful algal blooms. Warmer temperatures and elevated nutrient levels create a favorable growing climate for some types of harmful algae, which can release toxins and pose hazards to humans and animals. Also, more extreme rainfall, which is anticipated with climate change, could increase the transport of nutrients from land to receiving water bodies, including reservoirs.

Development around water supplies. Many municipalities rely on water supply sources located in other municipalities. This can lead to challenges when a municipality cannot regulate land uses around their water supply. One solution is to proactively acquire adjacent lands that drain into a water supply source in order to limit development and other land uses that may negatively impact water quality. As an example, the City of Albany has a partnership with Mohawk Hudson Land Conservancy (MHLC) and The Nature Conservancy (TNC) to protect land around the Alcove Reservoir.

Infrastructure Systems

Water Infrastructure

CONTINUED

Wastewater

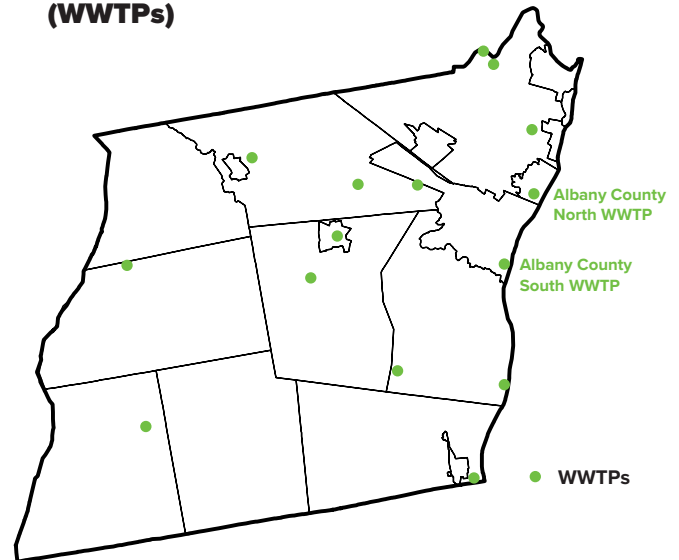
All of the land area within the Villages of Green Island, Menands, and Colonie and the Cities of Cohoes and Watervliet is sewered, and a majority of the land area within the City of Albany and the Town of Colonie is sewered. Sewered areas in the Towns of Bethlehem, Guilderland, and New Scotland are concentrated along major urbanized roadways and in areas where development is concentrated. The rural Towns of Knox, Berne, Westerlo, Rensselaerville, and Coeymans are largely served by private septic systems and have limited municipal wastewater infrastructure.

The Albany County Water Purification District owns all trunk sewer lines serving the district and treats all wastewater from the portions of Albany, Cohoes, Watervliet, the Town and Village of Colonie, Green Island, Menands, and Guilderland included in the district at its North and South Wastewater Treatment Plants (WWTPs). Several towns, including Guilderland, Colonie, Bethlehem, New Scotland, Berne, and Coeymans also have their own sewer districts and operate wastewater conveyance and treatment plants.

Stormwater

Albany County owns and operates a Municipal Separate Storm Sewer System (MS4) – which is distinct from the sanitary sewer system – that carries stormwater throughout most of Albany County. This stormwater runoff does not go to a sewage treatment plant. Stormwater discharges became regulated in 2003 and these regulations require publicly-owned entities to implement measures that reduce the amount of stormwater pollution discharged directly to water bodies otherwise untreated.

>> Wastewater Treatment Plants (WWTPs)



The Albany County Stormwater Coalition is an inter-municipal partnership that helps municipalities comply with stormwater regulations and improve and protect the quality of the region's water resources. Its members include Albany County, the City of Albany, the Village of Altamont, Bethlehem, Cohoes, the Town of Colonie, Green Island, Guilderland, Menands, New Scotland, Watervliet, and SUNY Albany.

The Albany Combined Sewer Overflow (CSO) Pool Communities Corporation works in partnership with the Stormwater Coalition and the Cities of Albany, Cohoes, Rensselaer, Troy, Watervliet, and the Village of Green Island to improve the water quality of the Hudson River and its tributaries. The Albany Pool Communities own and operate more than 90 CSOs that discharge raw sewage directly into the river. The Corporation's ongoing projects include efforts to separate sewers.



⌘ **Albany County North Wastewater Treatment Plant**
Menands



Climate Impacts

Combined Sewer Overflows (CSOs).

In combined sewer systems, the increase in variability and intensity of precipitation events can overload the capacity of mains and wastewater treatment plants and result in the discharge of untreated sewer overflows into waterways, including the Hudson River. Sewer overflows can lead to increased water pollution and algal blooms and associated taste, odor, and toxin problems. Separating sewers is critical to improving water quality and mitigating runoff.

Damage to Infrastructure. Warmer temperatures and prolonged drought can corrode water infrastructure and lead to water main breaks and subsequent inflow and infiltration into the water supply. Likewise, increased flooding and sea level rise can inundate low-lying treatment plants and pumping stations and cause the release of untreated sewage into waterways. The quality of groundwater aquifers can also be impaired by higher temperatures.

Infrastructure Systems

Energy Infrastructure

The reliability and resiliency of energy service is critical to everyday life and normal functioning in the county. Power outages have cascading effects that can disrupt other critical sectors including transportation, communications, business, and healthcare. **Extreme weather events are the main cause of power outages in the United States and their increased frequency due to climate change is expected to cause more frequent and longer-lasting power outages in the future.**

Power Generating Facilities

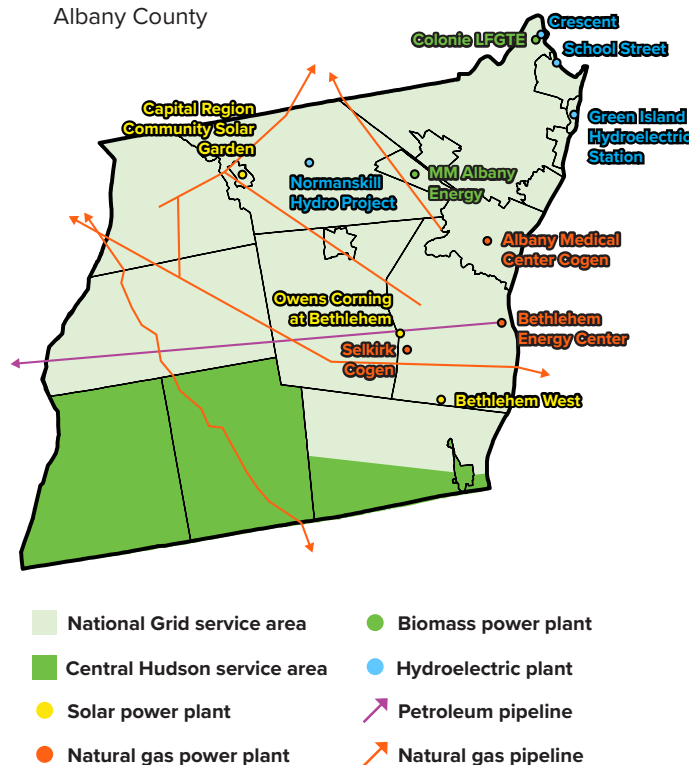
There are 9 renewable and 3 non-renewable power generation facilities in the county:

- **Colonie LFGTE Facility**, Colonie
- **Crescent Plant**, Colonie
(in the 100-year floodplain)
- **School Street Plant**, Cohoes
- **Green Island Hydroelectric Station**, Green Island (in the 500-year floodplain)
- **Normanskill Hydro Project**, Guilderland
(in the 100-year floodplain)
- **Capital Region Community Solar Garden**, Guilderland
- **MM Albany Energy**, Albany
- **Albany Medical Center Cogen**, Albany
- **Bethlehem Energy Center**, Bethlehem
(in the 100-year floodplain)
- **Owens Corning at Bethlehem**, Bethlehem
- **Selkirk Cogen**, Bethlehem
- **Bethlehem West**, Bethlehem

Several natural gas and petroleum pipelines also traverse the county in addition to a robust network of transmission lines, transformers, substations, and other energy infrastructure.

>> Energy Infrastructure

Albany County



Gas and Electric Service

Gas and electric service are provided throughout the county by National Grid and Central Hudson Gas and Electric. Central Hudson primarily operates in Rensselaerville, Westerlo, and Coeymans while National Grid serves the rest of the county.



National Grid Net Zero by 2050

National Grid plans to achieve net zero greenhouse gas (GHG) emissions by 2050 by decarbonizing the gas network, interconnecting large-scale renewables with the grid, enabling and optimizing distributed generation, advancing clean transportation, and utilizing energy storage.



⚡ **Routes 40 and 67, Schaghticoke, NY**
High Wind Event, August 2020



Climate Impacts

Service Disruptions. Energy infrastructure, like power lines and energy facilities, are constantly exposed to the elements. High winds and heavy snow can down power lines, flooding can inundate energy facilities located along water bodies, and drought can limit hydropower production and power plant cooling – all potentially causing disruptions to service.

Infrastructure Systems

Communications Infrastructure

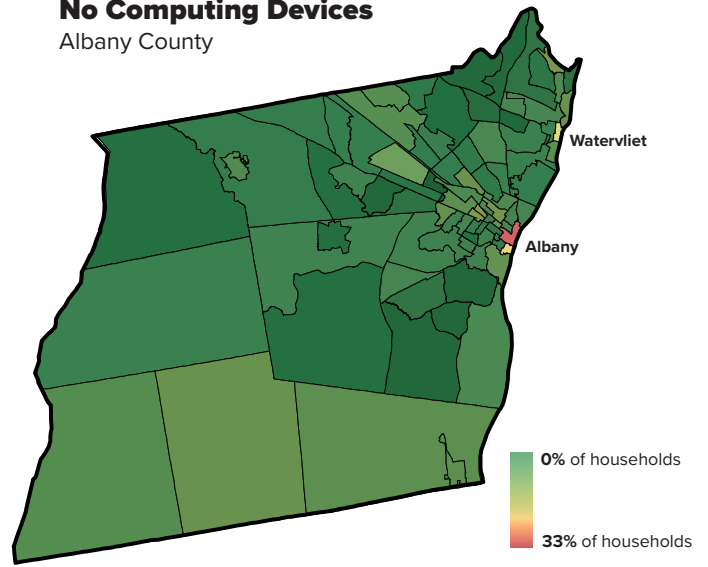
Internet access, TV and radio broadcasts, phone calls, text messages, 911 communications, air traffic control, and other communications are enabled by a network of physical (buildings, towers, antennas, etc.) and cyber infrastructure. This communications infrastructure allows people to contact each other, messages to be broadcast, and information to be accessed almost instantly. Continued functionality of communications systems is critical during disaster events, especially so that emergency messages can be broadcast and first responders can communicate with each other and the public.

Climate stressors, however, put communications infrastructure at risk. Several buildings in downtown Albany are important components of the communications network but are also located in the floodplain. These buildings include 11 N. Pearl Street, which is a carrier hotel and meet-me-point for several regional carriers, including Canadian Bell and all major telecoms. Flooding at these locations can short critical equipment and disrupt the communication systems. **Communications infrastructure must also be equipped to handle increased usage during disaster events, when more people are using the system.**

Disruptions to the communication system can be an even greater threat in communities with limited access to phone, TV, the internet, and other messaging systems as these communities may be less able to receive and send information during disaster events. According to the U.S. Census Bureau, approximately 16,500 households in Albany County (13%) do not have a broadband internet connection. Broadband access is most lacking in the City of Albany and Watervliet.

>> Percent of Households with No Computing Devices

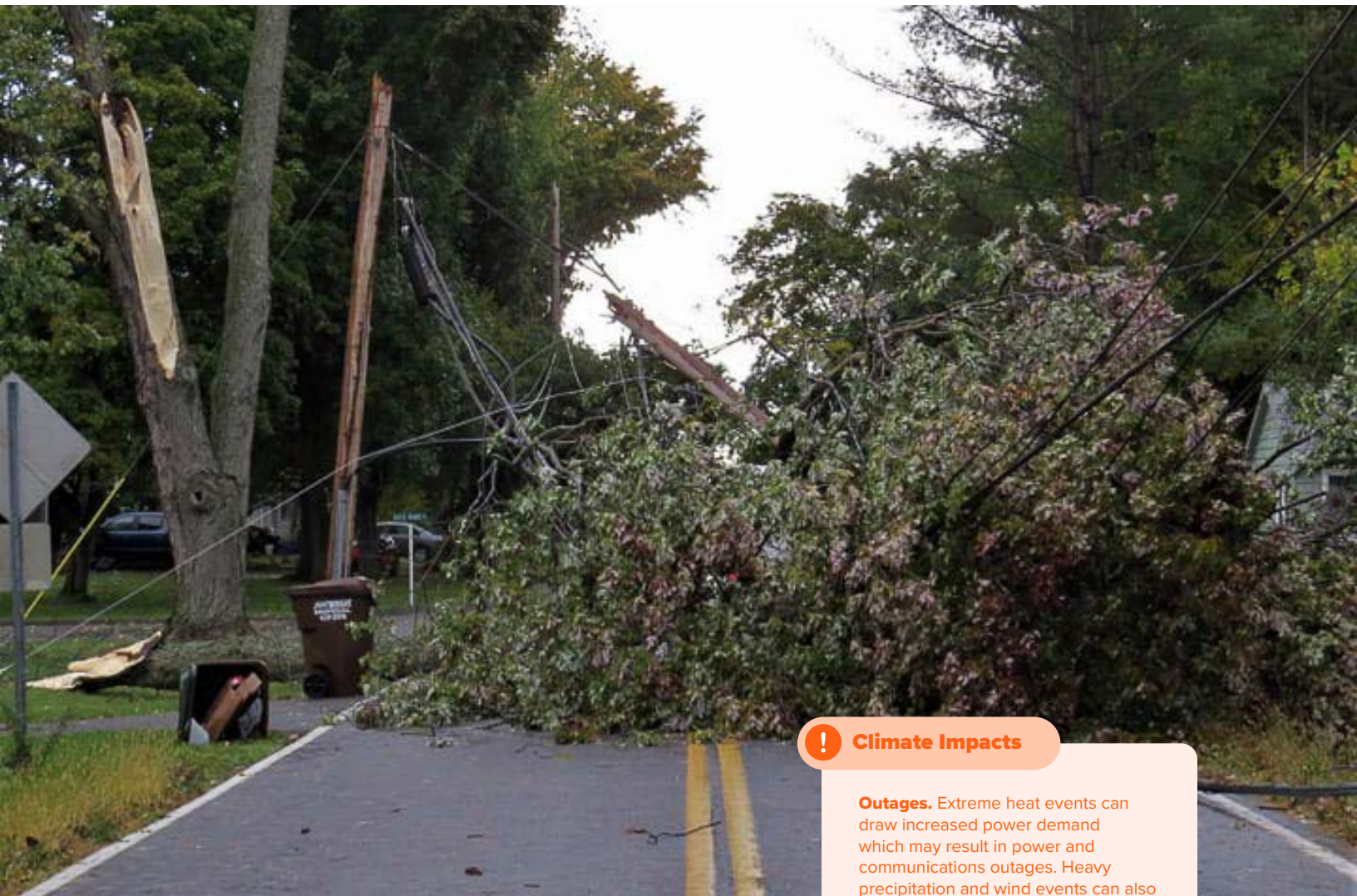
Albany County



Expanding Broadband Access

The Albany County Connect Project is an ongoing initiative of the County Executive's office with the goal of bringing high-speed internet access to every Albany County resident by 2023. The first phase of the initiative, currently in process, includes a gap analysis of broadband penetration as well as a study to evaluate the feasibility of launching broadband county-wide.

New York State is also undertaking a statewide broadband mapping program to study the availability and quality of broadband across the state and to identify solutions to support high-speed internet access in underserved areas.



⚡ **Downed Trees and Power Lines, Bethlehem**
High Wind Event, October 2020



Climate Impacts

Outages. Extreme heat events can draw increased power demand which may result in power and communications outages. Heavy precipitation and wind events can also cause damage to telecommunication lines, transformers, and other critical infrastructure.

Health and Social Services

The health and social services sectors are important in preparing for, responding to, and recovering from climate disasters.

Assets in this category include physical infrastructure like hospitals and police and fire stations as well as a mix of public, non-profit, and private providers like first responders, social services workers, the Red Cross, and other supportive institutions. Building stronger partnerships between these entities is an important aspect of climate resiliency, as more effective partnerships can lead to a more coordinated response effort and more effective and rapid recovery. Partnerships can also create opportunities to leverage each other's unique capabilities, share information and services, and build more robust supportive networks.

It is important to note that the effects of climate stressors will be most acutely felt by vulnerable populations and that these populations may need additional consideration and assistance in preparing for and recovering from climate events. Continued access to health and social services, even in the event of a disaster, is especially important for these populations.

! Climate Impacts

Health Impacts. Climate change influences human health and disease in many ways. Extreme heat can increase the risk of heat-related illness and death as well as cardiovascular failure. Water quality changes can result in an increased prevalence of harmful algal blooms, cholera, and other water-borne diseases. Air pollution and increasing allergens can exacerbate respiratory allergies, asthma, and cardiovascular diseases. Severe weather can increase risk for injuries, fatalities, and mental health impacts. Changes in vector ecology can lead to more widely-spread diseases (including malaria, Zika, Lyme disease, West Nile virus, and others). Other health impacts may include, but are not limited to, mental health impacts, lower cognitive ability, and increases in crime.

Sumpter Street, Colonie »
Heavy Rain Event, September 2015



Health and Social Services

Critical Facilities

Critical facilities include police and fire stations, hospitals, Red Cross shelters, government operations buildings, schools, and nursing homes among others. These facilities are either critical to emergency response (i.e., police and fire stations and hospitals) and/or may house large concentrations of vulnerable populations (i.e., nursing homes and schools). Critical facilities like schools and government buildings may also function as temporary heating/cooling centers or short-term shelters during emergency situations.

The distribution of critical facilities in Albany County varies. Police and fire stations are located in every municipality but other facilities like hospitals and Red Cross shelters are localized in and around the City of Albany. For municipalities with limited access to Red Cross shelters, hospitals, and other critical facilities, schools and government buildings can potentially serve as temporary heating/cooling centers or short-term shelters during emergencies.

The Red Cross has identified several critical needs to improve its operations in the county including: identifying additional shelters in rural areas, updating sheltering agreements to provide non-congregate options as well as longer-term housing options, and creating a more locally-trained workforce.



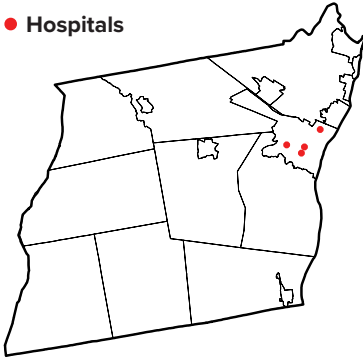
Climate Impacts

Passive Survivability. Because of their critical importance to emergency response, the reduction or loss of function of critical facilities may result in loss of life, extensive property damage, or disruption to vital socioeconomic activities. Critical facilities should be afforded a higher level of protection than other assets to ensure their continued operation during climate events and should be designed for increased resilience to climate stressors, like flooding and power outages. Critical facilities should be designed with the ability to “island” or to provide for “passive survivability,” where the critical life-support functions of a building can be maintained even if a climate disaster results in extended loss of power, water, or other utilities.

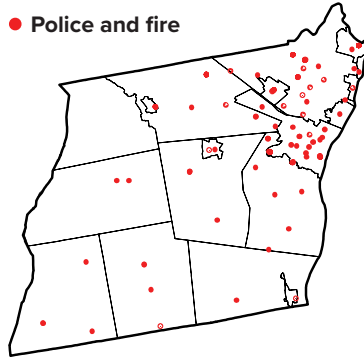
» Critical Facilities

Albany County

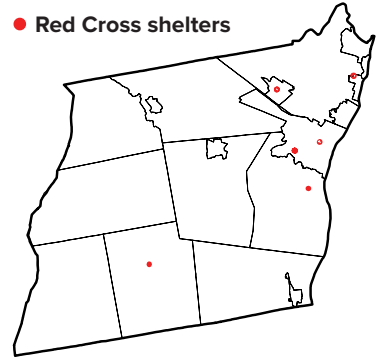
● Hospitals



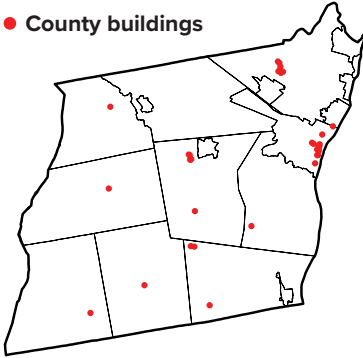
● Police and fire



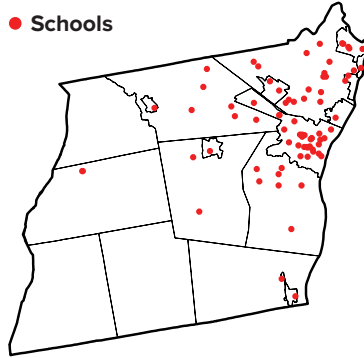
● Red Cross shelters



● County buildings



● Schools



Health and Social Services

Emergency Response Plans and Evacuation Routes

Emergency response plans are developed by local municipalities to prepare for potential emergency situations, like floods, hurricanes, chemical releases, and other life-threatening disasters. **Emergency response plans improve response times and effectiveness and reduce negative effects by determining how to deploy resources and assigning responsibilities to responding agencies ahead of time.**

All municipalities in Albany County have a local emergency operations plan except the City of Watervliet, Town of Coeymans, and the Village of Voorheesville.

At the county level, emergency response is provided by the Office of Emergency Management, which is within the Office of the Sheriff. The Office of Emergency Management is tasked with developing and implementing emergency management programs and activities and coordinating all aspects of the County's mitigation, preparedness, response, and recovery capabilities. The Office tends to focus its efforts in rural areas of the county where local capacity is limited. It also maintains a vulnerable persons list, who receive welfare checks during heat and cold emergencies.

Evacuation routes have not be formally established at either the local or county level, meaning that evacuation routes depend on the location and nature of the disaster situation. The county's 2018 Hazard Mitigation Plan recommended the creation of local emergency evacuation routes as well as a county-wide evacuation plan prior to the next Hazard Mitigation Plan Update.



University at Albany ERC

The University at Albany is an important institutional resource for emergency preparedness in the county. The university operates an Emergency and Risk Communications (ERC) Message Testing Laboratory within its College of Emergency Preparedness, Homeland Security, and Cybersecurity whose mission is to identify strategies to increase attention to, comprehension of, and resulting behavioral actions of risk messaging. The lab uses focus groups, experiments, and surveys to develop best practices for emergency messaging and shares those results with risk communicators.

Findings from the lab's research have been implemented by local, state, and federal agencies including the National Oceanic and Atmospheric Administration (NOAA), the United States Geological Survey (USGS), the Federal Emergency Management Agency (FEMA), and the Centers for Disease Control and Prevention (CDC).



⚡ **Firefighters Respond to Downed Trees and Power Lines**
New Scotland Avenue and Buckingham Road in Albany,
High Wind Event, August 2019

Health and Social Services

Vulnerable Populations

Climate change does not affect everyone equally. Some people are more vulnerable to climate impacts because of where they live. Others are more vulnerable because of their race, income, age, ability, or other attributes. These demographic, economic, and social characteristics represent one's **social vulnerability** to climate change. The impacts of a changing climate will be felt across the county, but especially by those in socially vulnerable communities.

Climate stressors magnify existing inequalities, increasing the risk of various climate-related impacts including:

- **Long-term displacement or homelessness.** Low-income households, including seniors on fixed incomes, have fewer financial resources to prepare for or fix damages resulting from climate hazards. Inequalities in housing conditions and insurance coverage also lengthen recovery time for low-income households.
- **Reduced ability to get to safety.** No vehicle households, seniors, differently-abled people, and those with chronic illnesses may be less able to access transportation, making evacuation difficult during floods or other climate disasters.
- **Health problems.** Low-income households are more likely to lack central air, which makes them more likely to suffer from mold and poor indoor air quality. Seniors, minorities, and low-income households – especially those living in urban communities where there are fewer trees, fewer green spaces, and more pavement – are more susceptible to heat stress, obesity, heart disease, and a number of other ailments.
- **Reduced job stability.** Climate-dependent industries, like agriculture and seasonal tourism which often employ low-wage workers, may see impacts to business, including reductions in crop yields and visitation, that may put workers' jobs at risk.



⚡ **Hackett Boulevard, City of Albany**
Flash Flooding, August 2018



Climate Impacts

(In)ability to Evacuate. Populations that have limited or no access to a vehicle may have trouble evacuating in extreme storm events or getting to heating and/or cooling centers during extreme temperature emergencies.

Health and Social Services

Vulnerable Populations CONTINUED

Socially Vulnerable Areas

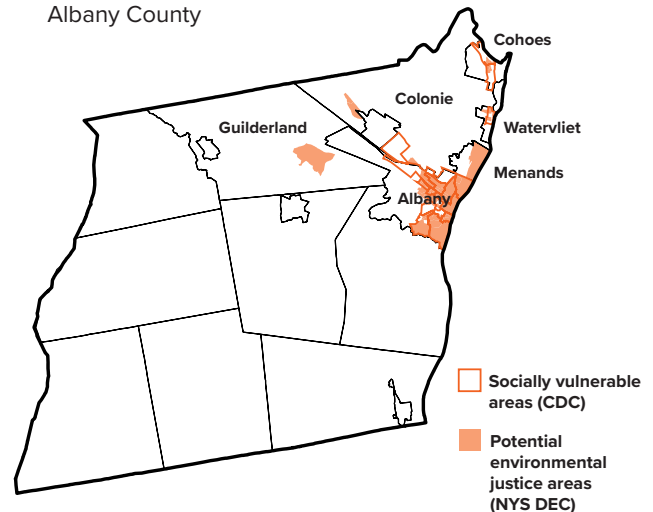
The Centers for Disease Control (CDC) uses a Social Vulnerability Index (SVI) to identify populations who may be at increased risk to hazardous events, including natural and climate disasters, because of socioeconomic or demographic conditions. In Albany County, 24 census tracts, mostly concentrated in the City of Albany, particularly along the Hudson River, are considered Socially Vulnerable Areas. Of the almost 90,000 Albany County residents who live in these areas, 54% identify as minorities, 31% of households do not have access to a vehicle, and 27% are below the federal poverty level.¹

Environmental Justice (EJ) Areas

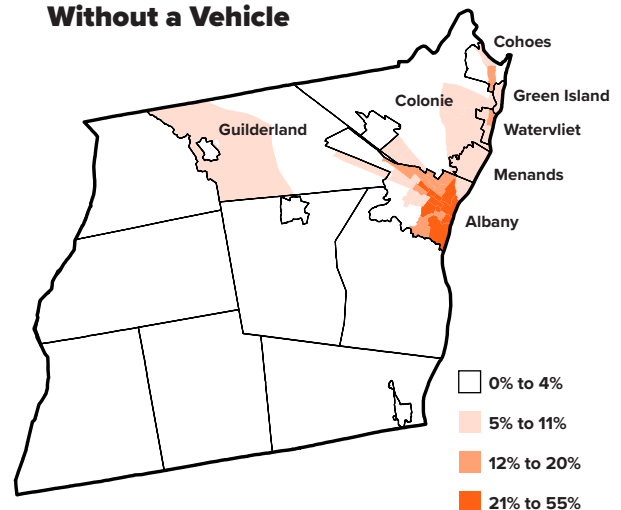
The New York State Department of Environmental Conservation (NYS DEC) identifies areas with large low-income populations and/or minority populations as Potential Environmental Justice Areas (PEJAs). **Environmental justice areas are often disproportionately affected by environmental impacts like climate change.**

The 69 census block groups that qualify as PEJAs in Albany County are located mostly in the City of Albany. Of the some 75,000 Albany County residents who live in these areas, roughly 32% are below the federal poverty level¹ and 59% identify as members of minority groups.

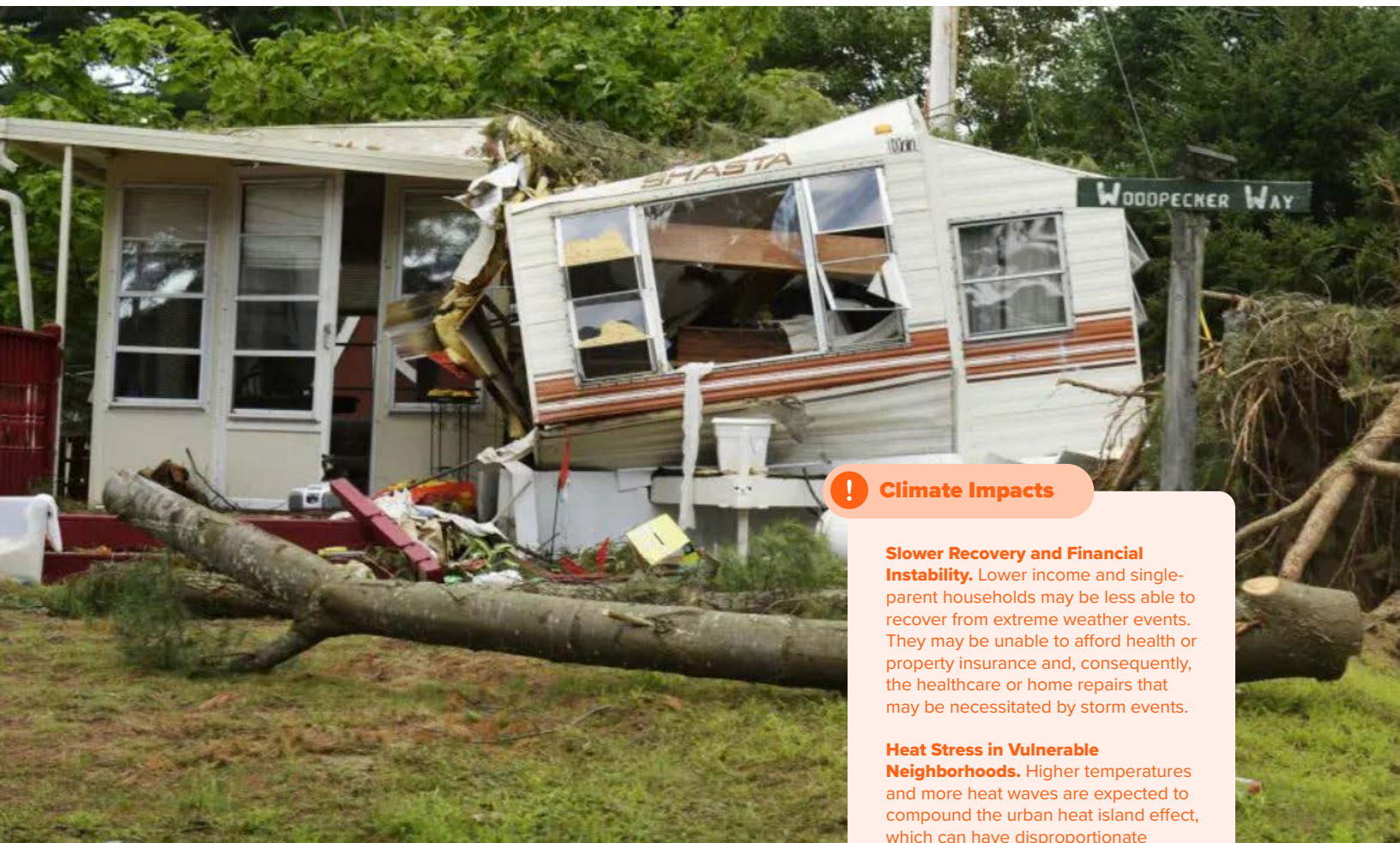
» Vulnerable Populations Albany County



» Percent of Households Without a Vehicle



¹ In 2021, the federal poverty level for a family of 4 was \$26,500, \$17,420 for a family of 2, and \$12,880 for individuals.



⌘ **Destroyed Mobile Home, Fulton County, NY**
Wind Storm, August 2016

! Climate Impacts

Slower Recovery and Financial Instability. Lower income and single-parent households may be less able to recover from extreme weather events. They may be unable to afford health or property insurance and, consequently, the healthcare or home repairs that may be necessitated by storm events.

Heat Stress in Vulnerable Neighborhoods. Higher temperatures and more heat waves are expected to compound the urban heat island effect, which can have disproportionate health impacts on lower-income urban neighborhoods where there are fewer trees and fewer green spaces.

Natural and Cultural Resources

Natural resources, like parks, open spaces, and natural systems, can be important tools for climate resilience.

The forestlands, wetlands, and open spaces conserved in Albany County's parks and preserves help sequester the carbon pollution that is driving climate change. Parks and open spaces also directly reduce some of the primary health challenges that are exacerbated by climate change, including heat stress and respiratory problems. When designed for resilience, parks and public lands can be active agents in climate resilience by managing stormwater, protecting upland infrastructure, reducing greenhouse gas emissions, and promoting public health. Public lands in particular represent significant opportunities to maximize the deployment of climate strategies to model and encourage resilience throughout the county.

! Climate Impacts

Parks and public lands can help mitigate and adapt to climate change in several ways, including:

- **Minimizing flooding and improving water quality** by absorbing and filtering stormwater runoff and, in some cases, by acting as a buffer between floodwaters and upland homes and infrastructure
- **Improving air quality** by sequestering carbon and other filter particulate matter, including emissions from vehicles
- **Cooling urban heat islands** by providing shade
- **Improving public health** by cleaning air, cooling surrounding areas, and promoting healthy activities
- **Maximizing use of climate resilient strategies** and providing opportunities to test, model, and encourage their adoption throughout the county

Binnen Kill Wetlands »
Bethlehem



Natural and Cultural Resources

Natural Systems

Hydric Soils

Areas with hydric soils either currently support or are capable of supporting wetland ecosystems. Hydric soils are formed under sufficiently wet conditions and can support the growth and regeneration of hydrophytic vegetation, the type of vegetation characteristics of wetlands.

Steep Slopes

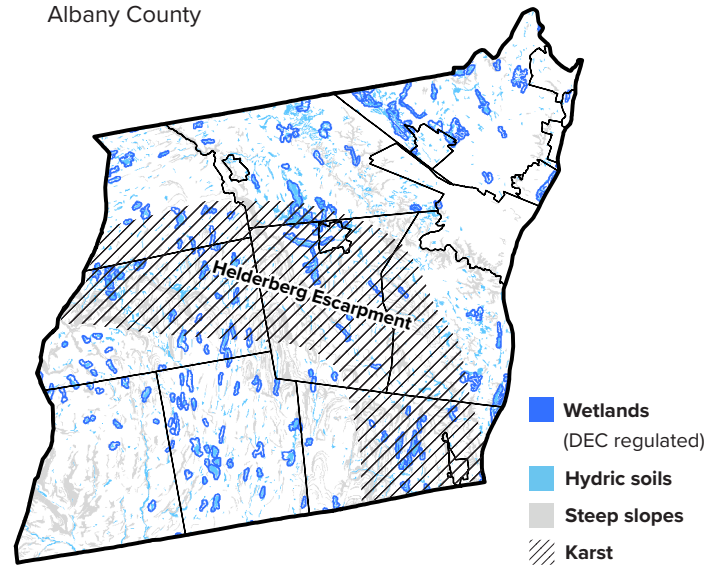
Steep slopes (greater than 25%) cover roughly 13% of Albany County's land area. Steep slopes are more vulnerable to destabilization and landslides.

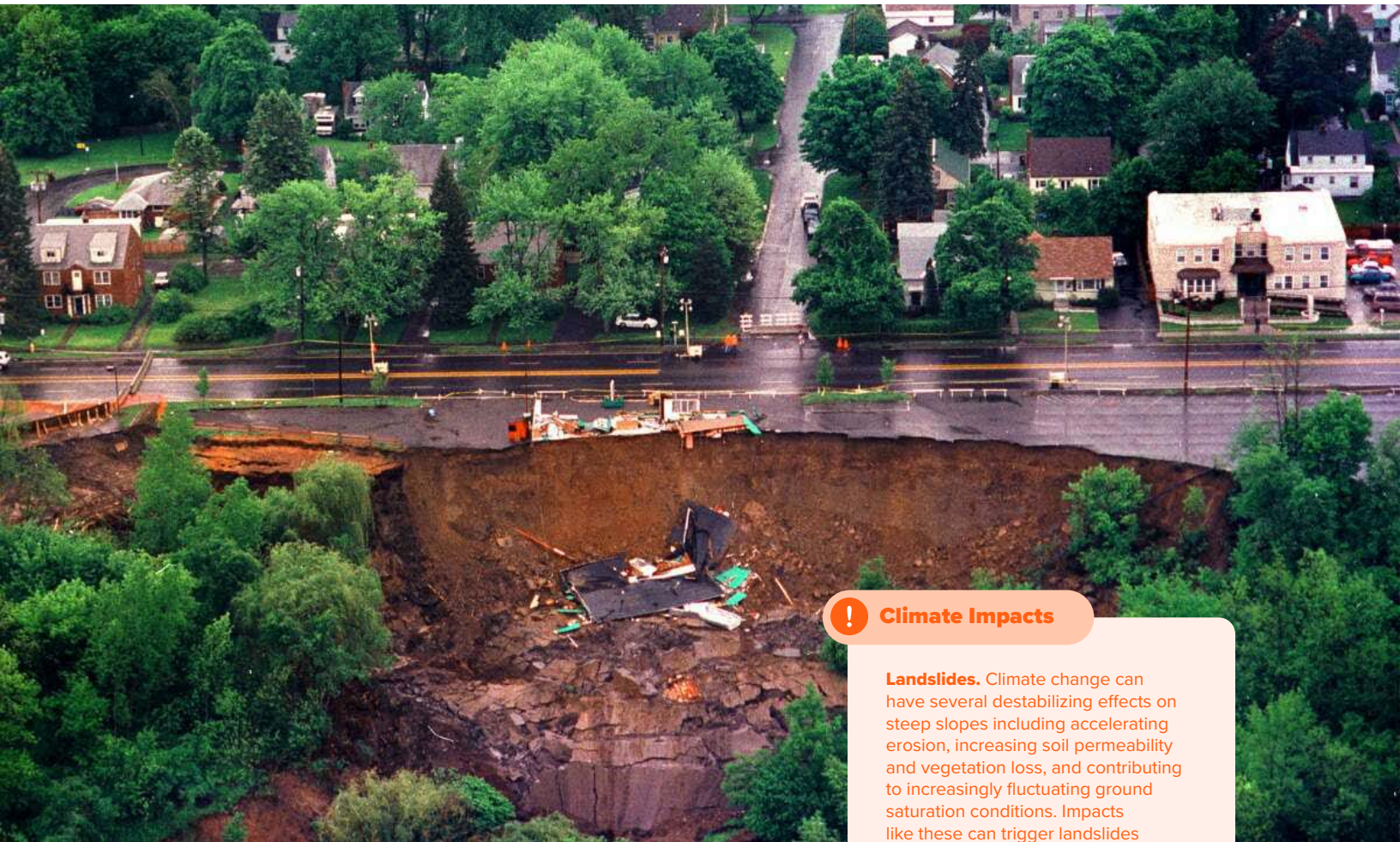
Karst

Karst topography, which is characterized by caves, springs, sinkholes, and disappearing streams, can be found in a narrow band along the Helderberg Escarpment in Albany County. Karst areas provide unique habitats as well as mineral and water resources, but they are also particularly susceptible to environmental impacts. Their groundwater is very easily polluted and, following storms, droughts, and changes in land use, new sinkholes can form suddenly, even miles away from the karst area.

>> Natural Systems

Albany County





⚡ **Normans Kill Ravine Landslide**
Delaware Avenue, Bethlehem, May 2000



Climate Impacts

Landslides. Climate change can have several destabilizing effects on steep slopes including accelerating erosion, increasing soil permeability and vegetation loss, and contributing to increasingly fluctuating ground saturation conditions. Impacts like these can trigger landslides and severely affect downslope developments and ecosystems.

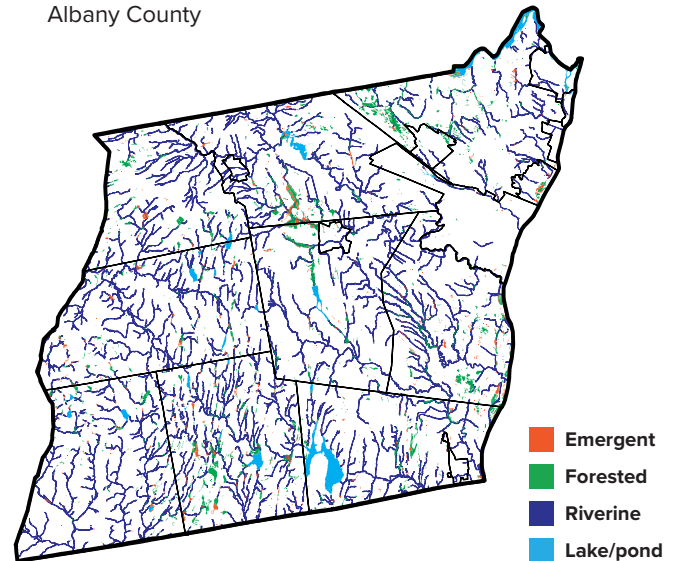
Natural and Cultural Resources

Natural Systems CONTINUED

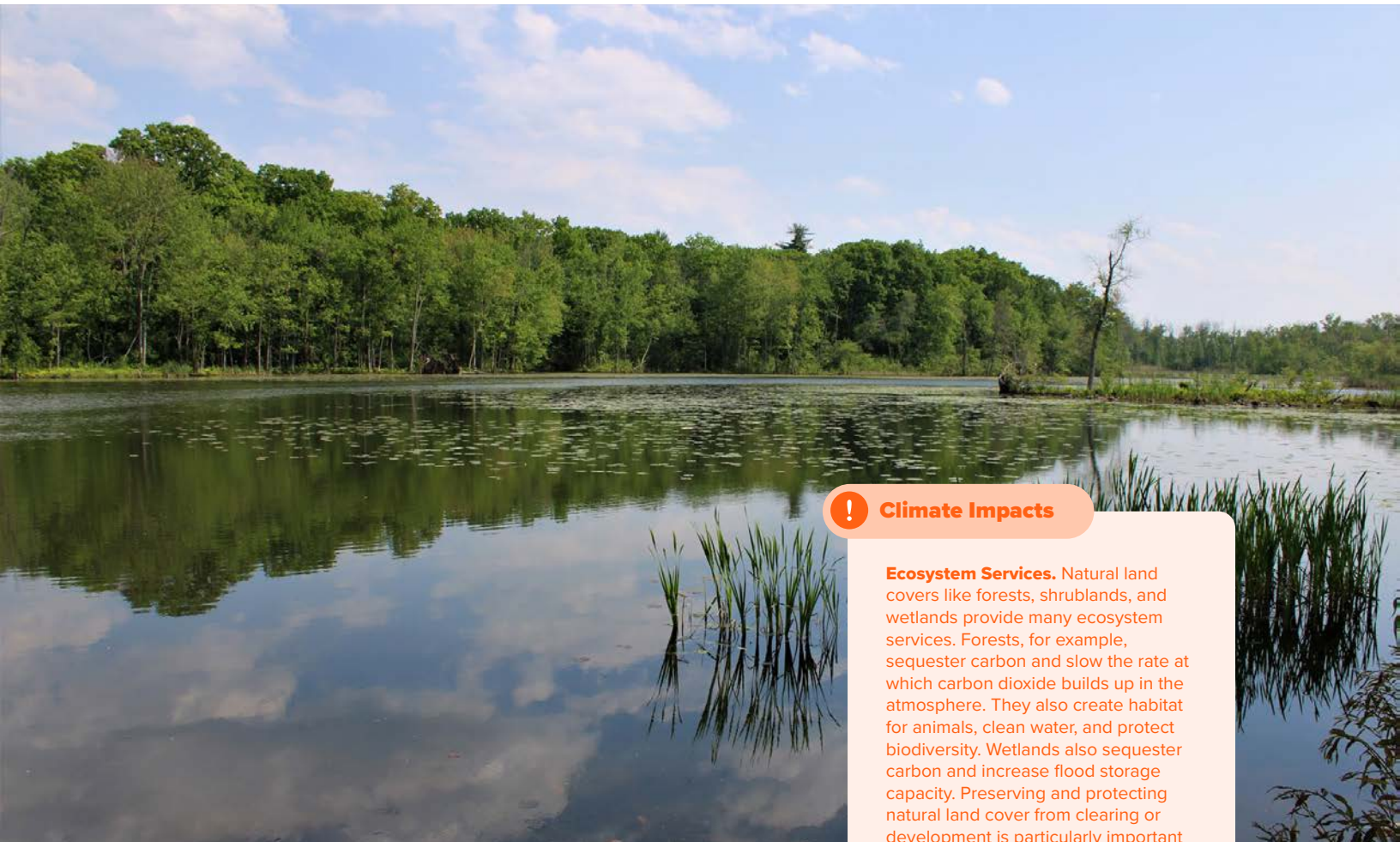
Freshwater Wetlands

There are approximately 22,000 acres of freshwater wetlands in Albany County that are subject to protection under the State's Freshwater Wetlands Act. These wetlands include marshes, bogs, meadows, and similar areas that are saturated by surface or groundwater and serve as natural habitats for many species of animals and plants. They are an important tool in mitigating climate change, as they can absorb floodwater and runoff and prevent the loss of upland soil.

» Wetland Types (USFWS NWI)¹ Albany County



¹ Data from U.S. Fish and Wildlife Service
National Wetlands Inventory



⚡ **Ann Lee Pond Nature and Historic Preserve**
Colonie



Climate Impacts

Ecosystem Services. Natural land covers like forests, shrublands, and wetlands provide many ecosystem services. Forests, for example, sequester carbon and slow the rate at which carbon dioxide builds up in the atmosphere. They also create habitat for animals, clean water, and protect biodiversity. Wetlands also sequester carbon and increase flood storage capacity. Preserving and protecting natural land cover from clearing or development is particularly important as these ecosystems, when destroyed, drained, or encroached upon, can release the carbon they have stored back into the atmosphere.

Natural and Cultural Resources

Floodplains

Almost 7% of Albany County's land area (or 22,000 acres) is located in a designated floodplain. Floodplain areas can be found along the Hudson and Mohawk Rivers as well as along inland rivers and streams.

High Risk Floodzones

Zone A. Areas in Zone A are subject to flooding by the 1% annual chance flood. The 1% annual chance flood, also known as the base flood or the 100-year flood, is the flood that has a 1% chance of being equaled or exceeded in any given year.

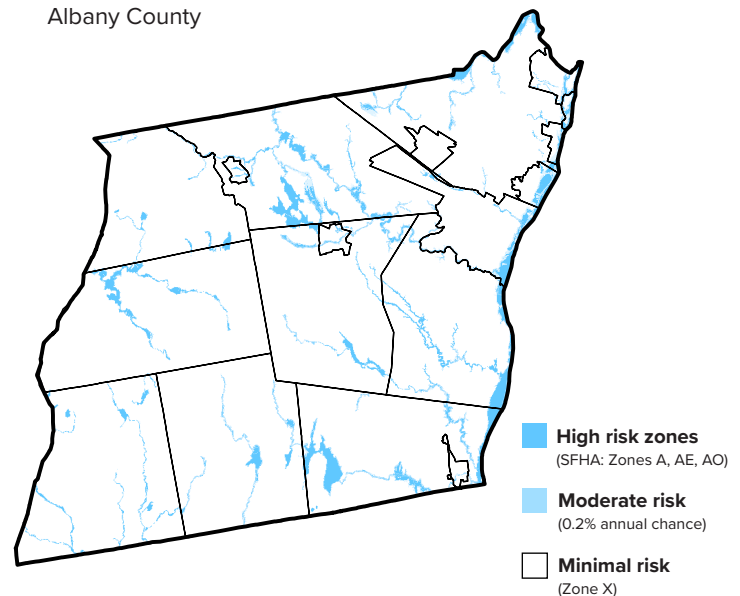
Zone AE. Areas in Zone AE are also subject to flooding by the 1% annual chance flood. The distinguishing characteristic between Zone A and Zone AE is that detailed hydraulic analyses were used to determine the floodzones in Zone AE while approximate methods were used for Zone A.

Zone AO. Areas in Zone AO are subject to 1% annual chance shallow flooding with average depths between 1 and 3 feet. This type of flooding is usually sheet flow on sloping terrain. Zone AO floodzones are found in Albany County only in the Village of Altamont.

Special Flood Hazard Area (SFHA). Zone A, AE, and AO together collectively make up the Special Flood Hazard Area (SFHA), which encompasses all of FEMA's high risk floodzones. Approximately 6.4% of land area in Albany County is located in the SFHA. Flood insurance is mandatory for home- and property-owners with federally-backed or -regulated mortgages in these areas.

» FEMA Floodzones

Albany County



Moderate Risk Floodzones

0.2% Annual Chance Floodzone. These areas are subject to flooding by the 0.2% annual chance flood. The 0.2% annual chance flood, also known as the 500-year flood, is the flood that has a 0.2% chance of being equaled or exceeded in any given year.

Minimal Risk Floodzones

Zone X. Areas beyond the 0.2% annual chance floodzone are only at minimal risk of flooding.



⚡ **Hudson River Flooding, Troy, NY**
Hurricane Irene, September 2011



Climate Impacts

Stormwater Storage. Parks can be designed to absorb and filter stormwater, reduce flooding, and recharge drinking water supplies. Strategically-located parks and open spaces can also act as buffers from rising water levels and inland flooding.

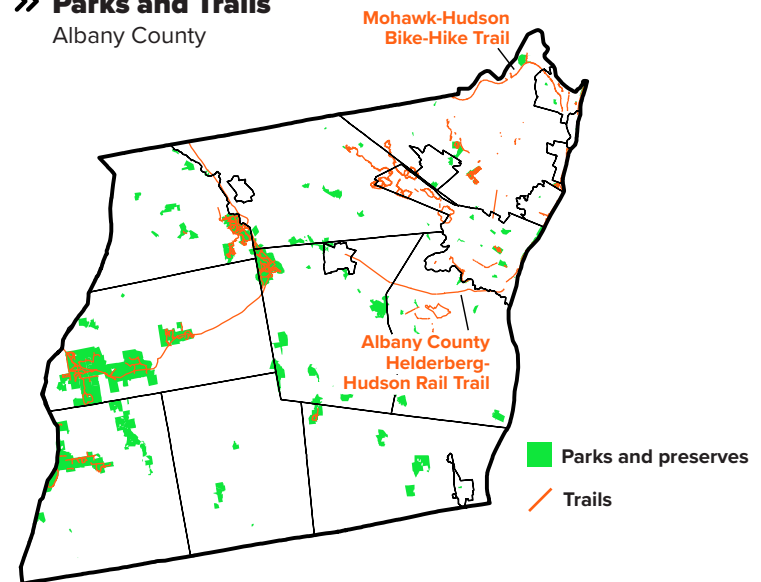
Natural and Cultural Resources

Parks and Trails

There are 85 parks and conservation areas that provide more than 19,000 acres of open space in the county. These open spaces include State parks, forests, and wildlife management areas, Mohawk Hudson Land Conservancy (MHLC) preserves, and county and local parks. **These parks and open spaces are critical components in the County's resiliency strategy, as they provide multiple climate, environmental, and health benefits.** A system of 173 miles of trails connects these open spaces and other destinations together. Major trail systems include the Long Path, which connects to New York City, the Albany County Helderberg-Hudson Rail Trail, and the Mohawk-Hudson Bike-Hike Trail.

» Parks and Trails

Albany County



Mohawk Hudson Land Conservancy

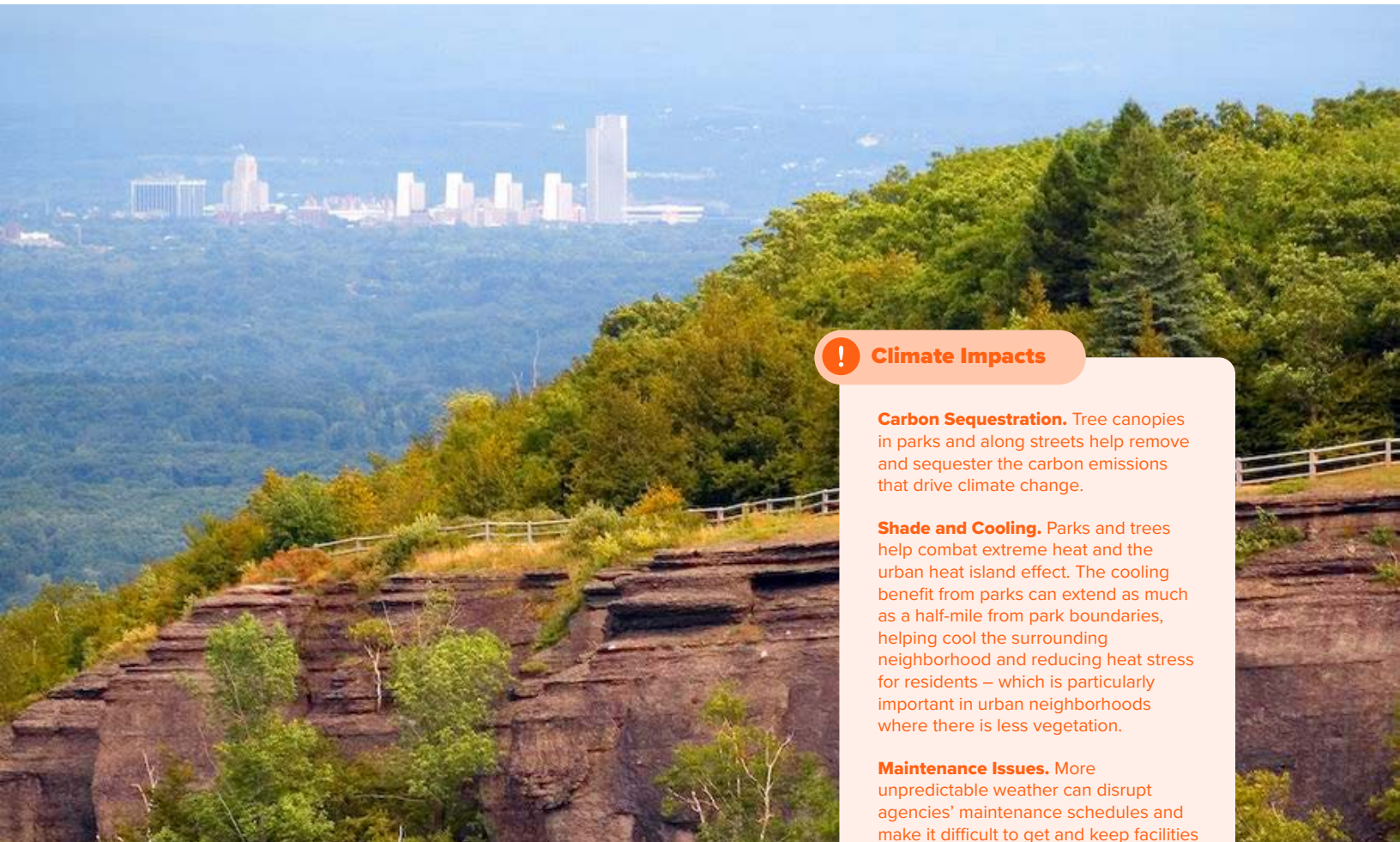
The Mohawk Hudson Land Conservancy (MHLC) is a non-profit, accredited land trust whose mission is to preserve natural, scenic, agricultural, and historic landscapes and habitats. MHLC conserves land for public and natural benefit by using acquisitions and easements. Its lands protect natural resources and working landscapes for farming and forestry and also provide 21 public preserves for hiking, cross-country skiing, and other recreation. MHLC's recent projects include:

- Protecting the 86-acre **Picard Grove** at the base of the Helderberg Escarpment
- Protecting the 257-acre **Helderberg Workshop property**, an undeveloped natural area with wetlands, scenic open spaces, and habitat below Thacher Park



Five Rivers Environmental Center

Five Rivers Environmental Education Center, located in Delmar, is a living museum in the heart of over 450 acres of fields, forests, and wetlands. Five Rivers offers a wide variety of educational programming, including workshops, lessons for school groups, and guided walks. The center also has 10 miles of hiking trails, which provide opportunities for cross-country skiing, snowshoeing, and wildlife viewing.



📍 **John Boyd Thacher State Park**
Voorheesville



Climate Impacts

Carbon Sequestration. Tree canopies in parks and along streets help remove and sequester the carbon emissions that drive climate change.

Shade and Cooling. Parks and trees help combat extreme heat and the urban heat island effect. The cooling benefit from parks can extend as much as a half-mile from park boundaries, helping cool the surrounding neighborhood and reducing heat stress for residents – which is particularly important in urban neighborhoods where there is less vegetation.

Maintenance Issues. More unpredictable weather can disrupt agencies' maintenance schedules and make it difficult to get and keep facilities ready for use. Wetter winters may make it difficult to have fields ready by spring. While hotter summers may signal the need for providing more shade in open spaces and scheduling more programming later in the day when the heat is more bearable.

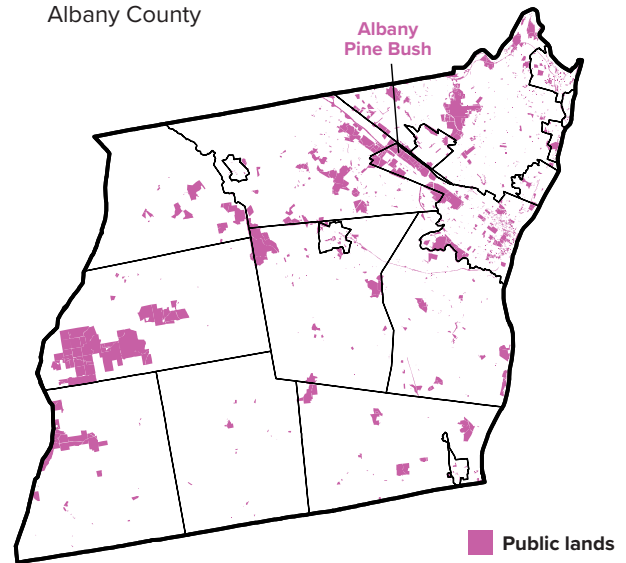
Natural and Cultural Resources

Public Lands

There are 28,000 square miles of publicly-owned land in Albany County, more than half (54%) of which are parks or open space lands. **These parks and open spaces are important, to the greatest extent possible, to preserve from development moving forward as they represent huge swaths of land that are actively mitigating climate change impacts.** The remaining public lands include government, public, and school buildings, landfills, police and fire stations, land bank properties, and transportation, telecommunications, and wastewater treatment infrastructure owned by federal, State, and local municipalities.

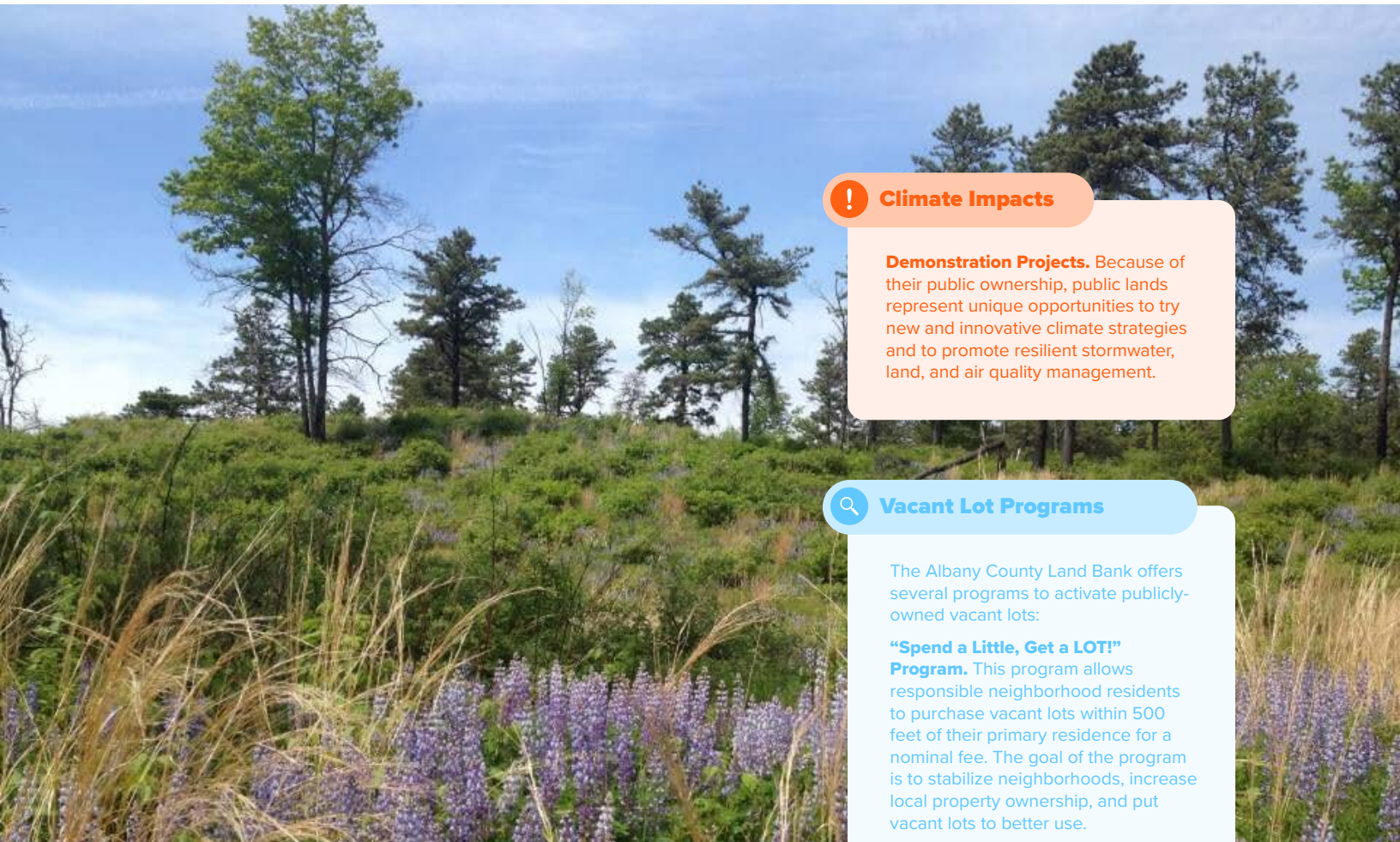
» Public Lands

Albany County



Albany Pine Bush

The Albany Pine Bush Preserve is one of the largest inland pine barrens ecosystems in the world. It covers 3,400 acres across the City of Albany and Towns of Colonie and Guilderland. The Pine Bush is a unique ecosystem – one of only 20 inland pine barrens to still exist – with gently rolling sand-dunes and a variety of rare plants and animals, including the federally endangered Karner blue butterfly. In 2014, the Pine Bush was designated as a National Natural Landmark by the National Park Service. The Albany Pine Bush Preserve is owned by a partnership of State, municipal, and non-profit agencies and is managed by the Albany Pine Bush Preserve Commission.



⚡ **Albany Pine Bush Preserve**
Colonie and Guilderland



Climate Impacts

Demonstration Projects. Because of their public ownership, public lands represent unique opportunities to try new and innovative climate strategies and to promote resilient stormwater, land, and air quality management.



Vacant Lot Programs

The Albany County Land Bank offers several programs to activate publicly-owned vacant lots:

“Spend a Little, Get a LOT!”

Program. This program allows responsible neighborhood residents to purchase vacant lots within 500 feet of their primary residence for a nominal fee. The goal of the program is to stabilize neighborhoods, increase local property ownership, and put vacant lots to better use.

Residential Side Lot Program.

This program offers certain vacant residential lots for a discounted price to property owners who own adjacent lots. Buyers are expected to improve these lots, thereby beautifying the neighborhood and improving surrounding property values.

Natural and Cultural Resources

Historic and Cultural Resources

There are 224 historic districts and sites listed on the National Register of Historic Places in Albany County as well as several hundred religious, social, and moral institutions that contribute to cultural character and heritage.

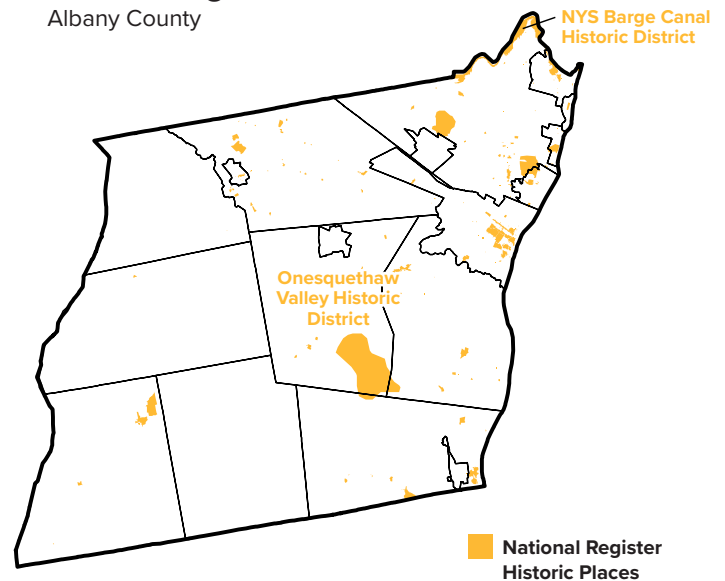
Cultural resources, historic buildings, archaeological sites, and other historic landscapes experience similar effects from climate change as natural resources located in the same area. What differentiates cultural resources is that they are individually unique and intensely place-based, with their meaning often tied to their specific location. **The geographic importance and architectural-sensitivity of historic structures makes protecting cultural resources from the impacts of climate changes particularly challenging.**

Onesquethaw Valley Historic District

The largest historic district in the county is the Onesquethaw Valley Historic District located along the Onesquethaw Creek in New Scotland. This 3,400+ acre historic district has 25 contributing buildings – most notably eight 18th-century stone houses – and three contributing archaeological sites including: a grist mill site, a sawmill site, and a prehistoric Indian site.

» National Register Historic Places

Albany County



NYS Barge Canal Historic District

A portion of the larger 450-mile New York State Barge Canal Historic District is located in Colonie along the Mohawk River. Today, the canalized river, which has been widened and straightened in some areas, forms the eastern segment of the Erie Canal. The original Erie Canal channel parallels the river from Rome to its mouth but has been largely abandoned. The New York State Canal System is unique in that it is designated as a National Historic Landmark, a distinction received by only 3% of National Register Historic Places.



⌘ **Bradt-Oliver House**
Bethlehem



Climate Impacts

Resource Deterioration. Weathering, sunlight, moisture, and other natural factors affect the preservation and protection of historic and cultural resources. Climate change projections indicate that the rates, combinations, and intensity of these factors are increasing, and that these irreplaceable resources are likely to be altered, deteriorated, or removed at faster rates or in ways not previously observed.

Economic Systems

Climate stressors can affect business, industry, and overall economic vitality in Albany County.

Albany County's economy generally developed around a stable climate. As climate stressors and associated hazards change now and into the future, collaborative investment from public and private stakeholders in adaption and preparedness will be necessary to ensure a resilient economy with businesses capable of enduring climatic disruptions.

People, businesses, and workers in natural resource-based industries and industries that involve outdoor labor (i.e., agriculture, forestry, fishing) are especially aware of climate change impacts and are actively taking steps to be better prepared and resilient. Climate risk and resiliency is also becoming increasingly important for future industry opportunities, especially within many of the region's top targeted sectors from power and semiconductors to offshore wind and advanced materials.



Did you know?

A Deloitte Global survey found that over **80% of executives are concerned about climate change** and the effects it could have on their companies.

Columbia Street Flooding »
City of Albany, August 2014



Economic Systems

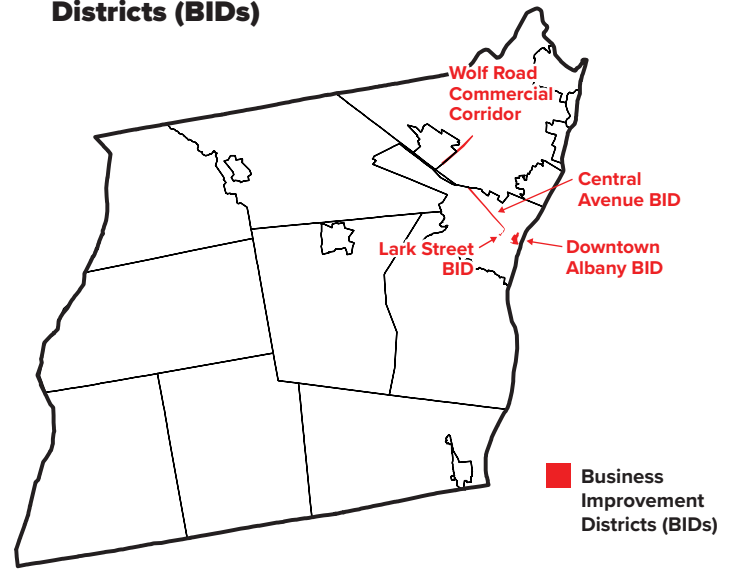
Businesses

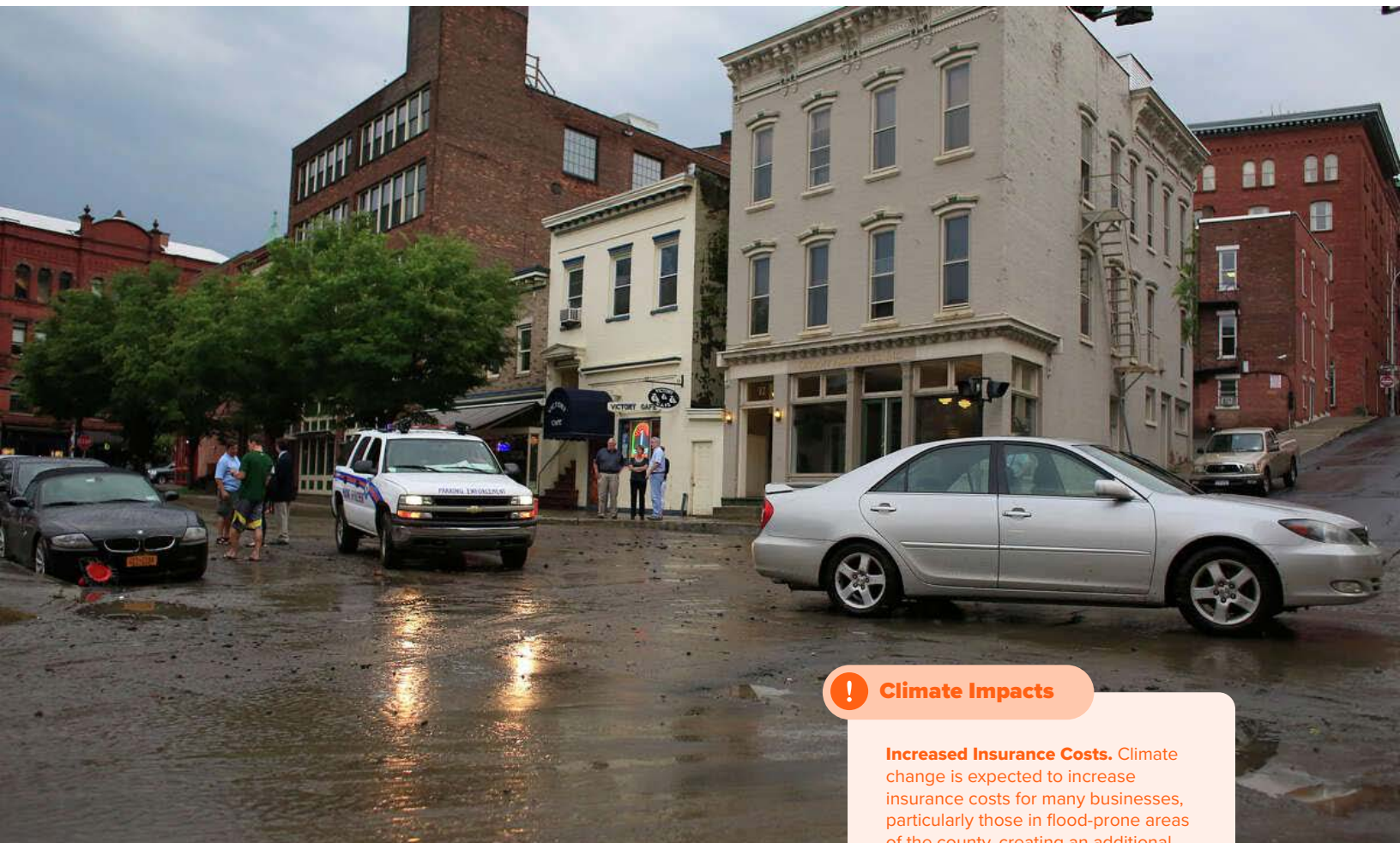
Albany County is home to thousands of businesses which offer many different goods and services.

Climate stressors can result in several impacts on Albany County's businesses and the overall economy system, including:

- Operational impacts** due to damaged facilities, loss of supporting infrastructure such as roads and power, or workforce disruptions. These interruptions cause increased downtime, resulting in lost revenue, as well as increased capital cost for businesses to repair damaged structures and replace lost assets.
- Regulatory and political uncertainty** around climate at all levels of government is a significant concern for many businesses, specifically those in real estate, development/construction, and healthcare/life sciences.
- Supply chain issues** are a growing strain as a greater frequency and severity of climate hazards interrupts production and distribution globally as well as within local supply chain networks. For example, storm events that impact the water level in the Hudson River can cause ships to spend more time waiting for safe passage under downstream bridges. There are also certain goods, like grains, that cannot be exposed to rainfall during the loading process and increased rainfall events affect their ability to ship. These types of delays raise costs and prices, and delay overall output.
- Scarcity or cost of resources** following a significant climate event can place additional financial burden on businesses from an operational perspective as well as reduce the ability of directly-affected businesses to raise capital for repairs and recovery.

>> Business Improvement Districts (BIDs)





⌘ **Sheridan Avenue Flooding**
City of Albany, August 2014

! Climate Impacts

Increased Insurance Costs. Climate change is expected to increase insurance costs for many businesses, particularly those in flood-prone areas of the county, creating an additional financial burden.

Economic Systems

Agriculture

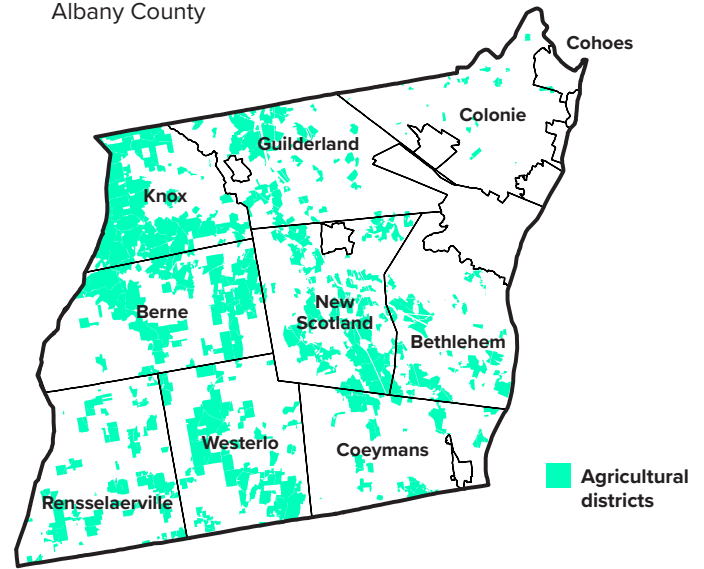
There are more than 70,000 acres of land in designated Agricultural Districts in Albany County. The majority of the contiguous blocks of districted agricultural land is located in the rural towns of Berne, Knox, Westerlo, and Rensselaerville. These Agricultural Districts protect farmland from non-agricultural uses. The effects of climate change, however, will require more than just protection against encroaching development to ensure the continued viability of agricultural production in the county.

Increased temperatures and more frequent storm events will require farmers to make strategic business decisions to manage production risks, diversify operations, and invest in new infrastructure. **As average temperatures and precipitation rates change, the viability and yield of certain crops may decrease, potentially leading to crop yield losses in the county.** Sustainable agricultural practices, like rotating crops, planting cover crops, using organic fertilizers, and creating riparian buffers will be increasingly important to ensure the long-term viability of agricultural production in the county and to reduce associated greenhouse gas emissions.

Agricultural land use is a significant contributor to greenhouse gas emissions. Globally, agriculture, forestry, and similar land uses account for an estimated 23% of human-induced greenhouse gas emissions, according to the Intergovernmental Panel on Climate Change (IPCC). These greenhouse gas emissions include methane from livestock farming, nitrous oxide from over-fertilization, and loss of carbon sequestration potential from conversion of natural lands to agricultural lands.

>> Agricultural Districts

Albany County

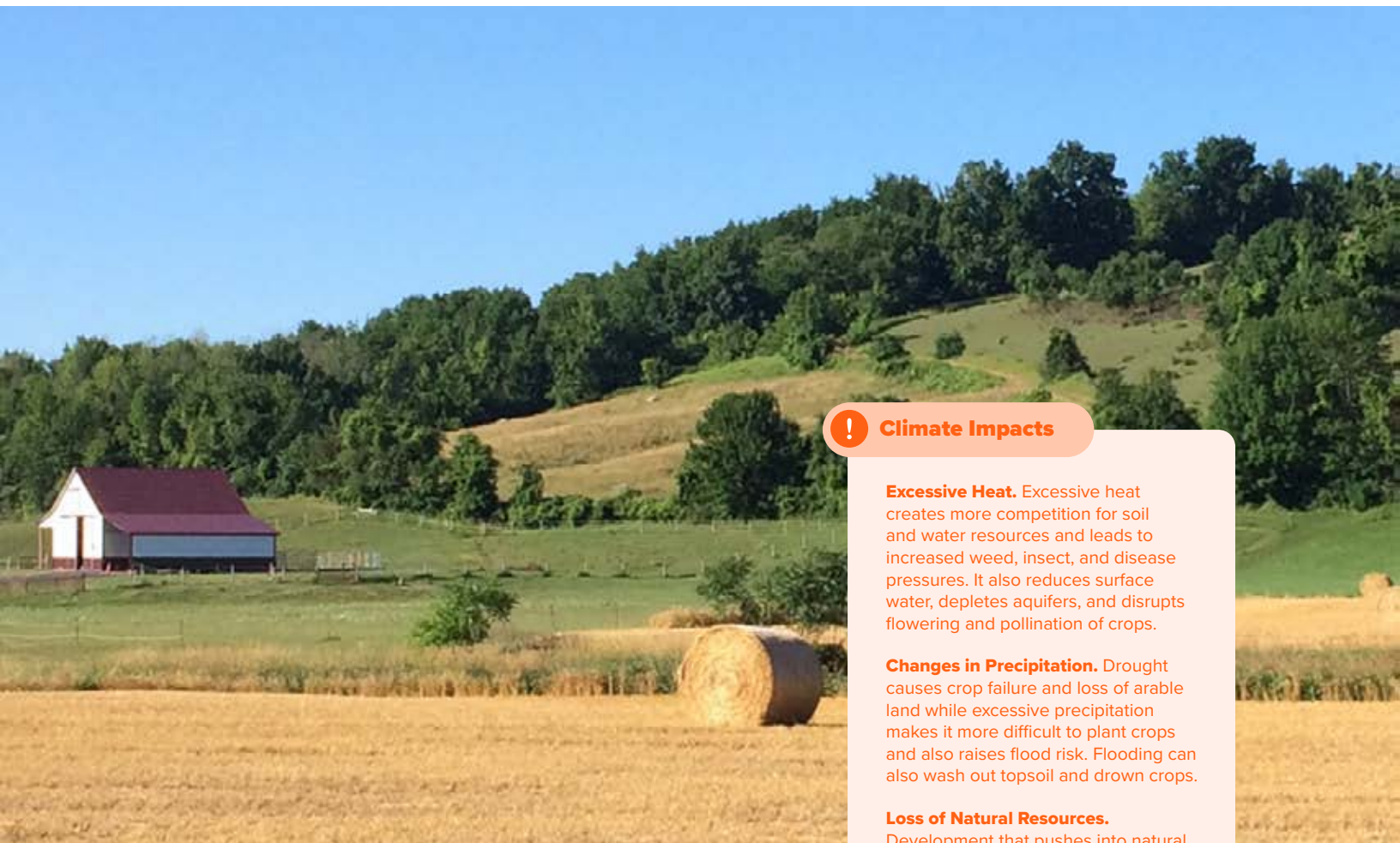


Ag and Farmland Protection Plan

The Albany County Agricultural and Farmland Protection Plan Update (2018) identified several climate-related impacts on agriculture that are expected to affect agricultural productivity in the county. These impacts include:

- Reduced ability of perennial crops to be economically sustainable
- Need to replace varieties of field crops with more heat-tolerant varieties
- Increased pest, disease, and weed pressure
- Significant production declines in the dairy industry due to heat stress

The plan also noted opportunities, one being that changes in climate might lengthen the growing season and present opportunities to adopt new crops and systems that were not previously climatically supported.



Climate Impacts

Excessive Heat. Excessive heat creates more competition for soil and water resources and leads to increased weed, insect, and disease pressures. It also reduces surface water, depletes aquifers, and disrupts flowering and pollination of crops.

Changes in Precipitation. Drought causes crop failure and loss of arable land while excessive precipitation makes it more difficult to plant crops and also raises flood risk. Flooding can also wash out topsoil and drown crops.

Loss of Natural Resources. Development that pushes into natural lands can dry up water sources and may remove habitats of insects that benefit crops.

Needs and Opportunities Assessment

This chapter outlines climate-related needs and challenges facing the county and identifies high-level strategies and opportunities to address them.

The **Needs and Opportunities Assessment** provides the basis for the recommended resilience projects and strategies included in **Chapter 4: Recommended Projects**, where the high-level opportunities identified in this assessment were expanded into detailed and actionable project recommendations that the County and its partners can undertake to strategically address community needs.



Needs and Opportunities

Overview

The identification of issues and needs was informed by:

- **Findings from the County Profile** (Chapter 1)
- **Stakeholder meetings**, with multiple local agencies, organizations, and businesses who are impacted by or interested in climate change
- **Municipal Working Group (MWG) meetings**, with local officials from Albany County municipalities
- **Technical Advisory Committee (TAC) meetings**, with technical experts from Albany County, New York State, the Capital District, and other local agencies in areas like environmental conservation, emergency services, economic development, and transportation
- **Public feedback**, from community members at engagement events



Identifying Needs

In addition to the findings from the County Profile, needs were identified through discussions with a broad range of stakeholders, each with varying interests related to climate change and its impacts.

An abbreviated list of involved stakeholders is shown below:

- Advance Albany County Alliance
- Affordable Housing Partnership
- Albany County Land Bank
- Albany County Sheriff's Office
- Albany County Stormwater Coalition
- Capital District Habitat for Humanity
- Capital District Regional Planning Commission
- Center for Economic Growth
- Five Rivers Environmental Center
- Mohawk Hudson Land Conservancy
- National Grid
- Port of Albany
- Port of Coeymans
- Radix Ecological Sustainability Center
- Redburn
- Red Cross
- Rosenblum
- University at Albany

Defining Terms

An issue is a climate-related problem that has been identified through the existing conditions analysis and/or through community feedback.



Sample Issue:

Albany County does not have a county-wide plan for climate resilience.

A need translates the issue into an objective, or a goal that can be achieved to address the *issue*.



Sample Need:

To develop a comprehensive plan that considers climate impacts and makes recommendations to improve resilience of the county's systems.

An opportunity is a tangible action, like a project, program, or policy, that can be implemented to account for the *need* and, in turn, address the *issue*.



Sample Opportunity:

Work with local municipalities and technical experts to develop an Albany County Climate Resiliency Plan.

Needs and Opportunities

Community Planning and Capacity

Community planning is an important first step in developing climate resilience. Opportunities exist to expand climate-related policy, program, and plan adoption at both the County and local level, to increase public awareness, and to build community capacity.

+ Want to know more?

See page 136 for the projects recommended to address these needs and opportunities.

Issue

- 01** Public awareness and preparedness for potential climate impacts in Albany County is limited

- 02** Municipalities across Albany County differ in their adoption and enforcement of climate resilient laws and regulations

- 03** Existing policies do not address or do not go far enough in addressing climate change

- 04** Local municipalities do not have the capacity or expertise to develop policies or plans for climate resilience

Need

Increase public awareness of potential climate impacts, build capacity around how to prepare, and better communicate what resources are available to recover

Expand adoption of climate resilient regulations and use these regulations to promote sustainable practices and protect communities

Proactive policies and regulations that consider climate change

Support for municipalities in policy, program, and plan development

Opportunity

Implement a **public messaging/educational campaign** to spread awareness of climate impacts; create an **online repository or “one-stop center”** for climate resources like sustainable building practices or help navigating insurance/FEMA assistance

Encourage **information sharing** among municipalities; create **working groups** to share lessons learned

Implementing **higher regulatory standards** for floodplain management or flood-resilient zoning, **regularly updating building codes** as the needs of a changing climate become apparent, **adopting policies that promote mitigation** like low emission vehicle standards, complete street policies, and smart growth principles

At the County level, support municipalities with **technical and financial assistance** in adopting climate policies, implementing climate programs, and developing resiliency plans; explore **shared service agreements** to expand capacity

Needs and Opportunities

Housing

Housing in Albany County is vulnerable to the effects of climate change for a number of reasons, not least of which is that 20% of residential parcels are located in flood hazard areas. Opportunities exist to create a more resilient housing stock through proactive design regulations and open space planning, and to assist residents in preparing for and dealing with climate events through improved assistance programs.

+ Want to know more?

See page 156 for the projects recommended to address these needs and opportunities.

Issue

- 01 Lack of climate resilient and affordable housing stock
- 02 Older housing stock is vulnerable to severe weather events, increasing the frequency and cost of maintenance and repairs
- 03 Housing is located in flood hazard areas
- 04 Socially vulnerable and unhoused populations are at increased risk to extreme weather, like hot and cold emergencies

Need

Identify safe growth areas that meet the community's needs; encourage/incentivize resilient construction and retrofits

Opportunity

Proactive identification of areas suitable for new residential uses; **Stretch Code** compliance; **workforce development**

Block-by-block approach that holistically tackles historic preservation, energy efficiency, floodproofing, and vacant structure redevelopment

Create a **centralized entity** to coordinate funding streams and provide grant application assistance to broaden participation and access

Identification of areas where open space can be acquired to mitigate flooding

Coordinated open space planning to strategically acquire and preserve open space in flood hazard areas adjacent to residential uses

Identification of places that can host heat/cold refugees for short periods during extreme weather events

Designate **warming and cooling centers** (e.g., libraries, community centers, government buildings, etc.) where community members can stay warm or escape the heat during extreme weather events

Needs and Opportunities

Infrastructure Systems

Albany County's infrastructure system is aging and, in some cases, is vulnerable to climate stressors like flooding, extreme heat, and invasive species. Opportunities exist to improve the existing system with an eye toward a green energy future that supports electrification and emissions-free transportation.



Want to know more?

See page 164 for the projects recommended to address these needs and opportunities.

Issue

- 01** Lack of a consistent and comprehensive dataset documenting past storm events

- 02** Aging and undersized stormwater infrastructure increases flood risks in developed areas, especially in neighborhoods constructed prior to NYS DEC stormwater regulations

- 03** Electrical infrastructure is vulnerable to flooding

- 04** Electrification of the county's energy system requires new storage and distribution facilities to ensure reliability and meet demand

- 05** Spread of invasive species impacts transmission infrastructure

- 06** Lack of charging infrastructure to support electrification of the transportation system

- 07** Lack of active transportation facilities to support emissions-free transportation

- 08** Transportation corridors are often located in close proximity to waterways

Need

Opportunity

Data collection system to measure and monitor storm events in diverse locations

County-wide **network of rain gauges** with public access to dataset

Stormwater infrastructure upgrades and replacements

Strategically **prioritize upgrades** that:

- Use a coordinated watershed-based approach
- Are in socially vulnerable communities
- Reduce flood hazards and CSOs
- Include natural infrastructure and ecological restoration

Storm hardening and/or relocation of existing energy infrastructure

Coordinated planning effort to **identify flood resilient locations for new substations** and strategic replacements/upgrades of old infrastructure

New energy infrastructure needed to support renewable energy generation and electrification of the grid

Coordinated identification of **locations for new energy storage, charging facilities, and microgrids** to improve reliability and redundancy

Plant native, disease resistant trees along transmission corridors

Work collaboratively to **align energy and ecological resilience and urban forestry goals** and initiatives

Increased public access to E/V charging infrastructure

Installation of **public E/V charging stations** on county-owned property

Interconnected, countywide network of non-motorized transportation infrastructure

Expand existing and create new **trail systems** to better connect local communities, including implementation of the Capital District Trails Plan

Ensure continued use of transportation corridors, even during extreme storm events

Reduce flood hazards impacting transportation infrastructure, particularly along evacuation routes

Needs and Opportunities

Health and Social Services

Strengthening the social service network with considerations for climate change can increase community resilience, especially for those most vulnerable to climate stressors like seniors, the unhoused, and socially vulnerable populations.

+ Want to know more?

See page 206 for the projects recommended to address these needs and opportunities.

Issue

- 01 Climate change is disproportionately impacting socially vulnerable communities
- 02 A prevalence of impervious surfaces and lack of vegetative cover increases vulnerability to climate stressors, especially in urban communities that are already at greater risk to the effects of climate change
- 03 Deploying volunteers from other regions to help respond to and recover from an emergency is expensive and time consuming
- 04 Extreme heat and extreme cold events will increase with climate change and could be exacerbated during electric outages
- 05 Natural disasters displace people and are particularly challenging for those without stable housing

Need

Strengthen partnerships and networks to promote, protect, and advocate for vulnerable communities

Integrate nature into urbanized areas to mitigate the urban heat island and reduce impervious cover

Need a trained local workforce to respond to disasters

Need a coordinated network of organizations that can mobilize services quickly to respond to emergencies

Provide shelter during an emergency, including non-congregate and longer-term solutions

Opportunity

Create a **Climate Justice Corps** that is rooted in local communities, prioritizes inclusion and participation in decision-making processes, and builds local capacity

Undertake a coordinated effort to inventory, monitor, diversify, and **expand the urban forest** in a way that:

- Increases the capacity of existing programs (e.g., Mow to Own) and organizations
- Creates local job opportunities
- Expands urban agriculture

Develop a **trained, local volunteer workforce** by building on existing UAlbany partnership

Partner with electric utilities and local community organizations to establish **heating and cooling centers**

Increase capacity to identify **new sheltering options** in low hazard areas and **update sheltering agreements** county-wide

Needs and Opportunities

Natural and Cultural Resources

Natural systems are critical tools for climate resilience, but they too are subject to the effects of climate change. Opportunities exist to protect and preserve Albany County's natural resources and ecosystems so that they can continue productively contributing to climate resilience.

+ Want to know more?

See page 216 for the projects recommended to address these needs and opportunities.

Issue

- 01 Shifts in species distributions

- 02 Increase in invasive species (both plant and animal) that are out-competing native species and threatening whole ecosystems

- 03 Public awareness of, engagement with, and access to existing nature preserves could be improved

Need

Identification and creation of wildlife corridors throughout the county

Opportunity

Interconnected open space network to support species movement between the Catskills and Adirondacks

Proactively prevent and monitor the spread of invasive species

Development of **educational, citizen science, and workforce training programs** as well as local job creation

Protect and expand the county's diverse, native ecosystems and increase public access to and awareness of the value of these resources

Support existing nature preserves in adapting to climate stressors, establishing native seed banks, and providing free public transit and educational opportunities

Needs and Opportunities

Economic Systems

A changing climate brings to the economy both opportunities – for the growth of green industries and renewable energy development – and challenges – like stress on agricultural systems and businesses. A resilient economic system can balance these, leveraging opportunities for growth while ensuring system-wide resilience in the face of change.

+ Want to know more?

See page 236 for the projects recommended to address these needs and opportunities.

Issue

- 01** Lack of trained workforce in green building and renewable energy sector

- 02** A diversity of pressures on agricultural systems (e.g., heat, drought, extreme precipitation, pests)

- 03** Local businesses have limited awareness about who to contact and what resources are available to support economic resilience in the face of climate impacts

- 04** Renewable energy development is displacing prime agricultural and forest lands

Need

A locally trained/skilled workforce to fill immediate and future needs

Opportunity

Workforce development and apprenticeship programs to provide well-paying jobs that advance climate resiliency goals

An interdisciplinary, community-wide approach to supporting farmers in adapting to climate change

Proactive **education** and extension efforts; **diversification of crops; system-wide investments** for energy and water management

A centralized point-of-contact for learning about and accessing economic resiliency resources

Identification of a **lead agency** or organization and/or creation of a **one-stop repository** to support businesses as it relates to climate resilience; incorporate climate resilience considerations into existing business support initiatives

To protect prime and productive soils and forested areas, while also advancing renewable energy development

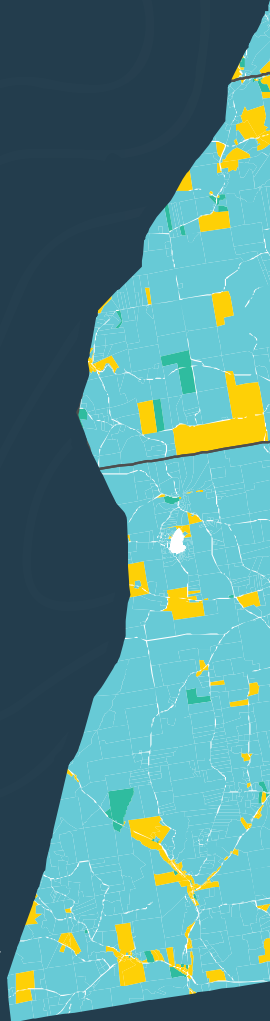
Adopt policies and regulations that **focus renewable energy development on brownfields**, greyfields, and other non-prime agricultural lands

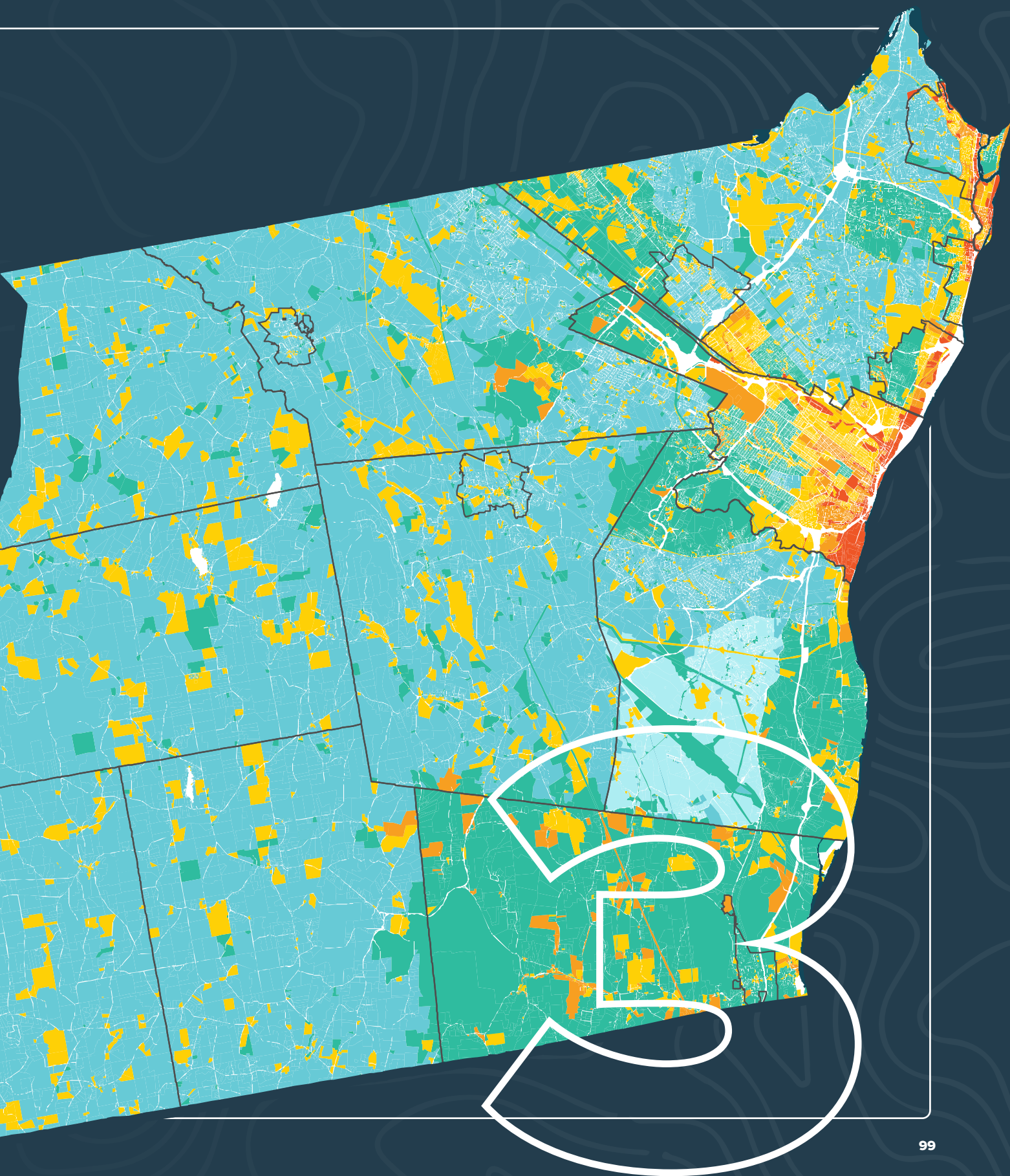
Risk Assessment and Analysis

This chapter assesses the vulnerability of county-wide systems to flood, heat, and climate stress.

A **Risk Assessment** was performed to identify areas and assets in the county at high risk to the impacts of climate change. The risk assessment uses flood risk, heat risk, and social vulnerability data from multiple state and federal sources to create a composite “climate risk score” for each parcel in the county. Climate risk scores quantify the relative risk each parcel faces to the potential impacts of climate change, like flooding and drought. They range from minimal (0) to extreme (5).

These climate risk scores, in combination with the needs and opportunities identified in **Chapter 2: Needs and Opportunities Assessment**, were used to develop and prioritize the projects detailed in **Chapter 4: Recommended Projects**.





Risk Assessment Methodology

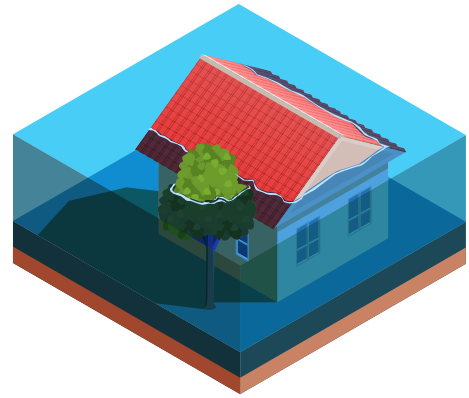
Climate Risks in Albany County

A changing climate will bring a number of climate stressors and impacts to Albany County in the future, including flooding, sea level rise, drought, and extreme weather events. The **Risk Assessment** that follows measures the degree to which land and systems in the county are vulnerable to these climate impacts.



Key Words

- **Risk** is the chance that an asset (or parcel) will be affected by adverse climate impacts. In this chapter, flood risk measures the chance that a parcel will be impacted by flooding. Heat risk measures the chance that a parcel will be impacted by extreme heat.
- **Vulnerability** is the degree to which a system is susceptible to adverse climate impacts based on that system's characteristics. In this chapter, social vulnerability measures the degree to which people are vulnerable to climate impacts based on socio-demographic characteristics like age, ethnicity, and income.



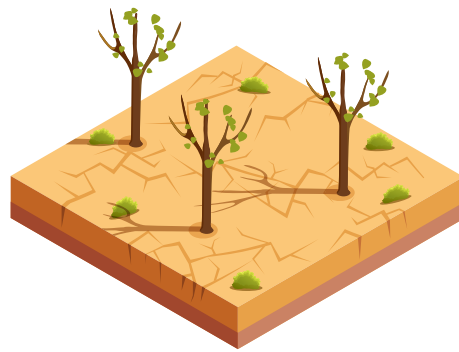
Flooding/Sea Level Rise

Flooding from sea level rise, heavy precipitation events, and changes in land use can inundate infrastructure, wash out fields, and cause severe damage to homes and buildings.



Extreme Weather Events

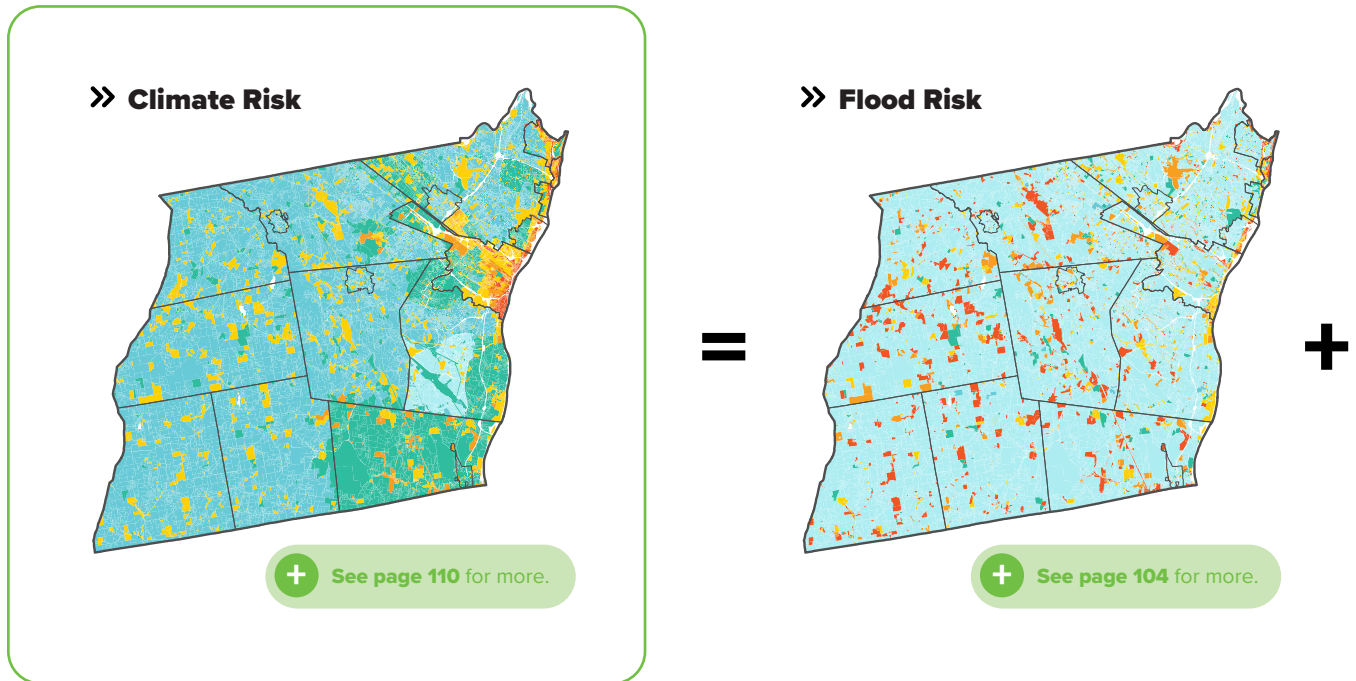
Extreme weather events, like heavy wind, rain, and snow storms and heat waves and cold snaps, can disrupt daily life in the county, and can be particularly impactful on socially vulnerable communities.



Drought

Long stretches of drought can negatively impact agricultural land and crop yields and can threaten water supplies in rural areas that are dependent on wells.

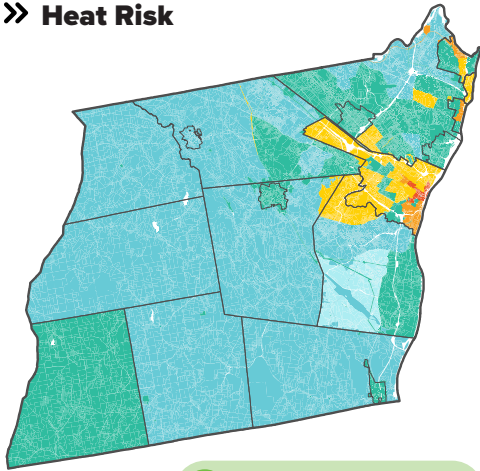
Risk Assessment Methodology



Measuring Climate Risk

In this **Risk Assessment**, “climate risk” is derived from a parcel’s flood risk, heat risk, and social vulnerability – which are combined to measure a parcel’s overall risk to the impacts of climate change. The level of climate risk can range from minimal (0), which suggests little to no impacts, to extreme (5), which implies critical impacts that can greatly disrupt systems and potentially put life and property at risk.

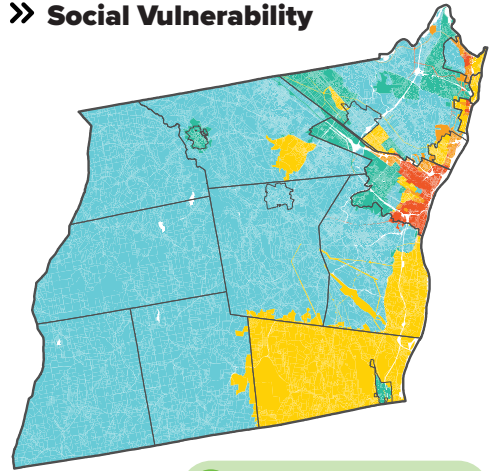
» Heat Risk



+ See page 106 for more.

+

» Social Vulnerability

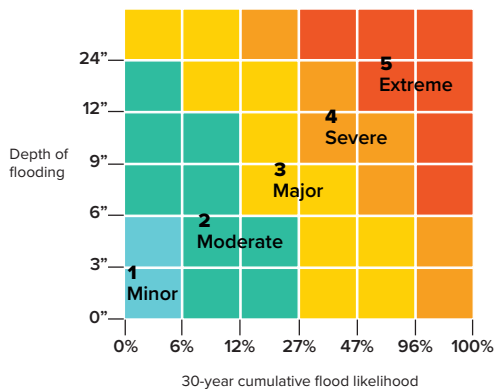


+ See page 108 for more.

Risk Assessment Methodology

Flood Risk

Flood risk was identified for each parcel using First Street Foundation's "Flood Factor" score, which identifies flood risk based on the likelihood of flooding at different depth intervals over a 30-year time period. The Flood Factor scores incorporate climate change models.



For assets spanning multiple parcels or in the public right-of-way (e.g., roads, trails, bus routes), flood risk was approximated using the 2050 projection for the 100-year flood.

Data source: First Street Foundation
Data scale: parcel

5 Extreme Flood Risk
Flood Factor score between 9 and 10

4 Severe Flood Risk
Flood Factor score between 7 and 8

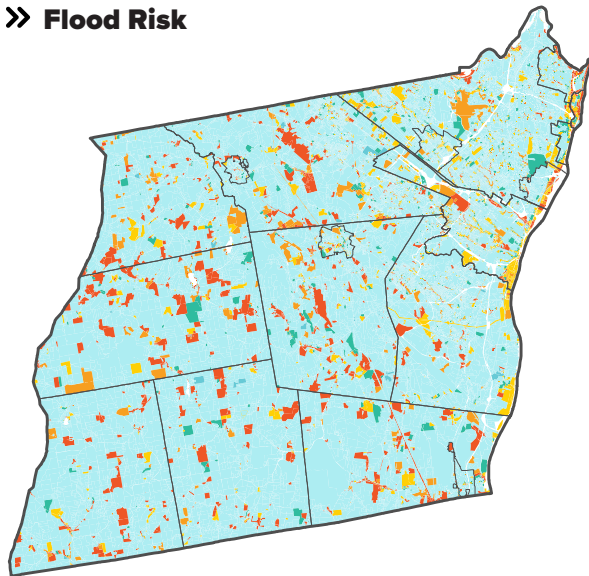
3 Major Flood Risk
Flood Factor score between 5 and 6

2 Moderate Flood Risk
Flood Factor score between 3 and 4

1 Minor Flood Risk
Flood Factor score of 2

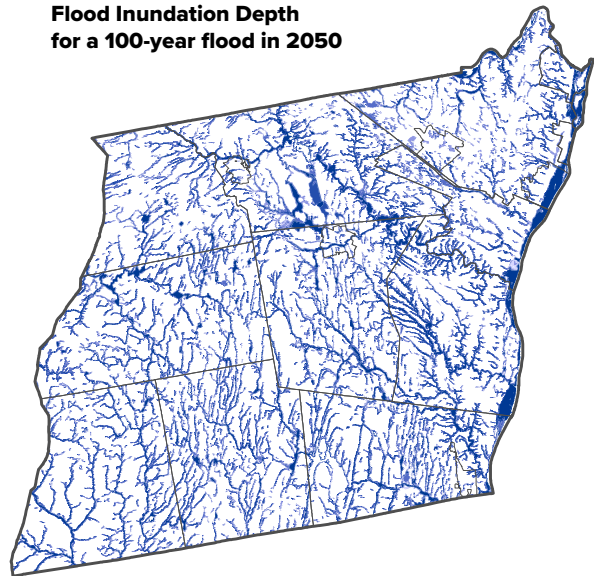
0 Minimal Flood Risk
Flood Factor score of 1

» Flood Risk



- 5 Extreme
- 4 Severe
- 3 Major
- 2 Moderate
- 1 Minor
- 0 Minimal

Flood Inundation Depth for a 100-year flood in 2050



- >36" of inundation
- 25-36" of inundation
- 13-24" of inundation
- 6-12" of inundation
- <6" of inundation



A Closer Look

As part of the interactive mapping exercise (learn more about this on [page xi](#)), local officials were asked to identify areas in their communities that experience nuisance flooding – or that flood consistently, even after regular storms. While some of these areas were not captured in the FEMA floodplains, they did appear in the Flood Factor dataset, underscoring how comprehensive it is.

Risk Assessment Methodology

Heat Risk

The New York State Department of Health's (NYS DOH) Heat Vulnerability Index (HVI) was used to approximate heat risk for each census tract in the county. The HVI uses a composite of several factors, including language spoken, age, environmental conditions, and socio-economic characteristics to approximate overall heat vulnerability. In instances where a parcel spanned multiple census tract boundaries, the highest HVI measure was used.

Data source: NYS DOH HVI
Data scale: census tract

5 Extreme Heat Risk
NYS DOH HVI greater than 18

4 Severe Heat Risk
NYS DOH HVI of 17 or 18

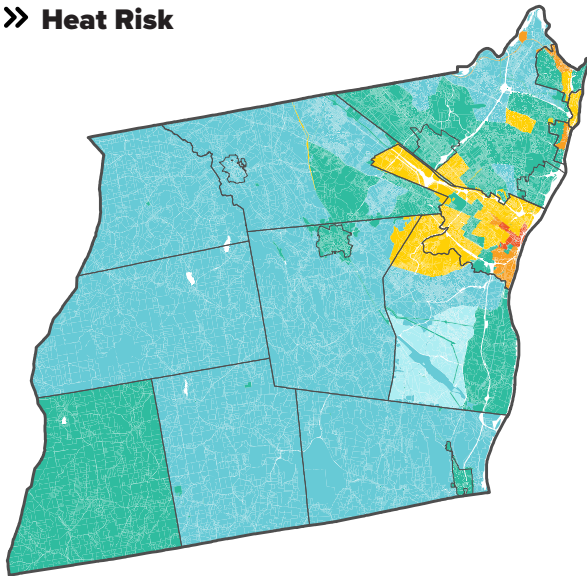
3 Major Heat Risk
NYS DOH HVI of 15 or 16

2 Moderate Heat Risk
NYS DOH HVI of 13 or 14

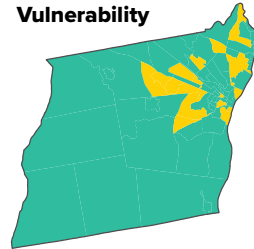
1 Minor Heat Risk
NYS DOH HVI of 12

0 Minimal Heat Risk
NYS DOH HVI of 11

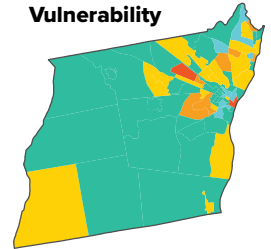
» Heat Risk



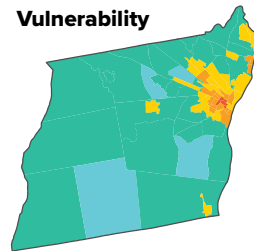
Language Vulnerability



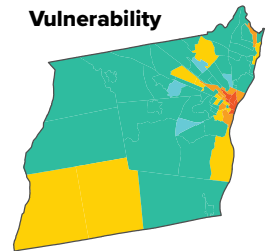
Elderly Vulnerability



Environmental Vulnerability



Socio-economic Vulnerability



Risk Assessment Methodology

Social Vulnerability

A social vulnerability score was assigned to each parcel based on its overlap with three datasets:

- NYS DEC Potential Environmental Justice Areas (PEJAs)
- CDC Social Vulnerability Index (SVI)
- NYSERDA Draft Disadvantaged Communities (DACs)

Data source: NYS DEC PEJAs (ACS 2014-2018), CDC SVI (2018), NYSERDA DACs (2021)

Data scale: census tract (DAC and SVI), census block group (PEJAs)

5 Extreme Social Vulnerability
Parcel intersects with all three of the social vulnerability datasets (PEJAs, CDC SVI >0.5, and DACs)

4 Severe Social Vulnerability
Parcel intersects with only two of the social vulnerability datasets

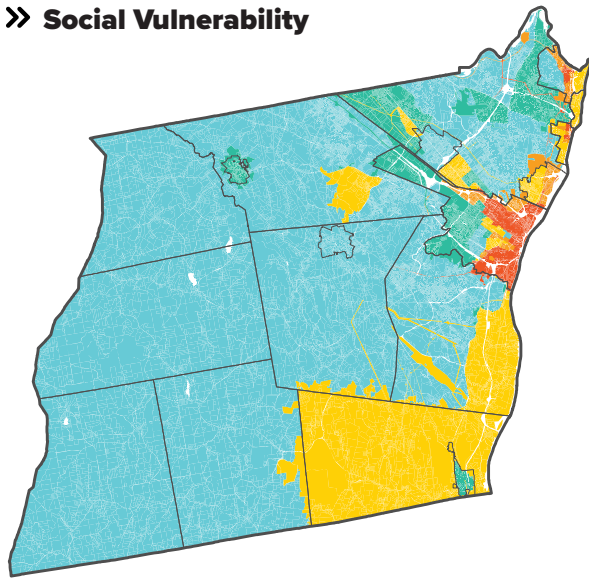
3 Major Social Vulnerability
Parcel intersects with only one of the social vulnerability datasets

2 Moderate Social Vulnerability
Parcel only intersects with CDC SVI (0.25-0.5)

1 Minor Social Vulnerability
Parcels does not intersect with PEJAs, CDC SVI (over 0.25), or DACs

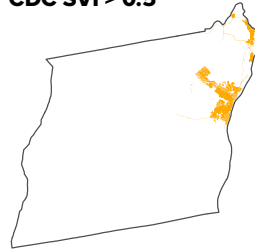
No zero score. Assume all areas may have some level of social vulnerability depending on individual circumstances.

» Social Vulnerability

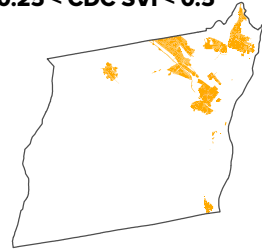


- 5 Extreme
- 4 Severe
- 3 Major
- 2 Moderate
- 1 Minor

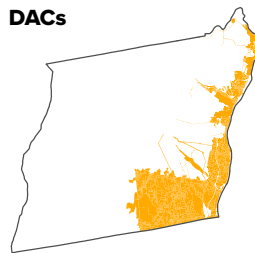
CDC SVI > 0.5



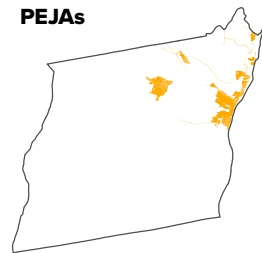
0.25 < CDC SVI < 0.5



DACs



PEJAs



Risk Assessment Methodology

Climate Risk

A composite climate risk score was created for each parcel by summing its flood risk, heat risk, and social vulnerability scores, as described in pages 104 through 108. Each score is weighted equally. The resulting climate score measures the parcel's overall vulnerability to the impacts of climate change.

Data source: flood risk scores, heat risk scores, social vulnerability scores

Data scale: parcel

5 Extreme Climate Risk
Sum of flood, heat, and social vulnerability scores is greater than 10 (includes any combination of scores with two 5s)

4 Severe Climate Risk
Sum of flood, heat, and social vulnerability scores is 9 or 10

3 Major Climate Risk
Sum of flood, heat, and social vulnerability scores is 6, 7, or 8

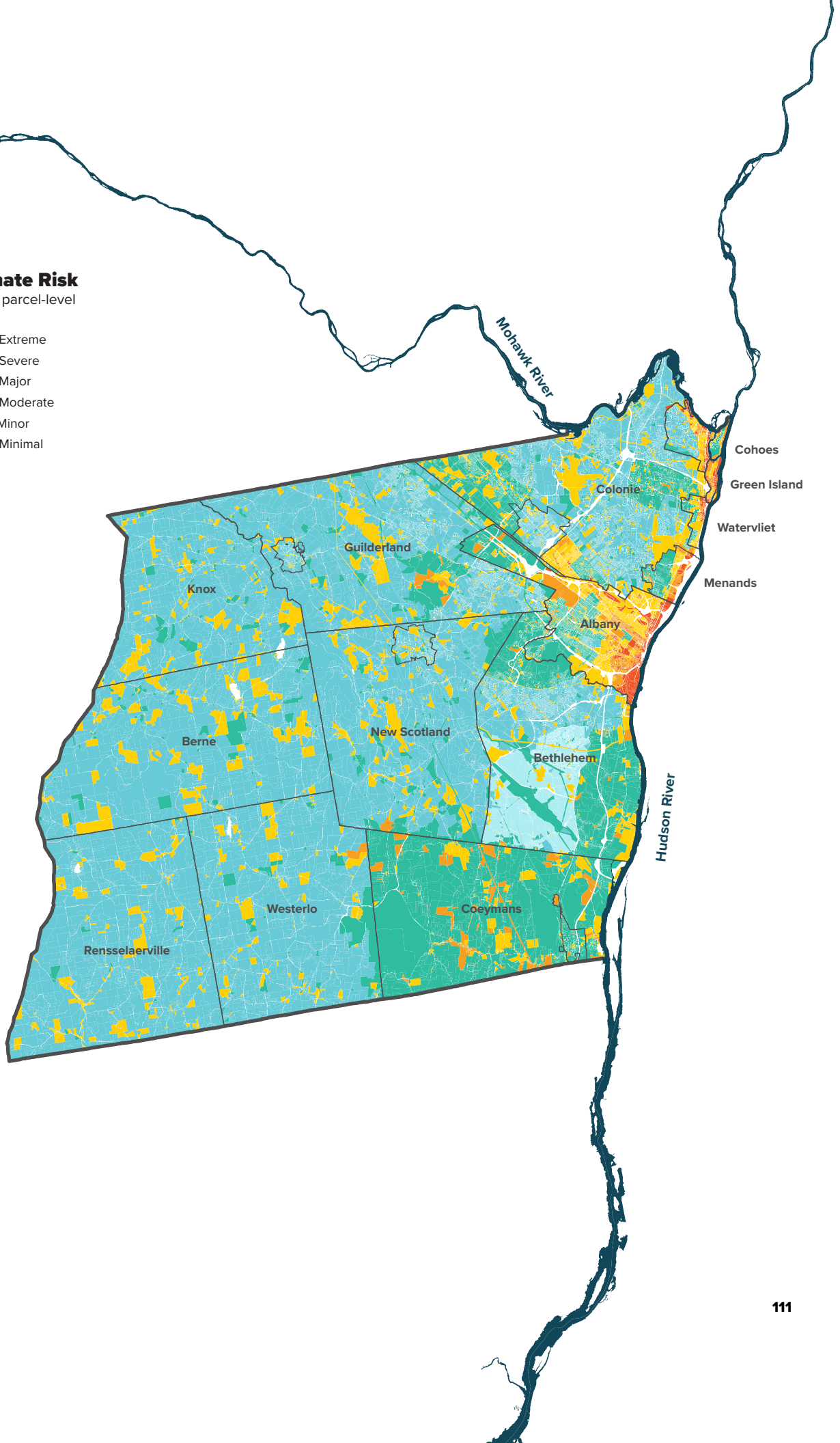
2 Moderate Climate Risk
Sum of flood, heat, and social vulnerability scores is 4 or 5

1 Minor Climate Risk
Sum of flood, heat, and social vulnerability scores is 2 or 3

0 Minimal Climate Risk
Sum of flood, heat, and social vulnerability scores is 1

» **Climate Risk**
At the parcel-level

- 5 Extreme
- 4 Severe
- 3 Major
- 2 Moderate
- 1 Minor
- 0 Minimal



Housing Vulnerability

Housing

County-wide, 20% of residential parcels are at major climate risk, 5% are at severe climate risk, and 1% are at extreme climate risk. **Heat risk affects the greatest percentage of residential parcels**, with 28% experiencing major heat risk or greater. Additionally, 24% of parcels experience major social vulnerability or greater and 9% experience major flood risk or greater.

Homes that are at flood or heat risk or that are located in socially vulnerable areas may be affected by climate change in a number of ways:

- **Residential parcels with flood risk** may experience physical damage to homes during flood events, which can put residents at risk of injury or death and may lead to temporary or permanent displacement.
- **Residential parcels with heat risk** often do not have air-conditioning or are located in neighborhoods with fewer trees and more impervious surfaces. Residents may be at increased risk to extreme heat exposure. In Albany County, housing that is vulnerable to heat is concentrated primarily in the City of Albany.
- **Residential parcels that are socially vulnerable** likely have residents who will be disproportionately impacted by climate events, like flooding and extreme heat. These residents may be older, financially-challenged, have limited access to transportation, or other characteristics that put them at increased risk and likely increased need for assistance in preparing for or recovering from climate events. Housing with socially vulnerable residents is concentrated primarily in the City of Albany and the Town of Coeymans.



Methodology

Climate risk was assessed for every residential parcel in the county. Residential parcels include single- and multi-family residences, apartment complexes, senior living facilities, dormitories, and mobile homes.



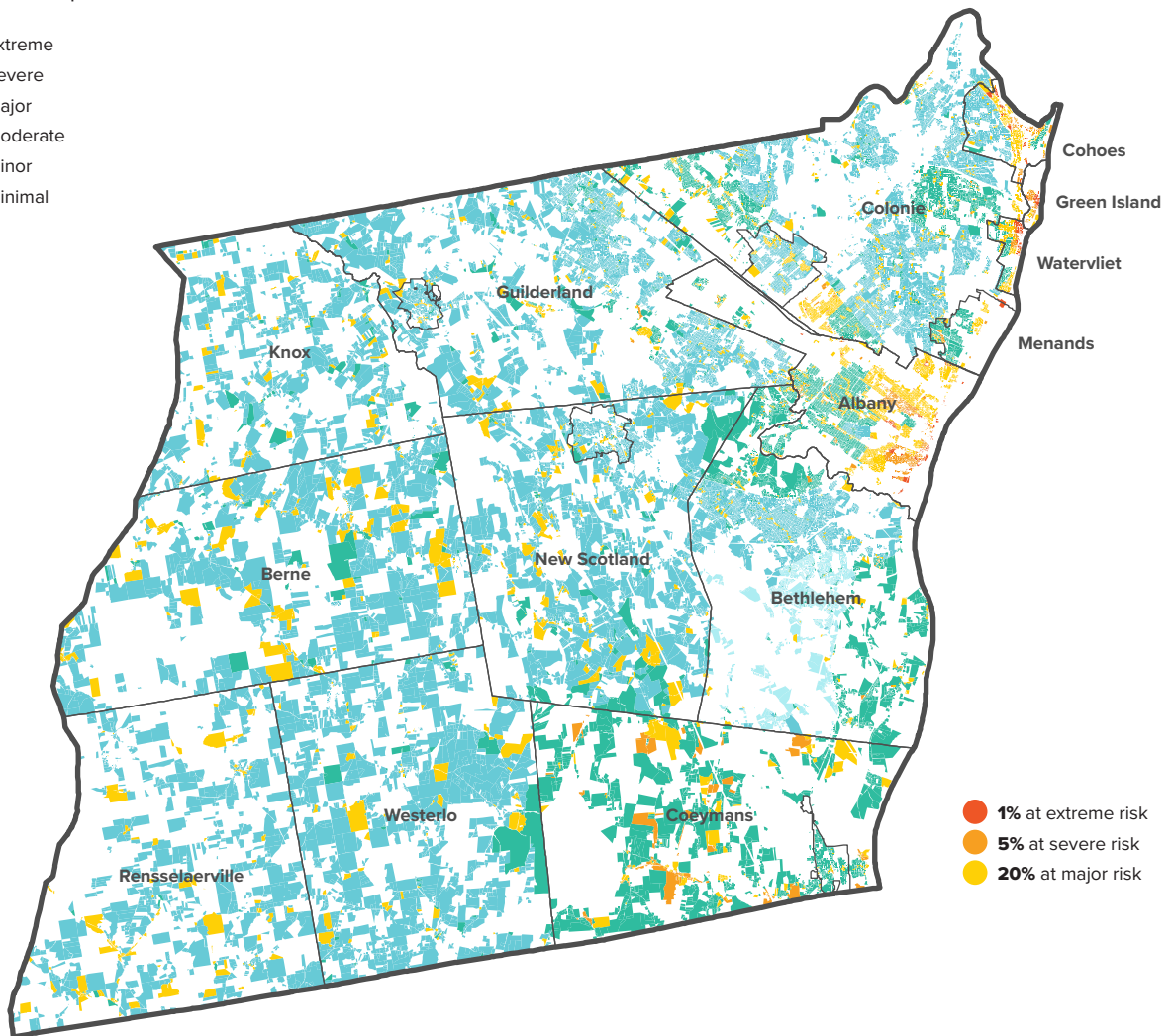
Key Findings

- **Overall climate risk is greatest for residential parcels located in the City of Albany, Cohoes, Green Island, and Watervliet.**
- **Heat risk affects the largest percentage of residential parcels** in the county and is most prominent in the City of Albany and northern Bethlehem.
- **Socially vulnerable housing is concentrated mostly in the City of Albany**, but also appears at high levels in Cohoes, Green Island, Watervliet, and Coeymans.
- **Flood risk is more dispersed across the county** and affects fewer residential parcels than do heat risk and social vulnerability.

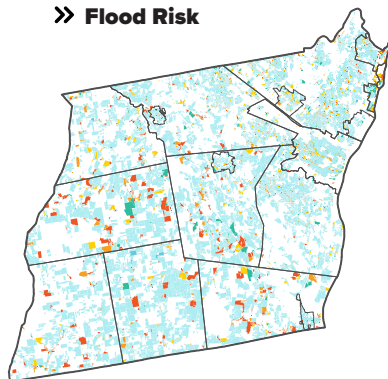
» Climate Risk

Residential parcels

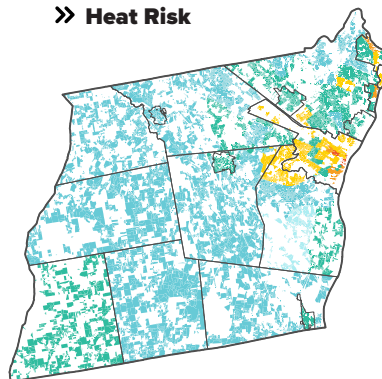
- Extreme
- Severe
- Major
- Moderate
- Minor
- Minimal



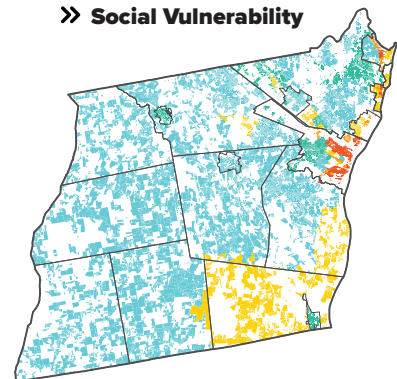
» Flood Risk



» Heat Risk



» Social Vulnerability



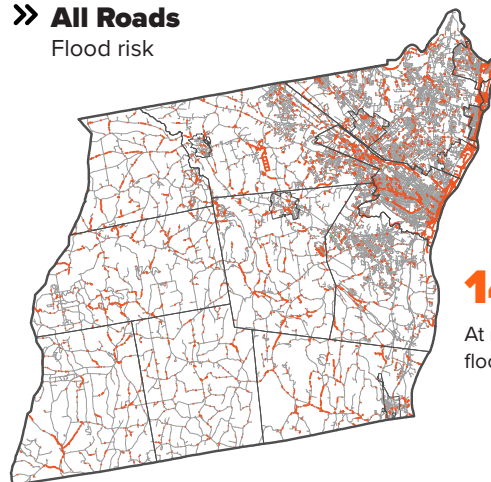
Infrastructure Systems Vulnerabilities

Transportation Infrastructure

Multiple roads and transit routes are at risk of flooding as approximated by the projected 100-year floodplain in 2050. Flooding can wash out roads and bridges, making corridors impassable, limiting transit services, and potentially delaying emergency response services.

Almost **400 miles of roads are at flood risk** – 35 miles of which are County-owned – and more than **1,700 miles of CDTA bus routes are at risk**.

» All Roads Flood risk



14%

At risk of 100-year flood in 2050

! Key Findings

Notable at-risk County roads include:

- **Fox Creed Road** (2 miles), Rensselaerville
- **Blodgett Hill Road** (1.5 miles), Coeymans
- **Creble Road** (1.5 miles), Bethlehem

Notable at-risk CDTA bus routes include:

- **Hackett Boulevard**, CDTA Routes 734, 805, and 806, City of Albany
- **Saratoga Street**, CDTA Route 182, Cohoes
- **George Street**, CDTA Routes 182 and 809, Green Island
- **State Route 146**, CDTA Route 719, Guilderland

🔍 A Closer Look: Vulnerable Corridors

Corridors of High Flood Risk and Social Vulnerability.

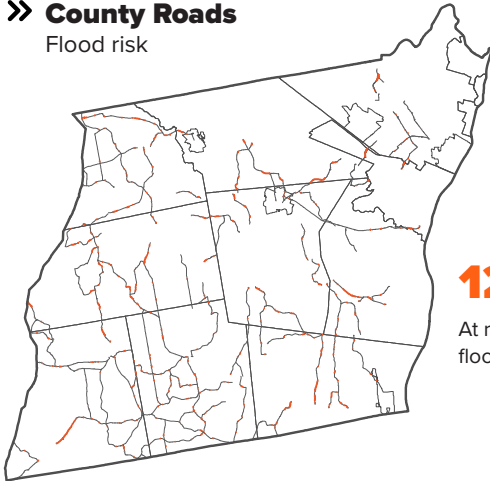
The risk assessment identified several corridors where high flood risk and high social vulnerability overlap. The socio-demographic characteristics of populations living along these corridors compound their flood risk, making them particularly susceptible to the impacts of flooding and more likely to experience outside impacts, as compared to other populations.

Flood Risk:

- Extreme
- Severe
- Major
- Moderate
- Minor
- Minimal

» County Roads

Flood risk

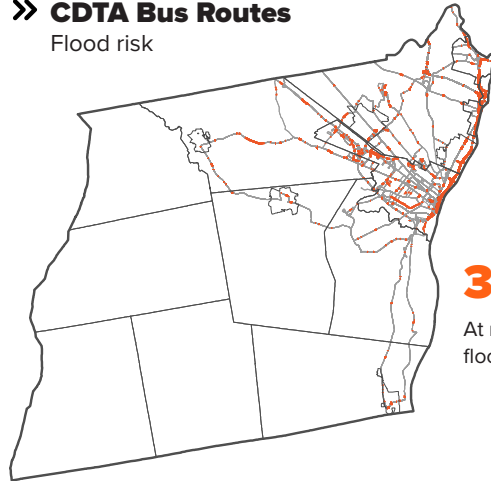


12%

At risk of 100-year flood in 2050

» CDTA Bus Routes

Flood risk



32%

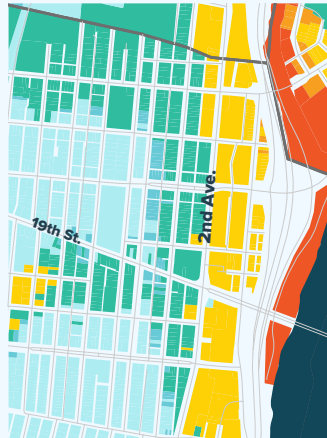
At risk of 100-year flood in 2050



Sheridan Ave.
City of Albany



South End
City of Albany



2nd Ave.
City of Watervliet



N. Mohawk St.
City of Cohoes

Infrastructure Systems Vulnerabilities

Water and Port Infrastructure

Water and port infrastructure in the county is at risk of flooding, potentially putting the drinking water supply, water and wastewater treatment, and marine commerce at risk.

Climate impacts can have a number of effects on these infrastructure systems:

- **Reservoirs and drinking water wells.** Extreme precipitation events at reservoirs can cause overtopping and downstream flooding. Flooding at drinking water wells can contaminate well water, making it unsafe for use. In some cases, flooding can also collapse wells.
- **Water and wastewater treatment facilities.** Flooding can overwhelm water and wastewater treatment facilities, potentially leaving communities without safe drinking water or causing the release of untreated sewage.
- **Ports.** Flooding at ports can bring marine commerce operations to a halt. Portions of the Port of Albany are at major flood risk or greater. The Port of Coeymans faces mostly moderate flood risk.



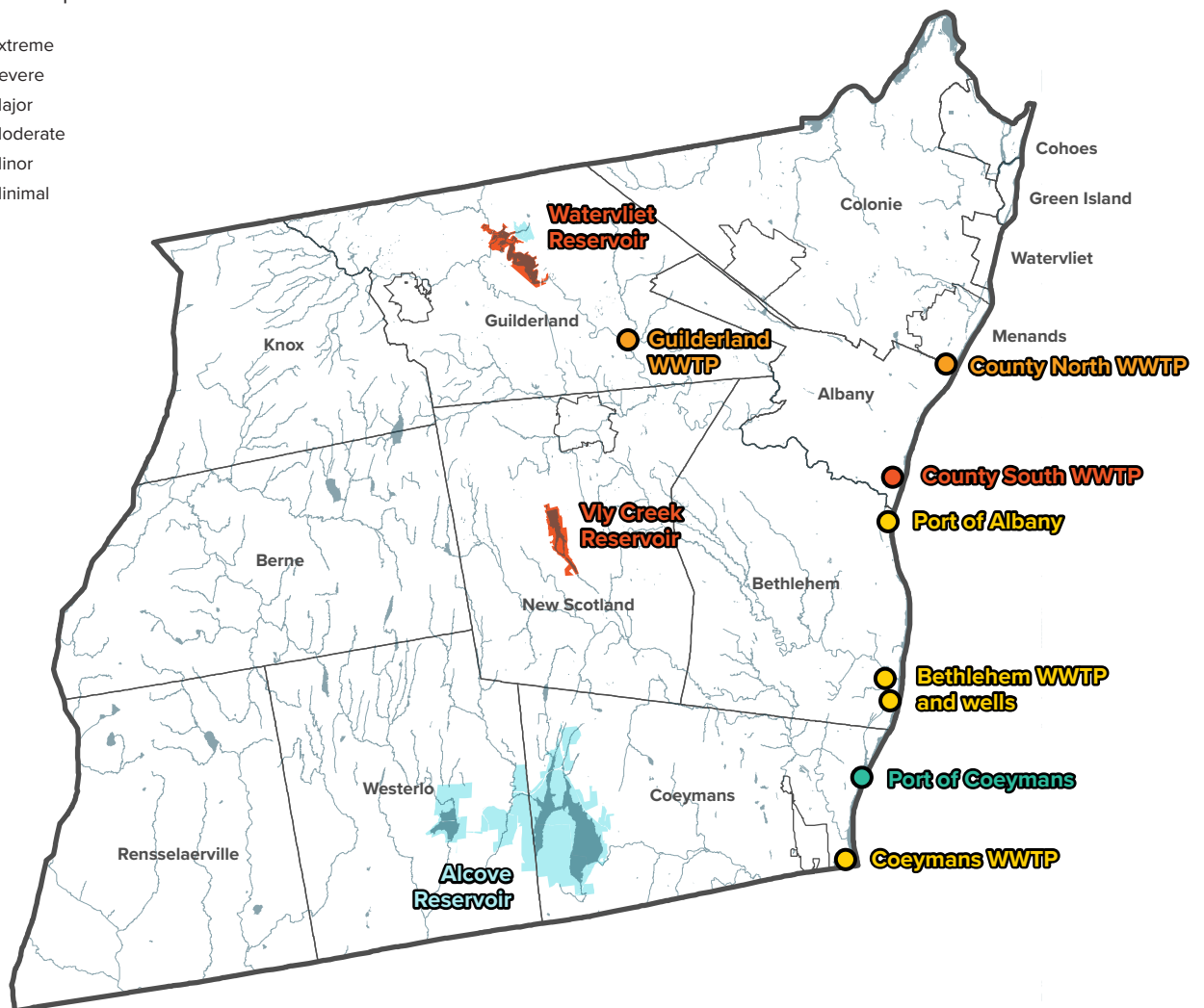
Key Findings

- **The Watervliet and Vly Creek reservoirs are both at extreme flood risk.** Bethlehem drinking water wells are also at major flood risk.
- **The County's South WWTP is at extreme flood risk.** Several other wastewater treatment facilities are also at high flood risk including: Guilderland WWTP (severe risk), County North WWTP (severe risk), Bethlehem WWTP (major risk), and Coeymans WWTP (major risk).
- **Several parts of the Port of Albany are at major flood risk or greater.** The Port of Coeymans faces mostly moderate flood risk.

» Flood Risk

Water and port infrastructure

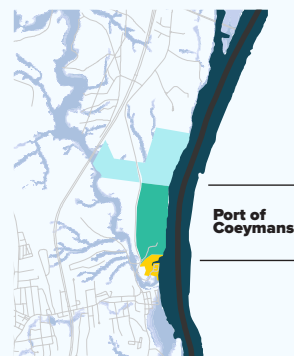
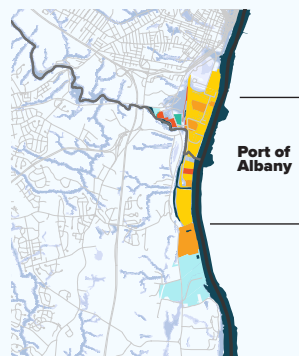
- Extreme
- Severe
- Major
- Moderate
- Minor
- Minimal



A Closer Look: The Ports

Flood Risk:

- Extreme
- Severe
- Major
- Moderate
- Minor
- Minimal



Infrastructure Systems Vulnerabilities

Public Properties

A number of publicly-owned properties are at major or greater flood or climate risk. Some of these properties are critical facilities, like wastewater treatment plants or government buildings, whose operation is critical to community function and for recovery from storm events. Because these properties are publicly-owned, opportunities exist to take immediate steps to mitigate risk and ensure continued operations.

Other at-risk, publicly-owned properties include several vacant properties as well as public parks. Publicly-owned green spaces like these could be excellent sites to deploy green infrastructure or other resilient pilot projects. As one example of an on-going resilience project in a public park, the Town of Bethlehem has committed to only installing infrastructure that can accommodate flooding in Henry Hudson Park. The park is almost entirely located within the 100-year floodplain and is vulnerable to flooding from both the Hudson River and Vloman Kill Creek.

+ Want to know more?

See page 244 to learn about pilot projects and how they could be used in Albany County.

! Key Findings

A selection of public properties at either high flood or climate risk includes:

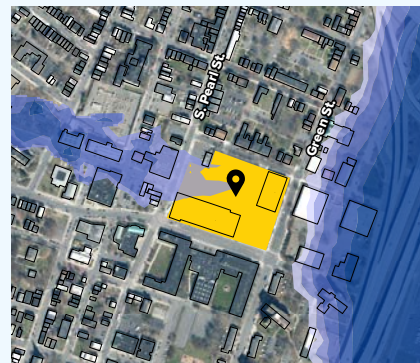
Flood risk:

- County South WWTP
- Lawson Lake County Park
- Henry Hudson Park
- 940 and 946 Albany Shaker Rd.

Climate risk:

- County Hall of Records (95 Tivoli St.)
- Times Union Center (51 S. Pearl St.)
- County Board of Elections (260 Pearl St.)
- County North and South WWTPs
- Several Land Bank properties
- Several properties on Franklin St.
- 107 Sheridan Ave.

🔍 A Closer Look: County-owned Sites

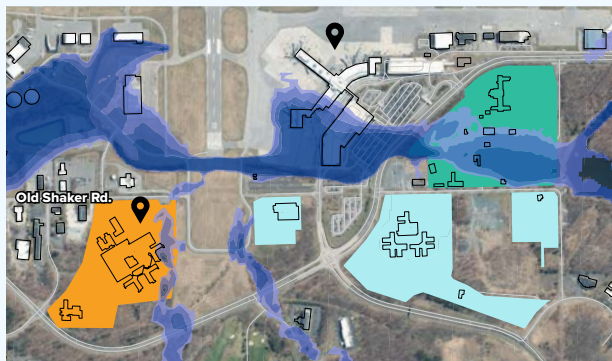
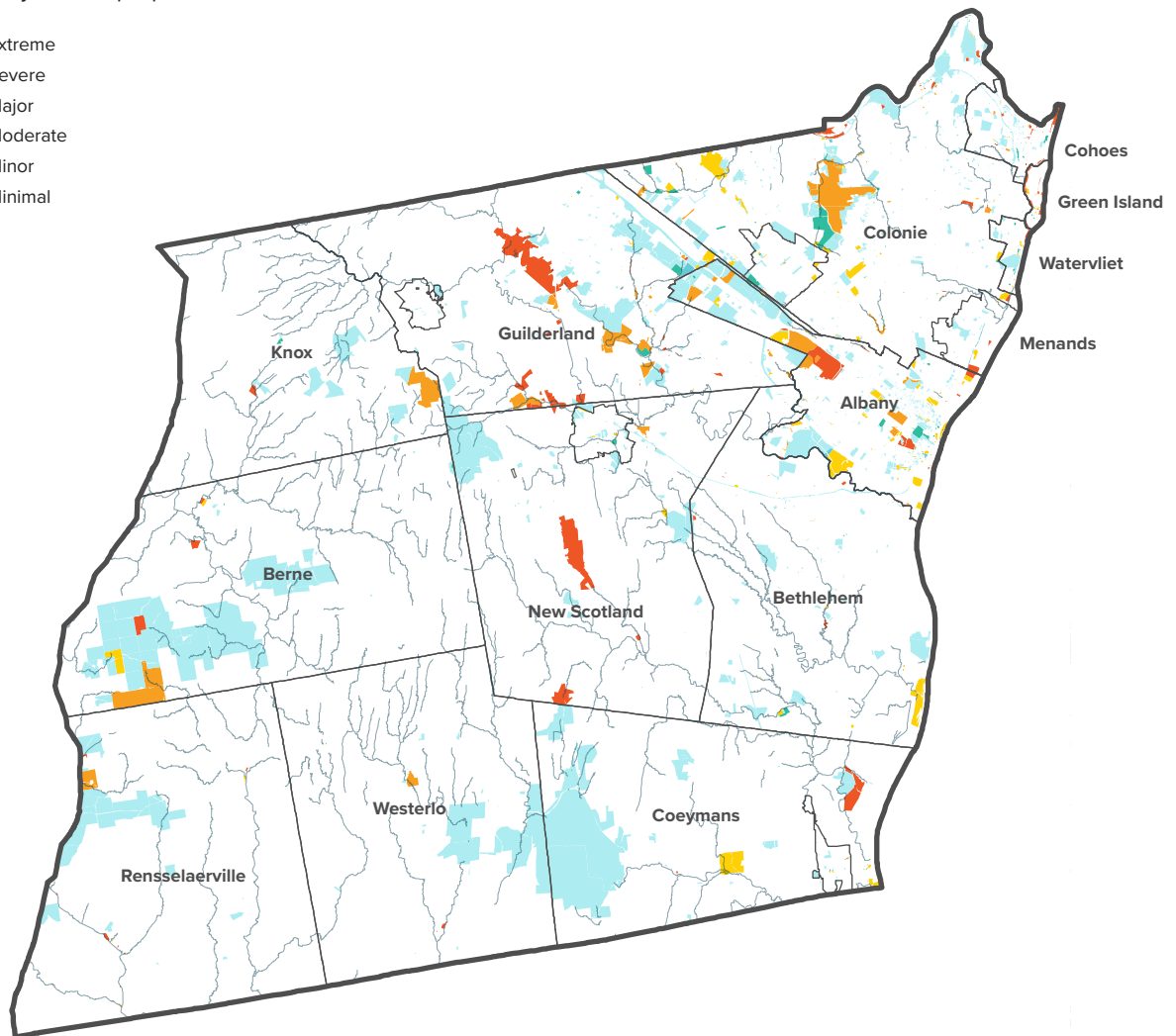


County Dept. of Health and Mental Health
260 S. Pearl Street and 175 Green Street

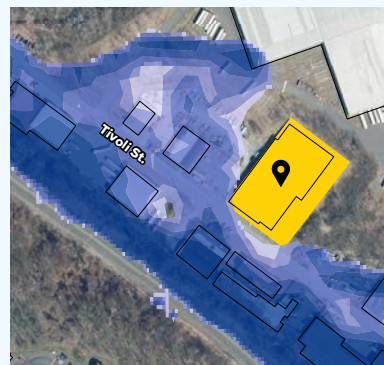
» Flood Risk

Publicly-owned properties

- Extreme
- Severe
- Major
- Moderate
- Minor
- Minimal



County Jail/Juvenile Detention Center, Airport
Old Albany Shaker Road and Airport Park Boulevard



County Hall of Records
95 Tivoli Street

Inundation from
a 100-year storm
in 2050:

- > 36"
- 25-36"
- 13-24"
- 6-12"
- < 6"

Health and Social Services Vulnerabilities

Health and Social Services

Flood risk is an acute climate stressor for health and social services facilities in Albany County, as flooding at these facilities can disrupt emergency response during climate events and put community health and safety at risk. Many health and social services facilities are also vulnerable to heat stress, as well.

At-risk facility types include:

- **Emergency response services** like fire departments and ambulance companies. Flooding at these facilities can delay response times during emergency events and extreme heat can impact equipment.
- **Healthcare facilities** like the VA Medical Center and the Mohawk Hudson Humane Society. Flooding can limit access to and disrupt services at these facilities, putting patients at risk. It is also important for these facilities to plan for back-up power generation in case extreme heat or cold causes electrical blackouts.
- **Congregate facilities** like nursing homes, schools, colleges, and detention centers with high-density populations. Flooding at these facilities is likely to affect large populations and require a significant draw on response resources. Some residents and/or users of these facilities may also be at increased susceptibility to heat risk, especially seniors and young children.

! Key Findings

Nearly every municipality in Albany County has at least one critical facility that is at severe or extreme flood risk. These include:

Albany County:

- County Jail (severe)
- Juvenile Detention Center (severe)

City of Albany:

- SUNY Albany (severe)
- Albany Law School (severe)
- VA Medical Center (severe)

City of Cohoes:

- Cohoes Fire Dept. Island Station (severe)

Town of Coeymans:

- Coeymans Hollow Volunteer Fire Dept. (extreme)

Town of Bethlehem:

- Bethlehem Central Senior High School (severe)
- Delmar Fire Dept. Station 2 (severe)

Village of Green Island:

- Heatly School (extreme)

Town of Guilderland:

- Guilderland High School (extreme)
- Guilderland Center Fire District (extreme)
- McKownville Fire District (severe)

Town of New Scotland:

- New Salem Volunteer Fire Dept. Station 2 (extreme)
- Onesquethaw Volunteer Fire Company Station 1 (extreme)

Village of Menands:

- Mohawk Hudson Humane Society (severe)

Town of Rensselaerville:

- Rensselaerville Fire Dept. (extreme)

Village of Voorheesville:

- Voorheesville Elementary School (extreme)

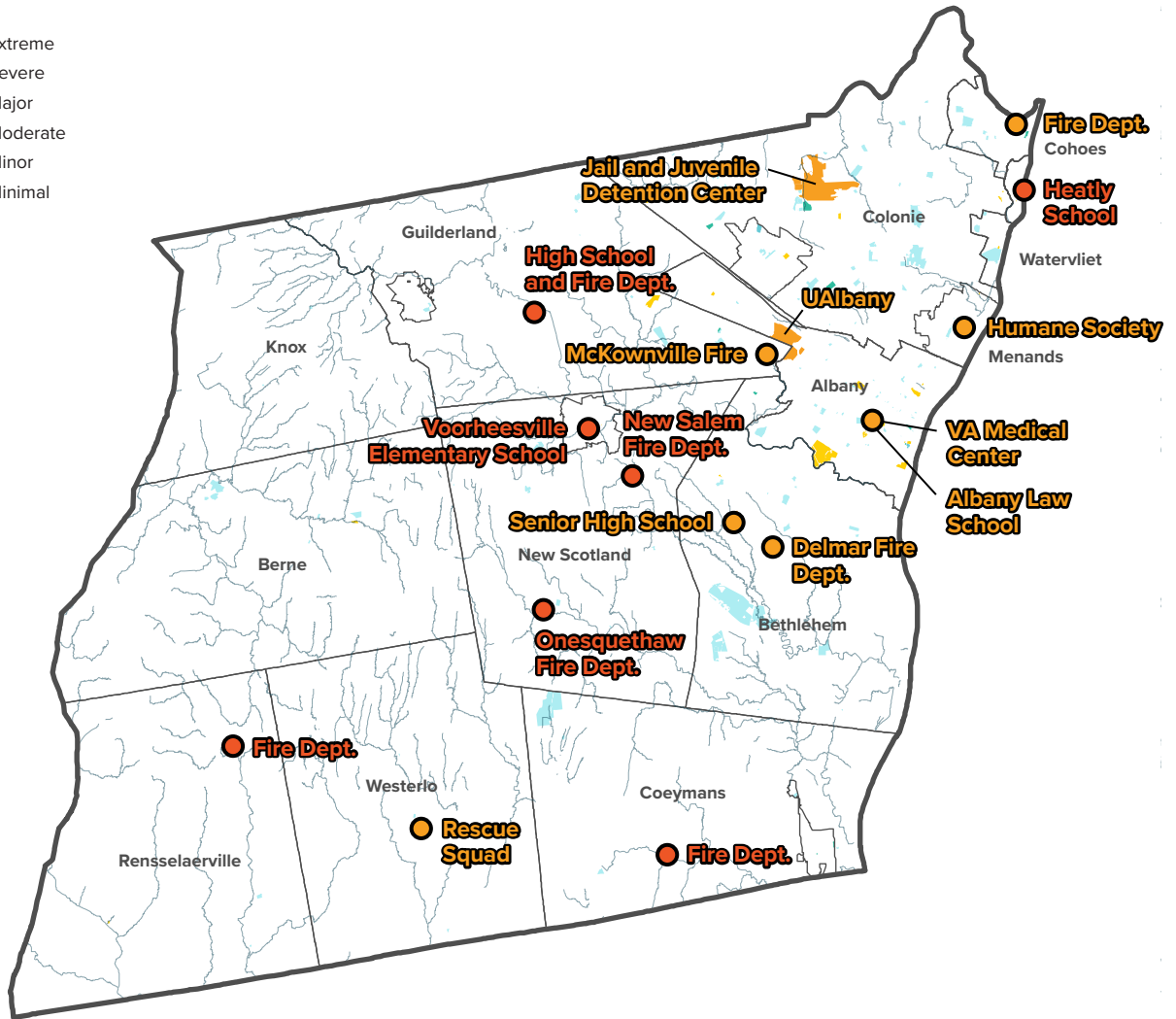
Town of Westerlo:

- Westerlo Rescue Squad (severe)

» Flood Risk

Health and social services facilities

- Extreme
- Severe
- Major
- Moderate
- Minor
- Minimal



Natural and Cultural Resources Vulnerabilities

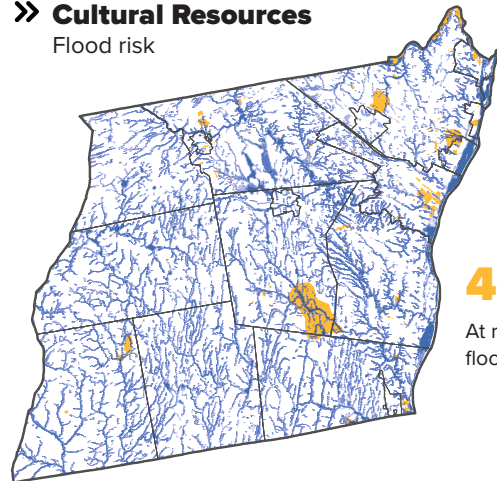
Natural and Cultural Resources

Natural and cultural resources experience flood “risk” differently:

- **Cultural resources are vulnerable to flooding** – they are likely to be damaged (in some cases irreparably) by flooding unless proper steps are taken to protect them.
- **Natural resources, on the other hand, can reduce vulnerability to flooding** by absorbing, temporarily storing, and treating flood and stormwater before it returns back to waterways. This makes open space preservation and expansion an important tool for reducing community-wide vulnerability.

» Cultural Resources

Flood risk



40%

At risk of 100-year flood in 2050

! Key Findings

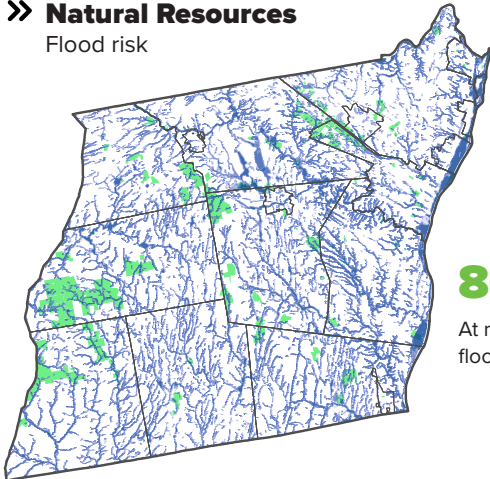
A number of historic and cultural resources, including 40% of all National Register Historic Places in the county, are at risk of inundation from the 100-year flood in 2050.

Some notable at-risk resources include:

- Onesquethaw Valley Historic District
- Watervliet Shaker Historic District
- Washington Park Historic District
- Olmstead Street Historic District
- Center Square/Hudson-Park Historic District
- Albany Rural Cemetery
- Conkling-Boardman-Eldridge Farm
- Watervliet Arsenal

» Natural Resources

Flood risk



86%

At risk of 100-year flood in 2050



Key Findings

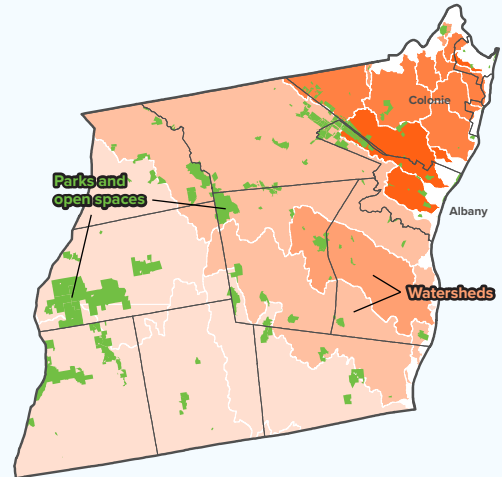
Several natural resources, including **86% of all the parks and preserves in the county, are located within what is expected to be the 100-year floodplain in 2050**. Locating parks and open spaces in floodplains is beneficial, as they can help absorb and temporarily store flood and stormwater.

Some natural resources in the floodplain include:

- Albany Pine Bush Preserve
- John Boyd Thacher State Park
- Partridge Run WMA
- Edmund Niles Huyck Preserve
- Rensselaerville State Forest



A Closer Look



Less impervious
(0% to 10%)

More impervious
(75% +)

Watersheds and Open Space Preservation.

Albany County's most urbanized watersheds – which have the largest percentages of impervious surfaces like parking lots, roadways, and driveways – also have the fewest parks and open spaces. These conditions can lead to increased stormwater runoff and degraded water quality. Special consideration should be taken in these urban watersheds, particularly in the City of Albany and Colonie, to preserve and expand open space wherever possible to reduce the amount of impervious surface area and increase stormwater absorption.

Economic Systems Vulnerabilities

Businesses

More than half (54%) of the commercial and industrial properties in Albany County are at major or greater climate risk, meaning that extreme weather events like floods, droughts, and storms can put operations at risk.



Methodology

This analysis was performed at the parcel level. "Businesses" are considered any parcel classified as either a commercial (property class 400) or industrial (property class 700) property. These parcels may include multiple, individual businesses on a single parcel.



Key Findings

- **Climate change presents the greatest risk to businesses** located in the City of Albany and along the Route 32 corridor in Menands, Watervliet, Green Island, and Cohoes.
- Most businesses at flood risk are vulnerable to flooding from the **Hudson River**.

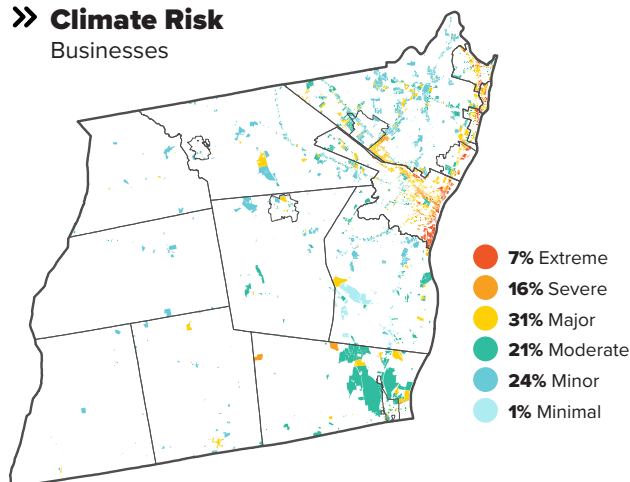


Want to know more?

See page 236 for recommendations to increase business resiliency.

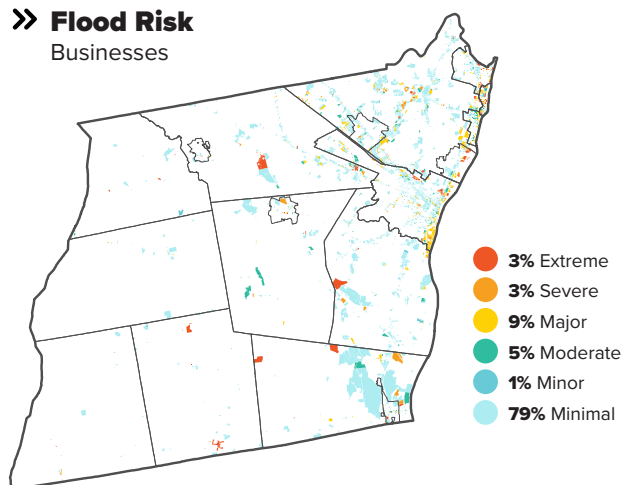
>> Climate Risk

Businesses



>> Flood Risk

Businesses



Agriculture

Agricultural operations in Albany County are most vulnerable to flood and drought, as these conditions can lead to crop failure, loss of arable land, and other pressures on the viability of the agricultural system.



Key Findings

- **Flood risk is the climate stressor that most impacts agricultural districts** in Albany County, with heat risk (and drought) being a secondary risk.

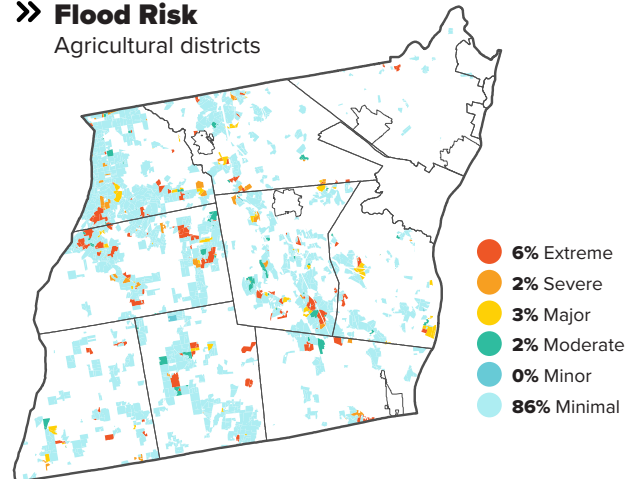


Want to know more?

See page 248 for recommendations to improve agricultural resiliency.

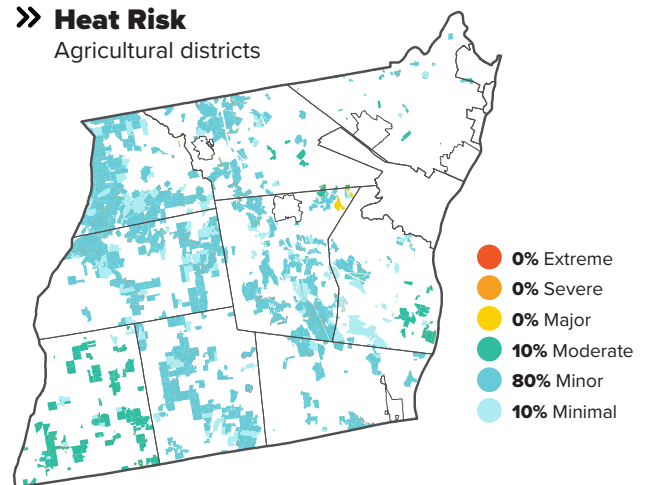
» Flood Risk

Agricultural districts



» Heat Risk

Agricultural districts



Recommended Projects

The chapter outlines the projects recommended to build climate resilience in Albany County.

These projects were developed based on the findings from the **Needs and Opportunities Assessment** (Chapter 2), the **Risk Assessment** (Chapter 3), and feedback from stakeholders and the community.

They are organized into two tiers: Tier 1 projects represent ongoing initiatives largely focused on climate mitigation activities. Tier 2 projects focus on building resilience and adapting to climate change. Each Tier 2 project is explained in a detailed “project profile” that explores the need and recommended actions for, potential benefits of, and steps necessary to implement the project.





Project Types

Addressing climate change requires a holistic approach that combines **mitigation** (altering behaviors to slow the rate of climate change), **adaptation** (taking steps to live with the effects of climate change), and **resilience** (improving systems so they are better able to prepare for and recover from climate events in the future).

The projects recommended in this Plan focus primarily on resilience, but the three approaches are complementary – in fact, often overlapping – and should all be viewed as essential tools in building overall climate resilience.



Mitigation

Mitigation actions work to make the impacts of climate change less severe. Most often, the goal of mitigation is to prevent or reduce the emission of greenhouse gases into the atmosphere as this is a key driver of climate change. Mitigation actions can include increasing renewable energy use, decarbonizing the transportation and building sectors, and planting trees to increase carbon dioxide storage.



Albany County Climate Action Plan

To complement this Climate Resiliency Plan, Albany County is developing a parallel Climate Action Plan that will focus on identifying mitigation actions and establishing targets for emissions reductions. The development of the Climate Action Plan is funded by a \$35,000 grant from the NYS Climate Smart Communities Grant Program.



Adaptation

Adaptation involves anticipating the adverse effects of climate change and taking appropriate action to proactively prevent or minimize damage. In essence, adaptation is the process of adjusting to the current and future effects of climate change. Adaptation actions can include moving people and economic activities out of flood-prone areas, building defenses to protect against sea level rise, and/or growing alternative crops that are more suitable for warmer temperatures.



Focus of this Plan



Resilience

Climate resilience focuses on anticipating and preparing for the impacts of climate change to ensure the county and its inhabitants can quickly respond to and recover from future climate-related events. Building resilience can involve creating plans and programs to help people and businesses recover faster from climate events, using historical data and future projections to make informed land use and development decisions, and upgrading or relocating infrastructure. Most of the recommended projects in this Plan are intended to build climate resilience.

Project Tiers

Tier 1 Projects

“Tier 1” projects are initiatives the County is already pursuing that should be continued and/or expanded. These Tier 1 projects can be thought of as “quick-wins” that are easy to implement because many are already in progress. Most are mitigation activities.

Several new initiatives are also recommended for the County to add to its on-going activities. These initiatives will require additional study beyond the scope of this Plan.

» On-going County initiatives to continue and/or expand:

- 01** Inventory greenhouse gas emissions from County facilities and operations.
- 02** Electrify County buildings.
- 03** Electrify the County’s vehicle fleet.
- 04** Install EV charging stations on County property and other public properties.
- 05** Pursue renewable energy generation on County property.
- 06** Retrofit streetlights to LED.
- 07** Participate in the Climate Smart Communities (CSC) and Clean Energy Communities (CEC) programs.
- 08** Support the Nature Bus program and other initiatives to expand access to public transit and open spaces.
- 09** Provide climate risk data to the public and the development community.
- 10** Expand composting of organic waste and support Zero Waste Capital District initiatives.



For more info on Zero Waste, click here.

» Other recommended initiatives that warrant additional study (beyond the scope of this Plan):

- 11** In coordination with on-going resiliency work by National Grid and Central Hudson, conduct an **energy resiliency study** to:
- Identify electrical infrastructure (e.g., substations) that is vulnerable to flooding and either elevate, harden, or relocate these facilities.
 - Explore opportunities to implement microgrids and/or distributed renewable energy systems in strategic areas to ensure power is available to support critical services during emergencies and power outages.
 - Identify areas where transmission infrastructure is at or nearing capacity and upgrade to enable the interconnection of distributed renewable energy generation.
- 12** Conduct a detailed **communications and broadband resiliency study** to:
- Identify critical communications infrastructure vulnerable to flooding and upgrade or relocate.
 - Consider microgrids to provide reliable access to power when the grid is down.
 - Evaluate the potential for back-up communications systems (e.g., line-of-site technologies, such as microwave link) to provide critical communications connectivity if the broader system is disrupted.

The development of the energy resiliency study and the communications and broadband resiliency study should be coordinated as both systems are interdependent.



Climate Impacts

Communications infrastructure is critical for coordinated and effective emergency response and recovery. **People's lives depend on the continued functioning of these systems.** The economic costs of disruptions to the communications system can also be major. That's why communications resiliency is key – to minimize the likelihood of a service outage and to maintain critical communications during emergency events.



On-going Projects

National Grid is currently working on several projects locally to advance its vision of eliminating fossil fuels from its gas and electric systems by 2050. Some of these projects include:

- Conducting a feasibility study for **community geothermal** in the Sheridan Hollow and South End neighborhoods, in collaboration with NYSERDA, CHA Engineering, and AZTEC Solar
- Supporting utility infrastructure construction at the **Marmen Wind Turbine Assembly Plant** site at the Port of Albany
- Exploring the potential to pilot a **food waste digester** at the University at Albany

Project Tiers

Tier 2 Projects

“Tier 2” projects focus on building climate resilience. They are larger in scope and scale than the Tier 1 projects and will likely require collaboration with multiple project partners and funding from multiple sources. Each Tier 2 project is explained in a detailed project profile on the following pages.

Some of the Tier 2 profiles also include deeper dives, with site-specific recommendations. These projects are labeled with this symbol: 

Community Planning & Capacity:

- 01** Increase County capacity to support resilience efforts.

 Page 136

- 02** Create a Climate Justice Corps Network.

 Page 142

- 03** Purchase First Street Foundation’s Flood Factor data.

 Page 148

- 04** Support municipal participation in FEMA’s CRS Program.

 Page 152

Housing:

- 05** Create a “Resilient Homes Program.”

 Page 156

Infrastructure Systems:

- 06** Build out the County’s network of rain and stream gauges.

 Page 164

- 07** Conduct a county-wide culvert analysis.

 Page 168

- 08** Conduct a county-wide transportation vulnerability assessment.

 Page 172 

- 09** Increase resilience at municipal facilities.

 Page 180 

- 10** Plan for sea level rise at the County’s North and South WWTPs.

 Page 198 

Health and Social Services:

- 11** Increase resilience to extreme temperature events.

 Page 206

- 12** Prepare for long-term and large-scale displacements.

 Page 212

Natural and Cultural Resources:

- 13** Expand the county-wide trail network.

+ Page 216

- 14** Create a “Green Streets Initiative.”

+ Page 224

- 15** Develop a County-wide Open Space Plan.

+ Page 230

Economic Systems:

- 16** Create a “Business Resiliency Program.”

+ Page 236

- 17** Develop a “Sustainable Albany” campaign.

+ Page 240

- 18** Create a network of demonstration projects.

+ Page 244

- 19** Advance the resiliency recommendations included in the County Agricultural and Farmland Protection Plan.

+ Page 248

- 20** Create an “Agricultural Resiliency Program.”

+ Page 252



Resilience Strategies

Each project advances one or more of the following resilience strategies:

- Build climate resilience over time and across scales and systems.
- Guide growth and development away from high risk areas.
- Preserve, expand, and restore natural areas.
- Learn from past events and anticipate future disturbances.
- Support data-driven decision-making.
- Promote regional sharing of information and resources.
- Effectively and equitably respond to and recover from natural disturbances.
- Implement inclusive, community-based planning processes.
- Support and empower local communities and institutions.
- Strengthen residents' sense of place and awareness of natural processes by deepening connections between social and ecological systems.
- Increase the public's understanding of and capacity to respond to climate change.
- Promote and support a diverse local economy.
- Increase the capacity of local businesses to prepare for, respond to, and recover from natural disturbances.
- Develop a skilled workforce to support a sustainable, resilient economy and high quality of life.
- Plan and design for passive survivability.
- Preserve agricultural lands and strengthen the local food system.
- Decarbonize the building sector.
- Ensure mass transit and active transit are viable modes of transportation.
- Decarbonize the electric grid.

Project Profiles

The following project profiles provide detailed explanations of the recommended Tier 2 projects.

These profiles explain the need for each project, the recommended actions necessary to implement the project, as well as its potential benefits. Planning-level cost estimates, potential partners, and funding sources are identified for each project as well. Many project profiles also include case studies and lessons learned from similar projects implemented in other communities.

These profiles were designed so they can be used as part of grant applications by lead project agencies – such as the County, a local municipality, or a non-profit – to secure funding for project implementation.

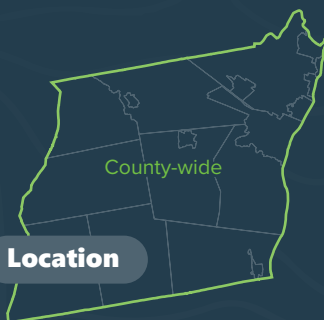
❧ **Patroon Creek Greenway**
Ten Broeck Street,
City of Albany (*proposed*)



Increase County Capacity to Support Resilience Efforts

Community Planning and Capacity

1



Description

This project focuses on increasing the County's capacity to implement, manage, and maintain climate resilience-focused programs and policies over time as well as to support local municipalities, particularly those with limited capacity, in proactively addressing climate change.

Need

While there are several state and federal funding sources available to support the implementation of climate resiliency projects, increasing capacity at the County level is critical to preparing for, responding to, and quickly recovering from future natural disturbances. In the short-term, increasing County capacity can help it proactively apply for grant funds, manage projects, and maintain and monitor projects once they are implemented to ensure their long-term success. In the longer-term, increasing County capacity through additional staff and resources will infuse “resilience thinking” into County processes, policies, and investments, ensure the delivery of critical services during and immediately after a disaster, and support local municipalities in implementing coordinated, yet locally-tailored resilience strategies.

Recommended Actions

Short-Term

- 01 Create a Director of Sustainability position in the County Executive’s Office to focus on climate resiliency efforts.** This new position, along with one or two supporting staff, could spearhead existing and future climate mitigation, adaptation, and resiliency efforts, lead the implementation of this Plan, and proactively apply for grants to assist municipalities in securing funding.
- 02 Conduct a comprehensive review and analysis of County processes and policies to identify opportunities to incorporate resilience strategies.** This initiative, led by the Director of Sustainability, should include a series of inter-departmental meetings to better understand relationships between County services and processes; identify opportunities to improve inter-departmental communication, integrate climate resilience considerations into County review processes and procedures (e.g., see sidebar to the right regarding integrating climate resiliency considerations into the review process for General Municipal Law 239 referrals); and synthesize lessons learned from other emergencies, including the Covid-19 pandemic and recent flood events.



Resilience Strategies

This project advances the following resilience strategies:

- Promote regional sharing of information and resources.
- Implement inclusive, community-based planning processes.
- Support and empower local communities and institutions.
- Support data-driven decision-making.



Climate Impacts

“Resilient states are those that are able to not only deliver routine services but also effectively integrate information and adapt service provision to changed circumstances.”

—Frances Z. Brown. 2022. *Governance for Resilience: How Can States Prepare for the Next Crisis?* Carnegie Endowment for International Peace.



Tips for Success

In amending its existing policies, one simple action the County could take is to **amend the County Planning Department’s Planning and Zoning Action Referral Form to include a brief section on climate resiliency** that requires the applicant to identify whether the project area is in a flood risk area (e.g., located in the FEMA 100-year floodplain or in an area likely to be inundated by a 100-year storm in 2050), a heat vulnerable area, and/or a socially vulnerable area and to propose measures to mitigate these risks and/or vulnerabilities.

Recommended Actions

Short-Term

- 03 Establish a Capital Region Sustainability Council** in partnership with the Capital District Regional Planning Commission (CDRPC) to promote cross-county collaboration on sustainability initiatives. At a minimum, the Council should have representation from Albany, Rensselaer, Schenectady, and Saratoga Counties but representation from all counties and local municipalities is strongly encouraged, as well. The Council should meet quarterly to discuss initiatives, track progress, and share lessons learned.
- 04 Share climate risk assessment data with other departments.** Provide a series of trainings focused on introducing the climate risk assessment data presented in this Plan and identify opportunities to use this data to inform future decision-making.
- 05 Use the climate risk assessment to inform the design of future capital projects.** All new County infrastructure and building projects, as well as substantial improvements to existing infrastructure and facilities, should be designed, maintained, and operated to account for current and projected climate hazards. The climate risk assessment in Chapter 3 provides a valuable starting point for understanding the flood and heat risk and social vulnerability of existing County assets. Low impact development, such as the preservation of open space and integration of green infrastructure, should be considered as a climate risk mitigation strategy on all County properties.
- 06 Use scenario planning activities to collaboratively and proactively prepare for disasters.** Scenario planning should be used to structure conversations between County departments to explore the potential impacts of natural disturbances across multiple systems and scales and collaboratively explore solutions. For example, what if the county has been experiencing a week-long extreme heat (or cold) event and then a large storm causes a power outage? What services, facilities, and communities would be impacted? What strategies could be implemented to ensure critical services are not disrupted and the most vulnerable individuals receive help? Will these proposed changes have other unintended consequences?



Case Study

Monroe County Coastal Lakeshore Economy and Resiliency (CLEAR) Plan.

Scenario planning helps communities think about and analyze multiple plausible versions of the future. In the case of the Lake Ontario shoreline, while it can't be predicted with certainty how water levels will change in the future, we know there are three potential scenarios that could reasonably occur: a high-water scenario, a low-water scenario, and an extreme fluctuating water scenario.

As part of the development of the CLEAR Plan, representatives from various municipalities in Monroe County participated in a series of scenario planning exercises with the Project Team in which they were asked to imagine how their communities would be impacted by these potential future scenarios. Considering all these scenarios in decision-making makes the policies and projects that result from the planning process more well-thought-out, more adaptable, more effective, and more likely to be implemented.

Find out more about the Monroe County CLEAR Plan here:
monroecountyclear.com

Recommended Actions

Short-Term

- 07 Support municipalities in obtaining funding for climate resilient projects and/or programs.** Several federal and state funding sources are available to support climate resilience and adaptation. However, proactively pursuing these funding opportunities requires additional capacity that many local governments do not have. With its regional perspective, the County is well-positioned to work with municipalities to understand their priorities and identify projects that will increase climate resilience at the local and inter-municipal scales. Several funding sources prioritize projects that include regional coordination and benefits.
- 08 Host an annual climate change conference.** This could be an annual event each year hosted in partnership with CDRPC focusing on a different climate resilience, adaptation, or mitigation topic each year. It would provide a forum for municipalities to share information, identify opportunities for cooperation, discuss best practices and available data to support decision-making, learn about relevant funding opportunities, and participate in interactive trainings.

Recommended Actions

Long-Term

In addition to the short-term actions listed above, the following expanded actions could be undertaken once the County's capacity to focus on resilience is increased.

- 01 Create a new Department or expand existing Departments to focus on building resilience.** To build institutional knowledge and memory, it is recommended that the County continue to invest in increasing its capacity to undertake climate mitigation, adaptation, and resiliency initiatives in the long-term. This could take the form of a new Department or the expansion of an existing Department(s). Additionally, creating a resilience-focused position in multiple Departments could help infuse resilience thinking into all County processes and actions and improve inter-departmental communication and collaboration.



Potential County-led Projects

Below are example projects with local and regional benefits that the County could lead in terms of applying for funding and project management:

- **Shoreline restoration along the Hudson River to mitigate flooding and erosion and improve habitat quality.** This initiative could build on the City of Albany's Hudson River Shoreline Stabilization Study and the Town of Bethlehem's plans for improvements at Henry Hudson Park and link State-designated Local Waterfront Revitalization Program (LWRP) areas in Watervliet, Albany, and Bethlehem. Potential funding sources include the NYS DOS LWRP, NYS DEC Climate Smart Communities (CSC), and the NYS EFC Green Innovation Grant Program (GIGP).
- **Intermunicipal trail planning and implementation.** This initiative could focus on advancing the Capital District Trails Plan within Albany County, expanding active transportation options, and integrating natural infrastructure into trail corridors to mitigate flood risks. Potential funding sources include CDTC's Unified Planning Work Program (UPWP), the Transportation Improvement Program (TIP), NYS DEC Climate Smart Communities (CSC), the NYS EFC Green Innovation Grant Program (GIGP), the NYS Recreational Trails Program, and the U.S. Department of Transportation's RAISE discretionary grants.

Recommended Actions

Long-Term

02 Offer permit review, planning, and other shared services to municipalities. As the County increases its capacity, it will be able to provide more technical assistance and support to local municipalities, particularly those with limited staff and resources. For example, the County, through a shared services agreement with interested municipalities, could review local floodplain development permits and make recommendations regarding mitigation and/or adaptation measures to reduce flood and erosion impacts at the site and regional scales. At the local level, the review and approval of floodplain development permits often falls on the code enforcement office or building inspector. These individuals are often over-burdened and do not always have the training to review floodplain development permits from a regional flood resiliency perspective.

03 Provide climate resilience trainings for municipalities, community groups, and other interested entities. Building capacity across scales – from the county to municipalities to neighborhoods to individuals – is critical to increasing community resilience. In partnership with Cornell Cooperative Extension (CCE), the Soil and Water Conservation District (SWCD), and other organizations, the County could develop a series of trainings and workshops focused on different climate resilience topics, such as the importance of urban street trees, how to install and maintain rain gardens and other green infrastructure practices, and the importance of wetlands in terms of reducing flood risks and improving water quality. These events could be strategically focused on flood-prone neighborhoods and could also be structured as listening sessions to better understand local needs, concerns, and barriers to implementing resilient practices.



Tips for Success

In the near-term, it is recommended that the County hire one or two new staff to spearhead the implementation of this Plan, lead the County's multi-jurisdictional hazard mitigation planning process, and support other climate mitigation, adaptation, and resiliency projects. In the long-term, the creation of a new governance structure (e.g., a new County Department) is recommended that is dedicated to increasing the County's resilience to climate change and other future disruptions, promoting sustainable development, and ensuring the County provides a high quality of life for all residents now and in the future.



Tips for Success

To align the work of different County departments and municipalities around shared climate goals, Albany County could consider developing a county version of the **New York State Climate Action Council**. The Climate Action Council is a 22-member body made up of representatives from various State agencies as well as business and institutional leaders. The Council prepared a Scoping Plan and roadmap for the State to achieve its clean energy and climate goals.

Find out more here:
climate.ny.gov/resources/climate-action-council/

Recommended Actions

Long-Term

04 Implement an ongoing public outreach campaign. Community resilience requires an ongoing, open dialogue with the public. All of the recommendations in this Plan require additional public engagement to better understand: who and how they will be impacted by different climate-related disturbances; existing resources and support networks that could be leveraged and expanded; the ways in which solutions can be adapted to meet the needs of different communities; and what is needed to collaboratively develop future initiatives, policies, and programs to equitably build climate resilience and improve and sustain a high quality of life for all.

05 Set policy goals, develop strategies to achieve these goals, and identify key investments. The County's governance structure focused on resilience should take the lead in developing new policies, laws, and strategies to increase climate resilience as well as identify and prioritize investments in infrastructure, public services, and programs.

Potential Benefits

- **Increase the County's ability to prepare for, adapt to, anticipate, and recover** from future climate-related disturbances.
- **Improved communication and collaboration** between County departments and local municipalities.
- **Increased understanding of climate hazards and risks** and improved access to the tools and funding sources to mitigate these hazards and risks.
- **Equitable and inclusive development of climate resilience strategies, policies, and projects.**

Implementation

Possible Lead Agency

Albany County

Potential Partners

- County departments
- Local municipalities
- SWCD
- CDRPC
- CDTC
- CCE

Planning-level Cost Estimate

\$500,000 per year in the short-term (assuming a Director of Sustainability position is created, one to two new support staff are hired, and funding is provided for trainings/conferences)

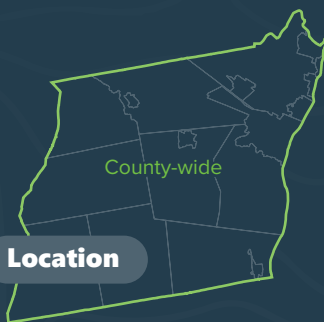
Potential Funding Sources

- Albany County budget
- NYS DEC CSC (to support trainings)
- NYS DOS Shared Services Initiative

Create a Climate Justice Corps Network

Community Planning and Capacity

2



Description

Albany County should create a youth-based Climate Justice Corps and workforce development program for supporting and implementing climate-smart resiliency strategies, like green infrastructure, tree planting, and sustainable building techniques. This Climate Justice Corps could be a county-wide network with local groups in participating communities and neighborhoods.

Need

A Climate Justice Corps would provide needed activities and jobs for youth and young adults, particularly in environmental justice communities where opportunities are limited and residents often face the greatest challenges from climate change. In a state that is deeply committed to green infrastructure and climate resiliency and that has pledged to fund this directive, there is tremendous support for green jobs workforce training and climate justice corps. Like former conservation corps, supported and funded programs like these have the combined ability to meet increased workforce demands, implement the green infrastructure that will be necessary to support Albany County's resilience, provide needed jobs with good wages, and outfit young adults with the knowledge and skills to improve their circumstances.

Recommended Actions

- 01 Become a host community for a NYSERDA Climate Justice Fellow.** NYSERDA's Climate Justice Fellowship Program funds fellows to work with community-based organizations, universities, municipalities, and clean energy businesses to advance climate justice and clean energy priorities for disadvantaged communities. The Climate Justice Fellow could take the lead on several of the actions recommended below, including assisting with community engagement and developing and implementing clean energy projects.
- 02 Develop a prioritized list of climate resiliency actions the Climate Justice Corps could assist in implementing.** Working collaboratively with local partners (suggestions listed on page 147), identify a set of climate resilience actions the Climate Justice Corps could undertake. Opportunities include: green infrastructure, tree planting, vacant lot transformation, retrofitting homes for climate resilience, maintaining trails and open spaces and others. Keep in mind that the Climate Justice Corps will be made up largely of youth workers so identify tasks accordingly. (See the sidebar on page 146 for more green job ideas.) The county should develop an initial list of actions and then meet with municipalities and neighborhood groups to customize the list to meet local needs and identify partnerships.



Resilience Strategies

This project advances the following resilience strategies:

- Build climate resilience over time and across scales and systems.
- Support and empower local communities and institutions.
- Strengthen residents' sense of place and awareness of natural processes by deepening connections between social and ecological systems.
- Increase the public's understanding of and capacity to respond to climate change.
- Develop a skilled workforce to support a sustainable, resilient economy and high quality of life.



NYS Green Jobs Commitment

New York State is committed to ensuring a just and equitable transition for all New Yorkers as part of its climate resiliency plans and as required by the Climate Leadership and Community Protection Act (CLCPA). In addition, as of December 2022, NYSERDA has committed more than \$120 million to support the creation of a clean energy workforce pipeline that prioritizes training programs for the state's most under-served populations. This presents a tremendous opportunity for communities to create and support youth workforce training opportunities and climate justice corps.



Tips for Success

Robust volunteer engagement can expand the Climate Justice Corps' capacity in an economical way. Volunteer stints can also be an opportunity for community members to learn how to make resilient improvements at their own properties.

Recommended Actions

CONTINUED



Case Study

The Philadelphia LandCare Program

is a nationally recognized workforce development program that converts vacant lots into green spaces with a focus on low- and moderate-income neighborhoods. To convert these lots, they hire local minority-owned businesses, contractors, and artists to clean and transform vacant lots into community assets that apply green infrastructure. They also provide workforce training for formerly incarcerated individuals and they employ regular maintenance crews to help manage the lots, which now total over 2,000.

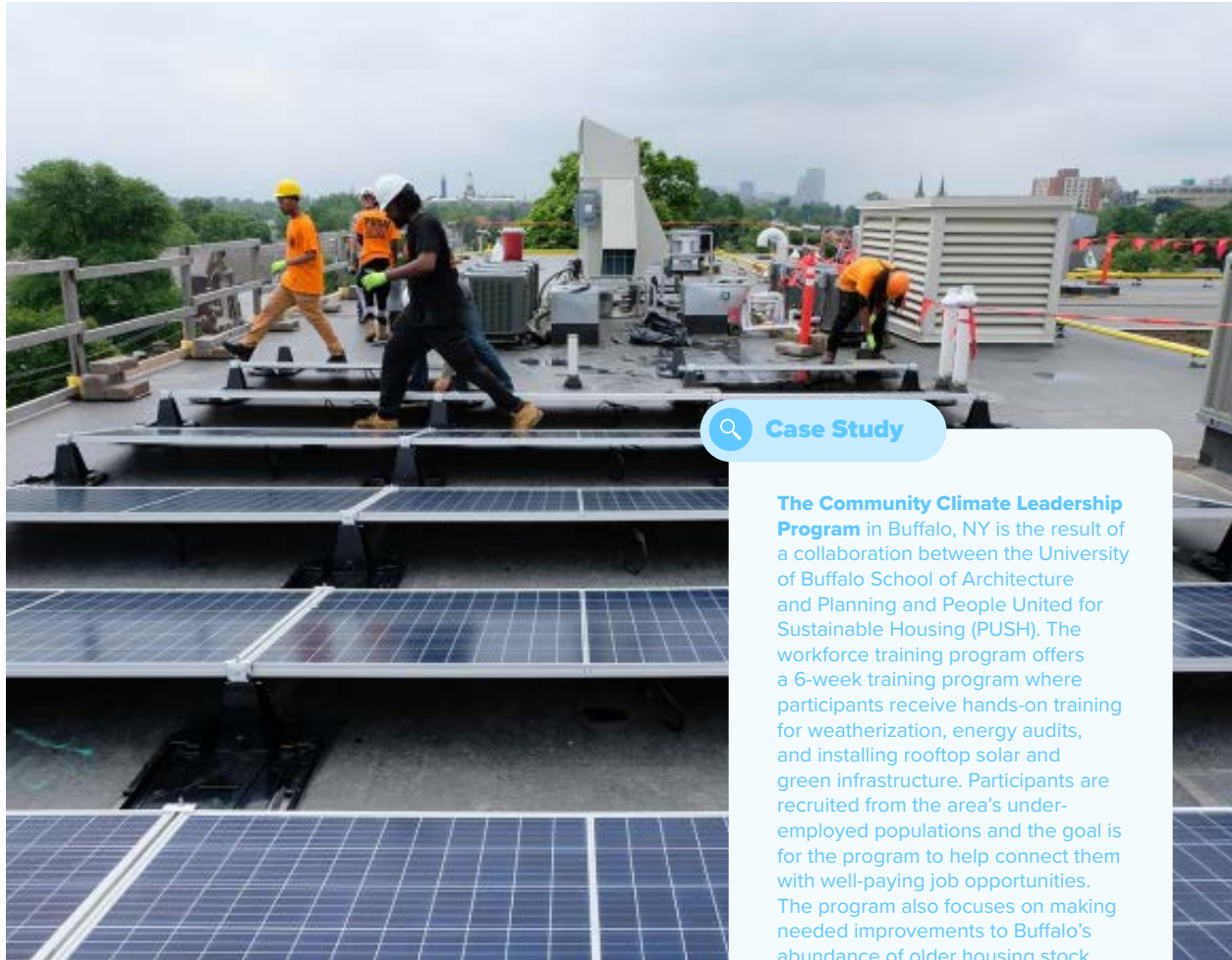
Find out more here: phsonline.org/programs/transforming-vacant-land

⤴ **Philadelphia LandCare Program**
Philadelphia, PA



Climate Impacts

According to a 2018 study of the vacant lots converted to green spaces through the Philadelphia LandCare Program, **residents living near these spaces experienced a 40% decrease in feelings of depression.**



Case Study

The Community Climate Leadership Program in Buffalo, NY is the result of a collaboration between the University of Buffalo School of Architecture and Planning and People United for Sustainable Housing (PUSH). The workforce training program offers a 6-week training program where participants receive hands-on training for weatherization, energy audits, and installing rooftop solar and green infrastructure. Participants are recruited from the area's under-employed populations and the goal is for the program to help connect them with well-paying job opportunities. The program also focuses on making needed improvements to Buffalo's abundance of older housing stock that is in need of weatherization and other climate-resilient improvements.

Find out more here:
buffalo.edu/inclusion/UBMakingaDiff/AllStories.host.html/content/shared/university/news/ub-reporter-articles/stories/2022/06/push-buffalo-green-jobs.detail.html

⤴ **Community Climate Leadership Program**
Buffalo, NY

Recommended Actions

CONTINUED

- 03 Create a workforce training program to develop skills in climate resiliency actions.** Building on the County's Youth Employment Program, develop a workforce training program that targets youth in environmental justice and socially vulnerable communities. This County-led Climate Justice Corps can serve as a model for local spin-offs. Partner with local schools and institutions to provide low-cost, accessible workforce training programs that focus on the skills needed to implement the identified climate resiliency tasks such as: sustainable building methods, horticulture and green infrastructure techniques, and others.
- 04 Develop a “kit of parts” to support local communities in creating their own climate justice corps.** Based on lessons learned from the County's Climate Justice Corps (**Action 03**), create a model that local organizations can implement in their own communities and provide technical assistance in creating local climate justice corps. Having a “kit of parts” that serves as a guidebook can jump-start the process, making it easier to initiate climate justice corps at the neighborhood or municipal scale and eliminating barriers for local communities to get involved in the county-wide network. The County should maintain a database of all local climate justice corps organizations and regularly (e.g., twice a year) convene the county-wide network of corps to share stories, progress, and lessons learned as well as identify opportunities for county-wide coordination and collaboration.
- 05 Identify partner organizations to support the climate justice corps network.** Reach out to local organizations serving youth to identify potential partner organizations and identify what the needs would be for those organizations to facilitate a climate justice corps. Having enough staff to facilitate a climate justice corps is a common challenge for many organizations looking to increase capacity and meet community needs. Partnering with educational institutions and not-for-profits to assist in procuring staff and funding staff positions to support the climate justice corps will be critical in launching new programs.



Green Job Opportunities

Green Infrastructure. Climate justice corps can help install and maintain green infrastructure and street trees, which can go a long way in building climate resilience, reducing the urban heat island effect, and addressing water quality issues that often impact environmental justice and socially vulnerable communities. This opportunity aligns well with the recommendations in **Project 2** and **Project 5**.

Rehabilitating and Retrofitting Homes for Climate Resilience. Pairing workforce training with current homeowners (or aspiring homeowners) in vulnerable communities where updates to existing housing stock may be desperately needed but out of financial reach presents an opportunity to address a major challenge in strengthening a community's resilience. This can tie into the recommendations included in **Project 5**.

Vacant Lot Transformation. Vacant lots can have negative impacts on struggling communities and present opportunities for positive neighborhood transformation. Working with youth climate justice corps to convert these lots into green spaces that can benefit the community through green infrastructure, food production, community space and programming support, job creation, and mental health can strengthen and increase community equity and resilience.

Trail Construction and Maintenance. Climate justice corps workers can help build out and maintain the trail network, as recommended in **Project 13**.

Community Education and Outreach. For green infrastructure to succeed in a community, it must be understood and embraced as positive change. Employing youth to facilitate public engagement in their communities can build support for green infrastructure projects.

Recommended Actions

CONTINUED

06 Work with the Advance Albany Alliance and UAlbany to create a pipeline for Climate Justice Corps graduates to find full-time positions. Provide services to connect Climate Justice Corps graduates with well-paying job opportunities, especially in green industries if possible. Partner with local businesses and industries to link graduates with open positions. Also seek to fill Climate Justice Corps staff positions with program graduates.

07 Establish a mechanism to provide annual funding and support to the Climate Justice Corps. Recognize that existing organizations operating in this space have limited capacity and the County should assist in filling gaps. Provide funding to support staff and leadership positions. Assist local climate justice corps in procuring materials, equipment, facilitating trainings, and applying for grants.

Potential Benefits

- **Provide workforce training** and opportunities that will directly benefit communities through increasing opportunity and climate resilience simultaneously.
- **Support and empower local communities and organizations** by empowering organizations and community members to take the lead in making their community more resilient.
- **Strengthen residents' sense of place** and support of natural systems so that residents feel they are part of positive action and solutions.
- **Provide opportunities for youth in vulnerable communities** where there is currently a lack of support and options for youth.
- **Increase workforce capacity** for needed local services by partnering with municipalities and local businesses to assist in creating and filling needed positions.
- **Support prioritized climate resiliency efforts** through workforce development training initiatives by supporting county-wide efforts and partnering with organizations working to implement climate resiliency projects and strategies.

Implementation

Possible Lead Agency

- Albany County
- SUNY Albany

Potential Partners

- Local municipalities
- NYSERDA
- Capital Region BOCES
- Albany City School District
- Albany County Youth Employment Program
- CCE
- Habitat for Humanity
- Albany County Land Bank
- Advance Albany Alliance
- The Radix Ecological Sustainability Center
- Friends of Tivoli Lake Preserve and Farm
- Arbor Hill Development Corps.
- Five Rivers Environmental Center, Albany Pine Bush Preserve, and other preserves
- CDTA
- SWCD

Project Status and Timeframe

- Near-term (3 to 5 years):
Actions 01 and 02
- Mid-term (5 to 10 years):
Actions 03 through 07

Planning-level Cost Estimate

\$40,000 to hire a NYSERDA Climate Justice Fellow
(Note: This is 100% reimbursable.)

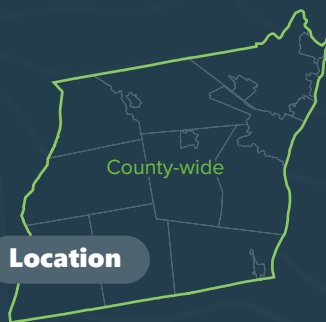
Potential Funding Sources

- NYSERDA Climate Justice Fellowship
- NYSERDA Clean Energy Internship Program
- EPA Brownfield Jobs Training Grants (epa.gov/brownfields/brownfields-job-training-jt-grants)

Purchase First Street Foundation's Flood Factor Data

Community Planning and Capacity

3



Description

By annually purchasing First Street Foundation's Flood Factor data, the County can provide property-level data quantifying flood risks and projections of flood hazards 30 years into the future. This spatial data could be hosted on the County's existing online interactive map application and made available to the public and the development community.

Need

The FEMA flood hazard areas are valuable tools to identify properties at risk of flooding during large storm events; however, this dataset does not capture the full extent of flood hazards county-wide and does not consider the future impacts of climate change. First Street Foundation's "Flood Factor" dataset provides a helpful complement to the FEMA flood hazard layers. It considers flooding caused by rain events (pluvial flooding), overflow of water bodies (fluvial flooding), high tides, coastal storm surges, and future environmental change including precipitation changes and sea level rise. The Flood Factor dataset is annually updated by an interdisciplinary team of scientists to reflect current and future flood risks based on the best available science.

By purchasing an annual subscription and hosting the Flood Factor dataset on the County's existing online interactive map, Albany County can provide high-quality flood risk and hazard data to the public in order to support smart development decisions, identify adaptation measures, and proactively identify critical infrastructure that may be at risk in the future.

Recommended Actions

- 01 Purchase First Street Foundation's Flood Factor dataset for Albany County** each year to make this dataset publicly available and support informed decision-making related to flood hazards and future development at the municipal level and individual property.
- 02 Host municipal trainings** to demonstrate how to use the dataset and interpret the data and highlight different potential applications of the data to proactively anticipate and mitigate flood risks. For example, this dataset could inform site plan reviews, zoning code and comprehensive plan updates, and the development of site-specific adaptation measures.
- 03 Incorporate the Flood Factor dataset into the County's decision-making processes** including planning board reviews, economic development initiatives, asset management, and facility design in order to ensure future decisions are informed by the best available data regarding current and future flood risks.



Resilience Strategies

This project advances the following resilience strategies:

- Learn from past events and anticipate future disturbances.
- Support data-driven decision-making.
- Promote regional sharing of information and resources.
- Increase the public's understanding of and capacity to respond to climate change.
- Build climate resilience over time and across scales and systems.



Flood Factor Data

Compared to FEMA's flood hazard areas, First Street Foundation's Flood Factor dataset provides a better picture of potential flooding because it incorporates considerations for climate change. It can also be used to model data for a number of potential future scenarios including for:

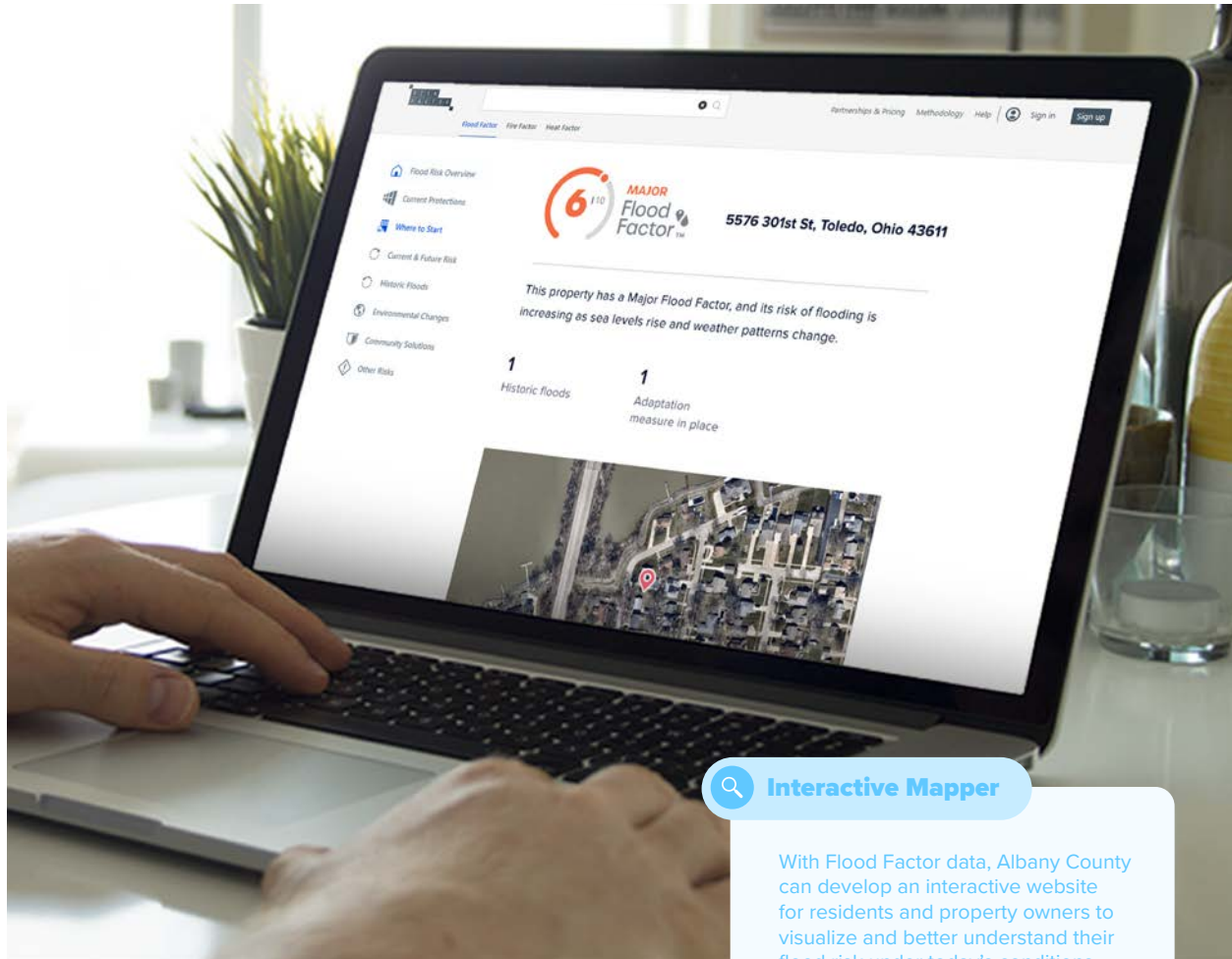
- Low, medium, and high CMIP 4.5¹ climate scenarios
- Three different timeframes (today, 15 years from now, and 30 years from now)
- Four different storm intervals (2-year storm, 5-year storm, 20-year storm, 100-year storm)

The Flood Factor dataset was used in combination with FEMA floodplains and community-identified nuisance flooding areas to conduct the **Risk Assessment (Chapter 3)**.

¹ The Coupled Model Intercomparison Project (CMIP) is an international effort that prepares climate models. These models often provide the basis for reports from the Intergovernmental Panel on Climate Change (IPCC).

Recommended Actions

CONTINUED



⤴ **First Street Foundation Flood Factor Website**
riskfactor.com

Interactive Mapper

With Flood Factor data, Albany County can develop an interactive website for residents and property owners to visualize and better understand their flood risk under today's conditions and also under future conditions.

Potential Benefits

- **Public access to a county-wide, comprehensive flood hazard and risk dataset** that takes climate change into account.
- **Increased public awareness of current and future flood risks** at the site, neighborhood, and county scales.
- **Proactive identification and implementation of adaptation measures** to mitigate future flood risks.
- **Smarter development decisions** that proactively respond to and avoid flood hazards on a site or in an area.

Implementation

Possible Lead Agency

Albany County

Potential Partners

Local municipalities

Project Status and Timeframe

The Flood Factor dataset is updated annually so the County would need to purchase a subscription every year to get the most up-to-date data.

Annual Cost Estimate

- Yearly subscription to First Street Foundation: \$2,500
- 40 hours of staff time* each year to process the data and add it to the interactive map: \$5,000
- 60 hours of staff time* to develop training materials: \$7,500
- 16 hours of staff time* per training: \$2,000

**Assuming an all-inclusive hourly rate of \$125*

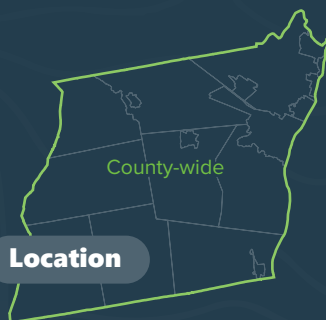
Potential Funding Sources

Albany County budget

Support Municipal Participation in FEMA's CRS Program

Community Planning and Capacity

4



Description

Albany County should encourage municipal participation in FEMA's Community Rating System (CRS) program by providing technical assistance to help interested municipalities apply for, maintain, and advance their participation in CRS. The CRS program is a voluntary, incentive-based program that recognizes, encourages, and rewards local floodplain management activities that exceed the minimum standards of the National Flood Insurance Program (NFIP).

Need

Participating CRS communities earn credit points for the local implementation of CRS activities, which can range from public education campaigns to open space preservation in the floodplain to upgraded communications systems to improve emergency response and recovery. For many municipalities in Albany County, participation in the CRS program will leverage activities that they are already doing. In return, flood insurance policy holders in participating CRS communities are eligible for discounts on their flood insurance premiums based on level of participation in CRS (i.e., the more points a community earns, the greater the reduction in flood insurance premiums).

Recommended Actions

Albany County can support municipal participation in the CRS program in multiple ways, including by:

- 01 Providing data, mapping services, and technical support** to assist local municipalities.
- 02 Continuing to provide public access to the FEMA 100- and 500-year floodplain via the County's online interactive map**, and adding additional data layers that will help communities quickly pull necessary data and information to comply with the CRS reporting requirements.
- 03 Continuing to conduct a Multi-Jurisdictional Hazard Mitigation Plan.**
- 04 Providing additional support to the Stormwater Coalition to expand public awareness and information campaigns.** These activities could also be targeted to neighborhood areas that are particularly prone to flooding, as shown in **Project 5**.

*Note that all of the actions listed above help communities earn points through the CRS program. If the County builds out its stream and rain gauge network (**Project 6**), this would provide another opportunity to help communities gain points through CRS.*



Resilience Strategies

This project advances the following resilience strategies:

- Guide growth and development away from high-risk areas.
- Preserve, expand, and restore natural areas.
- Support data-driven decision-making.
- Promote regional sharing of information and resources.
- Support and empower local communities and institutions.



Case Study: Monmouth County

Monmouth County, NJ. The Monmouth County CRS Assistance Program allows municipalities to seek professional and technical guidance in hazard mitigation, community planning, public outreach, and GIS mapping in order to earn or advance their CRS classification. The County also facilitates a quarterly "CRS User Group" that provides a regional forum for discussion about best practices and common obstacles associated with the CRS program. The CRS Assistance Program is a joint partnership between the Monmouth County Division of Planning and the Monmouth County Office of Emergency Management.

Recommended Actions

CONTINUED

- 05** **Creating an informational website** and repository for CRS resources, including a clearinghouse of state and federal training and funding resources.
- 06** **Hosting municipal trainings each year** to share best practices and lessons learned among municipalities.
- 07** **Directly assisting municipalities in applying for and advancing** their CRS classifications as this is often the most time-consuming and resource-intensive element of CRS program participation.
- 08** **Consider designating a County-wide CRS Coordinator** to help navigate the CRS manual, assist with paperwork and documentation, and conduct CRS quick-checks with interested communities. This could be a position created within the Albany County Stormwater Coalition to help municipalities with participation in and compliance with the MS4 and CRS programs.
- 09** **Consider designating a County-wide Certified Floodplain Manager (CFM)** to assist interested municipalities with the review of floodplain development permits.



Case Study: Monroe County



Monroe County, NY. With funding from the NYS Climate Smart Communities (CSC) program, Monroe County retained a consultant to provide technical assistance to municipalities with interest in becoming CRS communities or in maintaining or improving their CRS classification.

Assistance included:

- **Operating a website** (monroecountycrs.com) with information, resources, and tools to help municipalities understand and apply for CRS certification.
- **Conducting “CRS Quick Checks”** to determine if communities are eligible for the CRS program and/or to identify areas where communities can earn additional credits.
- **Coordinating a local CRS users group** for communities to share best practices and learn from others' experiences.
- **Helping municipal staff navigate the CRS program** including assisting with application documentation, verification procedures, and annual recertification requirements.

Potential Benefits

- **Increased number of Albany County municipalities participating in the CRS program**, especially those that may not have the technical, personnel, or financial capacity to do so otherwise.
- **Co-benefits from the implementation of CRS activities**, including reduction in flood insurance premiums, reduction in damage to property or public infrastructure from flood events, reduction of public expenditures necessary for recovery, mitigation of potential economic disruptions and losses, increased public awareness of flood protection measures, and protection of the environment, among others.
- **Increased inter-municipal cooperation** through the sharing of baseline data, information, and mapping services at the County level and through a county-wide dialogue between municipalities – both in the CRS program and those interested in joining – to discuss possible approaches and lessons learned.
- **Providing a helpful framework for identifying best practices for floodplain management.** In fact, many communities may find value in implementing aspects of the CRS program while not fully participating.

Implementation

Possible Lead Agency

Albany County

Potential Partners

- Floodplain coordinators in Albany County municipalities
- Stormwater Coalition
- NYS DEC

Needs for Implementation

If the County elects to offer guidance in-house, staff will need to receive training on the CRS program and its requirements. Alternatively, the County could hire a consultant to provide the recommended services.

Project Status and Timeframe

As part of the Albany County Climate Resiliency Plan process, municipal staff in interested communities were introduced to the CRS program. The Village of Green Island worked directly with the Project Team to evaluate the municipality's ability and desire to participate in the CRS program. A concerted effort by the County in the near-term could encourage additional municipal participation in CRS.

Planning-level Cost Estimate

Approximately \$20,000*

**Assuming one month of staff time at an all-inclusive hourly rate of \$125*

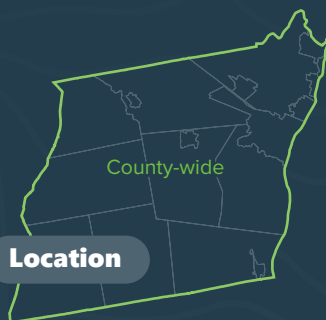
Potential Funding Sources

- NYS Climate Smart Communities (CSC)
- FEMA Pre-Disaster Mitigation (PDM)
- FEMA Flood Mitigation Assistance (FMA)
- FEMA Hazard Mitigation Grant Program (HMGP)

Create a “Resilient Homes Program”

Housing

5



Description

A “Resilient Homes Program” can provide educational, technical, and financial resources to assist home and property owners in implementing strategies to improve climate resilience, like installing green infrastructure and using sustainable building retrofitting techniques to mitigate flood and heat risks.

Need

People often experience the effects of climate change most intimately when climate events impact their homes, whether that be through basement flooding, damage from heavy winds, or difficulty paying energy bills during hot and cold snaps. As explored in the **Risk Assessment (Chapter 3)**, many homes in Albany County are at risk to a number of climate stressors, from flooding to extreme heat, and the need to adapt to and mitigate the potential impacts of these stressors is becoming even more imperative as extreme climate events become more frequent. Improving a home's resilience can be done in many ways from installing green stormwater infrastructure to switching to renewable energy sources to improving insulation, among others.

Recommended Actions

01 Identify, establish, and invest in “Resilient Focus Areas” where data shows that climate impacts may be more pronounced. Reference the **Risk Assessment (Chapter 3)** as a starting point. Target, in particular, environmental justice and socially vulnerable communities where the effects of climate change will have disproportionate impacts and where residents and homeowners may need more support. Provide grants, loans, and/or rebates to make options like using resilient building retrofitting techniques or installing green infrastructure more accessible for homeowners in “Resilient Focus Areas.” This action should build upon and expand the technical assistance that is already provided by the Albany County Soil and Water Conservation District (SWCD) through its Natural Resource Technical Assistance Program.



Resilience Strategies

This project advances the following resilience strategies:

- Increase the public's understanding of and capacity to respond to climate change.
- Strengthen residents' sense of place and awareness of natural processes by deepening connections between social and ecological systems.
- Build climate resilience over time and across scales and systems.
- Effectively and equitably respond to and recover from natural disturbances.
- Learn from past events and anticipate future disturbances.



Case Studies

Capital Region, NY. The Capital Region Clean Energy Hub (coordinated in Albany County by Affordable Housing Partnership) offers technical assistance and grants to tenants and homeowners to improve energy efficiency, including through the installation of solar panels and heat pumps.

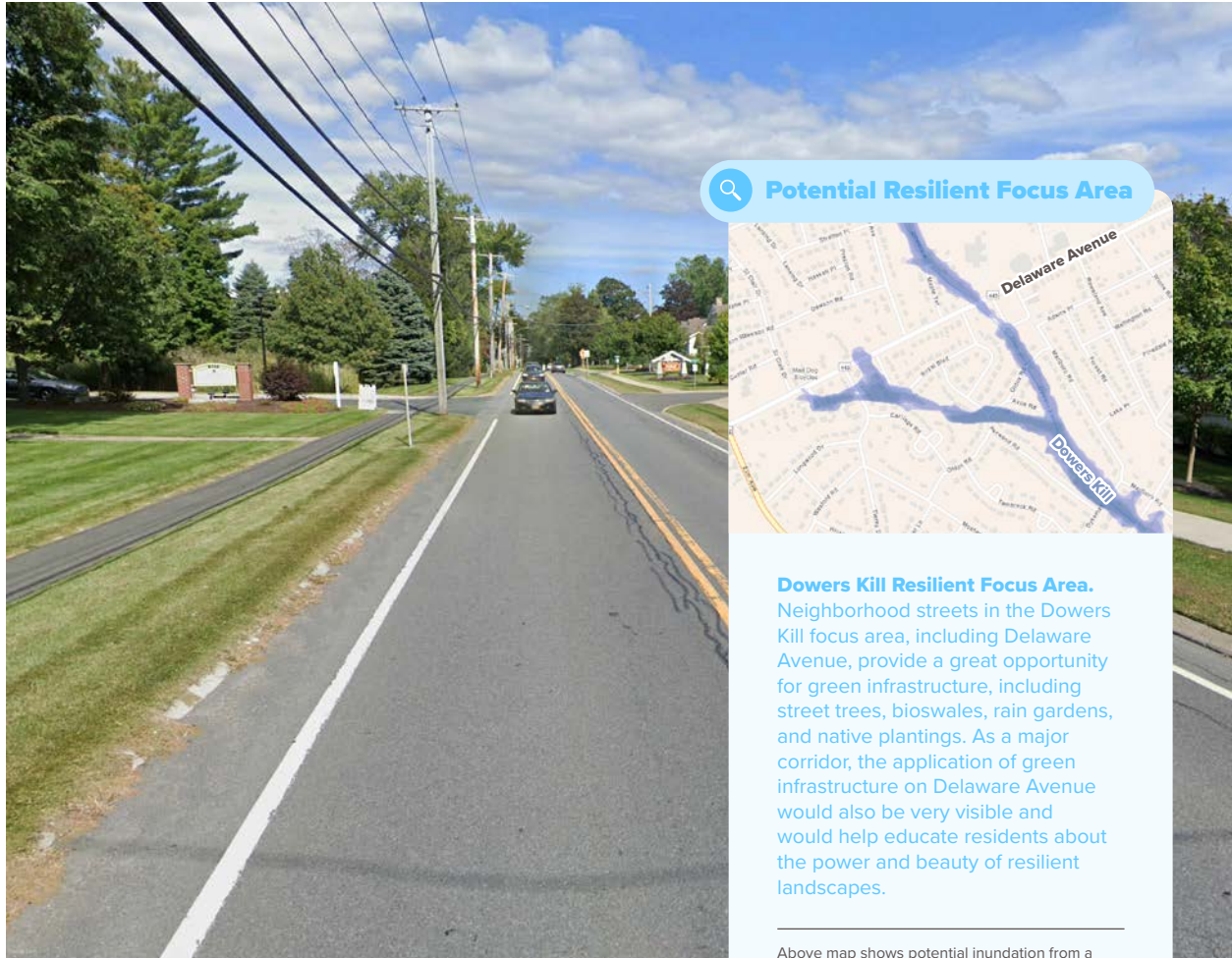
Find out more here:
ahphome.org/addressing-climate-change

Puget Sound, WA. “12,000 Rain Gardens in Puget Sound” is a campaign to reduce stormwater problems and localized flooding through direct education, including in-person training and events, as well as “RainWise” grants for up to \$1,000 to assist homeowners and landowners in installing rain gardens in eligible areas (where the municipal rebate program does not provide adequate assistance for homeowners to overcome financial barriers).

Find out more here:
12000raingardens.org/build-a-rain-garden/community

Recommended Actions

CONTINUED



⤴ **Delaware Avenue**
Town of Bethlehem

🔍 Potential Resilient Focus Area

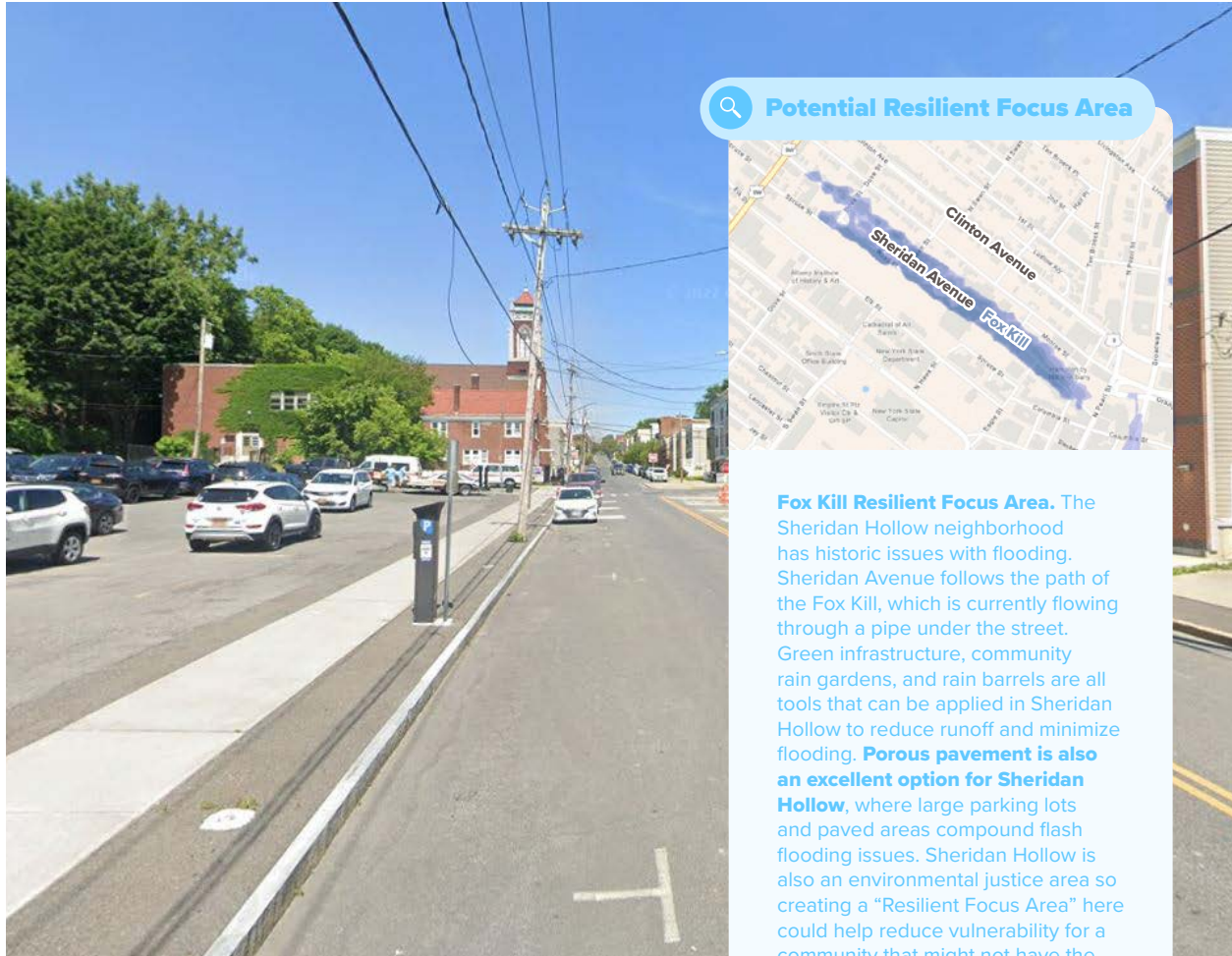


Dowers Kill Resilient Focus Area. Neighborhood streets in the Dowers Kill focus area, including Delaware Avenue, provide a great opportunity for green infrastructure, including street trees, bioswales, rain gardens, and native plantings. As a major corridor, the application of green infrastructure on Delaware Avenue would also be very visible and would help educate residents about the power and beauty of resilient landscapes.

Above map shows potential inundation from a 100-year storm in 2050. Darker blues represent deeper flood depths.

Recommended Actions

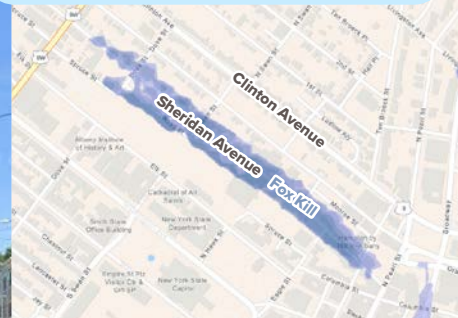
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⤴ **Sheridan Avenue**
City of Albany



Potential Resilient Focus Area



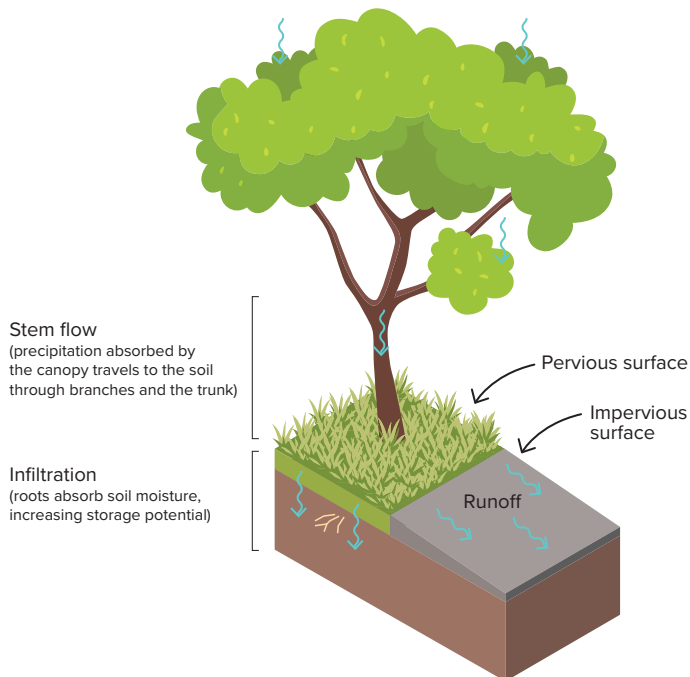
Fox Kill Resilient Focus Area. The Sheridan Hollow neighborhood has historic issues with flooding. Sheridan Avenue follows the path of the Fox Kill, which is currently flowing through a pipe under the street. Green infrastructure, community rain gardens, and rain barrels are all tools that can be applied in Sheridan Hollow to reduce runoff and minimize flooding. **Porous pavement is also an excellent option for Sheridan Hollow**, where large parking lots and paved areas compound flash flooding issues. Sheridan Hollow is also an environmental justice area so creating a “Resilient Focus Area” here could help reduce vulnerability for a community that might not have the capacity or resources to otherwise.

Above map shows potential inundation from a 100-year storm in 2050. Darker blues represent deeper flood depths.

Recommended Actions

CONTINUED

- 02 Educate homeowners about the benefits of green infrastructure.** Trees, rain gardens, porous pavements, and cisterns (including rain barrels) are effective ways to reduce runoff and flooding, help with groundwater and aquifer recharge, and combat the effects of drought. Albany County should partner with the Stormwater Coalition of Albany County and the SWCD to increase public understanding of green infrastructure and expand awareness of existing programs and resources that homeowners and property owners can make use of to install green infrastructure. The County should also consider providing grants, loans, and/or rebates and technical assistance for the installation of green infrastructure in “Resilient Focus Areas.”



Resilient Home Strategies

Regular gutter cleanout. Many of Albany's flat roofs will continue to become more vulnerable as rainfall events become more intense and more frequent. Regular clean-out of roof drainage systems is critical.

Disconnect roof drains from the sewer system. Many older homes in the county, including the City of Watervliet, have roof drains that discharge water directly into the sewer system. During large storms when the sewer is at capacity, these drains can back up into the basements of homes and cause flooding. Disconnecting roof drains and directing roof runoff into a cistern or rain garden can reduce the amount of stormwater going into the sewer system and mitigate residential flooding.

Elevating critical systems. Relocating mechanical equipment and utilities to higher levels (often to upper floors, the roof, or suspended from basement ceilings) makes these systems less likely to be damaged by flooding.

Wet floodproofing allows for the movement of water through a space or building, which can help prevent structural failure.

Dry floodproofing seals a space or building up to the level of anticipated flooding or higher to keep water from entering. This often requires strengthening of structural members to resist hydrostatic pressure caused by flooding and is not recommended for structures with basements.

Backup systems. Backflow prevention valves, backup generators, water catchments for uses other than drinking or washing food, operable windows that allow for easy escape, enhanced foundations, and emergency preparedness plans are all examples of backup systems that can increase ability to mitigate flooding.

Tree planting. Research shows that planting trees in strategic locations can significantly reduce building temperatures, which decreases residents' demand on cooling systems and can reduce energy bills by up to \$250 a year.

Recommended Actions

CONTINUED



⤴ **Rain Garden Demonstration Area**
Cornell Cooperative Extension



Cornell Cooperative Extension

The Cornell Cooperative Extension (CCE) in Albany County has a **demonstration rain garden** and routinely provides assistance to community members looking to install rain gardens and other types of green infrastructure through its “**Ask a Master Gardener**” Program.

Find out more here:
albany.cce.cornell.edu/gardening/master-gardener-program



Climate Impacts

Rain gardens and other green infrastructure in residential watersheds that are prone to flooding are an inexpensive way to reduce runoff and erosion, provide habitat, add natural beauty, reduce pollutant loads, and recharge groundwater. If 500 residents installed an 8' x 10' x 12" rain garden, runoff could be reduced by more than 300,000 gallons per storm.

Rain barrels are great ways to capture roof runoff and harvest water that can then be used in times of drought. If 500 residents installed 50-gallon rain barrels, runoff could be decreased by 25,000 gallons in a single storm, which could in turn lead to a 25,000 reduction in the demand for water during periods of drought.

Recommended Actions

CONTINUED

03 Create a guide for retrofitting existing homes for climate resiliency. There are many actions that homeowners can take to adapt to and minimize the negative impacts of climate change. While building resilience into new construction is the easiest and least expensive, there are still measures that can be taken to improve older and historic structures. This guide should identify resilient retrofitting strategies, like elevating critical equipment, wet and dry floodproofing, and installing backup systems. It should also provide guidance on how to implement these strategies and what funding sources and incentives are available to do so. Distribute the guide to residents and work with CCE, the SWCD, and other local partners to provide technical assistance to homeowners. Also assist municipalities with integrating recommendations from the guide into their zoning codes and local floodplain development permits.

04 Leverage the Climate Justice Corps recommended in **Project 2** to connect homeowners with workers who have the technical expertise and know-how to assist in resilient retrofits and the installation and maintenance of green infrastructure.

+ Want to know more?

See page 142 to read more about the recommended Climate Justice Corps and how it could assist homeowners with resilient retrofits.

Case Study

FEMA

retrofitting strategies that are required or encouraged by FEMA and the local

With the basement and move mechanical systems to a carbonated platform or to a floor above the BFE. Elevate the building.

Unapproved for FEMA flood insurance reduction. Raising basement and elevating the lowest interior floor.

Retrofit+

retrofitting strategies that incorporate additional design recommendations

Add a front porch, a staircase, and a ramp to help connect the house building with the ground. Consider installing backup measures which could include separate windows and doors and basements that don't require power to operate. Cover mechanical systems with a screen and consider locating the carburetor in the backyard or move mechanical systems to a floor above the BFE.

Boston Guide to Climate Resilient Retrofitting. Boston conducted an exploratory study in partnership with the Harvard Graduate School of Design to identify strategies for retrofitting Boston buildings for flood resilience and adaptation. The study includes numerous case studies and potential adaptation strategies.

Read the full guide here: boston.gov/sites/default/files/embed/file/2017-01/retrofitting_report_10.7.2016.pdf

+ SWCD Funding Opportunities

The Albany County Soil and Water Conservation District (SWCD) offers several grant programs that help homeowners access trees, rain barrels, and other green infrastructure measures at reduced costs, including:

- **Rain Barrel Program.** Offers rain barrels for only \$80. Available to all, even non-Albany County residents.
- **Tree and Shrub Program.** Offers reduced rates on seedlings and transplants, ground covers, fruits and berries, and wildflower seed mixes. Also offers tree tubes, marking flags, and fertilizer tablets.

Potential Benefits

- **Increase homeowner and resident participation** in resiliency efforts.
- **Increase green infrastructure systems** through public-private partnerships with homeowners.
- **Increase local water quality** by promoting systems that will reduce flooding, combat drought, decrease surface runoff, lower runoff temperatures, and help mitigate large scale climate events.
- **Assist homeowners in making improvements** that lower their costs and decrease demand on utility systems.
- **Create workforce development and job opportunities** to build new and improve existing affordable housing stock that is more resilient.

Implementation

Possible Lead Agency

- Albany County
- SWCD

Potential Partners

- Climate Justice Corps (recommended in **Project 2**)
- Stormwater Coalition
- CCE
- Albany County Land Bank Corporation
- Habitat for Humanity
- Local municipalities

Project Status and Timeframe

- Near-term (1 to 2 years): Develop plan for homeowner outreach and assistance and compile and develop literature that promotes resilient strategies and resources.
- Medium-term (3 to 5 years): Implement plan for literature distribution, homeowner outreach, and workforce development.
- Medium-term (3 to 5 years): Continue to grow and expand program to strengthen homeowner resiliency.

Planning-level Cost Estimate

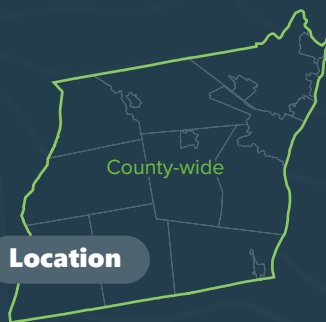
\$100,000 to create a “Resilient Homes Guidebook” and host trainings for community groups

Potential Funding Sources

- SWCD Tree and Shrub Program
- SWCD Stormwater Management and Urban Drainage Program
- FEMA Flood Mitigation Assistance (FMA) Program
- NYS EFC Green Innovation Grant Program (GIGP)
- NYS Homes and Community Renewal (HCR) Resilient Retrofits Program

Build out the County's Network of Rain and Stream Gauges

Infrastructure Systems



Description

An expanded network of rain and stream gauges can provide real-time information about rainfall and stream conditions in the county and can be used to provide advance-warning to residents about potential flash flood events. Data collected from the network can also help municipalities understand how climate change is impacting their communities, model future flooding events, and make more informed decisions about future land use and development.

Need

The existing rain and stream gauge network in Albany County provides limited coverage. The addition of more gauges at select locations would provide a more accurate picture, in real time, of rainfall and stream conditions across the county.

Three **rain gauges** currently exist in the county: one in Voorheesville (which collects rainfall data for the eastern, lower elevation portions of the county), one in Medusa (which collects rainfall data for the hill towns), and one at the UAlbany campus. The Voorheesville and Medusa gauges are connected to the NYS Mesonet system, which tracks meteorological conditions across the state. Expanding the rain gauge network is particularly important because the county's topographic variation and the convergence of different wind patterns in the Hudson and Mohawk River Valleys can result in rainfall amounts that vary significantly, even over short distances. Given these unique conditions, a denser network of gauges would provide a more accurate model of rainfall in the county.

There are four **stream gauges** in the county located on Normans Kill in Bethlehem, Patroon Creek in the City of Albany, the Hudson River near Green Island, and the Mohawk River in Cohoes. These gauges are all owned and maintained by USGS and the data they collect is publicly available. However, these stream gauges do not provide real-time data so are not currently usable as an advance-warning system. Upgrading the stream gauge network to provide real-time data would enable advance flood warnings, providing residents more time to evacuate and enabling first responders to mobilize and proactively close roads, as needed. An expanded stream gauge network can also be useful in building a more robust and localized database of historic rain events to better project and model the impacts of future storm events.



Resilience Strategies

This project advances the following resilience strategies:

- Learn from past events and anticipate future disturbances.
- Support data-driven decision-making.
- Promote regional sharing of information and resources.
- Increase the public's understanding of and capacity to respond to climate change.
- Build climate resilience over time and across scales and systems.



NYS Mesonet

NYS Mesonet is a statewide network of weather stations that measure rain, temperature, wind, snow, and other data to quantify atmospheric conditions in New York State. The system currently has 126 stations, with at least one station in every county or borough. These stations are connected in a network overseen by UAlbany's Department of Atmospheric and Environmental Sciences (DAES). The data, both historic and current, allows for more accurate weather predictions.



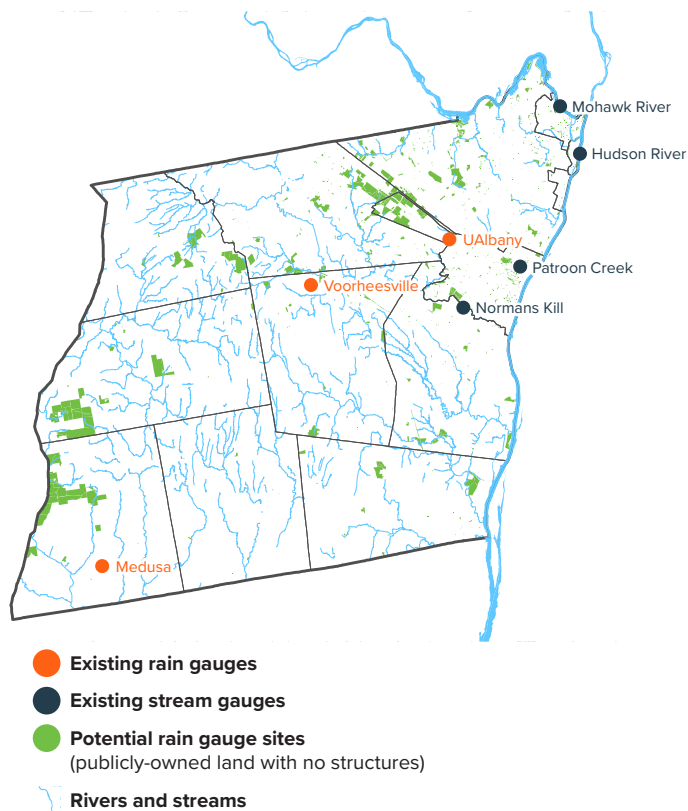
HRBR Regulating District

The Hudson River-Black River (HRBR) Regulating District is a New York State public benefit corporation that protects public health and safety by regulating the flow of waters in the Upper Hudson River (Albany County) and Black River watersheds. It works to reduce flooding caused by excess runoff and augment river flow when necessary by balancing water levels via its network of dams and reservoirs.

Gauge data can be found here:
hrbrd.ny.gov/gauge-data-and-reservoir-release/

Recommended Actions

- 01 Expand the rain gauge network.** Work with the Stormwater Coalition to identify optimal sites for new rain gauges, with the goal of creating a dense grid for data to be interpolated across the county. Rain gauges should be sited in the open (away from structures) and preferably on publicly-owned land, as locating on private property may require legal agreements. Specific locations should be chosen to avoid micro-climates or conditions that may affect localized rainfall readings. To the extent possible, rain gauges should be evenly distributed across the county. As more gauges are added to the network, the better and more accurate interpolation will be.



Tips for Success

Siting Rain Gauges. Rain gauges should be located in the open, away from trees and buildings which might disturb rain collection. In open areas it is also important to install shrouds to protect gauges, as winds can distort readings. Ideal locations would also have the capability to connect into existing power and communications infrastructure. If sites do not have access to line power or Ethernet, then a solar panel and battery array must be installed as well.

Siting Stream Gauges. Stream gauges should be prioritized along streams in urbanized watersheds and along streams that have a history of flooding, as gauges in these areas could assist in early detection and warning for flash floods. It is important to consider battery back-ups for gauges connected to line power, as these units are susceptible to power loss during storms, which coincidentally may be the same time streams are most likely to overflow.

Co-locating. If site conditions are favorable, a rain gauge can be sited in the same location as a stream gauge and the two devices could share a control cabinet, power, and communications connections.



Case Study

City of Albany. The City of Albany uses Opti brand rain gauges. These gauges are digital and provide real-time and historical data on a dashboard, which can be integrated with forecasts to create predictive alerts. Another option is to link rain gauge data to the 911 system so that affected areas can be notified quickly during heavy rains.

Recommended Actions

CONTINUED

- 02 Expand the stream gauge network.** New gauges should be prioritized in urbanized watersheds with high impervious surface coverage, as flash flooding is more likely to occur here and to impact development. They should also be installed in areas that have historically experienced flooding. The type of rain gauge to be installed is also an important consideration. Gauges that just measure stream height can be set up relatively quickly and inexpensively, but are best suited to give warning for small areas or roadways. Gauges that also measure flow can model flooding for larger areas but take longer to install and calibrate.
- 03 Share collected data with municipalities and the public.** Data collected from the rain and stream gauge network should be shared with municipalities. This data can help municipalities understand climate impacts, identify problem areas, and make decisions regarding infrastructure improvements (e.g., sizing of hydraulic openings), land use, and development. For municipalities participating in FEMA's Community Rating System (CRS) program, access to this data can also help them earn points under Activity 350: Flood Protection Information (see **Project 4**). Ultimately, the rain gauges could be connected into the NYS Mesonet system to provide public access to real-time and historical data.

Potential Benefits

- **Enabling communities to make more informed decisions** regarding infrastructure, land use, and development by increasing the availability of accurate, localized data.
- **Protecting residents** by providing advance warning of flash flood events.
- **Right-sizing drainage systems** by identifying areas that receive unusually high rainfall.

Implementation

Possible Lead Agency

- Albany County
- UAlbany DAES
- USGS

Potential Partners

- Stormwater Coalition
- Local municipalities

Project Status and Timeframe

Once locations have been identified, rain and stream gauges can be installed relatively quickly, likely in a one- to two-year timeframe. It will take longer to build out the network to increase interpolation accuracy and to give stream gauges time to calibrate. Ultimately, the gauges could be connected into the NYS Mesonet system and managed by through a partnership between the County, local municipalities, and UAlbany.

Planning-level Cost Estimate

- Rain gauge unit cost: \$7,500
- Stream gauge unit cost: \$30,000
- Unit cost for solar panel and battery array, if needed: \$15,000

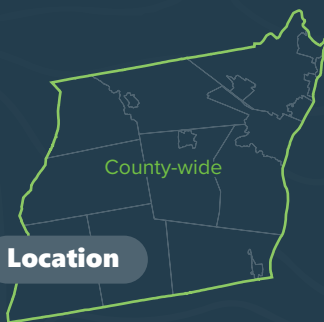
Potential Funding Sources

- FEMA Pre-Disaster Mitigation (PDM)
- FEMA Flood Mitigation Assistance (FMA)

Conduct a County-wide Culvert Analysis

Infrastructure Systems

7



Description

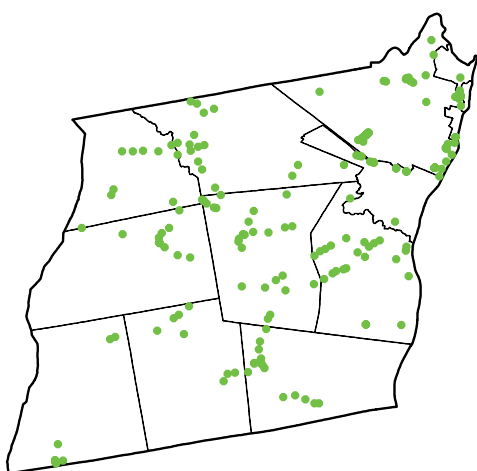
By conducting a county-wide culvert analysis, the County can proactively identify culverts for replacement or repair that are undersized for current and future climate conditions – thus posing the greatest risk for failure – and prioritize these culverts for right-sizing based on future precipitation models.

Need

Landcover changes due to development over the past half century have increased runoff in roadside drainage areas and streams. Today, that means that culverts designed to move runoff away from roads, houses, and businesses are often overwhelmed by more water than they were designed to handle. When this is the case, peak runoff during storms – or even during “regular” rainfall events – can cause localized flooding and road over-wash, which can damage roadways, destabilize embankments, and cause significant erosion. These impacts are expected to intensify with climate change.

The county’s culvert system is managed by several different agencies – the County, the State, local municipalities, and private entities. Without a comprehensive database and corresponding hydrological model, when changes are made to one culvert, the impacts that change has on upstream and downstream communities are not fully understood.

A county-wide culvert analysis would provide an inventory of existing conditions, including the size, shape, condition, and ownership of each culvert, and a better understanding of how the culvert system functions county-wide. This analysis would also provide the foundation for a coordinated asset management system and the hydrological modeling necessary to test the system-wide impacts when any given culvert is modified. Importantly, this analysis would enable local highway departments and stormwater managers to proactively mitigate future flooding.



● NYS DOT-owned culverts

(Note that this map does not represent all culverts in the county. The county only has an incomplete inventory at present.)



Resilience Strategies

This project advances the following resilience strategies:

- Learn from past events and anticipate future disturbances.
- Support data-driven decision-making.
- Promote regional sharing of information and resources.



Cornell Culvert Model

Researchers at the New York Water Resources Institute at Cornell University have developed a GIS-based tool to evaluate culverts and draining infrastructure, known as the Cornell Culvert Model. It is designed to identify culverts that are likely to be inundated during heavy rain events and to prioritize those in need of replacement or repair. In the eastern part of New York State, the Hudson River Estuary Program has been supporting communities in using the Cornell Culvert Model in combination with LiDAR data to prepare Culvert Management Plans. These plans create a culvert inventory that can then be used to analyze culverts to determine their existing capacity and likelihood of failure.

Find the Cornell Culvert Model here: cornell.app.box.com/s/q9q3qd35oswxglxnpd931jzblh2uj5j



Culvert Inventory Data

NAACC. The North Atlantic Aquatic Connectivity Collaborative (NAACC) maintains an inventory of culverts and bridges that it has assessed for fish and wildlife passability, condition, and risk of failure, including some structures in Albany County.

Search the database here: naacc.org/naacc_data_center_home.cfm

Recommended Actions

- 01 Conduct a culvert inventory** to create a comprehensive database of all existing culverts in Albany County that are 12 inches or greater in diameter and up to 20 feet in length. Currently, there is no centralized database of culverts in the county. Culverts are owned and maintained by each individual municipality, the County, NYS DOT, and the NYS Thruway Authority. There are also privately-owned culverts, which are usually located under driveways and are small in size.
- 02 Develop an asset management system** to track maintenance actions and improvements to culverts over time.
- 03 Develop a county-wide precipitation model to project future flows** anticipated as a result of climate change and to assess culvert capacity to handle these increased flows. This recommendation is consistent with the NYS DOT Highway Design Manual¹ and Bridge Manual² which reflects the need to design for increased flows. Coastal bridges and culverts, including those along the Hudson River, will also need to account for climate change-induced sea level rise.
- 04 Develop a county-wide hydrological model** to define culvert catchment areas and to identify high-priority upgrades, like culverts that need to be upgraded or replaced to ensure they can handle predicted storm events and flows in the future. This model can also be used to test the impacts of proposed improvements on the county-wide system.
- 05 Take ecological resilience into consideration** and make sure any culvert upgrades or replacements are done in a way that improves and supports aquatic habitat and biological connectivity. Biological connectivity should play a role in prioritizing culvert upgrades.
- 06 Leverage the stream gauge network** proposed as part of **Project 6**. Stream gauge data can be a helpful metric in analyzing culverts.



Case Study

Ulster County.³ Using raw LiDAR data, engineers created a hydrological model to evaluate detailed drainage patterns and model drainage catchments for individual culverts in Ulster County, New York. The County provided over 100 culvert inventory locations in order to compare existing culvert capacity (based on culvert size) to anticipated peak flows (based on modeled rainfall and runoff).

The process allowed the engineering team to identify improvements to the culvert inventory, including missing culverts, culvert location adjustments, and flagging erroneous entries. This improved culvert inventory data was the basis for mapping detailed drainage catchments to each point. Additional catchment characteristics such as total area, average slope, time of concentration, and average runoff curve number were derived in order to calculate peak flow estimates.

The peak flow calculations helped in ranking culverts based on the likelihood that their existing capacity was insufficient to handle predicted wet weather events. The hydrologically corrected surface model and detailed drainage maps became an important tool for validating the culvert inventory data. This culvert data is being used not only to evaluate flow capacity, but also the potential for supporting biological connectivity, which is an important factor in enhancing ecosystem services and watershed resiliency.

Read the full case study here:
[s3.amazonaws.com/
Case+Study+%2322-
+Ulster+County+Culverts.pdf](https://s3.amazonaws.com/groundpointengineering2/Case+Study+%2322-Ulster+County+Culverts.pdf)

Potential Benefits

- **Right-sizing culverts with consideration for climate change** by using predictive precipitation and hydrological models.
- **Preventing road over-wash and bank destabilization** by right-sizing infrastructure.
- **Supporting ecological resilience** by improving aquatic habitat quality and biological connectivity as part of culvert upgrade and replacement projects.
- **Creating a comprehensive database of culverts**, which can also be used to track maintenance records.
- **Making better informed decisions** about which culverts should be prioritized for replacement and/or repair.
- **Saving money** by proactively improving infrastructure instead of making emergency repairs.



Tips for Success

NYS DEC Stream Smart Crossings Technical Guidance. DEC is in the process of rolling out technical guidance and training on “stream smart crossings,” which are designed to provide enough capacity to pass sediment, debris, fish, and high flows from extreme storm events through structures like culverts or bridges without failure or damage to the structure. Stream smart crossings allow streams to act like streams, improving aquatic connectivity, wildlife passability, and the overall stream habitat.

Access the guidance documents here:
app.box.com/s/tzfozfyus4imn97haaxwynsa1czyejuz

- 1 NYSDOT Highway Design Manual Section 8.5.3: https://www.dot.ny.gov/divisions/engineering/design/dqab/hdm/hdm-repository/chapt_08.pdf
- 2 NYSDOT Bridge Manual Section 3.2.3.1: https://www.dot.ny.gov/divisions/engineering/structures/repository/manuals/brman-usc/NYSDOT_Bridge_Manual_2021_08-2022.pdf
- 3 Groundpoint Engineering, PLLC

Implementation

Possible Lead Agency

- Albany County
- CDTC

Potential Partners

- NYS DOT
- NYS Thruway Authority
- CCE
- Stormwater Coalition
- Local municipalities

Project Status and Timeframe

As this effort has essentially begun by individual entities gathering culvert information, the remaining project would have two separate tracks: combining existing records and completing the inventory. The establishment of a single database and combining of existing records would be a relatively short-term effort of six months to a year to complete. Data acquisition and mapping of the remaining culverts would likely require a two- to three-year commitment, depending upon budget. Development of corresponding rainfall and hydrologic models could be done concurrently.

Planning-level Cost Estimate

This project is anticipated to cost \$1 million. This assumes three professionals working full time for three years at a rate of \$100,000/year each. It also allows \$100,000 for office and equipment/software as well as other incidentals.

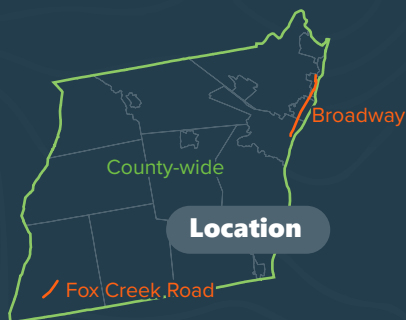
Potential Funding Sources

- NYS Climate Smart Communities (CSC)
- FEMA flood mitigation funding sources

Conduct a County-wide Transportation Vulnerability Assessment

Infrastructure Systems

8



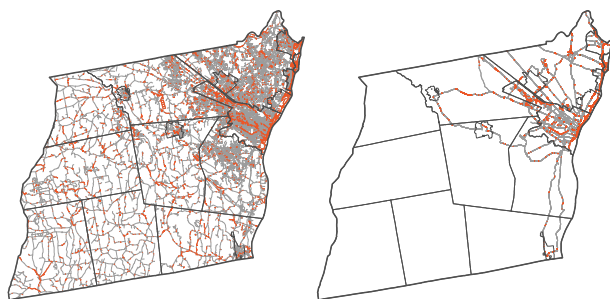
Description

A county-wide analysis of the vulnerability of roadways and transportation systems to the impacts of climate change, like flooding and extreme heat, is recommended. This analysis would assess roads, transit routes and stops, bridges, and other transportation assets to quantify climate-related risks and identify and prioritize infrastructure improvements based on risk exposure and the criticality of each asset to the county-wide transportation network.

Need

According to the **Risk Assessment** (Chapter 3), 12% of County-owned roads, 14% of all roadways, and 32% of public transit routes are vulnerable to inundation from the projected 100-year flood in 2050. Flooded roadways can result in unsafe driving conditions and impassable and damaged roads and can cause county-wide disruptions to travel, economic activity, and emergency response. Taking steps to make roadways more resilient can protect against these potential impacts, reduce disruptions to emergency response activities and general mobility, and make sure roadways and associated transportation assets are accessible and functional during and immediately following natural disasters.

It is also critical that green infrastructure is integrated into transportation corridors as a standard practice moving forward. Roadways often follow stream or waterway corridors, are major contributors to impervious cover, and can also be a significant source of excess heat in urban areas. Integrating green infrastructure (including trees) into future transportation projects will help: infiltrate water on-site, thus reducing runoff and mitigating flood risks; increase shade on road surfaces, thus cooling the roadway and the adjacent environment; and slow and filter runoff, thereby removing pollutants and improving water quality. Further, the inclusion of green infrastructure in transportation projects will open the door to other funding sources.



14%

Roads at risk of 100-year flood in 2050

32%

CDTA routes at risk of 100-year flood in 2050



Resilience Strategies

This project advances the following resilience strategies:

- Build climate resilience over time and across scales and systems.
- Effectively and equitably respond to and recover from natural disturbances.
- Learn from past events and anticipate future disturbances.
- Support data-driven decision-making.
- Ensure mass transit and active transit are viable modes of transportation.



Case Study



Monroe County, Florida – in the Florida Keys – is among the most vulnerable communities in the country to rising sea levels. The County conducted a GIS-based analysis to assess the impacts of current and projected levels of sea level rise on all County-maintained roads and stormwater features. From this assessment, the County developed an implementation plan and timeline to adapt roads and drainage for future sea level rise.

Find out more here:
keysroadsplan.com

Recommended Actions

- 01 Perform an in-depth study of the vulnerability of the county's transportation network and assets.** Use the Risk Assessment performed as part of this Plan as a starting point. Further refine this assessment by using updated flood projection data from First Street Foundation (as recommended in **Project 3**) to quantify the flood and heat vulnerability of every transportation corridor and asset.
- 02 Identify high-priority roadway segments for improvement.** Consider both the vulnerability of the roadway to climate stressors (like flooding, extreme heat, and extreme weather events) as well as the criticality of the segment to the county-wide transportation system. "Criticality" can be measured based on the number of residential units along the segment, the number of critical facilities along the segment, the roadway functional classification, and/or its importance as an evacuation route.
- 03 Implement resilient strategies along high-priority roadway segments.** These may include green infrastructure, drainage improvements, multi-modal enhancements, roadway relocation, and other strategies where appropriate. Preliminary recommendations are made for Fox Creek Road (page 176) and Broadway (page 178), but the roadway assessment should be extended to include all roads. This assessment should also use the findings from the proposed county-wide culvert analysis (**Project 7**) to prioritize roadway segments.



Case Study

Genesee Transportation Council's (GTC) Critical Transportation Infrastructure Vulnerability Assessment (2016). This assessment provides a regional look at critical transportation assets across the Genesee-Finger Lakes Region, profiles the natural and human-caused hazards that have the potential to impact critical transportation assets, and identifies the vulnerability of these critical transportation assets in the face of such hazards. The study also identifies strategies for preventing and/or mitigating the impacts of hazard events on those critical transportation assets.

Within the nine-county Genesee-Finger Lakes Region, county emergency management agencies have developed county-wide hazard mitigation plans, flooding mitigation plans, and emergency management plans for specific events, but the Critical Transportation Infrastructure Vulnerability Assessment represents the first systematic assessment of the region's transportation systems vulnerabilities.

Read the full assessment here:
gtcmpo.org/sites/default/files/pdf/2016/5750_-_final_report.pdf

Potential Benefits

- **Ensuring continued use of roadways and public transit**, even during storm conditions.
- **Ensuring continued emergency response, economic, travel**, and other operations that rely on the county-wide transportation network.
- **Mitigating damage to roadways** from potential climate events.
- **Saving money on repair and/or reconstruction** by taking proactive steps to mitigate damage.
- **Reducing runoff** by using resilient strategies like permeable paving and green infrastructure.
- **Reducing greenhouse gas emissions** by facilitating multi-modal and alternative transportation options.
- **Making better-informed decisions and improving resource allocation** by taking a holistic approach to prioritizing roadways for improvement, rather than making emergency repairs on a case-by-case basis.

Implementation

Possible Lead Agency

- Albany County
- CDTC

Potential Partners

- CDTA
- NYS DOT
- Local municipalities

Planning-level Cost Estimate

- County-wide vulnerability assessment: \$150,000 to \$200,000
- Prototypical bioretention area (3' x 12'): \$7,000 to install; \$1,400 to maintain annually

Potential Funding Sources

- CDTC Unified Planning Work Program (UPWP)
- FHWA and Federal Transit Administration
- NYS Climate Smart Communities (CSC)



Site-Specific Recommendations

Fox Creek Road

Need

Fox Creek Road is a County-owned and maintained road located in a rural area of the Town of Rensselaerville. Between State Route 145 and Pearson Road, Fox Creek Road parallels Fox Creek for about 2 miles of its length. In some places along this stretch, the road also crosses the creek. While normally low in flow, the creek can grow significantly during storm events and potentially inundate the roadway and affect the surrounding area. Projections from First Street Foundation indicate that, as a result of a 100-year storm in 2050, this segment of Fox Creek Road could experience more than 36" of flooding. Recommended improvements in this section focus on infrastructure upgrades along the length of the road to ensure culverts and bridges can accommodate future projected flows.

Recommended Actions

- 01 Assess the capacity of BIN 3301500 to handle increased anticipated flows.** Past repairs to this bridge have constricted its opening, leading to evidence of damage and overtopping from rain events that have exceeded its capacity. The bridge should be analyzed for the proper hydraulic opening to accommodate the increased flows anticipated from a changing climate.
- 02 Investigate the single barrel culvert** between BIN 3301400 and BIN 3301500 for adequate capacity and replace if found to be a constricting point. This culvert is owned and maintained by Albany County.
- 03 Replace the twin barrel culvert** downstream of the single barrel culvert. The culvert appears damaged from excessive flows and should be replaced with a larger structure that can handle increased anticipated flows. This culvert is also owned and maintained by Albany County.
- 04 Identify an alternate route (detour)** to preserve mobility in the event that Fox Creek Road is flooded and inaccessible.
- 05 Employ watershed management techniques** to ensure impervious cover in the watershed remains low (currently 8%). Any new development in the watershed should include mitigating measures for stormwater runoff, else efforts undertaken as part of this project might be nullified by increased flows.



Work in Progress



BIN 3301400. BIN 3301400 is currently proposed for replacement in 2023. The new bridge has been designed to meet all current NYS standards, including the hydraulic profile, and will have approximately double the opening as the existing structure. It also incorporates three cross vanes – one upstream and two downstream – which will absorb energy from storm flows and reduce potential damage downstream by reducing water velocity.



Site-Specific Recommendations

Fox Creek Road



⚡ Fox Creek Road, Rensselaerville

Projected inundation from a 100-year storm in 2050

● > 36" ● 25-36" ● 13-24" ● 6-12" ● < 6"



Tips for Success

The county-wide culvert analysis and precipitation modeling and hydrological modeling proposed as part of **Project 7** would provide critical information for appropriately sizing the hydraulic openings for the Fox Creek Road project and also for identifying any resulting impacts on the broader system.



Site-Specific Recommendations

Broadway

Need

Broadway is an important north-south regional connection and bus rapid transit (BRT) corridor (CDTA Blue Line) between the City of Albany, Menands, and Watervliet. Several locations along the corridor are flood-prone, including in the City of Albany where the Patroon Creek meets Tivoli Street and in Menands where an unnamed creek crosses under Broadway just south of the State Route 378 crossing. Most of the north-south stretch is also at risk from Hudson River flooding and sea level rise.

Recommended Actions

01 Incorporate green infrastructure along the Broadway corridor as well as along roads in areas upstream of the corridor and along the Hudson River.

Installation of bioretention areas along the length of the corridor and at locations of existing drop inlets (DIs) would divert stormwater from the wastewater system and create pockets of vegetation that contribute to cooling, carbon capture, and an improved streetscape. The section of Broadway in the City of Albany can easily accommodate bioretention areas between Thatcher Street and Loudonville Road as it already has wide, 12-foot sidewalks. There are also many parking lot impervious areas along the Broadway corridor that could be integrated with green infrastructure to absorb and mitigate flooding from the Hudson River.

02 Evaluate the feasibility of integrating protected bike infrastructure and dedicated bus rapid transit (BRT) lanes along Broadway to promote multi-modal travel.

While the Broadway right-of-way is not wide enough to support *both* bus and transit lanes, certain stretches can support either dedicated BRT lanes or dedicated bike lanes with green infrastructure. From Wolfert Avenue to 1st Street in Watervliet, Broadway could accommodate at least one dedicated BRT lane in each direction and one travel lane in



Funding Secured!

Following from the recommendations included here, Albany County submitted an application to CDTC's United Plan Work Program (UPWP) and was awarded \$130,000 in March 2023 to prepare the "Broadway Flood Resilient Multi-Modal Corridor Study." The study will identify and evaluate conceptual design alternatives that would improve multi-modal transportation facilities and connectivity, increase the urban forest, and integrate green infrastructure and climate resiliency along the Broadway/Route 32 corridor from Albany to Watervliet.

each direction. Another option is a travel lane in each direction, bike lanes in each direction, and 5-foot green infrastructure buffers adjacent to the sidewalk. Additional study could help determine where BRT lanes or bike lanes are more appropriate.

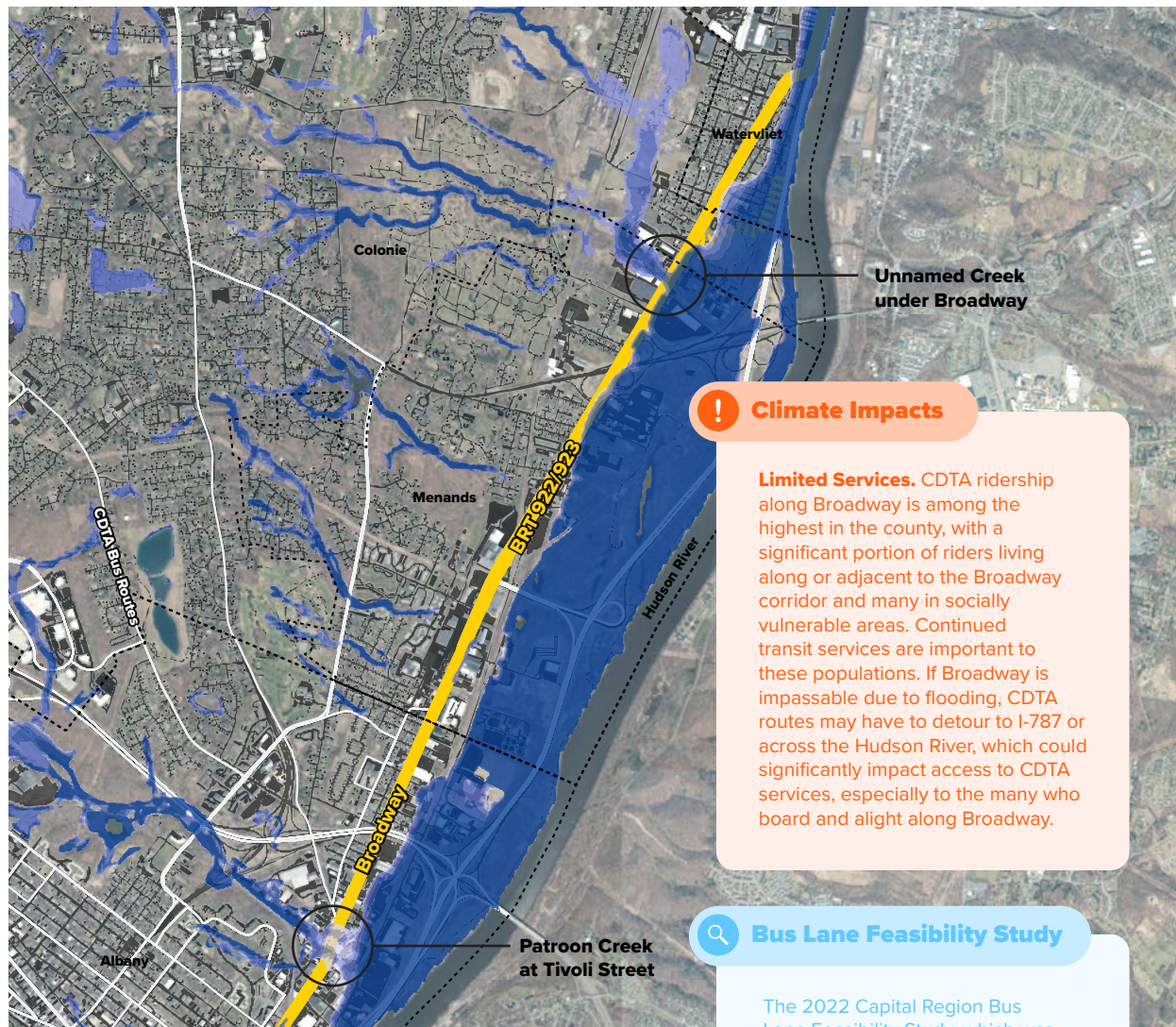
03 Tie improvements on Broadway into on-going projects. NYS DOT is in the planning stages of replacing the State Route 378 bridge over the Hudson River and is conducting a feasibility study for reconfiguring I-787. Both projects will impact Broadway and may provide opportunities to incorporate flood resilience improvements.

04 Mitigate flooding along Patroon Creek by taking measures upstream to impound or divert flow and/or by enlarging the creek's current cross-section. It is also important to increase the permeable area of the creek's watershed so that less runoff enters the creek during rain events. Detailed flood modeling could be performed to inform this recommendation.



Site-Specific Recommendations

Broadway



^ Broadway

Projected inundation from a 100-year storm in 2050

- > 36"
- 25-36"
- 13-24"
- 6-12"
- < 6"
- Impervious surfaces

! Climate Impacts

Limited Services. CDTA ridership along Broadway is among the highest in the county, with a significant portion of riders living along or adjacent to the Broadway corridor and many in socially vulnerable areas. Continued transit services are important to these populations. If Broadway is impassable due to flooding, CDTA routes may have to detour to I-787 or across the Hudson River, which could significantly impact access to CDTA services, especially to the many who board and alight along Broadway.

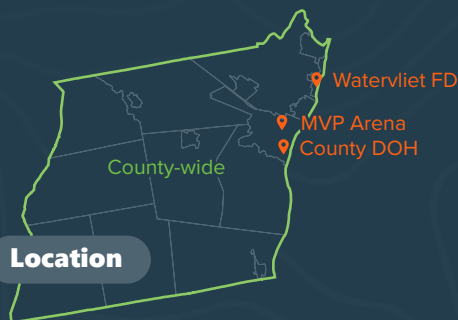
🔍 Bus Lane Feasibility Study

The 2022 Capital Region Bus Lane Feasibility Study, which was developed by CDTC and CDTA, identified Broadway as a priority corridor to improve bus performance, especially because the Washington/State/Broadway corridor has the highest bus volumes in the CDTA system and sees nearly 6,000 daily boardings per day (accounting for 15% of total CDTA ridership). The feasibility study recommended short tactical bus lanes on Broadway from State Street to Hudson Avenue, as well as pedestrian and bicycle improvements.

Increase Resilience at Municipal Facilities

Infrastructure Systems

9



Description

Resilient retrofits, like switching to energy efficient lighting, waterproofing foundations, and elevating critical equipment, can protect buildings from the impacts of climate change and make sure that critical municipal facilities can remain operational even during emergency situations.

Need

Two-thirds of all buildings in Albany County will still be around in 2040.¹ Many of these buildings were built decades ago, likely without considerations for climate change. Several municipal facilities throughout the county are vulnerable to climate impacts. As found in the **Risk Assessment** (Chapter 3), schools (e.g., Voorheesville Elementary, Heatly High School in Green Island), fire departments (e.g., Guilderland Center Fire Department and the Watervliet Fire Department), critical facilities (e.g., County North and South WWTPs), and government facilities (e.g., Watervliet City Hall and Police Department) are vulnerable to flooding, extreme heat, and/or other climate impacts or are located in socially vulnerable areas where these impacts are likely to have disproportionate effects. Disruptions to these facilities could result in significant negative impacts to the local community, including the potential loss of life.

Fortunately, resilient retrofits can be made to nearly any building to protect against climate impacts, from extreme temperatures, floods, storms, and high winds to water stress, drought, wildfires, and seismic risk. Proactively adapting municipal facilities to ensure continuity of and access to services is a necessary component of the County's resilience to climate change.

Recommended Actions

- 01 Assess municipal buildings for resilient retrofit opportunities.** This may include: waterproofing building foundations, elevating important mechanical and electrical equipment, using smart controls for building technologies, installing green roofs, switching to LED lighting, installing solar panels, and other techniques. Page 182 also has more techniques to retrofit buildings for climate resilience.

See page 184 for a proposed green roof concept for the MVP Arena Parking Garage.



Resilience Strategies

This project advances the following resilience strategies:

- Decarbonize the building sector.
- Build climate resilience over time and across scales and systems.



Climate-Resilient Buildings

Extreme heat areas: In areas that are prone to extreme heat or are vulnerable to heat island effects, replace black roof membranes with white roof membranes, which reflect the heat, or green roofs, which reduce heat absorption.

Flood prone areas: In areas that are prone to flooding, replace existing roof systems with green roof systems or blue roof systems which are designed to retain water, and reduce demand on storm sewer systems. Ensure roof systems are designed with proper drainage to prevent overstressing the structural systems with excess water weight. Green roofs can also improve air quality around the building and provide habitats for bees and other insects. Move any mechanical, electrical, and plumbing equipment to upper floors or onto the roof above the local floodplain to ensure they are not damaged in the event of a flood. Any mechanical or electrical equipment that is ground-mounted outside the building should be elevated above the local floodplain.

High wind areas: In high wind areas where flying debris is a concern, ensure windows, doors, and storefront systems are impact rated. Also ensure that roofing systems and wall cladding systems are designed to resist the required wind uplift loads.

¹ *Resilient Retrofits: Climate Upgrades for Existing Buildings*, Urban Land Institute, 2022.



Tips for Climate Resiliency in Buildings

Building elevations. For new builds or substantial renovations of existing buildings located in the FEMA Special Flood Hazard Area (SFHA) or other flood-prone areas, the first occupied floor should be designed using the best available base flood elevation plus two feet, the Flood of Record plus two feet, or the 500-year flood elevation, whichever is highest. Critical equipment and infrastructure should be designed to be placed at the best available base flood elevation plus three feet, the Flood of Record plus three feet, or the 500-year flood elevation, whichever is highest. In areas subject to tidal influence, critical equipment and infrastructure should be designed to be placed at five feet above the best available base flood elevation, four feet above the Flood of Record, or the 500-year flood elevation, whichever is highest. In consideration of climate change, design standards for building and infrastructure projects subject to tidal influence should also incorporate the NYS DEC sea level rise projections, as described in 6 NYCRR Part 490. In riparian areas, flood elevations should be derived from flows provided by the USGS Future Flow Explorer. This calculation should consider the useful life of the facility or infrastructure.

Building foundations. Ensure that building foundations have proper waterproofing systems to prevent water infiltration and that drainage systems are designed to accommodate the necessary volume of water to efficiently move water away from the building.

Basements. For existing buildings within the local floodplain where flooding of the basement is inevitable, ensure floodwater can freely flow in and out of the basement through flood vents to prevent structural damage and hydrostatic pressure. Ensure all building materials are water-resistant and can be submerged for short periods of time without degradation.

Windows and doors. Replace windows, doors, and storefront systems. Seals and gasketing within these systems break down over time, significantly reducing their energy efficiency and allowing air and water infiltration. Modern windows, doors, and storefront systems have significantly better thermal properties which reduce heating and cooling demands. They can also be designed with different tints to improve natural daylighting while reducing solar heat gain and glare within the building, improving occupant comfort, and reducing the need for artificial light. If necessary, provide solar shades on the exterior to control heat and glare.

Roofing and cladding systems. Replace roofing systems and wall cladding systems which do not provide adequate insulation. Modern roofing and cladding systems that provide continuous insulation significantly reduce heating and cooling demands and save energy. They also reduce air infiltration and exfiltration which helps maintain more consistent interior conditions, improving occupant comfort and ensuring the building will maintain more consistent interior conditions for a

longer period of time if there was a power outage and mechanical systems went down.

Back-up systems. Build redundancy into critical mechanical, electrical, or plumbing systems such as back-up generators to ensure essential building functions can still operate in the event of an emergency.

Smart controls. Provide building management systems and smart controls which can monitor MEP (mechanical, electrical, and plumbing) equipment and systems to ensure they are functioning properly or alert building personnel of issues. Program systems to reduce heating or cooling while the building is not occupied or turn off lights. Ensure systems have manual overrides to enable building personnel to control the systems in the event of an emergency.

Lighting. Replace light fixtures with LED lighting to reduce electricity usage. Provide occupancy/vacancy sensors to automatically control lighting based on space usage or daylighting sensors which can control artificial lighting levels based on natural lighting levels.

Plumbing systems. Replace plumbing fixtures with low-flow fixtures to reduce potable water usage or implement grey-water collection systems to reuse grey-water for irrigation systems or flushing toilets. This can significantly reduce demand on sewer systems and wastewater treatment plants.

Mechanical systems. Replace mechanical equipment with new high-efficiency mechanical systems. New mechanical equipment is significantly more efficient and systems such as electric heat pumps can dramatically reduce the environmental impact of heating and cooling buildings. Replace gas-fired mechanical and plumbing equipment and fixtures with electric-powered equipment to reduce carbon emissions.

Ventilation and filtration. Ensure mechanical systems are providing proper ventilation. With building closures becoming increasingly tighter, mechanical ventilation is becoming more and more important to ensure fresh air is being provided within the building. Provide passive means of ventilation such as operable windows to ensure ventilation is provided in the event of an emergency and the mechanical system goes down. Also ensure mechanical systems are providing proper filtration and maintaining indoor air quality levels. Proper ventilation and filtration can prevent mold growth within buildings and help reduce the spread of viruses.

Renewable energy. Install on-site renewable energy such as solar panels with battery back-up storage. Solar panels can be mounted on building roofs or as canopies over top of parking lots. On-site renewable energy generation can reduce demand on municipal power grids and battery back-up can ensure access to power in the event of an emergency.

Recommended Actions

CONTINUED

- 02 Assess municipal properties for resilient site improvements.** This may include: installing permeable pavement in municipal parking lots, installing bioretention areas, rain gardens, or other green infrastructure, planting trees, and creating pocket parks out of underutilized space, among other strategies.

See page 190 for proposed site improvements at the County Department of Health (DOH) / Board of Elections (BOE) parking lot.

- 03 Partner with municipalities to help them assess climate risks** and identify proactive solutions to build climate resilience at the local level.

See page 196 for a recommended approach for County-municipal cooperation. This case study looks at how the County can assist Watervliet in relocating its currently undersized and flood-prone Fire Department facility to a new location to improve emergency response operations.

Potential Benefits

- **Mitigating property damage, injury, and system outages** in the event of a disaster.
- **Conserving resources** by reducing energy and water demands and switching to renewable sources.
- **Reducing the impact of disruptions** and the time it takes for facilities to come back on-line.
- **Reducing insurance premiums** and preserving access to insurance.
- **Saving money by avoiding losses** from damage and disruption.

Implementation

Possible Lead Agency

- Albany County
- Local municipalities

Potential Partners

- County departments

Project Status and Timeframe

- Short-term: Conduct detailed building and site assessments for all County facilities identified as vulnerable in the Risk Assessment (Chapter 3). Develop a prioritized list of building retrofits.
- Mid-term: Implement climate resilient retrofits on existing buildings and sites.
- Long-term / ongoing: Integrate climate-resilient strategies into all new County facilities and properties.

Planning-level Cost Estimate

Varies based on which resilience strategies are implemented.

Potential Funding Sources

- NYS Climate Smart Communities (CSC)
- NYS EFC Green Innovation Grant Program (GIGP)
- NYS Environmental Bond Act
- NYS HCR Resilient Retrofits



Site-Specific Recommendations

MVP Arena Parking Garage

Resilient Retrofit Opportunity

Need

The MVP Arena Parking Garage has been experiencing stormwater runoff from the top roof level into the center of the structure at multiple locations.

According to the **Risk Assessment** in Chapter 3, the MVP Arena site is also at extreme climate risk:

- The site's **flood risk is moderate** (25% chance of flooding in 30 years).
- The site's **heat vulnerability is extreme** due to an abundance of impervious land cover and lack of tree canopy.
- The site's **social vulnerability is extreme** as it is located in a Disadvantaged Community (NYSERDA), a Potential Environmental Justice Area (NYS DEC), and scores high on the CDC's Social Vulnerability Index (SVI).

Several green roof systems were evaluated for the roof of the MVP Arena Parking Garage to capture stormwater runoff and prevent it from draining into the interior of the garage. Based on conversations with the County, retaining parking on the roof deck is important, but they would consider removing some spaces to capture and hold stormwater during rain events.



See More Like This

The proposed green roof at the MVP Arena Parking Garage is a great example of a demonstration project – or an opportunity to showcase climate resilient practices on a public building or in a highly-visible public space. It also provides the opportunity to monitor the green roof's performance (e.g., amount of water retained in different storm events, impacts on drainage into the garage, potential cooling effects) to inform future installations elsewhere in the county.

See **Project 18** on page 244 for more information about demonstration projects.



Case Study

Ithaca, NY. Local governments are well-positioned to lead on improving building resiliency as they pull the levers on things like building codes, site plan review, and land use regulations. The City of Ithaca, New York is putting its weight behind building decarbonization, adopting the Ithaca Energy Code Supplement which requires all new buildings meet net-zero energy requirements by 2026. The City also created the Electrify Ithaca program which leverages private capital and government incentives to help building and homeowners cover building electrification costs.

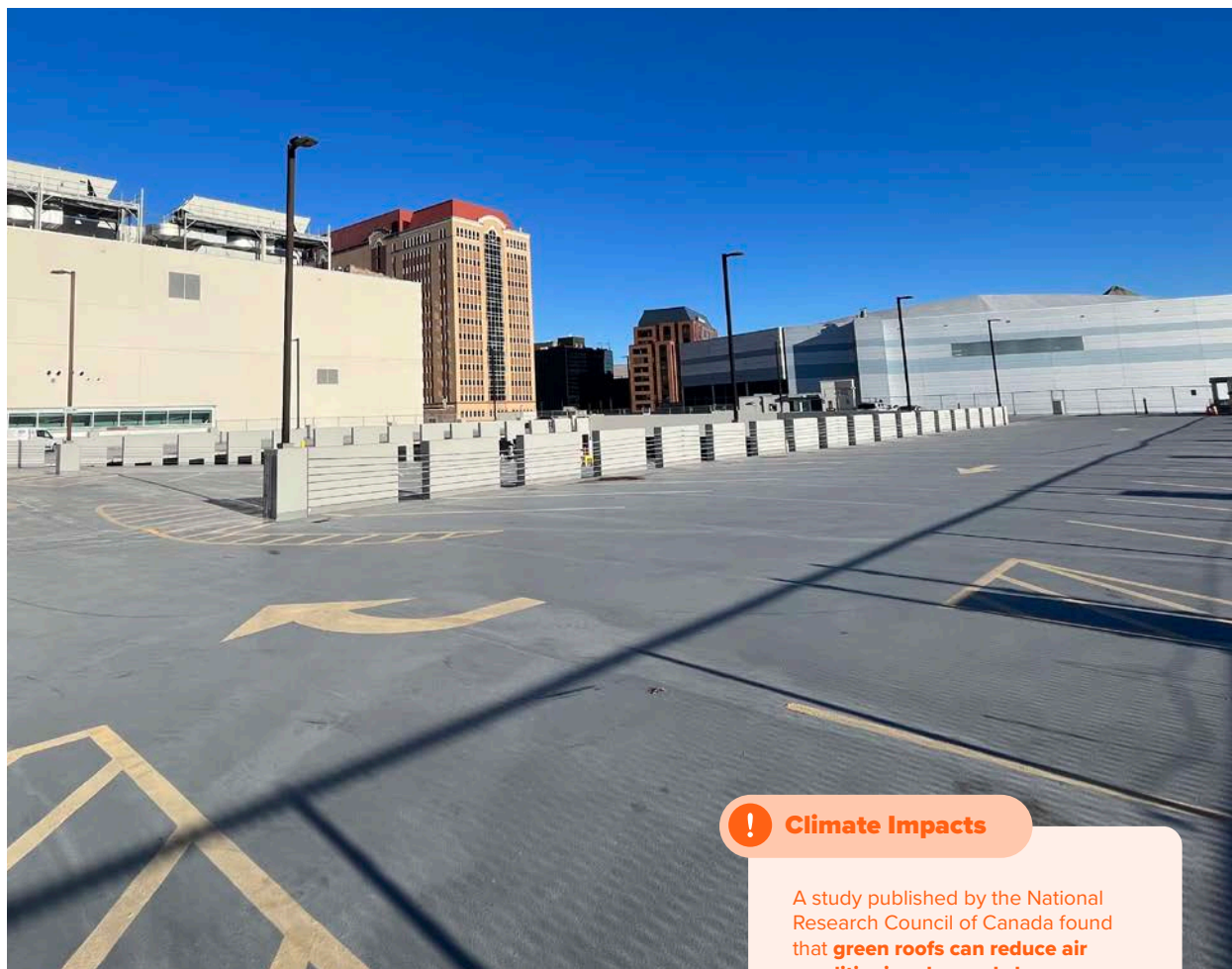
Find out more here:
www.cityofithaca.org/642/Green-New-Deal



Site-Specific Recommendations

MVP Arena Parking Garage

Resilient Retrofit Opportunity



! Climate Impacts

A study published by the National Research Council of Canada found that **green roofs can reduce air conditioning demands by more than 75%.**

⤴ **MVP Arena Parking Garage Roof**
51 S. Pearl Street, City of Albany



Site-Specific Recommendations

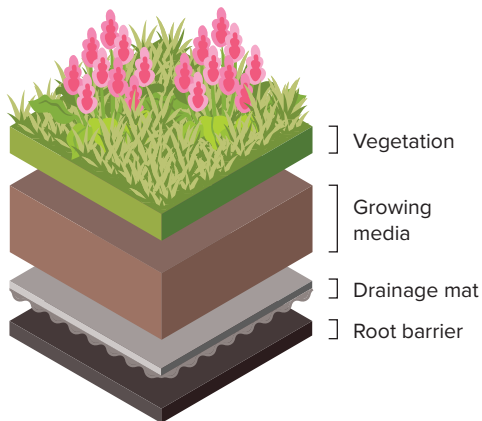
MVP Arena Parking Garage

Resilient Retrofit Opportunity



A Closer Look: Green Roof Types

The green roof system types shown on this page are suitable options for MVP Arena based on available information regarding the structural capacity of the parking garage, which is believed to have an approximately 24 PSF limit for green roof systems based on code minimum design loads.

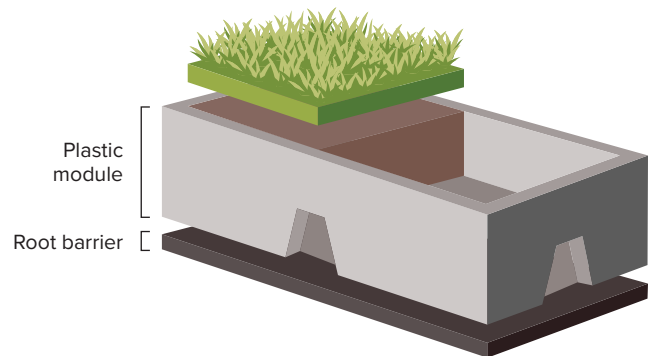


Extensive System

Light green roofs with 3 to 4 inches of substrate. Vegetation types include sedums, grasses, and other perennials requiring low maintenance.

Design Considerations

Cost	● ● ● ●
Maintenance	● ● ● ●
Water retention	● ● ● ●
Weight	● ● ● ●
Irrigation needs	● ● ● ●



Modular System

Creates a versatile vegetated roof solution. The trays form an all-in-one pre-vegetated system. They save time and manpower because they are easy to install and remove.

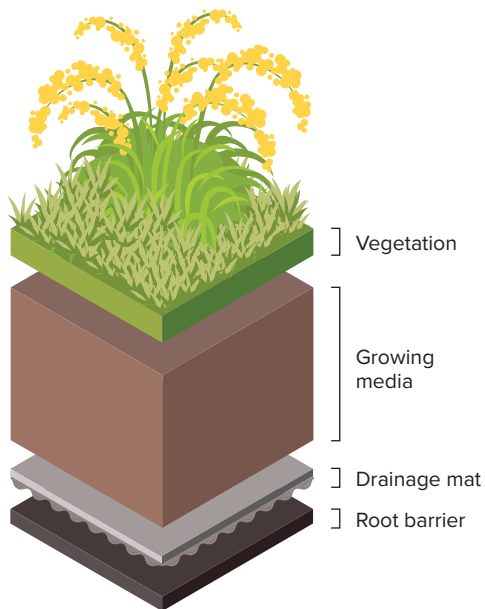
Design Considerations

Cost	● ● ● ●
Maintenance	● ● ● ●
Water retention	● ● ● ●
Weight	● ● ● ●
Irrigation needs	● ● ● ●



A Closer Look: Green Roof Types

The green roof types shown on this page are significantly larger and heavier than the systems shown on the previous page. Additional information would be needed regarding the structural capacity of the parking garage to evaluate whether these systems would be feasible at MVP Arena.

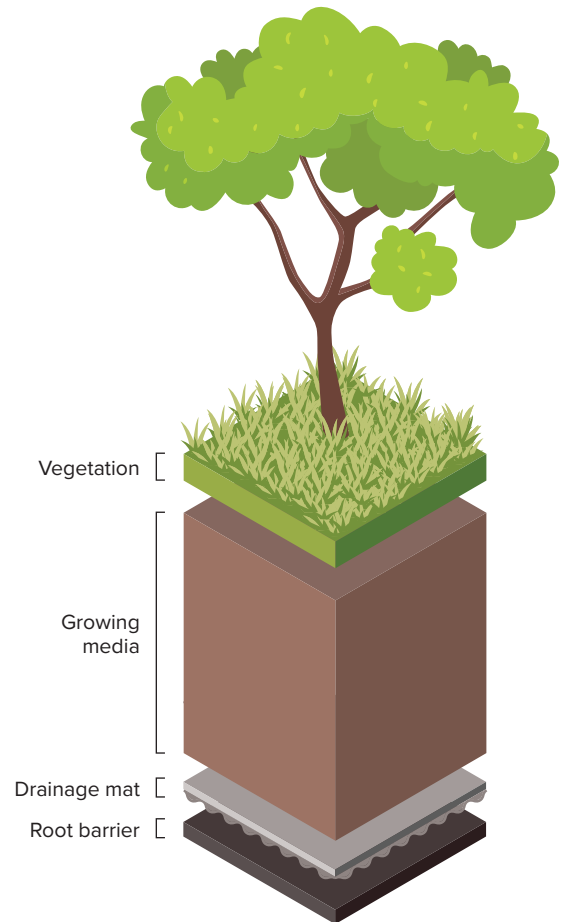


Semi-Intensive System

Mid- to light-weight green roofs with 6 to 12 inches of substrate. Vegetation types include sedums, grasses, perennials, shrubs, and even some plants for urban agriculture.

Design Considerations

Cost	● ● ● ● ●
Maintenance	● ● ● ● ●
Water retention	● ● ● ● ●
Weight	● ● ● ● ●
Irrigation needs	● ● ● ● ●



Intensive System

Heavy green roofs with more than 12 inches of substrate. Vegetation types include a wide variety of perennials, shrubs, and trees that require increased maintenance and heavy structural capacity.

Design Considerations

Cost	● ● ● ● ●
Maintenance	● ● ● ● ●
Water retention	● ● ● ● ●
Weight	● ● ● ● ●
Irrigation needs	● ● ● ● ●



Site-Specific Recommendations

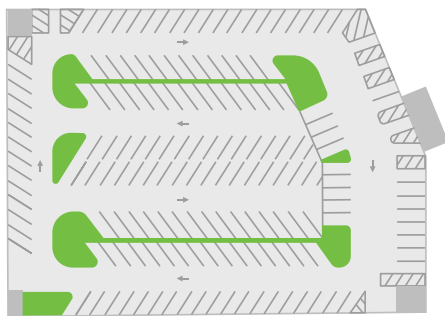
MVP Arena Parking Garage

Resilient Retrofit Opportunity

Recommended Actions

OPTION

- 01** **Install bioretention strips** lining the interior of the upper level parking spaces to help catch stormwater and limit the amount of water that descends through the interior of the structure. In this example, 3-foot-wide bioretention strips are shown as well as bioretention areas on parking aisle end caps. The bioretention strips can be planted with sedums, grasses, and perennials.



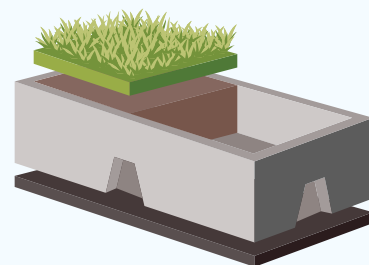
Design Statistics¹

Capture area	4,850 sf
H ₂ O storage	6,325 gallons
4" modular system ²	\$112,000 - \$136,000
4" extensive system ³	\$122,000 - \$146,000
Total parking spaces	165 spaces
Percentage of parking spaces lost ⁴	8% (15 spaces lost)



Suggested Green Roof Type

The green roof layout in Option 1 provides a good opportunity to pilot or “test” the modular system on this scale. If the modular system is found to work well, the modules could be relocated to another County building and a more permanent extensive system can be installed on the MVP Arena Parking Garage roof in the footprint of Option 2 (see page 189).



Modular system

- 1 Note that Option 1 could be installed using a modular or extensive green roof system. Only one system type needs to be installed. Cost estimates are provided for each type.
- 2 Unit cost for 4" modular system:
\$23 to \$28/sf
(installed cost with labor and materials)
- 3 Unit cost for 4" extensive system:
\$25 to \$30/sf
(installed cost with labor and materials)
- 4 Even though some parking spaces are lost in this option, the rooftop parking area only reaches capacity one to two times per year.



Site-Specific Recommendations

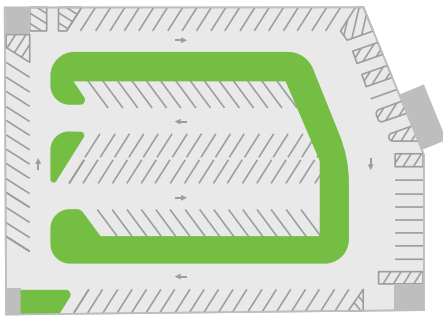
MVP Arena Parking Garage

Resilient Retrofit Opportunity

Recommended Actions

OPTION

- 02** Install a bioretention band lining the interior of the upper level to help catch stormwater and limit the amount of water that descends through the interior of the structure. In this example, 16-foot-wide bioretention areas are shown in a horseshoe pattern. The bioretention band can be planted with sedums, grasses, and perennials.



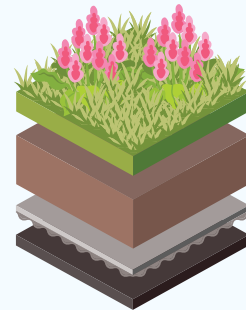
Design Statistics¹

Capture area	10,800 sf
H ₂ O storage	14,000 gallons
4" modular system ²	\$249,000 - \$303,000
4" extensive system ³	\$271,000 - \$325,000
Total parking spaces	128 spaces
Percentage of parking spaces lost ⁴	29% (52 spaces lost)



Suggested Green Roof Type

While either a modular system or an extensive system would work for Option 2, the extensive system is a good fit if the County is interested in a more permanent system that provides a greener feel with more bioretention areas and water storage capacity.



⌘ Extensive system

- 1 Note that Option 2 could be installed using a modular or extensive green roof system. Only one system type needs to be installed. Cost estimates are provided for each type.
- 2 Unit cost for 4" modular system: \$23 to \$28/sf
(installed cost with labor and materials)
- 3 Unit cost for 4" extensive system: \$25 to \$30/sf
(installed cost with labor and materials)
- 4 Even though some parking spaces are lost in this option, the rooftop parking area only reaches capacity one to two times per year.



Site-Specific Recommendations

DOH Parking Lot

Resilient Site Improvement

Need

Large areas of pavement like the parking lot outside the Albany County Department of Health (DOH) and Board of Elections (BOE) exacerbate the impacts of climate change by inhibiting stormwater infiltration and contributing to the urban heat island effect. These negative environmental and social impacts can be mitigated through sustainable stormwater management and increasing the urban tree canopy.

According to the **Risk Assessment** in Chapter 3, the County DOH/BOE site is at extreme climate risk:

- The site's **flood risk is major** (80% chance of flooding in 30 years).
- The site's **heat vulnerability is severe** due to an abundance of impervious land cover and lack of tree canopy.
- The site's **social vulnerability is extreme** as it is located in a Disadvantaged Community (NYSERDA), a Potential Environmental Justice Area (NYS DEC), and scores high on the CDC's Social Vulnerability Index (SVI).

Several options were developed to redesign the parking lot using sustainable practices like permeable paving, landscaped bioretention basins, and tree planting. These options are detailed in the following pages.



Climate Impacts

Permeable (or porous) pavements.

In addition to reducing runoff, porous pavements can help filter out pollutants that contribute to water pollution (e.g., phosphorus, metals, and suspended solids). Porous pavements can also reduce the need for road salt and reduce construction costs for residential and commercial development by reducing the need for some conventional drainage features.

Bioretention basins. Bioretention basins located at the caps of parking aisles can help with stormwater management and in reducing pavement surface temperatures. Bioretention basins with trees can also help cool air and pavement surface temperatures and increase stormwater absorption and filtration. Additional tree cover is greatly needed at the DOH/BOE site and in the surrounding neighborhood due to the area's extreme heat vulnerability.



See More Like This

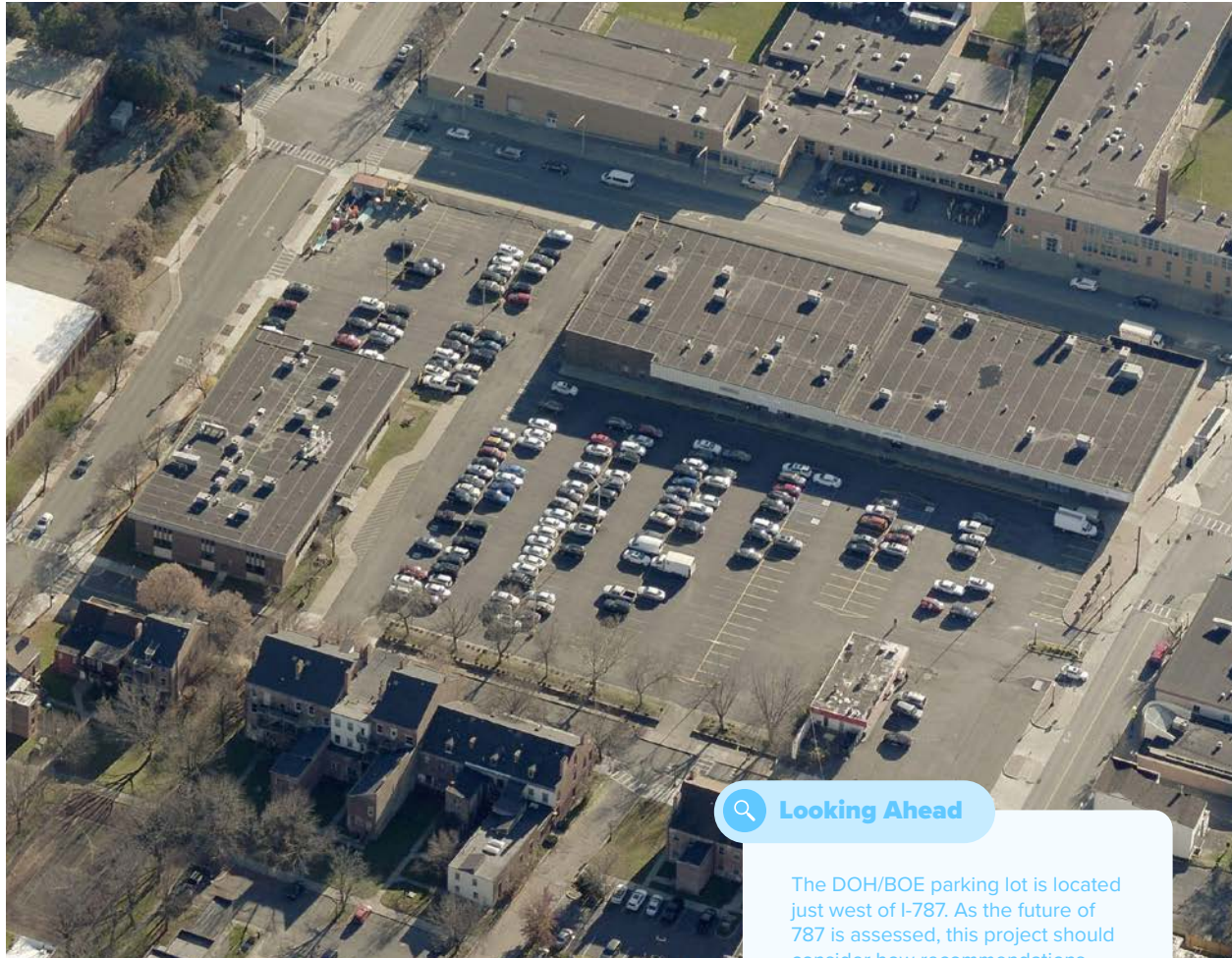
Sustainable improvements to the DOH parking lot could be incorporated into the demonstration project network as proposed in **Project 18** on page 244.



Site-Specific Recommendations

DOH Parking Lot

Resilient Site Improvement



Looking Ahead

The DOH/BOE parking lot is located just west of I-787. As the future of 787 is assessed, this project should consider how recommendations from the 787 study may impact this property and its facilities.

⌘ **County Department of Health (DOH) and Board of Elections (BOE) Parking Lot**
175 Green Street and 260 S. Pearl Street, City of Albany



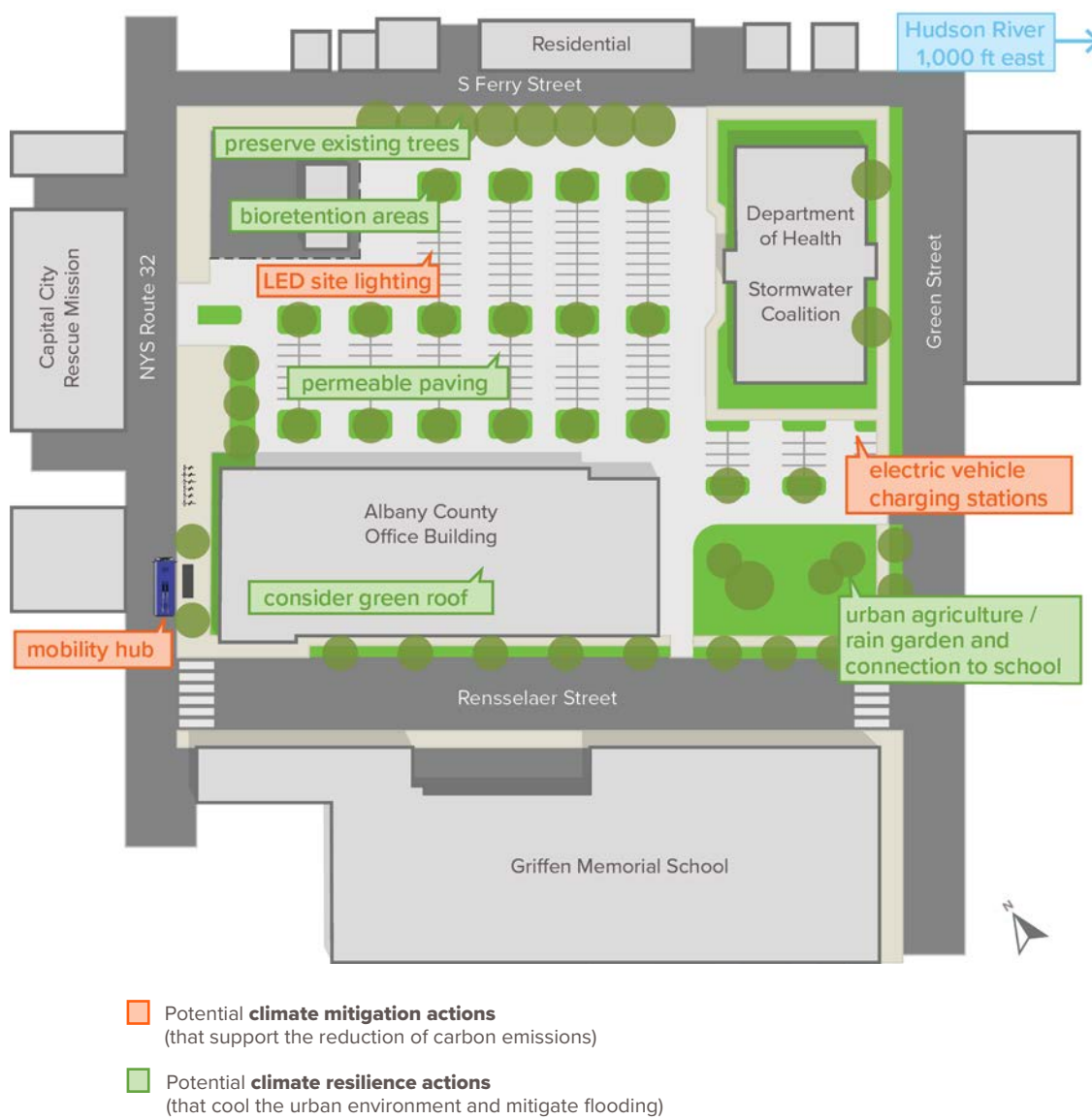
Site-Specific Recommendations

DOH Parking Lot

Resilient Site Improvement

Recommended Actions

The DOH/BOE parking lot could benefit from a number of mitigation and/or climate resilience actions. Potential opportunities are shown below and various options for implementing a combination of these actions are described on the following pages.





Site-Specific Recommendations

DOH Parking Lot

Resilient Site Improvement

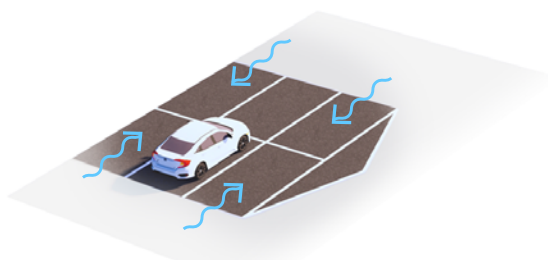
Recommended Actions

OPTION

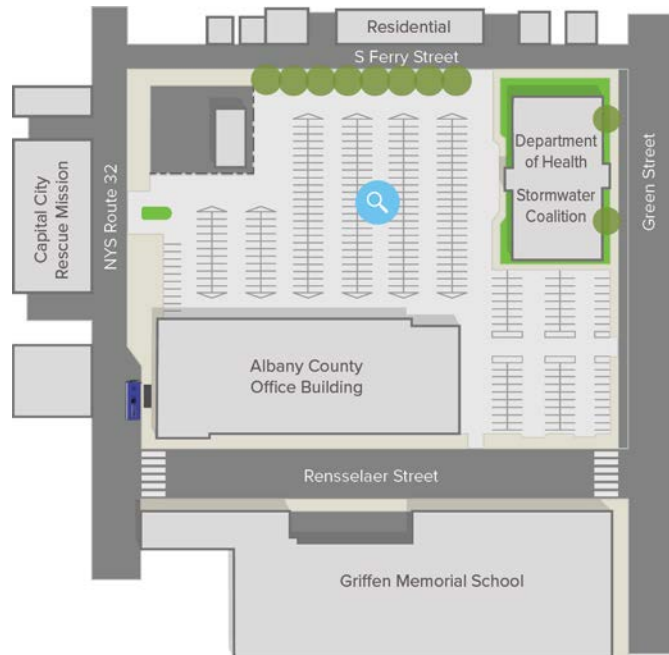
01

Install permeable paving

throughout the entire parking lot area (approximately 142,200 sf) to help reduce stormwater runoff by infiltrating rain water and melting snow. Permeable paving can include pervious asphalt, pervious concrete, interlocking pavers, or plastic grid pavers. Porous pavements are appropriate in low dust areas with lower vehicle traffic volumes, like a parking lot. Cross slopes cannot exceed 10% and, to ensure porous pavements function as designed, they should be vacuumed in the fall to remove dead leaves and sediment that accumulated in the pores.



A Closer Look: Permeable Paving



Design Statistics

Capture area	142,200 sf
Cost (entire site)	\$3.5 million
Cost (per square foot)	\$25 / sf
Percent permeability of parking lot (out of 142,200 sf area)	100%



Site-Specific Recommendations

DOH Parking Lot

Resilient Site Improvement

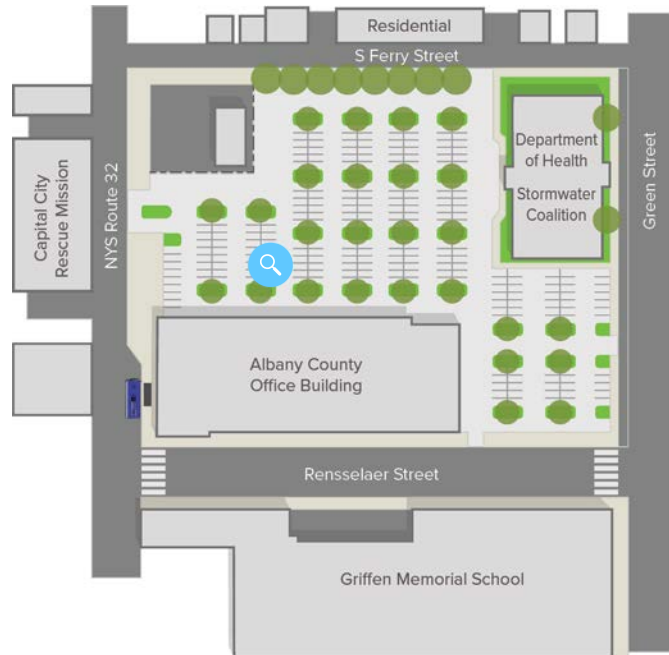
Recommended Actions

OPTION

- 02 Install landscaped islands with rain gardens and deciduous trees** throughout the parking lot to help infiltrate and filter stormwater runoff. These landscaped islands will also help reduce the urban heat island effect by absorbing heat and shading adjacent areas. The rain gardens would be comprised of a shallow ponding area over a soil bed planted with flood- and drought-tolerant plants, a mulch layer, a stone drainage layer, underdrains, and an overflow mechanism to convey larger rain events (approximately 2.5 to 3 feet total depth).¹



A Closer Look: Landscaped Island



Design Statistics

Capture area	14,340 sf
Cost (entire site)	\$2.2 million
Cost (per square foot)	\$153 / sf
Percent permeability of parking lot (out of 142,200 sf area)	10%

¹ Additional information regarding the depth to the water table is needed to confirm a rain garden is an appropriate stormwater management practice for this location.



Site-Specific Recommendations

DOH Parking Lot

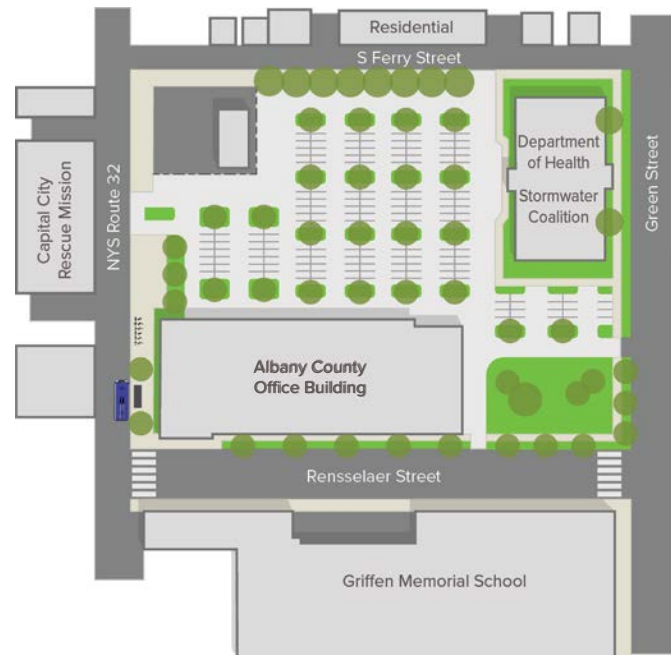
Resilient Site Improvement

Recommended Actions

OPTION

03

Provide expansive green infrastructure and community space to build on the improvements presented in Option 2. A large landscaped area, potentially across the street from Griffen Memorial Elementary School, would help create a “cool” urban oasis and present opportunities for urban agriculture and/or teaching gardens. This expanded community space could also provide a more visible gateway to the County’s Stormwater Coalition offices. Further, the creation of welcoming, community-oriented spaces can help mitigate the impacts of heat waves by providing a cool place to gather and creating a central location for the County Department of Social Services and other partners to distribute services, benefits, and aid during emergency events.



Design Statistics

Capture area	29,840 sf
Cost (entire site)	\$4 million
Cost (per square foot)	\$134 / sf
Percent permeability of parking lot (out of 142,200 sf area)	20%



Site-Specific Recommendations

Watervliet Fire Department

County-Municipal Partnership

Need

An important component of building resilience is identifying flood-prone structures – particularly those that have experienced repetitive losses and/or are critical facilities whose operation could be disrupted by a flood – and relocating them or adapting the structure and site to withstand future flood events. The Watervliet Fire Department is located at the edge of the FEMA 100-year floodplain and in the 500-year floodplain. As part of the **Risk Assessment** presented in Chapter 3, the Fire Department was classified at extreme climate risk due to its location in an area with major flood risk (80% chance of flooding over 30 years) and severe heat and social vulnerability. Further, the Fire Department is located on top of the former Erie Canal and is experiencing subsidence in several locations, which is causing structural damage to the facility and creating unsafe conditions for firefighters and emergency responders. The Watervliet Fire Department is proactively exploring options to relocate and construct a new facility to reduce its exposure to environmental hazards. This project uses Watervliet as a case study for County-municipal cooperation and outlines an approach for assisting the Watervliet Fire Department in relocating their currently undersized and flood-prone facility to a new location to improve emergency response operations.

Recommended Actions

01 The County should partner with the Watervliet Fire Department to identify a suitable site for a new fire station.

This site must be located in an area with a low risk of flooding and provide easy access to the Fire Department's service area. The new site should be able to accommodate an approximately 20,000-square foot structure.

02 Support the Watervliet Fire Department in securing funding to acquire a new site and build a new fire department and emergency response facility with the following features:

- Approximately 20,000-square foot structure (the current firehouse is 13,000 square feet); a two-story structure is possible if required based on the new site configuration
- 5+ drive-through bays (doors in front and back to reduce hazard of backing into station)
- Radio/watch room
- Firefighting gear decontamination area
- Medical equipment decontamination area
- Expanded meeting/classroom area
- Expanded commercial kitchen with daytime room
- Fitness room
- Laundry and fire gear cleaning/drying room
- Hose cleaning and drying area
- Firehouse vehicle exhaust system
- Firehouse back-up generator(s)
- Outdoor crew gathering area
- Spare equipment storage area
- LEED building standard (which would be supported by FEMA CRS as encouraged in **Project 4**)
- Separate sleeping quarters, gender-specific restrooms and showers
- Public restrooms
- Administrative offices for chief, company officer, fire investigators, EMS coordinator, union

Implementation

Planning-level Cost Estimate

\$13,500,000 to \$14,000,000*

**This is an all-in number, including design, permitting, owner contingency separate from the estimate contingency, and furniture, fixtures, and equipment. This cost estimate does not include the costs of site acquisition.*

Potential Funding Sources

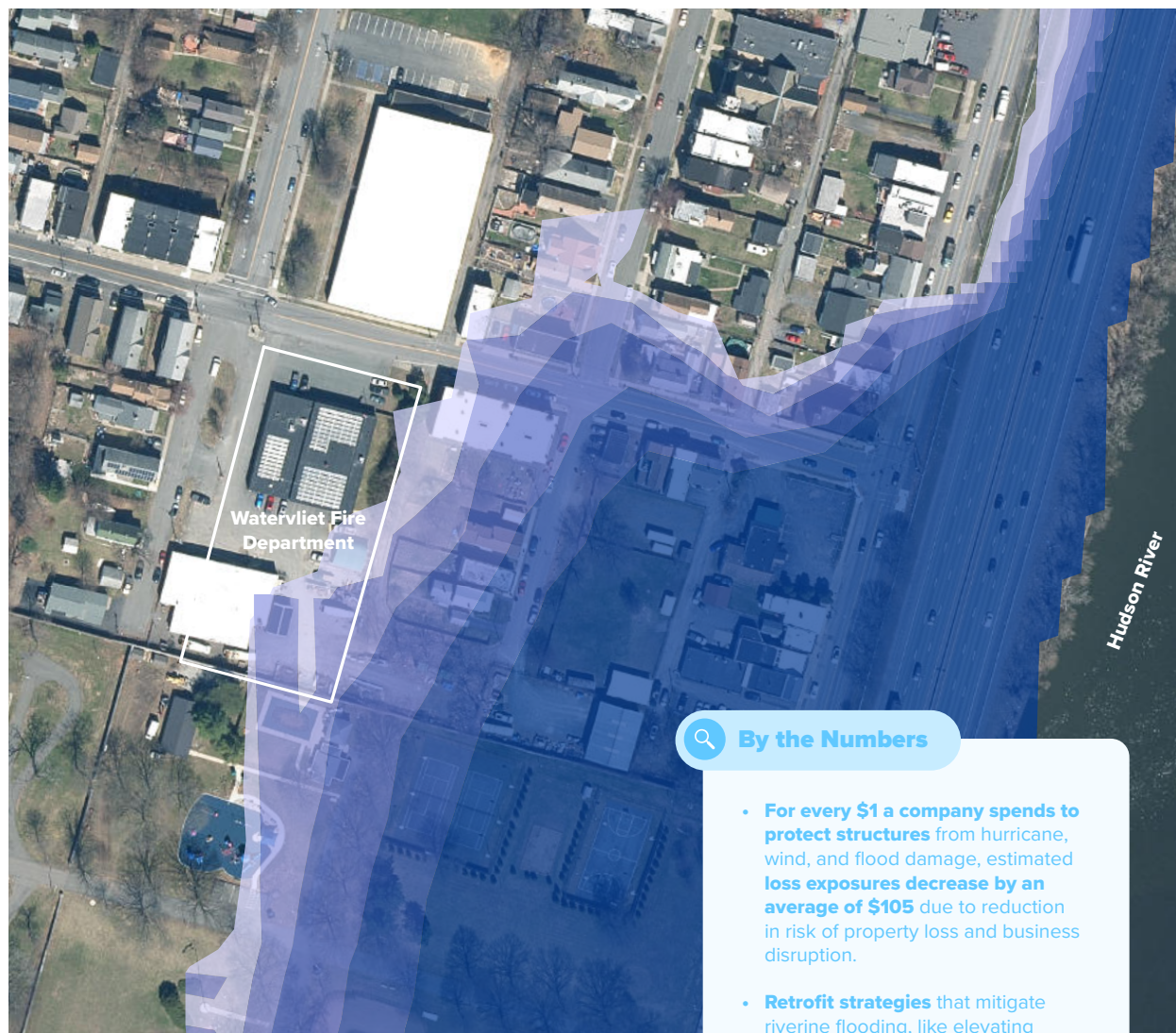
- FEMA Hazard Mitigation Grant Program
- NYS DEC Climate Smart Communities
- NYS Environmental Bond Act



Site-Specific Recommendations

Watervliet Fire Department

County-Municipal Partnership



By the Numbers

- For every \$1 a company spends to protect structures from hurricane, wind, and flood damage, estimated loss exposures decrease by an average of \$105 due to reduction in risk of property loss and business disruption.
- Retrofit strategies that mitigate riverine flooding, like elevating buildings, HVAC systems, or wet floodproofing, can each avoid \$2 in losses for every dollar invested.

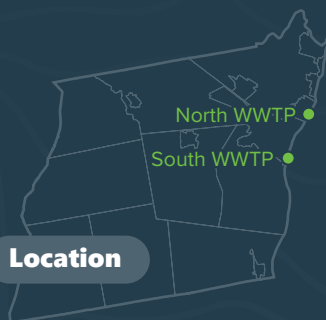
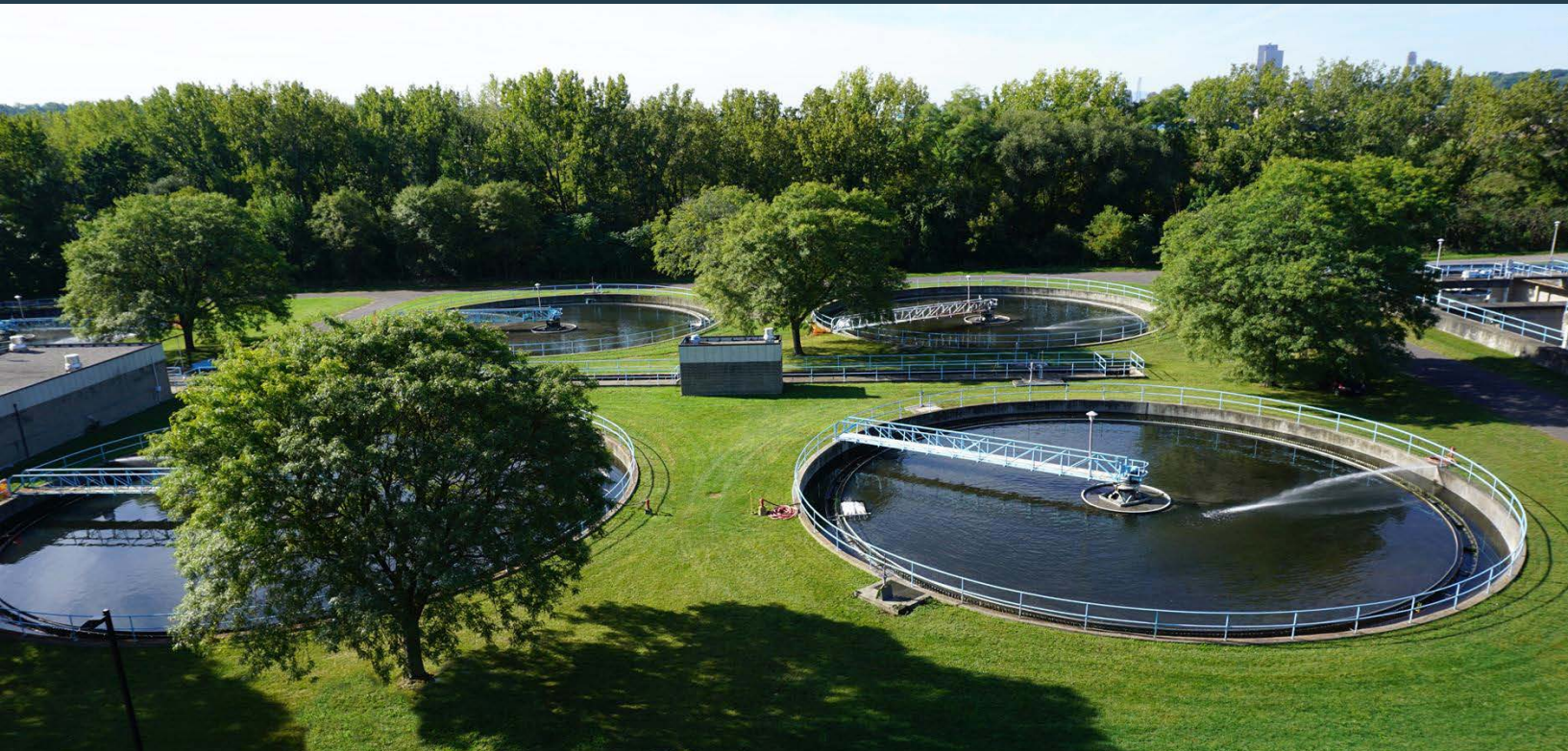
📍 **Watervliet Fire Department (116 13th Street)**
Projected inundation from a 100-year storm in 2050

● > 36" ● 25-36" ● 13-24" ● 6-12" ● < 6"

Plan for Sea Level Rise at the County's North and South WWTPs

Infrastructure Systems

10



Description

Resilience plans should be developed for the Albany County Water Purification District's North and South Wastewater Treatment Plants (WWTPs) to identify and implement mitigation measures that address the challenges presented by sea level rise and enable these facilities to continue functioning effectively even under conditions of higher Hudson River levels and more extreme storm events.

Need

Albany County's North and South Wastewater Treatment Plants (WWTP) are critical pieces of infrastructure that process residential and commercial wastewater for more than 200,000 people. The North WWTP (built in 1974) is located along the Hudson River in Menands and treats an average daily flow of 22 MGD, with wastewater originating from portions of the Cities of Albany, Cohoes, and Watervliet, parts of the Towns of Colonie and Guilderland, and the Villages of Colonie, Menands, and Green Island. The South WWTP (built in 1974) is located at the Port of Albany and effectively treats 22 MGD for the City of Albany and the entire Port of Albany. Both WWTPs discharge treated effluent to the Hudson River and both are located downstream of the Troy Lock and Federal Dam.

The Hudson River in this area is a tidal water body. According to a USGS stream gauge located at the Port of Albany, the Hudson River typically fluctuated daily between 2 feet below and 4 feet above sea level over the past year. The lowest river elevation recorded in the past year was 3.3 feet below sea level and the highest river elevation recorded was 7.7 feet above sea level.¹

Sea level rise on the Hudson River and an expected increase in the frequency and intensity of precipitation events have the potential to cause river elevations and flooding that will impact operations at the County's WWTPs. The NYS DEC projects sea level rise on the Hudson River in the 2050s to be anywhere from 5 inches (low projection) to 2.25 feet (high projection) above the baseline, with a middle projection of 14 inches. By 2100, the Hudson River may experience as much as 6 feet of sea level rise (high projection) which would reach an elevation of 13.7 feet above sea level at the Port of Albany. (See NYS DEC sea level rise projections on page 201.)

¹ USGS stream gauge data available at: <https://waterdata.usgs.gov/monitoring-location/01359165/#parameterCode=62620&period=P7D>



Resilience Strategies

This project advances the following resilience strategies:

- Build climate resilience over time and across scales and systems.
- Learn from past events and anticipate future disturbances.
- Support data-driven decision-making.
- Plan and design for passive survivability.



Climate Impacts

Wastewater treatment plants face multiple challenges from climate change. **Sea level rise will affect their ability to discharge using gravity** and can cause flooding of plant facilities. At some point, this may require effluent and stormwater pumps to adapt to higher sea levels. More intense storms and excessive runoff may also cause localized flooding at the plants and increase **combined sewer overflows (CSOs)** – where untreated wastewater is discharged directly into water bodies.



Case Study

Rainfall can dramatically increase flows, even in areas where stormwater and sewer systems are separate, and especially in communities with older sewer lines. During one recent storm, the **Town of Bethlehem** saw the hourly flow rate at its wastewater treatment plant jump 500%. The plant was able to treat this flow so no violations occurred, but it was a major challenge. An opportunity exists here and in other Albany County communities to upgrade old sewer lines.

Need

CONTINUED

Both the North and South WWTPs rely on gravity-fed collection systems to feed wastewater to the plants. Upon reaching the plants, the wastewater is screened to remove larger debris and floatables which might harm downstream processes or equipment. It is then pumped to the process units for treatment. The wastewater flows by gravity through the process tanks to the river for discharge.

According to the 1970 hydraulic profiles of the plants, the North WWTP sets a maximum river elevation of 18 feet for normal operation. The South WWTP sets a maximum river elevation of 12 feet for the same. This suggests that, under dry weather conditions, the NYS DEC's high projection of sea level rise of 6 feet (for the 2100s) will not impact the North WWTP, but will cause higher water levels at the South WWTP.

Future extreme rain events also have the potential to cause high-water events that could impact the WWTPs. In combination, extreme rain events and sea level rise may result in river levels that could impact the ability of the North and South WWTPs to operate by gravity.

Another important consideration is that the sewer system feeding the treatment plants is combined. This means that in dry weather conditions the sewers carry sanitary flow but, in wet weather conditions, they carry stormwater mixed with sanitary flow, or combined flow. Under wet weather conditions, the plants operate under approved Wet Weather

Operating Plans (WWOPs). These plans allow the plants to maximize flow and treatment during wet weather conditions while still maintaining the overall integrity of the systems. If the river level at the discharge points rises during these events (either due to sea level rise, extreme precipitation, or both), it will reduce the gravity discharge rate to the river.

According to the area-wide combined sewer Long Term Control Plan (LTCP), the plants are permitted to bypass secondary treatment and discharge partially treated sewerage with the fully treated flow during wet weather events. While water quality is not expected to suffer greatly – because floatables are captured and effluent is disinfected when required – the ability to maximize treatment as river levels rise may be impacted, especially considering that any reduction in flow through the WWTPs will result in additional combined sewer discharge elsewhere.

In order to continue to maximize treatment of wastewater to the required standards, to protect existing facilities, and to preserve water quality, the County's WWTPs may need to be adapted so that they can discharge against anticipated higher river levels in the future, where the current gravity-fed system cannot function effectively. The full impact of climate change on these facilities needs to be further evaluated with detailed consideration for the multiple variables and multiple players in the overall drainage basin.

Sea Level Rise Projections

Sea level rise projections referenced in this profile are derived from the NYS DEC sea level rise projections that were adopted as part of the 2014 Community Risk and Resiliency Act (CRRRA). These projections are used to inform decisions regarding certain State permits and expenditures.

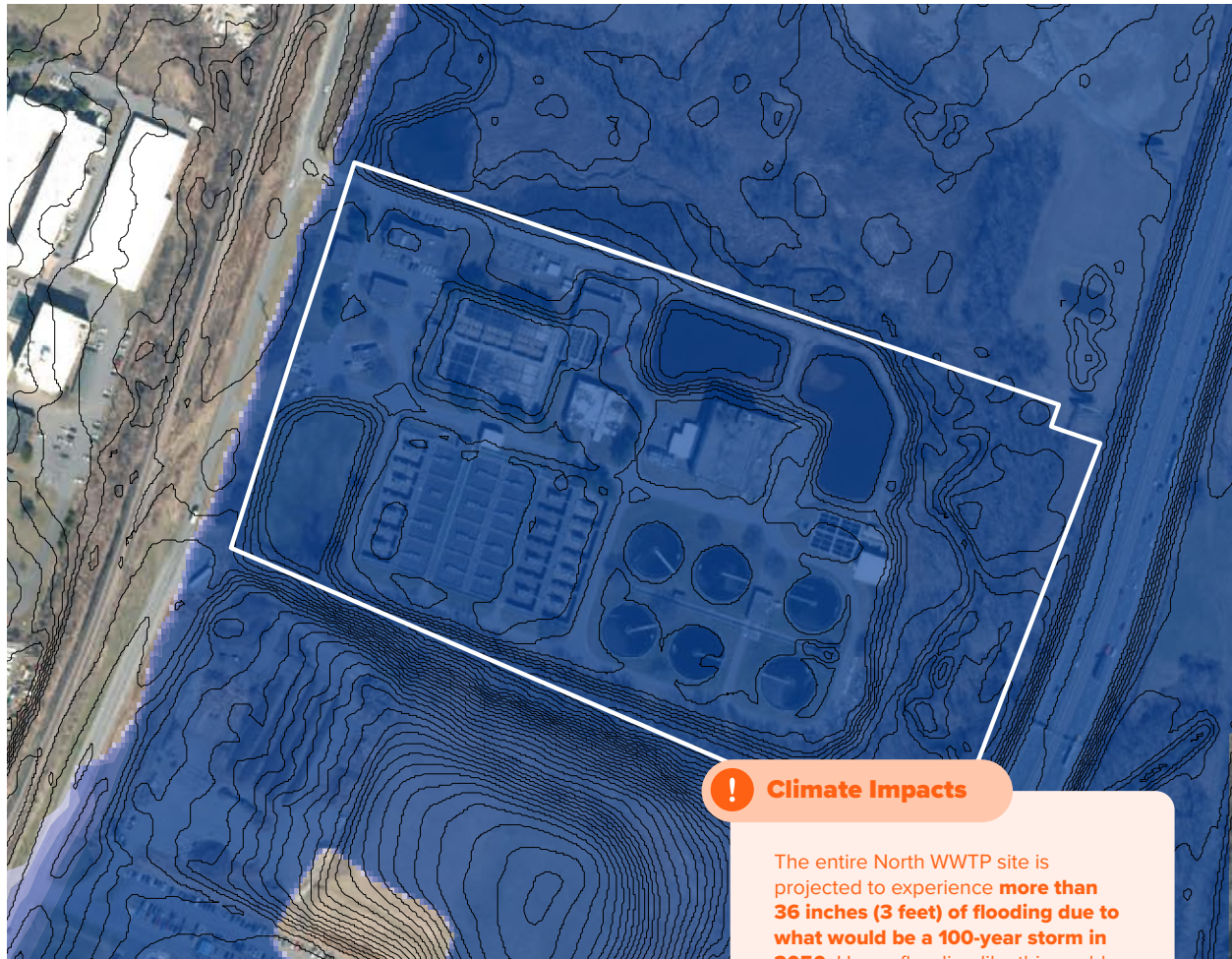
The projections for sea level rise above the baseline on the Hudson River¹ (specifically at the Troy Dam) are shown below. Projections for the 2050s are highlighted because these increases are expected in the near term, and are also consistent with the modeled flood data from First Street Foundation that was used to conduct the **Risk Assessment** (Chapter 3).

Sea Level Rise Projections, Mid-Hudson Region	2020s	2050s	2080s	2100s
Low projection (10th percentile)	1 inch	5 inches	10 inches	11 inches
Low-medium projection (25th percentile)	3 inches	9 inches	14 inches	18 inches
Medium projection (50th percentile)	5 inches	14 inches	25 inches	32 inches
Medium-high projection (75th percentile)	7 inches	19 inches	36 inches	46 inches
High projection (90th percentile)	9 inches	27 inches	54 inches	71 inches

¹ The "baseline" is the average level of the surface of the river between the years 2000 and 2004. Find out more here: <https://www.dec.ny.gov/regulations/103877.html>

Need

CONTINUED



⌄ Albany County North WWTP

Projected inundation from a 100-year storm in 2050¹

● > 36"
 ● 25-36"
 ● 13-24"
 ● 6-12"
 ● < 6"

/ 2' contours

¹ Note that the inundation projections shown here are from First Street Foundation Flood Factor data and may vary from the NYS DEC projections listed on page 201.

Need

CONTINUED



Albany County South WWTP

Projected inundation from a 100-year storm in 2050¹

● > 36"
 ● 25-36"
 ● 13-24"
 ● 6-12"
 ● < 6"

/ 2' contours

¹ Note that the inundation projections shown here are from First Street Foundation Flood Factor data and may vary from the NYS DEC projections listed on page 201.

Recommended Actions

Short-term

- 01 Continue to implement the WWOPs**, conduct periodic reviews, and update as necessary.
- 02 Evaluate installation of a low lift effluent pump station at the South WWTP.** The LTCP indicates that operations at the South WWTP are already significantly affected when the river reaches the 25-year flood elevation. To mitigate this issue, a low lift effluent pump station should be considered at the South WWTP so that it can continue to operate and treat and discharge effluent during storm and other high-water events in accordance with permits.
- 03 Evaluate the installation of a low lift effluent pump station at the North WWTP.** While the North WWTP is not yet hydraulically limited by high-water levels according to the LTCP, proactive adaptation should be considered at the North WWTP to prepare for rising Hudson River levels.
- 04 Evaluate construction of a flood wall and stormwater pump stations at both the North and South WWTPs.** Large rain events paired with sea level rise may result in water levels that physically flood the WWTP facilities. A flood wall around the facilities and stormwater pump station can mitigate these issues. Modeling of the impacts of the flood walls on the Hudson River tidal basin will be necessary to determine the likelihood and potential frequency at which flooding might overwhelm the plants in order to inform design of the flood wall and pump station.
- 05 Participate in the Mohawk River Watershed Coalition and the Hudson River-Black River Regulating District.** Flows from WWTPs have impacts on the entire watershed. The Water Purification District can work with local watershed organizations to take steps to mitigate impacts when treatment cannot be maximized and to improve water quality and watershed health.



Tips for Success

EPA Guide for Flood Resilience at Water and Wastewater Utilities.

The EPA developed a guide to help municipalities plan for flood resilience at water and wastewater utilities. The guide includes step-by-step worksheets for identifying, analyzing, and mitigating the impacts of flooding on these utilities.

For the full guide visit: www.epa.gov/sites/default/files/2015-08/documents/flood_resilience_guide.pdf



Tips for Success

Note that **Actions 02-04** at left are preliminary and further study is recommended to refine them. Additional analyses should include: an assessment of water quality impacts, process review of each plant in its present configuration and identification of equipment or processes vulnerable to flooding, hydraulic review of each plant in its present configuration, Hudson River modeling, and cost-benefit analyses.



Case Study

The **Town of Bethlehem's Wastewater Treatment Plant** is at a low elevation along the Hudson River, making it vulnerable to very high episodic flooding. If this flooding were to occur when the outflow was elevated because of upstream rainfall, wastewater would not be able to be treated before it flows into the Hudson. While this condition has not occurred in the last 20+ years, it came close during the high-water floods in 2009/10. In 2012, the Town conducted a study and estimated the cost of installing a pump to overcome flood pressure at \$5 million.

Recommended Actions

Long-term

- 01 Implement the recommended capital improvements**, based on the findings of the assessments recommended in the short-term actions.
- 02 Conduct similar resilience assessments for other water-dependent critical facilities** and sites along the Hudson River including: the Bethlehem and Coeymans WWTPs and the Ports of Albany and Coeymans.

Potential Benefits

- **Protecting community health** by maximizing wastewater treatment and ensuring the plants continue to function during high-water events.
- **Protecting vulnerable assets from flooding** through mitigation measures like pump stations, flood walls, and elevation of critical equipment.
- **Ensuring continued operations** at these facilities during high-water or extreme precipitation events, or under future conditions where the Hudson River is higher, extreme precipitation events occur more frequently, and/or floodplains are larger than they are today.
- **Adapting facilities so they can remain functional in-place in the future**, without the need to relocate entire facilities and/or alter the sewer collection system.

Implementation

Possible Lead Agency

Albany County Water
Purification District

Potential Partners

- NYS DEC
- FEMA
- Albany Pool LTCP Partners
- Mohawk River Watershed Coalition
- Hudson River-Black River Regulating District

Timeframe

In-depth analyses of these sites should be conducted within 5 to 7 years to enable proactive planning in the face of climate change. Identified mitigation measures should be implemented as soon as reasonably possible based on priority and available funding.

Planning-level Cost Estimate

- North WWTP low lift effluent pump station: \$9 to \$11 million
- South WWTP low lift effluent pump station: \$7 to \$9 million
- North WWTP flood wall and stormwater pump station:* \$5 to \$7 million
- South WWTP flood wall and stormwater pump station:* \$5 to \$7 million

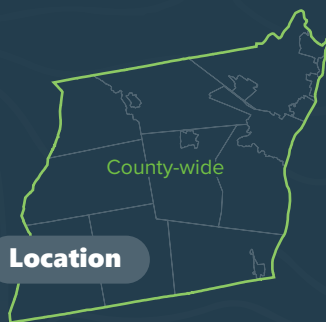
**Assuming a cost of \$1,500 to \$2,000 per linear foot of flood wall depending on site constraints and materials*

Potential Funding Sources

- NYS DEC Climate Smart Communities (CSC)
- FEMA Hazard Mitigation Grant
- Environmental Facilities Corporation (EFC)
- NYS Environmental Bond Act

Increase Resilience to Extreme Temperature Events

Health and Social Services



Description

Using the heat vulnerability and social vulnerability datasets described in **Chapter 3** of this Plan, the County should identify areas that will be most impacted by extreme heat and cold events and develop a strategy to proactively establish a network of community cooling and warming centers, rapidly and equitably distribute aid, and mitigate the urban heat island effect by reducing impervious surfaces, increasing the urban forest, and creating public spaces that encourage social interaction, especially in socially vulnerable and heat vulnerable areas.

Need

Extreme heat and cold events are expected to increase in frequency, severity, and duration as a result of climate change. Extreme weather is associated with several negative physiological and mental health impacts and disproportionately affects low-income and elderly residents – many of whom may also be facing financial, housing, and/or energy insecurity. Heat waves can cause heat stroke, dehydration, dizziness, and fainting and can also compound pre-existing conditions, such as cardiovascular and respiratory diseases, leading to hospitalization and even death. Extreme cold events can cause frost bite, hypothermia, and potentially death. This project focuses on mitigating the negative impacts of extreme heat and cold events by proactively ensuring the County is prepared to rapidly and equitably respond to and recover from heat and cold emergencies.

Recommended Actions

The County should develop an **Extreme Heat and Cold Emergency Response Plan**. This comprehensive plan should be an inter-departmental and inter-municipal effort that, at a minimum, defines strategies and actions to address the following:

- 01 Provide financial support to expand the capacity of existing facilities to serve as cooling and warming centers.** The County's Department of Social Services maintains a list of cooling centers county-wide and, in discussions with several stakeholders during this planning process, it was noted that libraries also serve as refuges during extreme heat and cold events due to their accessibility to vulnerable populations, their willingness to welcome all, and the many other resources they provide (e.g., computers, free WiFi, programming). It is recommended that the County engage existing cooling centers and the library system to identify opportunities to improve access to and expand the capacity of these facilities. For example, as the frequency and intensity of extreme heat and cold events increases with climate change, these facilities may require additional staff and resources and expanded hours to effectively operate as cooling and warming centers.



Resilience Strategies

This project advances the following resilience strategies:

- Effectively and equitably respond to and recover from natural disturbances.
- Support and empower local communities and institutions.
- Preserve, expand, and restore natural areas.
- Support data-driven decision-making.
- Increase the public's understanding of and capacity to respond to climate change.
- Learn from past events and anticipate future disturbances.



Funding Opportunity

An Extreme Heat and Cold Emergency Response Plan could be developed as an annex to the **County's Multi-Jurisdictional Hazard Mitigation Plan**, which will next be updated in 2023.

Recommended Actions

CONTINUED

02 Identify and define criteria for new locations of cooling and warming centers.

New locations and partnerships with community groups and institutions should be identified to build a more robust and accessible network of cooling and warming centers. Potential criteria for new cooling and warming centers include:

- Located in a low flood risk areas (e.g., flood risk score = 1; see the **Risk Assessment** in Chapter 3)
- Easily accessible by public transit, walking, and biking
- Located in socially vulnerable areas
- Welcoming to the homeless community
- Co-located with existing community services (e.g., churches, cultural institutions, County facilities)
- Paired with the distribution of relief, benefits, and other social services
- Public access to programming and other resources, enabling the facility to function as a shared community resource and destination, not just a refuge
- Equipped with a generator to provide back-up power during an outage
- Staffed with personnel trained in recognizing signs of heat- and cold-related illnesses



Climate Impacts

“Urban heat islands” occur when cities replace natural land cover with dense concentrations of pavement, buildings, and other surfaces that absorb and retain heat. This effect increases energy costs (e.g., for air conditioning), air pollution levels, and heat-related illness and mortality. **Climate change will likely lead to more frequent, more severe, and longer heat waves during summer months, exacerbating the urban heat island effect.**

Recommended Actions

CONTINUED

03 Provide financial assistance to increase resilience of individual households.

Residents should be able to safely remain in their own homes during extreme heat and cold events. To facilitate this, it is recommended that the County consider the establishment of a new grant program to subsidize the cost of air source heat pumps for socially vulnerable households. Not only do heat pumps provide critical cooling and heating during emergencies, but they also significantly increase energy efficiency (air source heat pumps can result in savings of up to 40% on energy bills). National Grid currently offers incentives to homeowners to purchase cold climate air source heat pumps for heating and cooling. But, even with this incentive, heat pumps can remain cost prohibitive for low-income households and even moderate- to middle-income households. This recommended grant program could expand assistance to renters as well as help bridge the financial gap between National Grid's incentive (up to \$1,000 per 10,000 BTUH) and the total cost of installing a heat pump unit (which may range from \$3,500 to \$5,000 with installation up to \$20,000 per unit).

04 Provide financial assistance to increase resilience of multi-family households.

As the State transitions to an all-electric grid, heat and cold emergencies paired with power outages will become even more dangerous. The majority of socially vulnerable communities are located in dense urban areas, where multi-family housing is concentrated. To protect multiple households within a single building in the event of a heat or cold emergency paired with a power outage, the County should consider establishing a financial incentive program for landlords in socially vulnerable areas to support the purchase and installation of back-up generators.



National Grid Incentives

In select "priority electrification" zip codes in Albany County, eligible National Grid customers can receive an additional 25% incentive for installing heat pump technologies, including air and ground source heat pumps and heat pump water heaters.



Geothermal Possibilities

In addition to air source heat pumps, the County, in cooperation with local energy suppliers and other partners, could consider providing assistance for geothermal and/or ground source heat pumps, as well. These systems are more energy efficient than air source heat pumps and – though initial capital costs are higher – they are less expensive to operate once installed. Geothermal in particular makes sense in more dense urban areas, where district systems can be utilized to provide heat and cooling to multiple buildings. NYSERDA has provided grants to Aztech Geothermal to examine the feasibility of such systems in the Sheridan Hollow and Mansion Neighborhoods in the City of Albany.

Recommended Actions

CONTINUED

05 Invest in public space improvements that increase access to parks, expand the urban forest, and encourage community gathering. Investment in high-quality public spaces, especially in socially and heat vulnerable areas, should be a priority. If a household does not have access to air conditioning, it can often be cooler outdoors than indoors. By supporting projects that expand the urban forest (thus creating cool, shady, outdoor spaces) and increase outdoor public space, the County can mitigate the urban heat island effect and provide a cool, welcoming refuge for distressed residents during a heat or cold emergency. Examples include:

- **Creating pocket parks and expanding the urban forest**, particularly in socially vulnerable and heat vulnerable areas by providing financial support for these projects county-wide and/or implementing them on County-owned property
- Partnering with CDTA to prioritize the **planting of deciduous trees adjacent to bus stops** to provide heat relief for transit riders in the summer
- **Provide drinking water stations** in public spaces

06 Plan for transportation to and from cooling and warming centers. Ensuring that the most vulnerable communities can access cooling and warming centers in the event of an emergency is critical. In partnership with CDTA, the proposed County Extreme Heat and Cold Emergency Response Plan should identify strategies for providing public transportation to and from community cooling and warming centers.



Preparing for Heat Waves

Some of the most vulnerable individuals to heat waves are the elderly and those isolated in their homes. For example, during a heat wave in 2021 in Portland, Oregon nearly all of the 115 individuals who died were living alone. One way to combat isolation during a heat wave is to proactively create welcoming outdoor public spaces that encourage social interactions. These public spaces build social resilience by helping neighbors get to know one another and develop a sense of community. In a heat wave, this social resilience can be life saving, as neighbors who know each other are likely to check on one another.

Studies have shown that communities with robust social infrastructure are better protected from heat waves. For a deep dive on this topic, check out Eric Klinenberg's *Heat Wave* which investigates the 1995 Chicago heat wave.



Leveraging County Land

By improving existing County-owned land through the planting of trees, the addition of green infrastructure, and the creation of welcoming public spaces, Albany County can make a big impact.

The County owns approximately 2,600 acres of land. Of this total land area, approximately 31% (793 acres) is located in an area with high social vulnerability (social vulnerability score of 3 or higher) and 7% (190 acres) in an area with high heat vulnerability (heat vulnerability score of 3 or higher).

Recommended Actions

CONTINUED

- 07 Improve communication of heat and cold advisories in targeted neighborhoods.** This includes providing financial assistance to improve communication (through a variety of media channels) with vulnerable communities regarding extreme heat or cold advisories; providing clear signage and information regarding where cooling and warming centers are located, their hours of operation, and how to access them; and wayfinding signage throughout neighborhoods to visually connect vulnerable communities to cooling and warming centers.
- 08 Train local volunteers and community leaders.** Building local capacity to respond to future heat and cold emergencies is critical to improving the resilience. Working with local community partners – such as the Red Cross, UAlbany, social and cultural institutions, and community leaders – the County could implement a volunteer training program. This training program should focus on building capacity at the neighborhood scale in socially and heat vulnerable areas by teaching volunteers to recognize the signs of heat stress/hypothermia, effectively respond, and proactively check on vulnerable residents during extreme weather events or electrical outages.

Potential Benefits

- **Coordinated, rapid, and equitable response** to extreme heat and cold events.
- **Mitigation of the negative health impacts** associated with extreme heat and cold events.
- **Expansion of the urban forest** and mitigation of extreme heat events.
- **Creating cool public spaces** in socially vulnerable and heat vulnerable areas.
- **Increasing social resilience** through the provision of social services and high quality public spaces.

Implementation

Possible Lead Agency

- Albany County
Dept. of Social Services
- Albany County Dept. of Health
- Albany County Emergency
Management Office

Potential Partners

- Other Albany County Depts.
- Red Cross
- UAlbany
- Community organizations
and cultural institutions
- Municipalities
- CDTA

Planning-level Cost Estimate

\$75,000 for the development of an Extreme Heat and Cold Emergency Response Plan

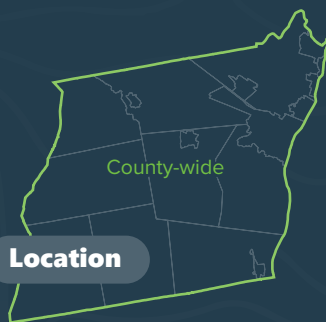
Potential Funding Sources

- Albany County budget
- NYS DEC Climate Smart
Communities (CSC)
- FEMA Hazard Mitigation Grant
Program (HMGP)

Prepare for Long-term and Large-scale Displacements

Health and Social Services

12



Description

In coordination with the County's Multi-Jurisdictional Hazard Mitigation Planning process, it is recommended that the County develop an emergency response plan in anticipation of future large-scale flood events that have the potential to displace many residents for extended periods of time. This plan should include the identification of county-wide evacuation routes, strategies for quickly deploying resources and aid to those impacted, and equitably recovering from a large-scale flood event.

Need

Flooding is one of the main hazards identified in the County's Multi-Jurisdictional Hazard Mitigation Plan. Climate change is also expected to amplify the impacts of future flood events. According to the County's 2018 Hazard Mitigation Plan, most municipalities (with the exception of Watervliet, Coeymans, and Voorheesville) have local emergency operations plans to anticipate emergencies and plan responses accordingly. However, there is no formal emergency evacuation route plan for the county as a whole. In addition to needing a designated county-wide network of evacuation routes, a comprehensive plan focused on preparing for, responding to, and recovering from a large-scale flood event is needed.

Recommended Actions

The County should develop a **Flood Emergency Response and Recovery Plan**. This plan should be an inter-departmental and inter-municipal effort that, at a minimum, defines strategies and actions to address the following:

- 01 Designate county-wide evacuation routes.**
Work with municipalities to develop a county-wide system of evacuation routes in preparation for a large-scale flood event. Once designated, the evacuation routes should be posted in a place easily accessible by the public and signage should also be developed to physically mark evacuation routes.
- 02 Identify neighborhoods most likely to be impacted by a large-scale flood event.**
Knowing who will most likely be impacted will help the County shape its preparation, response, and recovery to a large-scale flood event. Specifically, a strong understanding of the socio-demographic characteristics (e.g., renters versus homeowners, income, car access, etc.) of flood-prone neighborhoods will help the County identify the most effective strategies for communicating emergency warnings, coordinating evacuations, and efficiently disbursing aid to those who need it most.



Resilience Strategies

This project advances the following resilience strategies:

- Guide growth and development away from high risk areas.
- Promote regional sharing of information and resources.
- Effectively and equitably respond to and recover from natural disturbances.
- Implement inclusive, community-based planning processes.
- Support and empower local communities and institutions.
- Increase the public's understanding of and capacity to respond to climate change.



Funding Opportunity

A Flood Emergency Response and Recovery Plan could be developed as an annex to the **County's Multi-Jurisdictional Hazard Mitigation Plan**, which will next be updated in 2023.

Recommended Actions

CONTINUED

- 03 Enhance emergency communications.** Early warning systems and communication strategies tailored to the local community are necessary to give people enough advance warning to prepare for a flood event and evacuate if necessary.
- 04 Plan for transportation during emergency evacuations.** Ensuring that the most vulnerable communities and individuals can evacuate and access safe shelter in the event of an emergency is critical. In partnership with CDTA and the Red Cross, the County should identify strategies for providing public transportation and other forms of transportation to support evacuation efforts.
- 05 Establish an ongoing dialogue with residents and businesses about their risks to flooding.** This could be accomplished by assigning emergency response coordinators at the neighborhood level who could disseminate information related to flood risks, as well as other climate-related risks. Prioritize placing emergency response coordinators in flood-prone and socially vulnerable neighborhoods. In addition to assisting with information dissemination, these individuals could assist with emergency communications, evacuations, housing displaced individuals, and the disbursement of aid.
- 06 Identify potential sites for temporary housing.** In the event of a large-scale disaster, many people may be displaced for an extended period of time. The County should identify several sites located in low flood risk areas that can support temporary shelters for displaced individuals. The County should also work with the Red Cross to update existing sheltering agreements and incorporate lessons learned from the Covid-19 pandemic, such as the need for non-congregate sheltering options. Accommodations for individuals who need longer-term housing solutions should also be identified.



Tips for Success

The network of stream and rain gauges proposed in **Project 6** could be an integral component of the early warning emergency communications system. It could notify officials if stream levels are rising so that advance warning can be provided to residents about the need to take precautions or evacuate.



Tips for Success

Link communities up with the Climate Justice Corps to assist in educating community members about their flood risks and to help them implement retrofits that would work toward floodproofing their homes. See **Project 2** for more information about the Climate Justice Corps and **Project 5** for resilient home strategies.

Recommended Actions

CONTINUED

07 Train local volunteers. Having access to a trained local workforce in the event of a flood emergency is critical. Deploying individuals from another region is expensive, time consuming, and they may lack the on-the-ground knowledge of local communities. In partnership with the Red Cross, UAlbany, and local community-based organizations, the County should implement a volunteer training program to increase the capacity of local residents in flood-prone areas to respond to future disasters. Local volunteers should be trained in psychological first aid and cultural sensitivities.

08 Efficiently and effectively disburse emergency benefits and aid. In the event of a large flood emergency, the affected area will likely receive funding from the State and federal government. The County should make a plan now regarding how it can quickly and effectively ensure this aid is immediately directed to the individuals who need it most. Further, the County should consider supplementing State and federal assistance by establishing a grant program to support socially vulnerable households who may need additional funding to cover expenses and accelerate their recovery.

09 Facilitate buy-outs and relocation of individuals in high flood risk areas. In areas where repetitive losses have occurred and/or flooding is a persistent issue, the County should facilitate discussions regarding buy-outs with homeowners. In instances where a buy-out would displace renters, it is recommended that the County partner with housing-focused non-profits to assist these displaced individuals in securing permanent housing in low flood risk areas. The Land Bank can also play an expanded role in helping make residents in flood-prone areas more buyer-ready so they can purchase homes and reduce their risk of future displacement.

Potential Benefits

- **Coordinated, rapid, and equitable response** to large-scale flood events.
- **Improved capacity of residents to prepare for and deal with flooding** through enhanced emergency communications and increased knowledge of available resources.

Implementation

Possible Lead Agency

- Albany County Emergency Management Office
- County Department of Social Services

Potential Partners

- Other Albany County Depts.
- Red Cross
- UAlbany
- Advance Albany Alliance
- Community organizations and cultural institutions
- Municipalities
- CDTA
- FEMA

Planning-level Cost Estimate

\$125,000 for the development of a county-wide Flood Emergency Response and Recovery Plan*

If conducted in tandem with the proposed Extreme Heat and Cold Emergency Response Plan (see **Project 11) the County could realize efficiencies related to municipal coordination and public engagement and ultimately reduce costs.*

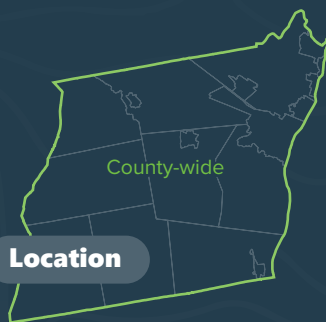
Potential Funding Sources

- Albany County budget
- NYS DEC Climate Smart Communities (CSC)
- FEMA Hazard Mitigation Grant Program (HMGP)

Expand the County-wide Trail Network

Natural and Cultural Systems

13



Location

Description

Albany County's trail network should be built out and better connected to create an expansive county-wide system that serves both recreational and transportation purposes. New trail segments, including the Albany Loop Trail and the Patroon Creek Greenway, should be linked into the system and existing segments, like the Helderberg-Hudson Rail Trail, should be expanded, programmed, and maintained.

Need

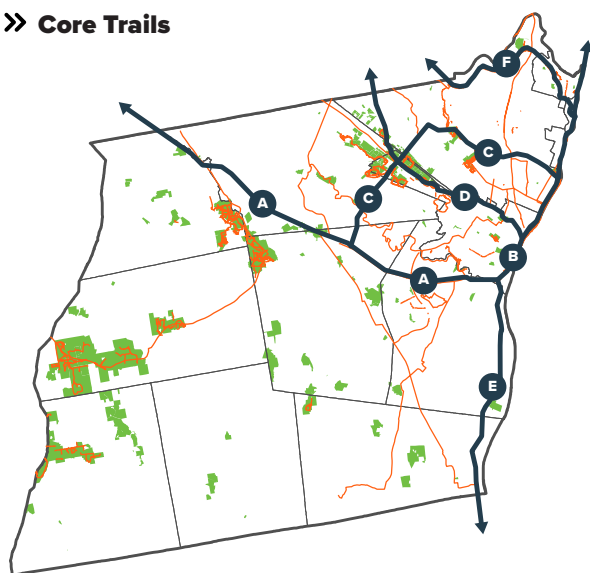
Recent work by the CDTC has laid the groundwork to promote a larger Capital Region trail network. Using its existing trail network as a starting point, Albany County can advance the CDTC's recommendations by connecting existing and adding new segments into the network. An expanded trail network can support alternative, sustainable transportation options, improve community health, reduce reliance on personal vehicles and thus reduce emissions and provide added benefits of ecologic restoration and natural systems resilience.

Recommended Actions

01 Conduct feasibility studies for the unexplored segments of the Albany County Core Trails.

Work with CDTC and municipalities to identify and prioritize opportunities for linkage and feasibility studies. Evaluate complexity levels and priorities for implementation. At the County level, proactively assist municipalities in applying for grants, and take the lead in coordinating inter-municipal trail projects. Note that the recommended County-wide Trails Committee (see **Action 05**) can be an important partner in facilitating inter-municipal collaboration.

» Core Trails



- A** Albany County Helderberg-Hudson Rail Trail
- B** South End Bikeway Connector
- C** Albany Loop
- D** Patroon Creek Greenway
- E** Hudson Northway
- F** Mohawk-Hudson Bike-Hike Trail
- Orange dot** Non-core trails



Resilience Strategies

This project advances the following resilience strategies:

- Preserve, expand, and restore natural areas.
- Strengthen residents' sense of place and awareness of natural processes by deepening connections between social and ecological systems.
- Ensure mass transit and active transportation are viable modes of transportation.
- Implement inclusive, community-based planning processes.
- Build climate resilience over time and across scales and systems.



Capital Region Trail Plan

The 2019 Capital Region Trail Plan creates a framework for building a Capital Region trail network. To date, several recommended projects have gained momentum whether through planning efforts, such as the completion of feasibility studies, or through partial implementation of designated trail segments.

As a next step, CDTC is recommending that municipalities and organizations work to progress the plan recommendations through individual projects that would either: implement recommendations already made, move projects closer to implementation by conducting linkage and feasibility studies, or by completing trails plans or complete streets plans for individual municipalities looking to better tie their communities into the regional network.

Read the full plan here:
regionaltrailperspectives.weebly.com

Recommended Actions

CONTINUED

- 02 Implement the Albany Loop Trail.** The Albany Loop Trail will create a 15-mile on-road bike connection around greater Albany that links the Helderberg-Hudson Rail Trail in Voorheesville to the Mohawk-Hudson Bike-Hike Trail in Watervliet. Albany County is presently working with CDTC to conduct a feasibility study for the segment of the trail that would run from the Albany County Rail Trail in Voorheesville to the intersection of Albany Shaker Road and Maxwell Road in Colonie.
- 03 Implement the Patroon Creek Greenway.** The City of Albany and CDTC recently partnered to complete a feasibility study for the Patroon Creek Greenway, a roughly 9-mile-long multi-use trail connection from the Hudson River waterfront to the Albany Pine Bush Preserve and Six Mile Waterworks Park. Although the proposed greenway is entirely contained within the City of Albany, it has the potential to be a major east-west regional connection by linking to existing trail systems in the Albany Pine Bush, which extend west into Colonie and Guilderland, and by connecting to the existing Mohawk-Hudson Bike-Hike Trail, which extends north to Watervliet, Green Island, and Cohoes. Given the regional significance of the Patroon Creek Greenway, the County is well-positioned to lead the implementation of this new trail system. Further, the Patroon Creek Greenway would largely serve socially vulnerable communities and also creates several opportunities for ecological restoration along Patroon Creek. The creation of new open space and permeable surfaces within this urbanized watershed, which is over 95% impervious, will significantly strengthen climate resilience, particularly in this socially vulnerable area.



Climate Impacts

Integrating ecological restoration and green infrastructure into trail corridors. Where possible, natural infrastructure should be integrated into trail corridors to sustainably manage stormwater and increase ecosystem health. Trails have the added potential to serve as corridors between habitat patches if designed with the needs of different species in mind. In addition, many trail corridors follow waterways, creating opportunities for enhancing and/or expanding stream buffers. Pairing trails with climate resiliency measures can also substantially increase their fundability while boosting the substantial social, economic, and environmental impact they can have in a community.



Tips for Success

Opportunities exist to co-locate off-road trails with inter-municipal utility easements, which are often long and linear and lend themselves to trails. For example, much of the Patroon Creek Greenway's proposed alignment uses the County's Patroon trunk sewer easement. Another concept trail connects Coeymans to the City of Albany along the Albany Water Board's easement.

Recommended Actions

CONTINUED



⌄ Potential Patroon Creek Greenway/Albany Loop Connection

City of Albany

- Core trails
- Non-core trails

Recommended Actions

CONTINUED

04 Extend and expand connections to the Helderberg-Hudson Rail Trail. In line with the Capital Region Trail Plan, it is recommended that Albany County initiate a feasibility study to investigate options for extending the Helderberg-Hudson Rail Trail northwest into Schenectady County. The County should also focus on increasing access to the existing portions of the Helderberg-Hudson Rail Trail, including identifying and establishing new trail connections to nearby economic centers, hamlets, and residential areas to maximize trail use. Additional actions to enhance the existing trail include: create, fund, and implement a trail maintenance plan, which could be accomplished in partnership with the Climate Justice Corps (see **Project 2**); continue to program the trail with regular activities, like the Albany County Fall Fest and 5K; and support municipalities in creating trail-oriented development ordinances to encourage public and private connections to the trail.

05 Create a County-wide Trails Committee. Trail systems require regional planning that extends beyond municipal boundaries. Planning and implementing trails in a vacuum can lead to a disconnected and disjointed system. A County-wide Trails Committee – made up of representatives from local municipalities, trail advocacy organizations, and user groups – can help advocate for and prioritize trail projects in the county and can encourage decision-makers to consider trail planning from a regional lens.

06 Create a trail and bike lane maintenance program supported by the Climate Justice Corps. Through this program, Climate Justice Corps (**Project 2**) team members could ride trails and bike lanes and report conditions to appropriate departments for repairs, place traffic cones or spray paint surface hazards, do minor cleanup of glass and debris, and perform bike lane and trail counts. Some of these tasks are already being performed by volunteer trail ambassador programs but there is a limit to the number of volunteers available and how much they can accomplish. This program would make for a more reliable transport system for alternative transportation users.



Tips for Success

Through its transportation planning grants, CDTC is able to provide technical assistance and funding for municipalities seeking to progress trail implementation for trails that are “principally for transportation purposes rather than recreation purposes.” Many of CDTC’s programs require minimal matching funds, and projects, if supported by Albany County through either partnerships or matching, would be more favorable as inter-municipal collaborations.



Case Study: Saratoga County

The Saratoga, NY County-wide Trails Committee was created to advance the trail network proposed in the County’s Green Infrastructure Plan. The Committee is convened under Saratoga PLAN, a community-based conservation organization.

Find out more here: saratogaplan.org/countywide-trails-committee/

Recommended Actions

CONTINUED

07 Promote policies that encourage trail development. Considerations for trail development and connections are often an after-thought in local planning processes. When trail planning is not top-of-mind, opportunities can be lost to development or trail connections can be developed in an ad-hoc way that doesn't support the larger trail system. Albany County and its local municipalities should include considerations for trail development in their site review, permitting, and approvals processes to identify and act on opportunities for trail connections. Albany County in particular should model trail advocacy at the county-level by making land use and transportation decisions that support trail development and alternative transportation.

08 Create a funding stream for trail projects. Trail projects are large-scale projects that require considerable funding – often from multiple sources – for planning and implementation. It is recommended that the County include an annual allocation in its budget for design, construction, and maintenance of trail projects. The County could work with the County-wide Trails Committee to disburse funds based on project priority as well as provide technical assistance to municipalities to apply for other grants.

09 Encourage municipalities to reduce minimum parking requirements or replace them with maximum parking requirements. This strategy is being increasingly used by municipalities to encourage alternatives to single-occupancy vehicles, like walking and biking, and also has the added benefit of reducing impervious surfaces.



Trail-Supportive Policies

There are various policies that Albany County and its municipalities can adopt to encourage trail projects, including:

- **Adding a section to the Albany County Planning and Zoning Action Referral Form** to identify properties that could advance trail connections. Identifying opportunities early helps keep trail planning top-of-mind and makes sure trail development is included in the planning and approvals processes.
- **Requiring properties foreclosed upon by Albany County to be reviewed** for potential trail connections and easements prior to being sold. This is similar to an existing Albany County law that requires properties acquired by foreclosure to be reviewed first for conservation purposes as the most preferred use (Albany County Code § 360-39).
- **Encouraging and/or incentivizing municipalities to adopt policies to require trail connections as part of the permitting process.** The recommended County-wide Trails Committee could also be useful in assisting municipalities in crafting trail-related policies.

Potential Benefits

- **Increasing sustainable transportation options** through the expansion and creation of trail networks and their connections to residential areas and key destinations.
- **Generating support for and momentum to implement projects** through advocacy and coalition building.
- **Promoting regional trail systems development and connections** through increased awareness of ongoing projects and identification of opportunities for inter-municipal collaboration.
- **Supporting smaller municipalities** who may not have the capacity or expertise for trail planning through the sharing of resources and best practices.
- **Encouraging trail development** by elevating considerations for trail development in the planning process and emphasizing early identification of trail opportunities.
- **Increasing resiliency for the rising costs of fuel** (and associated supply issues) by providing less expensive transportation alternatives.
- **Increasing access to nature** and expanding outdoor recreation opportunities.
- **Strengthening natural systems** by providing the necessary links to connect fragmented habitats.
- **Reducing impervious surfaces** through increased non-car transportation alternatives.
- **Increasing residents' sense of place** and connection to natural systems and the outdoors.
- **Increasing physical health benefits** by providing more recreation opportunities.
- **Increasing mental health benefits** by promoting physical activity and increasing access to nature.

Implementation

Possible Lead Agency

- Albany County
- CDTC

Potential Partners

- CDRPC
- Local municipalities
- MHLC
- Trail advocacy organizations

Project Status and Timeframe

- Short-term: Create a County-wide Trails Committee; continue to enhance, program, and maintain existing trails.
- Mid-term: Pursue funding to implement the Capital District Trail Plan in Albany, including the Albany Loop Trail and the Patroon Creek Greenway.

Planning-level Cost Estimate

Trail design and construction costs vary based on the amenities provided and structures required (e.g., some trails may require a bridge to cross existing roadways or railways). Some relatively simple trails with limited amenities may cost approximately \$1.5 million per mile, while more complex urban trails may cost significantly more (e.g., the Patroon Creek Greenway is estimated to cost between \$3 million to \$9 million per mile depending on the number of structures and ecological restoration integrated into the trail corridor).

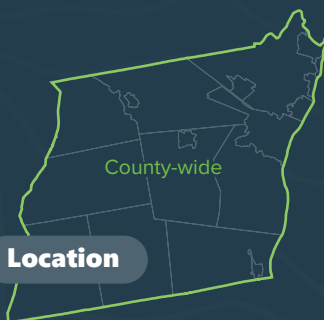
Potential Funding Sources

- Transportation Alternatives Program/Air Quality Improvement Program (TAP/CMAQ)
- Consolidated Local Street and Highway Improvement Program (CHIPS)
- Recreation Trails Program (RTP)
- Surface Transportation Block Grant program (STBG)
- Rebuild American Infrastructure with Sustainability and Equity (RAISE) Discretionary Grants
- Infrastructure Investment and Jobs Act / Bipartisan Infrastructure Law
- Environmental Protection Fund (EPF)
- Green Innovation Grant Program (GIGP)
- Market New York
- NYS Climate Smart Communities (CSC)
- Environmental Protection Fund Grants (NYS OPRHP)
- Park & Trail Partnership Grant Program (NYS OPRHP)
- CDTC Unified Planning Work Program (UPWP)

Create a “Green Streets Initiative”

Natural and Cultural Systems

14



Description

A “Green Streets Initiative” could promote green infrastructure and tree planting along local and neighborhood streets – especially in underserved and socially vulnerable areas – as a way to equitably expand the tree canopy, reduce the urban heat island effect, and improve community health.

Need

Green infrastructure is the practice of using natural processes and systems to best manage natural resources. It has numerous benefits, including:

- **Infiltrating water.** Open space, rain gardens, bioswales, infiltration chambers, and porous pavements are all tools that can be applied to increase infiltration, which can reduce flooding, replenish groundwater reserves, protect against drought, reduce erosion, minimize water pollution, and reduce thermal pollution of waterways.
- **Reducing the urban heat island effect.** Urban heat islands occur when natural systems are lost and surfaces absorb and re-emit the sun's heat, making those areas hotter than their surrounding areas and compromising their ability to cool down and reset during night-time hours. Trees, green roofs, and vegetation are all effective tools in reducing the urban heat island effect. By shading surfaces, deflecting the sun's rays, and releasing moisture into the air, these natural systems offer tremendous benefits to cities.
- **Lowering building energy demands.** Green infrastructure systems such as trees, vegetation, and green roofs can reduce building energy demands and local temperatures by shading buildings, building surfaces, and the surfaces surrounding buildings. They can also reduce energy demands by acting as a windbreak.
- **Protecting water supplies.** Open space generates much less stormwater runoff than developed lands and has the ability to protect streams and water bodies from stormwater runoff, which often carries sedimentation and pollutants. Open space can also reduce thermal pollution of streams by allowing runoff to cool before it reaches a water body.
- **Reducing air pollution.** According to the EPA, breathing dust, chemicals, smog, and particulate pollution has serious detrimental health effects including respiratory ailments, coughing, aggravated asthma, and even premature death. Trees and vegetation can significantly reduce ozone and particulate pollution by removing and filtering it.



Resilience Strategies

This project advances the following resilience strategies:

- Strengthen residents' sense of place and awareness of natural processes by deepening connections between social and ecological systems.
- Increase the public's understanding of and capacity to respond to climate change.
- Preserve, expand, and restore natural areas.
- Build climate resilience over time and across scales and systems.
- Effectively and equitably respond to and recover from natural disturbances.
- Develop a skilled workforce to support a sustainable, resilient economy and high quality of life.



Climate Impacts

Trees are one of the most effective and inexpensive tools to build resiliency as they protect homes, neighborhoods, and surroundings from flooding, extreme heat, drought, pollution, and soil erosion, all while improving quality of life and overall mental health. According to a USDA study, the yearly economic benefits of planting trees exceed the cost of maintaining them by a factor of over 1,000.



Healthy Streets

The U.S. DOT Healthy Streets program provides grants to municipalities to expand tree cover and deploy state-of-the-art, porous pavement solutions to mitigate urban heat islands, improve air quality, reduce the extent of impervious surfaces in communities, and reduce stormwater runoff.

Need

CONTINUED

- **Prepare for drought.** By not capturing or infiltrating water where it falls, valuable water that could be used in times of drought is lost to stormwater runoff. Rainwater harvesting tools such as rain barrels, cisterns, and reservoirs can be used to store water and reduce demands on potable water. Composting toilets and grey-water harvesting systems are also good ways to reduce water demands and reuse non-potable water. Infiltrating water that is not harvested can recharge groundwater supplies. Rain gardens, bioswales, storm chambers, and porous pavement are all effective tools for recharging groundwater.
- **Improving mental health.** Many studies have linked exposure to nature to better mental and physical health. Many hospitals have even added tree views to patient rooms to speed recovery and improved health. According to NYS DEC, spending time around trees and looking at trees can reduce stress, lower blood pressure, and improve mood. People exposed to good tree canopy have also been shown to experience as much as a third less psychological stress.
- **Addressing environmental justice.** Socially vulnerable and environmental justice communities are more vulnerable to the effects of climate change than others. These communities are also more likely to lack tree cover, vegetation, and open space, and to miss out on the benefits of shade, better air quality, and the improved mental health that they provide. Focusing green infrastructure and tree planting in these communities can promote equity and increase resilience in areas that need it most.



Case Studies

Bethlehem, NY. The Town of Bethlehem prepared a Street Tree Inventory Analysis and Management Plan with funding from a NYS DEC Urban Forestry grant. The Town is also working with the Albany County Soil and Water Conservation District to implement the National Grid “10,000 Trees Program” by planting 60 trees at identified gap locations.

Find out more here:
townofbethlehem.org/849/Street-Tree-Advisory-Committee

South End, Albany, NY. With funding from DEC and HUD CDBG, the Radix Ecological Sustainability Center planted over 150 trees along streets in the South End as a way to reduce traffic-related air pollution and the urban heat island effect.

Find out more here: timesunion.com/news/article/The-South-End-is-facing-environmental-injustice-16533337.php

Syracuse, NY. In 2020, the City of Syracuse launched a plan to plant 70,000 trees in 20 years with the goal of raising the tree canopy cover of the city to 34%, addressing tree inequity and cooling city temperatures.

Find out more here:
syracuse.com/weather/2020/02/syracuse-plans-to-turn-down-city-heat-by-planting-70000-trees.html

Onondaga County, NY. “Save the Rain” is Onondaga County’s green infrastructure initiative to improve water quality in Onondaga Lake. To date, Onondaga County has advanced over 200 green infrastructure projects on both public and private property.

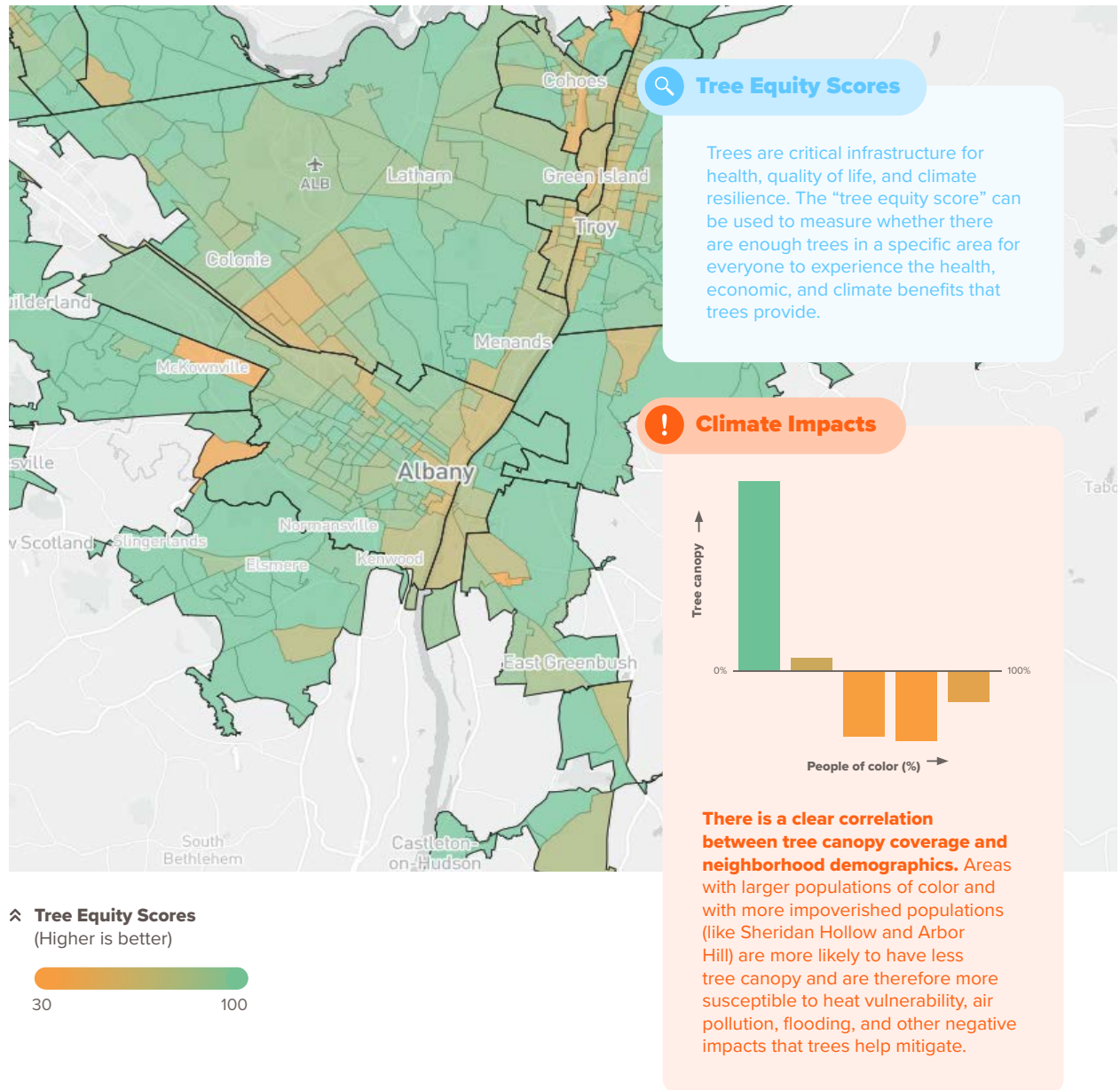
Find out more here: savetherain.us

Montgomery County, MD. “Green Streets” is a County initiative to reduce and filter stormwater runoff in neighborhoods where there is not enough open space for larger stormwater practices. Practices include rain gardens, bioretention, tree box filters, permeable paving, curb extensions, and grass swales.

Find out more here:
montgomerycountymd.gov/water/restoration/green-streets.html

Need

CONTINUED



Recommended Actions

- 01 Develop a “Green Streets Initiative.”** Partner with municipalities to implement green infrastructure along public rights-of-way and on publicly-owned property. To support this initiative, the County should focus on providing technical assistance to communities in securing funding, coordinating with regulatory agencies, and updating local zoning codes and capital improvement plans to prioritize tree planting and green infrastructure in the public right-of-way.
- 02 Focus investment in “Resilient Focus Areas.”** Focus the Green Streets Initiative in “Resilient Focus Areas” (as recommended in **Project 5**) where the urban canopy and nature access are limited and where flooding creates persistent issues. Provide residents in “Resilient Focus Areas” with free trees to plant in their yards. Provide incentives for property owners in focus areas to repave parking lots with porous pavement and incorporate tree islands.
- 03 Consider adopting a county-wide goal for tree planting.** Establishing a quantifiable goal can be a good way to spread awareness and get people interested in climate resiliency efforts. For example, Albany County could set a goal of planting **40,000 trees by 2035** which would bring the County’s tree equity score to 85 (out of 100). To achieve this goal, identify priority areas and neighborhoods with inequitable tree cover and prioritize planting in those areas. Engage partners and develop programs with the Climate Justice Corps (see **Project 2**), local schools, and others to involve community members in the process.
- 04 Commit to maintaining green infrastructure projects.** As with any infrastructure, green infrastructure requires regular maintenance. The County should develop a plan to maintain green infrastructure projects and leverage assistance from the Climate Justice Corps network (**Project 2**). Residents can also be partners in maintenance, especially those who plant trees on their property. As such, the green infrastructure maintenance plan should include an education component targeted at teaching residents the benefits of green infrastructure and how to care for it.



Boston’s Urban Canopy Goal

Speak for the Trees. The goal of Speak for the Trees is to assist the City of Boston in increasing the area’s canopy cover from 27% to 35% by the year 2030, with a focus on growing the tree canopy in underserved and under-canopied neighborhoods. As part of the initiative:

- **1,000 trees were given away to residents** to be planted in private yards, using new genotypes and introducing species that are better adapted to future threats and conditions.
- **An education program** was developed to teach residents about proper tree planting and care practices for the health and longevity of trees in their private yard.

Find out more here:
forestadaptation.org/adapt/demonstration-projects/speak-trees-boston-growing-bostons-urban-tree-canopy



Climate Impacts

Shade. According to the EPA, shaded surfaces can be 20-45 °F cooler than the peak temperature of unshaded materials.

Evapotranspiration. According to the EPA, evapotranspiration can reduce peak summer temperatures by 2-9 °F.

Potential Benefits

- **Increase local water quality** by promoting systems that will reduce flooding, combat drought, decrease surface runoff, lower runoff temperatures, and help mitigate large-scale climate events.
- **Increase tree cover** to combat rising heat and increased flooding.
- **Engage residents in participating in green infrastructure projects** through educational outreach.
- **Strengthen local access to trees and vegetation** that can improve community resiliency.
- **Apply green infrastructure** to underutilized properties in flood-prone areas where it can contribute to both mitigation and resiliency efforts.
- **Preserve and promote biodiversity** for the future.
- **Increase access to healthy foods** by incorporating food-productive tree species.
- **Create workforce development and job opportunities** to implement and maintain green infrastructure.
- **Increase access to nature** by expanding tree equity and implementing green infrastructure.
- **Strengthen natural systems** by providing the necessary links to connect fragmented habitats and designing for biodiversity.

Implementation

Possible Lead Agency

- Albany County
- SWCD
- CDTC

Potential Partners

- Local municipalities
- CCE

Project Status and Timeframe

A County position should be created to design, oversee, and implement the “Green Streets Initiative.” As the program grows, capacity can be increased.

Planning-level Cost Estimate

Rain garden cost (includes excavation, construction, and plantings): \$80/sf

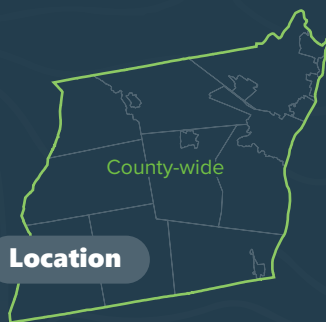
Potential Funding Sources

- NYS EFC Green Innovation Grant Program (GIGP)
- NYS DEC Climate Smart Communities (CSC)
- NYS Environmental Bond Act
- Healthy Streets Program (Infrastructure Investment and Jobs Act)

Develop a County-wide Open Space Plan

Natural and Cultural Systems

15



Description

Albany County should develop a County-wide Open Space Plan to identify existing open space areas to preserve and strategic parcels that could be acquired to create open space in high-value areas, including around drinking water sources, in flood-prone areas, and in highly urbanized watersheds.

Need

Through identifying and proactively conserving County- and other publicly-owned property in flood-prone areas and identifying key future acquisitions, Albany County can increase its resiliency through climate-smart land management decisions that protect source water, mitigate flooding, provide species migration and recreational corridors, integrate native landscapes into urban environments, and connect residents to natural systems in meaningful ways.

Recommended Actions

- 01 Prepare an updated open space preservation plan.** The last county-wide open space plan was prepared in 2005. This plan should be updated to identify additional priority open space areas to reflect climate resiliency needs and changes in development pressure that have occurred since the last plan was prepared. Identify properties in priority open space areas and flag any that may be eligible for acquisition. Preparation of an open space plan is a necessary prerequisite to participate in the State's upcoming state-wide open space planning project.
- 02 Protect open spaces near drinking water sources.** Sources of drinking water include rivers, lakes, streams, ponds, reservoirs, springs, and wells. The majority of Albany County residents get their water from the Alcove Reservoir on the Hannacroix Creek in Coeymans and the Watervliet Reservoir in Guilderland. Protecting (and/or acquiring) open space around potable water sources reduces sedimentation and pollutant loads and increases water quality.
- 03 Protect and create open space in floodplains.** With the challenges of increased flooding and rising tides in the future, protecting and creating open space in floodplains will be a critical tool in mitigating the impacts of flood risks by providing flood storage along water bodies and directing development away from high-risk areas.



Resilience Strategies

This project advances the following resilience strategies:

- Preserve, expand, and restore natural areas.
- Guide growth and development away from high-risk areas.
- Strengthen residents' sense of place and awareness of natural processes by deepening connections between social and ecological systems.
- Build climate resilience over time and across scales and systems.



The Future of I-787



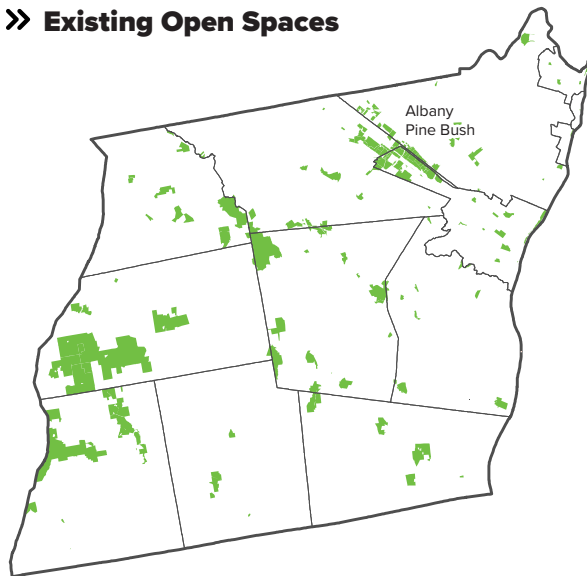
Albany Riverfront Collaborative is currently conducting a feasibility study for the **removal of I-787** to reconnect the City of Albany to the waterfront. The move would unlock 92 acres of land on both sides of the river – much of which is located in the floodplain. To further climate resiliency efforts, it is recommended that this study explore retaining much of the reclaimed land as open space (instead of developing it) as open space in this flood-prone area could act as a buffer, providing significant flood storage for downtown Albany and greatly expanding public access to the Hudson River waterfront.

Find out more here:
albanyriverfrontcollaborative.com

Recommended Actions

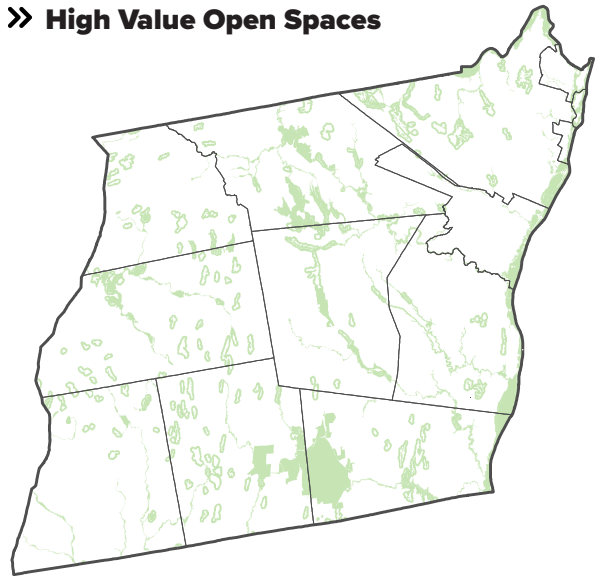
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» Existing Open Spaces



Existing parks and preserves

» High Value Open Spaces



Wetlands, 100- and 500-year floodplains, areas around drinking water sources



Tips for Success

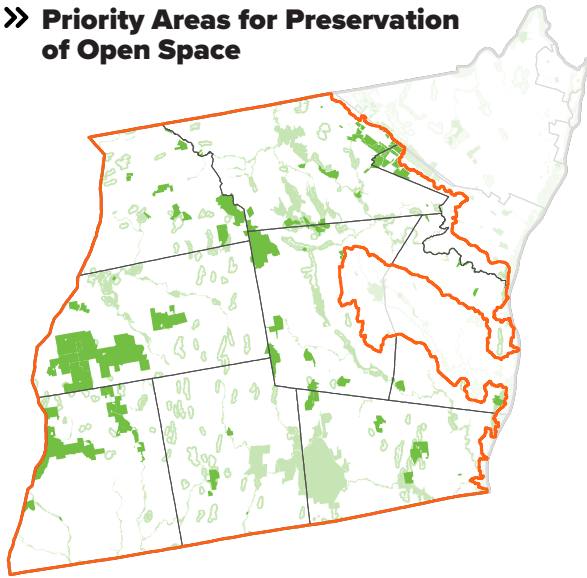
It's important to preserve and enhance existing open spaces and to protect them from future development. The Albany Pine Bush is a great example of an existing preserve where preservation and enhancement should be a priority as it is constantly facing development pressure. Tools like conservation easements and open space preservation zoning districts can help keep existing parks and preserves forever open and prevent encroaching development.



Tips for Success

Floodplains, wetlands, wildlife corridors, and areas around drinking water sources are high-value open spaces that should be preserved and protected from development wherever possible.

» Priority Areas for Preservation of Open Space

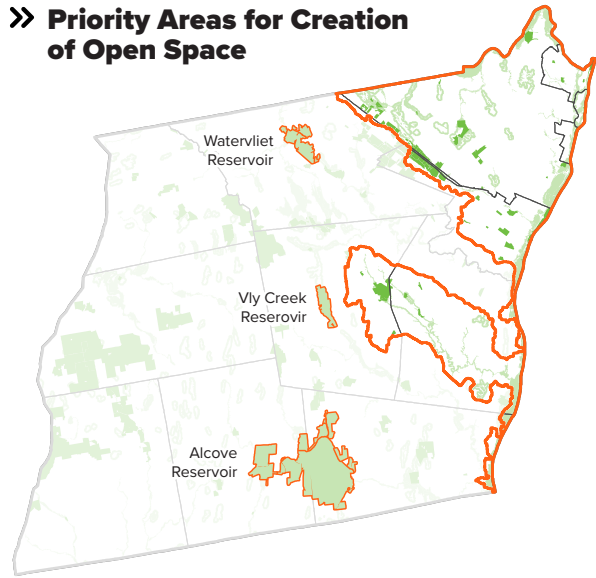


- Existing parks and preserves
- High-value open spaces
- Priority areas for preservation and enhancement of open space (pervious, rural watersheds)

! Climate Impacts

Preservation of existing open space should be prioritized in rural watersheds as these open spaces provide critical ecosystem services, such as clean drinking water, flood protection, biodiversity, and recreational opportunities and play an important role in building climate resiliency.

» Priority Areas for Creation of Open Space



- Existing parks and preserves
- High-value open spaces
- Priority areas for creation of new open space (impervious, urbanized watersheds and areas around water sources)

! Climate Impacts

Creation of **new open spaces in urbanized watersheds can increase pervious land cover** and mitigate stormwater runoff issues. Strategic acquisition of parcels for open space creation can also be helpful in protecting water sources and expanding access to nature.

Recommended Actions

CONTINUED

- 04 Protect and expand upstream flood storage.** Storing floodwaters upstream (i.e., wetlands, retention or detention ponds, etc.) increases the overall flood storage capacity of the system and reduces peak flows downstream. This helps protect vulnerable downstream communities and urban areas. Flood storage areas also often have the added benefit of being used for recreation, as an amenity, or for habitat creation.
- 05 Protect forests.** While young, fast-growing trees can help maximize carbon sequestration, older growth forests offer the best opportunities for carbon storage. Albany County should be looking to protect existing older growth forests while also working to plant and regenerate newer stands of trees. In the face of rising temperatures and increased threat from invasive species and insects, it will be critical to plant a wide variety of trees that can more easily adapt to climate change.
- 06 Protect wildlife corridors.** Maintaining landscapes with high ecosystem value and protecting wildlife corridors is especially important in supporting biodiversity and genetic variation, which are both critical for supporting life on earth, preventing diseases and pests, increasing food security, and much more. NYS DEC, MHLC, and the Nature Conservancy are working together to protect important wildlife corridors between the Catskills and the Adirondacks. Wildlife corridors are especially important in areas where open space is fragmented.
- 07 Support equitable access to open spaces.** Many of the most vulnerable populations who will be most affected by climate change have the least access to open spaces and natural features. Access can be provided in a number of ways including restorative projects in urban areas (such as the Patroon Creek daylighting project), connecting larger trail networks to neighborhoods and residential developments (**Project 13**), supporting educational partnerships that connect children with natural areas, and by supporting the Nature Bus –which provides free bus service to eleven different open spaces in the area.



Tips for Success

Use the Planning and Zoning Action Referral Form to identify open space opportunities early. Once the County develops an updated Open Space Plan, the County Planning and Zoning Action Referral Form and review process should be updated to flag any proposed development that impacts priority open spaces. The County should proactively work with developers to identify opportunities to conserve priority habitat and avoid flood-prone areas while also identifying viable, yet contextually sensitive, development strategies.



Case Studies

Conservation Easement Exemption Program. The Town of Bethlehem operates a conservation easement exemption program, where landowners who commit to forgo development of the property (greater than 5 acres) for at least 15 years receive a 50% exemption on the assessed value. A perpetual easement results in 90% exemption. Albany County approved an “opt-in” to the program so that the reduced assessed value would affect County taxes. Guilderland recently approved their conservation easement exemption program, but Albany County has not approved the exemption to be applicable to County taxes. This represents an opportunity to incentivize open space preservation through tax relief to landowners with conservation intentions.

Farmland Protection and Open Space Grant Program. Saratoga County operates a grant program which provides funds for the purchase of development rights (PDR) on eligible farmland and open space lands whose preservation is deemed to be of significant public benefit.

Find out more here:
saratogacountyny.gov/wp/wp-content/uploads/2021/02/2021-Fillable-Farmland-and-OS-Grant-Application.pdf

Recommended Actions

CONTINUED

- 08 Prepare development guidelines for landslide-prone areas.** Create a map of landslide-prone areas and prepare development guidelines for these and surrounding areas. Direct development away from landscape-prone areas and retain as open space where possible.
- 09 Create policies to support open space preservation.** One of the best strategies to mitigate impacts from climate change is to direct development away from high-risk areas, like floodplains, steep slopes, and natural areas. Work with municipalities to adopt land use and zoning policies that protect open space and prioritize smart growth. Create incentives for landowners to protect priority open space areas.
- 10 Create a funding stream** for open space conservation projects and/or land acquisition.

Potential Benefits

- **Preserve, expand and restore natural areas** to increase their ability to adapt to changing climates and protect against rising temperatures, flooding, and increased drought.
- **Strengthen natural systems** so that landscapes can better mitigate flooding, rising temperatures, and threats to species diversity.
- **Increase flood storage** through climate-smart land acquisition and use.
- **Improve water quality** through the preservation of natural systems and increased tree cover in and around source waters.
- **Increase drought tolerance** through the preservation of natural systems and increased tree cover.
- **Increase mental health benefits** of open spaces and natural systems by expanding them, connecting them, making them more accessible to all residents, and promoting ecological and environmental literacy.

Implementation

Possible Lead Agency

- Albany County
- MHLC

Potential Partners

- Land conservancies
- Advocacy groups
- Local municipalities
- Preserves
- SWCD
- SUNY Albany
- Stormwater Coalition
- CDTC
- CDTA
- NYSEDA
- CCE
- Discover Albany

Project Status and Timeframe

A task force should be established in the near-term to facilitate creation of the Open Space Plan, and resulting recommendations for protecting, expanding, and acquiring open space should be pursued after that.

Planning-level Cost Estimate

\$125,000 to \$150,000 to develop the Open Space Plan

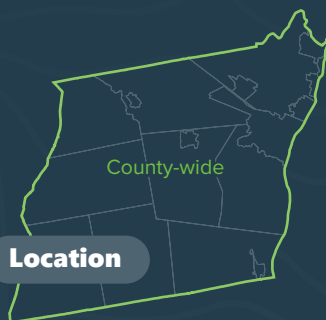
Potential Funding Sources

- NYS Environmental Bond Act
- NYS DOS Smart Growth Grant Program
- NYS Environmental Protection Fund (EPF)

Create a “Business Resiliency Program”

Economic Systems

16



Description

Considerations for resilience and disaster planning should be layered into the Advance Albany County Alliance’s (AACA) existing Business Retention and Expansion Program (BRE) to create a central hub for information to help businesses evaluate disaster risk, enhance disaster readiness, and connect to resources.

Need

Establishing relationships with businesses, understanding their needs, and enhancing their capacity to prepare for and respond to natural disturbances is critical, especially during disaster situations when normal operations and communication channels can be severely disrupted.

Recommended Actions

During Steady-State Periods

- 01 Map, connect, and strengthen the network for business disaster response.** Create a network map of the entities and organizations available to provide Albany County businesses support during disasters. Identify any gaps in the business support system and work to fill those gaps as-needed. Update the network map annually and utilize as a resource in the event of a disruption to help businesses connect to resources and information.
- 02 Promote business continuity and preparedness.** Bring attention to the issue of business preparedness through digital marketing (website, social media, eNewsletter) and direct engagement (events, site visits for business retention and expansion) with the Albany County business community.
- 03 Identify and connect with high-risk businesses through business retention and expansion (BRE) visits.** Use First Street Foundation Flood Factor data (**Project 3**) to identify high-risk businesses and connect with these businesses through the AACAs existing Business Retention and Expansion Program (BRE). Prepare a brief series of questions designed to understand the unique risk and needs of high-risk businesses in the event of a disaster. Help high-risk businesses understand their risk and engage in discussions about continuity planning. For those businesses who do not have adequate planning in-place, offer technical assistance (see next page).



Resilience Strategies

This project advances the following resilience strategies:

- Support data-driven decision-making
- Promote regional sharing of information and resources
- Effectively and equitably respond to and recover from natural disturbances
- Increase the public's understanding of and capacity to respond to climate change
- Promote and support a diverse local economy
- Increase the capacity of local businesses to prepare for, respond to, and recover from natural disturbances
- Develop a skilled workforce to support a sustainable, resilient economy and high quality of life
- Plan and design for passive survivability.



Tips for Success

The Economic Development Gap Analysis conducted as part of the 2019 Albany County Economic Development Strategy can be re-purposed as a starting point to identify gaps in the current business support system.

Recommended Actions

During Steady-State Periods CONTINUED

- 04 Provide technical assistance for business continuity planning.** Offer businesses resources to conduct risk assessments and, based on the results, help them prepare action plans that dictate how these businesses will act in the event of disaster. Ensure businesses know that they can reach out to AACA for assistance before, during, and after a disaster.

Recommended Actions

During and Post-Disruption

- 01 Map the affected area** and generate a list of potentially affected businesses.
- 02 Proactively connect with affected businesses** through multi-channel approaches to understand their immediate and longer-term needs. They may need help assessing their immediate needs and face issues from site access and damage to communication with staff and suppliers. Longer-term issues can include resource needs for reconstruction and operational costs, and employee and customer retention.
- 03 Use the network map to connect businesses with resources** and/or work with local officials to create new programs designed to help affected businesses.
- 04 Work with local field offices** of federal and State resources to coordinate disbursement.
- 05 If appropriate, coordinate a one-stop pop-up location** for business resources where businesses can meet with a staffer in-person who can help them receive personalized assistance and connect them to resources and information for recovery.
- 06 Take a case-management approach** and maintain contact with businesses to shift resources as needs change and ensure necessary resources are being provided.



Tips for Success

Resources for business continuity planning include:

- **Ready Rating** by the Red Cross.
- **Business Continuity Plan** from ready.gov by the U.S. Department of Homeland Security.
- **RestoreYourEconomy.org** managed by the International Economic Development Council (IEDC).

Note: This resource is focused on the role of economic developers in economic restoration, and has good case studies and methods for regional disaster preparedness, response, and recovery.

Recommended Actions

Post-Disruption

- 01 Conduct a post-disaster audit** to see where the response was strong and where improvements can be made.
- 02 Identify areas most affected by the climate disruption** as these are likely “weak links” in the economic development system. Develop mitigation strategies for these areas in particular.
- 03 Partner with the County’s GIS specialists** to conduct post-event impact assessments to understand the effects of the disaster.
- 04 Apply this knowledge and these “lessons learned”** for future disaster resiliency planning.

Potential Benefits

- **Increased capacity of businesses** to prepare for, mitigate, and recover from disturbances.
- **Mitigation of economic disruptions** and losses to business.
- **Reduced recovery time** for businesses to return to normal operations.

Implementation

Possible Lead Agency

Advance Albany County Alliance (AACA)

Potential Partners

- Albany County
- Local businesses
- Local economic development officials who participate in the BRE program

Project Status and Timeframe

Development of the “Business Resiliency Program” could be completed in just a few months. Once established, the program should be a central component of AACA’s business outreach in the next BRE survey and each year moving forward.

Needs for Implementation

Staff capacity is currently limited at AACA and, to successfully add a new business readiness effort, AACA should consider increasing capacity by hiring additional staff and/or retaining consulting services to support the development of the “Business Resiliency Program.”

Planning-level Cost Estimate

To complete this project work, AACA will need additional staff capacity. Therefore, the cost associated with this project is related to the increase in staffing needs.

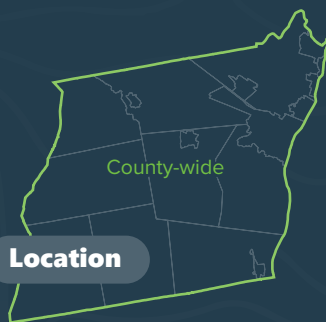
Potential Funding Sources

- ESD
- AACA

Develop a “Sustainable Albany” Campaign

Economic Systems

17



Description

The “Sustainable Albany” initiative should develop a coordinated and comprehensive strategy to market and promote sustainable assets in Albany County, including existing policies and programs, on-going projects, sustainable destinations, and local businesses that are committed to sustainability.

Need

Marketing sustainable programs, policies, incentives, and businesses is an effective strategy for attracting residents, visitors, and businesses to an area. Many cities utilize this “responsible tourism” or “ecotourism” strategy to promote and leverage their environmentally- and socially-conscious assets.

A coordinated marketing effort can promote Albany County’s existing network of sustainable efforts including:

- **Policies, plans, and programs** designed to address climate change, including the Albany County Green Infrastructure Policy, the City of Albany Unified Sustainable Development Ordinance, the Capital District Zero Emission Vehicle Plan, and others.
- **Local green projects** like the installation of electric vehicle charging stations throughout the county, the City of Albany’s LED streetlighting program, and the City of Cohoes’ floating solar facility.
- **Local businesses and organizations** that employ green practices or support green initiatives.
- **Nature preserves and environmental centers** that protect and preserve natural systems, including the Fiver Rivers Environmental Education Center, the Albany Pine Bush Preserve, and others.
- **Local food systems** that support local agriculture and promote access to healthy foods.
- **Outdoor recreation opportunities** that contribute to improved community health and quality of life, like the county’s location at the center of the Empire State Trail.
- **Sustainable transportation alternatives** like the CDTA system, the CDPHP Cycle! bike share network, ridesharing, greenways, and other options.
- **Available incentives** for residents and business owners to adopt sustainable practices, like those from NYSERDA and ENERGY STAR. The County may also consider developing its own incentive program for businesses to earn a “green” certification.



Resilience Strategies

This project advances the following resilience strategies:

- Support and empower local communities and institutions.
- Increase the public’s understanding of and capacity to respond to climate change.
- Promote and support a diverse local economy.
- Promote regional sharing of information and resources.



Case Studies

New York State Ecotourism. The “I Love New York State” program jointly markets culturally and environmentally significant locations, local food systems, and green recreation opportunities and amenities.

See more here: www.iloveny.com/travel-tools/ecotourism/

Sustainable Salt Lake. “Visit Salt Lake” markets green transportation, local food systems, and businesses that have made a commitment to sustainability as part of its program.

See more here: www.visitsaltlake.com/plan-your-visit/about-salt-lake/sustainable-salt-lake/

Sustainable Tourism in Sonoma County. Sonoma County, California uses sustainability as a marketing tool and highlights its green business program, energy independence office, and water conservation agency.

See more here: www.sonomacounty.com/partners/sustainability

Recommended Actions

- 01 Create a “Sustainable Albany” website** to market sustainable initiatives, attractions, and demonstration projects throughout the county’s municipalities. Take cues from the “Discover Albany” website. If a standalone website is not possible, expand the “Team Green” page on the Albany County website with additional information.
- 02 Create a Sustainable Albany video** to promote the county’s sustainable assets. Design the video so that it can be used in multiple contexts (e.g., as a short clip on social media, full-length on the website, as part of bus tours, etc.).
- 03 Develop a “Green Business” certification program** to identify and recognize businesses that meet certain standards for operating in environmentally-responsible ways (e.g., performing an energy audit, benchmarking, etc.). Provide certified businesses with a window sticker, plaque, or other identifier to communicate to customers that this business is a Sustainable Albany-certified “Green Business.” Highlight green businesses in a special section on the Sustainable Albany website. Look to Green America’s “Green Business Network Certification” as a model.
- 04 Find a physical location to house a Sustainable Albany Visitor Center.** A Sustainable Albany Visitor Center could function, on one level, as an educational center with interactive exhibits and displays and, on another level, as a marketing tool for and physical gateway into a larger network of satellite sites at partnering museums, institutions, certified green businesses, preserves, and other sustainable locations. This visitor center could be standalone or incorporated into the Discover Albany Visitor Center.



Case Study: Green America

Green America’s “Green Business Network Certification” certifies products and services from businesses that are committed to social and environmental responsibility. Today, there are more than 8,000 businesses in the Green America network.

To become certified, businesses must:

- Actively use their business as a tool for positive social change.
- Operate a “values-driven” enterprise according to the principles of social and environmental justice.
- Be environmentally responsible in the way they source, manufacture, and market their products and run their operations and facilities.
- Commit to socially equitable practices that benefit workers, customers, communities, and the environment.
- Be accountable for their work by continually tracking process and operating with transparency.

Find out more at: www.greenamerica.org/green-america-green-business-certification

Potential Benefits

- **Positioning Albany County as a forward-thinking, environmentally-responsible, and sustainable destination** for residents, visitors, and business expansion through the promotion of local sustainable efforts.
- **Increased public awareness of and interest in sustainability efforts** due to increased exposure through the “Sustainable Albany” campaign.
- **Expanded adoption of sustainable practices by businesses and institutions** as a result of “Green Business” incentives.
- **Expanded use of available incentives and programs** by residents and business owners as a result of increased promotion.
- **Improved access to the county’s sustainable resource offerings** by centralizing these resources all in one place.

Implementation

Possible Lead Agency

- Albany County
- Discover Albany

Potential Partners

- Local municipalities
- City of Albany Sustainability Committee
- SUNY Albany
- Albany Pine Bush
- Five Rivers Environmental Center
- MHLIC
- CDTA Nature Bus
- Local organizations and businesses

Project Status and Timeframe

Developing a website, promotional video, and social media presence for “Sustainable Albany” are immediate actions items necessary to jump-start the initiative. The “Green Business” certification program can be developed later but is an important piece of generating interest in and potentially providing a funding stream for the initiative. Establishing a physical location is a longer-term recommendation that requires increased partnerships and funding.

Planning-level Cost Estimate

\$225,000 for build-out of Sustainable Albany Visitor Center in existing building

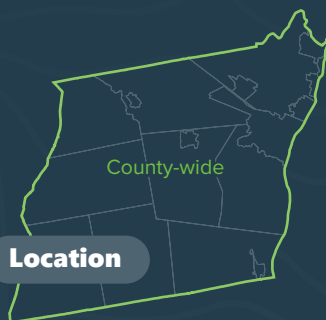
Potential Funding Sources

Market NY

Create a Network of Demonstration Projects

Infrastructure Systems

13



Description

Applications of sustainable practices, like rain gardens and green roofs, can be linked together and promoted as a network of “demonstration projects” that can be used to educate the public about sustainable practices, to pilot innovative strategies for resilience, and to recognize institutions for their sustainable efforts.

Need

Demonstration projects are valuable opportunities to introduce the public to and encourage adoption of sustainable practices through hands-on learning, to test ideas in low-stakes, small-scale settings, and to build and strengthen partnerships.

Recommended Actions

- 01 Identify existing demonstration projects** to include in the network. These projects could include the green roof demonstration at the Five Rivers Environmental Education Center, Cohoes' floating solar facility, green infrastructure installations at SUNY Albany, and others.
- 02 Identify future opportunities for demonstration projects.** Work with interested partners and institutions to identify and recommend future demonstration projects.
- 03 Use these sites to collect data.** Demonstration projects can be valuable learning resources for evaluating performance, modifying designs to improve functionality, and informing future applications. These sites may also be good candidates for the installation of rain gauges (**Project 6**) or other instrumentation to collect climate data.
- 04 Create an interactive map of demonstration projects** and include this map on the "Sustainable Albany" (**Project 17**) or a similar website to support ecotourism and direct visitors to sites.
- 05 Develop consistent branding** or signage to identify demonstration projects as part of the "Sustainable Albany" network. Consider incorporating QR codes into signage to link visitors to the Sustainable Albany website and to the larger demonstration project network.



Resilience Strategies

This project advances the following resilience strategies:

- Increase the public's understanding of and capacity to respond to climate change.
- Support and empower local communities and institutions.
- Support data-driven decision-making.
- Promote regional sharing of information and resources.



Sustainable Projects

Floating Solar in Cohoes. The City of Cohoes is planning a municipally-owned and operated solar facility that will float atop its reservoir.

Find out more here:
www.ci.cohoes.ny.us/523/Building-Floating-Solar-in-Cohoes

Green Infrastructure at the University at Albany. UAlbany uses a series of green infrastructure methods such as porous surfaces, rain gardens, and green roofs to sustainably manage stormwater on campus.

Find out more here:
www.albany.edu/facilities/stormwater/greeninfrastructure.html

Five Rivers Environmental Education Center is a living museum and designated National Environmental Study Area. The center includes trails, forest land, and a visitor center with interactive displays and exhibits. The local Friends of Five Rivers also offer many educational programs, events, and activities at the center.

Find out more here:
www.dec.ny.gov/education/1835.html

Recommended Actions

CONTINUED



Case Study

Five Rivers Environmental Education Center includes numerous exhibits and demonstrations that educate visitors about strategies for sustainability and resilience, including green roofs, pollinator gardens, native plants, and more.

⤴ **Green Roof Demonstration Project**
Five Rivers Environmental Education Center

Potential Benefits

- **Increased public awareness and acceptance** of sustainable practices.
- **Proof-of-concept of innovative sustainable techniques** that can demonstrate viability to municipal public works departments and encourage broader, county-wide adoption.
- **Promoting ecotourism** and encouraging nature-based activities that increase visitor appreciation and understanding of natural resources and sustainable practices.



Case Study

In 2016, the City of Albany Department of Water completed a demonstration project along **Quail Street** to slow and reduce water intake into sewers and minimize the potential for sewage overflow. During rain events, the first three inches of rainfall collects in separated storm sewers and in a swath of porous pavement between the sidewalk and the curb. This runoff is directed to bio-retention basins and is then returned to the combined sewer system once the flow in the sewer subsides.

This demonstration project has led to several similar projects being implemented in other locations in the city.

Implementation

Possible Lead Agency

- Albany County
- Discover Albany

Potential Partners

- SUNY Albany
- Albany Pine Bush
- Five Rivers Environmental Education Center
- MHLC
- City of Albany Sustainability Committee
- Local municipalities
- Local not-for-profits focused on climate resilience and climate justice

Project Status and Timeframe

Existing demonstration projects should be identified in the near-term, mapped, and promoted both online and through physical signage. Additional partners and demonstration projects can be added to the network over time.

Planning-level Cost Estimate*

- Development of an interactive map to highlight demonstration projects: \$25,000 to \$50,000
- Ongoing maintenance of the interactive map: \$5,000 to \$10,000 per year

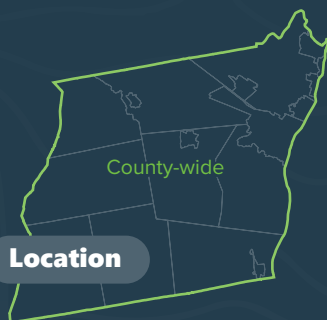
**Note that cost of demonstration projects will vary based on the project type.*

Potential Funding Sources

- Market NY
- NYS EFC Green Innovation Grant Program (GIGP)
- NYS DEC Climate Smart Communities (CSC)
- NYS Environmental Bond Act

Advance the Resiliency Recommendations in the County Agricultural and Farmland Protection Plan

Economic Systems



Description

Climate-related recommendations made in the 2018 Albany County Agricultural and Farmland Protection Plan should be advanced to protect the viability of farming in the county in the face of the increasing pressures of development and climate change.

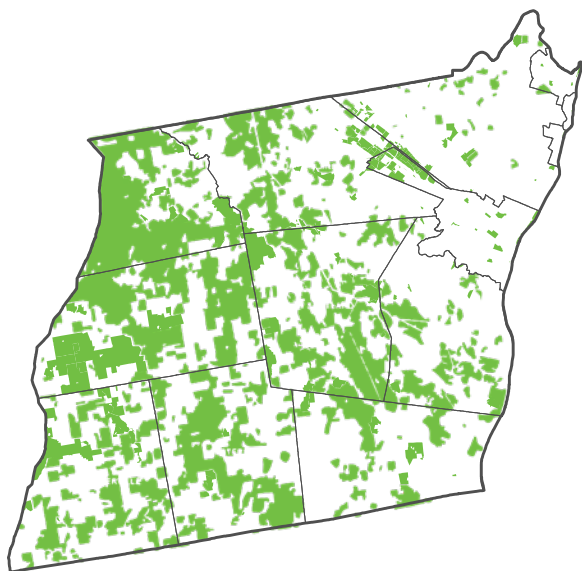
Need

The Albany County Agricultural and Farmland Protection Plan outlines numerous climate-related challenges facing agricultural operations in the county including:

- Increased flooding
- Increased development pressure on well-draining upland soils
- Increased pressure from solar farms to build on agricultural lands
- Increased runoff from an increase in developed areas
- Increased pressure from pests and disease
- Higher weather-related stress on crops at critical times
- Animal stress and minimized production from heat stress
- Higher energy needs to provide animal cooling
- Insurance needs to insulate against crop loss
- Need to change production to adapt to changing climate

Recommended Actions¹

- 01 Enhance protection of Prime and Productive soils.** Encourage and/or incentivize towns to adopt policies to reduce loss of large blocks of Prime and Productive soils as well as soils of statewide importance.



● Priority farmland for protection



Resilience Strategies

This project advances the following resilience strategies:

- Preserve agricultural lands and strengthen the local food system.
- Guide growth and development away from high risk areas.
- Preserve, expand, and restore natural areas.
- Promote and support a diverse local economy.
- Develop a skilled workforce to support a sustainable, resilient economy and high quality of life.
- Build climate resilience over time and across scales and systems.
- Promote regional sharing of information and resources.



Climate Impacts

Housing and development are putting pressure on the conversion of Prime and Productive Soils to non-productive uses. Protection of these soils, especially in large, consolidated blocks, is important to the continued viability of farming in the county. **Albany County's highest concentration of well-drained, Prime and Productive soils occur in towns like Bethlehem, New Scotland, and Guilderland, which all face increasing development pressure.**

¹ The recommended actions in this profile are based on recommendations made in the 2018 Albany County Agricultural and Farmland Protection Program.

For more detail and to read the full plan, visit: www.albanycounty.com/departments/economic-development-conservation-and-planning/agricultural-and-farmland-protection-plan

Recommended Actions

CONTINUED

- 02 Improve participation in existing farmland conservation programs.** Support municipalities in creating or updating local farm protection plans. Support conservation cost-share programs. Promote term easements and tax relief programs.
- 03 Create a Critical Farm Program.** Collaborate with conservation programs to create a Critical Farm Revolving Loan Fund that can be used to assist farmers in purchasing critical farmland that would otherwise be sold for non-agricultural uses. Encourage intergenerational transfer and beginning-farmer retention.
- 04 Create a county-wide lease of development rights program. Provide land transition options for retiring farmers.** Encourage young and beginning farmers to get involved. Offer landowners financial benefits for achieving temporary conservation goals while other programs are developed.
- 05 Support the development of a regional information exchange and disaster preparedness program.** Promote and market programs that support best management practices and provide incentives for participants. Facilitate and collaborate on a county-wide disaster response plan for farms, including measures for immediate livestock protection, transportation, and recovery.
- 06 Recognize and support infrastructure and businesses that are critical to supporting local agriculture.** Promote and support venues and businesses that offer locally-produced agriculture products, like farmers markets and farm stands. Assist in connecting local farms with local retail opportunities. Recognize venues that support local agriculture as “essential businesses.”
- 07 Expand agriculture-related workforce and development opportunities.** Support educational programming that emphasizes the value of local agriculture and skill development. Support workforce development for agriculture-related activities.



Local Inspiration

Bethlehem, NY residents voted in November 2022 to spend \$3M to purchase 307 acres for farmland protection, one of the largest municipal farmland protections thus far in the Hudson Valley.

Find out more here: www.timesunion.com/news/article/Voters-X-purchase-of-Bethlehem-farmland-17568579.php



Case Studies

Farms and Forests Conservation Program. The Town of Bethlehem, NY has a dedicated Farms and Forests Conservation Fund that can be used to help farmers and open space landowners keep their land in farmland, forest, and open space forever.

Find out more here: www.townofbethlehem.org/783/Farms-and-Forests-Conservation-Program

Prime Farmland Overlay District. The Town of Kinderhook, NY created an overlay district “to promote agricultural uses, protect prime production soils, and to prevent non-agricultural uses from negatively impacting continuation of farming as the primary use.”

Find out more here: ecode360.com/15489497

Farmers Markets and Farm Stands. Farmers markets and farm stands play an important role in connecting farms to communities and increasing understanding and support for agriculture-related issues.

The NYS Department of Agriculture and Markets provides a partial, voluntary list of markets and stands in Albany County here: agriculture.ny.gov/farmers-markets-county?county=Albany

Potential Benefits

- **Preserve agricultural lands** by increasing participation in farmland conservation programs and application of conservation tools.
- **Minimize loss of pervious and vegetated surfaces** that help with stormwater management and strengthen the county's ability to recover from hot daytime hours.
- **Improve water quality and reduce soil erosion** by incentivizing best management practices.
- **Increase ability of farms to adapt to and recover from climate-related challenges** by creating a resilient farm revolving loan fund and technical assistance to facilitate adaptation to climate change impacts.
- **Increase agricultural resiliency** through encouraging diverse crop offerings, seed banking and sharing, and promotion of natural systems that support community agriculture.
- **Strengthen local food systems** through financial incentives, technical support, workforce training and development, and connecting local retail to the local food system.
- **Increase access to local food systems** and disaster preparedness by connecting local producers to local retail opportunities so that there is a strong local market that can continue to be supported in times when outside supplies may be limited or threatened.
- **Expand workforce development** and opportunities related to agriculture by enhancing programs that are focused on connecting youth to agriculture and on providing workforce development opportunities.

Implementation

Possible Lead Agency

- Albany County
- MHLC
- SWCD
- CDRPC

Potential Partners

- CCE
- Hudson Valley Agribusiness Development (HVADC)
- DIRT Capital
- NYS Department of Agriculture and Markets (DAM)
- Hudson-Mohawk Resource Conservation and Development (RC&D)
- NYS DEP
- NRCS
- FEMA
- NYSEDA
- Albany County Land Bank
- The Equity Trust
- American Farmland Trust (ATF)
- The Land Trust Alliance (LTA)
- Scenic Hudson

Project Status and Timeframe

In the near term, a task force should be created to advance these recommendations. Implementation will likely take several years.

Planning-level Cost Estimate

Varies depending on the recommended action. See the Albany County Agricultural and Farmland Protection Plan for more information.

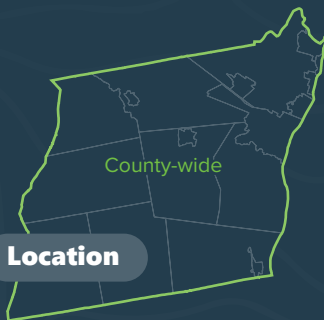
Potential Funding Sources

- NYS Farmers Market Resiliency Grant Program
- SWCD Agricultural Environmental Management
- USDA Farm Loans
- Industry associations and foundations

Create an “Agriculture Resiliency Program”

Economic Systems

20



Location

Description

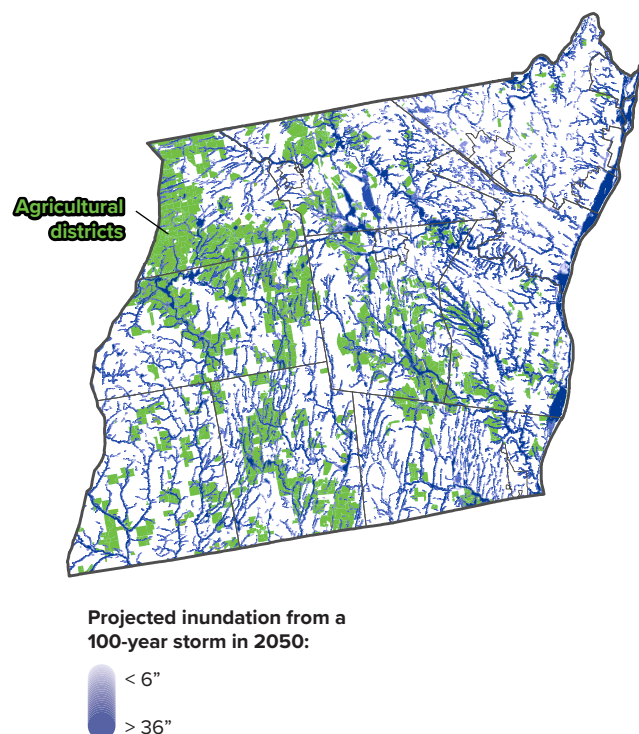
An Agriculture Resiliency Program can provide assistance to farmers in proactively preparing for and recovering from climate events, and in adopting practices that will help make their farms and operations more resilient to climate stressors like flooding, drought, heat stress, and invasive species.

Need

Agriculture producers, some of whom already struggle to stay viable and face growing pressures of development and sprawl, will face increasingly challenging obstacles as a result of climate change. Threats include: increased flooding, drought, invasive species, disease, pest problems, absent pollinators, sporadic weather that wipes out seasonal crops, and more. In addition, as development pressure continues to increase and the demand for solar power continues to grow, many farms will be highly sought after as places for expanded development and solar fields. As the world's food system faces increasing threats, it will be more important than ever to have a reliable local food system. In addition, many farms are located in areas vulnerable to flooding.

Recommended Actions

- 01 Target resources to agricultural lands at the greatest risk of climate change.** Encourage and incentivize farmers to take proactive measures to prepare farms for climate change and to adopt sustainable farming practices.



Resilience Strategies

This project advances the following resilience strategies:

- Preserve agricultural lands and strengthen the local food system.
- Effectively and equitably respond to and recover from natural disturbances.
- Increase the capacity of local businesses to prepare for, respond to, and recover from natural disturbances.
- Build climate resilience over time and across scales and systems.
- Promote and support a diverse local economy.
- Preserve, expand, and restore natural areas.



Tips for Success

Cornell Cooperative Extension Guide for Farming Success in an Uncertain Climate. The Cornell University College of Agriculture and Life Sciences developed a guide outlining potential solutions for agricultural challenges related to flooding, drought, heat stress, and invasive species.

A few recommendations include:

- Increasing soil organic matter for better draining
- Shifting to drought-tolerant crop varieties
- Shifting plant dates to avoid heat stress

Read the full guide here:
https://ecommons.cornell.edu/bitstream/handle/1813/54950/CornellClimateChange_Farming-Success-in-an-Uncertain-Climat_FINAL-218vftg.pdf

Recommended Actions

CONTINUED

- 02 Create educational resources and provide technical assistance to farmers in implementing sustainable agricultural practices.** Educate farmers on best practices for agricultural resilience like diversifying crop rotations, integrating livestock with crop production systems, minimizing off-farm flows of nutrients and pesticides, curbing fertilized and herbicide use, supporting pollinators, and implementing more efficient irrigation practices.
- 03 Use monetary incentives to promote proactive measures that prepare farms for climate change.** Provide small grants to implement sustainable practices like agricultural cisterns.
- 04 Provide agricultural disaster recovery assistance.** Assist farmers and agriculture-related businesses in applying for State and federal funds for disaster recovery. Create an agricultural disaster recovery bridge loan program to provide immediate funding to farmers who cannot wait for State or federal funds to be available.
- 05 Create an Albany County Food Policy Council** to oversee the development of a locally-based sustainable food system that ensures quality, affordable, healthy food for all local residents while providing living wages to farmers and other workers in the food system. Access to food is a significant threat presented by climate change. Rising heat and increasing precipitation will have an impact on local plants and soils, which are not evolved to accommodate these conditions.
- 06 Support the expansion of community gardens** as a way to build out a sustainable local food system.



Case Study



Climate Resilient Farming Grant.

Working with the Albany County Soil and Water Conservation District, the Patroon Land Farm was awarded a Climate Resilient Farming Grant to install a 1.3-million gallon irrigation reservoir. Overly wet fields drain into the reservoir and create a store of water that can be used during periods of drought.



Climate Impacts

Rainwater harvesting. Agricultural and freshwater resiliency can be increased by capturing excess water during increased periods of wetness and saving it for use during periods of drought. Much of Albany County's agricultural lands are located in and around natural water bodies and floodplains, making them excellent candidates for irrigation reservoirs and agricultural cisterns.

Potential Benefits

- **Increase ability of farms to adapt to and recover from climate-related challenges** by providing technical and financial assistance to facilitate adaptation to climate change impacts.
- **Increase agricultural resiliency** through encouraging diverse crop offerings, seed banking and sharing, and promotion of natural systems that support community agriculture.
- **Minimize loss of pervious and vegetated surfaces** that help with stormwater management and strengthen the county's ability to recover from hot daytime hours.
- **Improve water quality and reduce soil erosion** by incentivizing best management practices.



Tips for Success

Albany County Soil and Water Conservation District Climate Resiliency Assistance. The Albany County Soil and Water Conservation District provides programs and services to conserve, enhance and protect soil and water resources, including funding for voluntary agricultural environmental management and climate-resilient farming. Grants provided can cost-share up to 75% of the costs for planning and implementation.

Projects focus on Best Management Practices (BMPs) for protecting soil and water, many of which could help farmers and farms be more resilient.

Albany County could further support this effort through promotion of the program and providing additional matching funds.

Implementation

Possible Lead Agency

- Albany County
- CCE

Potential Partners

- SWCD
- Local municipalities

Project Status and Timeframe

In the near-term, farms and agricultural lands at the greatest risk to the impacts of climate change should be identified and farmers should be proactively educated about potential resiliency actions. Educational resources, technical assistance programs, and financial assistance programs should be developed in parallel to support this immediate action.

Planning-level Cost Estimate

Costs would be related to directing additional County funding to existing agricultural programs and increasing the County's contribution to SWCD.

Potential Funding Sources

- FEMA Hazard Mitigation Grant Program (HMGP)
- SWCD Agricultural Environmental Management
- Albany County budget
- Foundations

Implementation

The following section outlines an Action Plan for implementing the projects recommended in the Albany County Climate Resiliency Plan.

With the planning process complete, the next step to advance this Plan is to implement the projects recommended in **Chapter 4**. The Action Plan that follows provides a framework for doing this. It summarizes the project profiles, highlighting in a concise table the elements necessary for implementation including: (1) key actions, (2) project lead, (3) key partners, (4) planning-level cost estimate, (5) potential funding sources, and (6) performance metrics.

Several actions are designated as “high priority actions.” Many of these high priority actions are catalytic actions that, once complete, will allow other actions to move forward or may unlock additional funding sources. For example, updating the County’s Open Space Plan is a high priority action and necessary prerequisite to participating in and accessing funding from the State’s upcoming open space planning process.

Performance metrics are also defined for each project. They provide a measure against which to track project progress and evaluate the success of implementation. To track the progress of the County’s Open Space Plan, for example, acres of existing open space preserved could be measured or acres of new open space created. It is recommended that the Technical Advisory Committee (TAC) reconvene annually to discuss what’s been done, track progress, and redirect efforts if necessary.

A descriptive table of potential funding sources is also included following the Action Plan.



Finding Funding

There are many federal, State, and local programs that can be used to supplement funding for the recommended projects. Most funding sources are competitive and require project lead agencies to submit applications in order to be considered for funding. The project profiles in this chapter were designed so that they could be easily incorporated into grant applications. They include all the necessary information to justify and act as supporting documentation in grant applications, like the New York State Consolidated Funding Application (CFA).

In addition, by developing this Albany County Climate Resiliency Plan, the County is likely to have a competitive advantage in the application process as this Plan demonstrates the County’s on-going effort and commitment to resilience planning.

Patroon Creek Greenway »
Albany Pine Bush, City of Albany
(proposed)



Action Plan

Project	Key Actions	Lead
01 page 136 Increase County capacity to support resiliency efforts.	01 Create a Director of Sustainability position. <i>! HIGH PRIORITY ACTION</i> 02 Review existing County processes and policies to incorporate resilience. 03 Support municipalities in obtaining funding for climate-resiliency projects and programs. 04 Establish a Capital Region Sustainability Council. <i>! HIGH PRIORITY ACTION</i>	Albany County
02 page 142 Create a Climate Justice Corps Network.	01 Become a host community for a NYSERDA Climate Justice Fellow. <i>! HIGH PRIORITY ACTION</i> 02 Develop a workforce training program to build a Climate Justice Corps that can assist in implementing climate resiliency actions. 03 Develop a “kit of parts” to support local communities in creating their own climate justice corps.	- Albany County - SUNY Albany
03 page 148 Purchase First Street Foundation’s Flood Factor Data.	01 Purchase an annual subscription to First Street Foundation’s Flood Factor dataset for Albany County. <i>! HIGH PRIORITY ACTION</i> 02 Make data publicly available online and to local municipalities.	Albany County
04 page 152 Support municipal participation in FEMA’s CRS Program.	01 Provide data, mapping services, and technical support to assist local municipalities in applying for and earning points toward their CRS certification. 02 Create an informational website. 03 Host annual trainings and working groups for municipalities to share best practices and lessons learned.	Albany County

Key Partners	PLANNING-LEVEL Cost Estimate	POTENTIAL Funding Sources	Performance Metrics
- County departments - Local municipalities - CDRPC - CDTC - SWCD - CCE	\$500,000 per year for Director of Sustainability position and supporting staff/resources	- Albany County budget - NYS CSC - NYS DOS Shared Services Initiative	- Number of County policies revised to incorporate resilience. - Number of municipalities adopting new climate policies and/or programs.
- NYSERDA - Albany County Youth Employment Program - Local municipalities	\$40,000 to hire a NYSERDA Climate Justice Fellow <i>*Note that this cost is 100% reimbursable through the program.</i>	- NYSERDA Climate Justice Fellowship - NYSERDA Clean Energy Internship Program - EPA Brownfield Jobs Training Grants	- Creation of County-led Climate Justice Corps. - Number of projects implemented with assistance from the Corps. - Number of local Corps created.
Local municipalities	\$2,500 for annual subscription <i>*Additional cost in staff time to process the data, develop training materials, and host trainings.</i>	Albany County budget	- Purchase of subscription. - Number of years subscription is renewed. - Inclusion of Flood Factor dataset in County's online mapping services.
- Floodplain coordinators in Albany County municipalities - Stormwater Coalition - NYS DEC	Staff time	- NYS CSC - FEMA PDM - FEMA FMA - FEMA HMGP	- Number of municipalities participating in CRS. - Number of CRS points earned by participating municipalities. - Number of municipalities participating in working groups, whether involved in CRS or not.

Action Plan

Project	Key Actions		Lead	
Housing Projects	05 page 156	Create a “Resilient Homes Program.”	- Albany County - SWCD	
				01 Identify “Resilient Focus Areas.”  HIGH PRIORITY ACTION
				02 Invest in “Resilient Focus Areas” with grants, loans, and/or rebates to support home- and property-owners in using resilient retrofitting techniques or installing green infrastructure.
		03 Create an educational guide for retrofitting existing homes for climate resiliency.		
Infrastructure Systems Projects	06 page 164	Build out the County’s network of rain and stream gauges.	- Albany County - UAlbany DAES - USGS	
				01 Identify new locations for and install additional rain and stream gauges.
				02 Share collected data with municipalities and the public.
	07 page 168	Conduct a county-wide culvert analysis.	- Albany County - CDTC	
				01 Inventory all culverts.  HIGH PRIORITY ACTION
				02 Develop county-wide precipitation and hydrological models.
		03 Identify and prioritize culverts for right-sizing based on models.		
	08 page 172	Conduct a county-wide transportation vulnerability assessment.	- Albany County - CDTC	
				01 Assess vulnerability of and identify high-priority roadway segments for improvement.
				02 Implement projects to improve resilience.
		 Site Specific Project: Fox Creek Road Evaluate capacity of culverts and bridges along Fox Creek Road to accommodate projected future flows.		
		 Site Specific Project: Broadway Incorporate green infrastructure along the Broadway corridor. Evaluate feasibility of incorporating bike and/or BRT infrastructure along Broadway.		
		 HIGH PRIORITY ACTION – ALREADY IN PROGRESS		

Key Partners	PLANNING-LEVEL Cost Estimate	POTENTIAL Funding Sources	Performance Metrics
- Climate Justice Corps (Project 2) - Local municipalities - Stormwater Coalition - CCE - Albany County Land Bank Corporation - Habitat for Humanity	\$100,000 to create a “Resilient Homes Guidebook” and host trainings for homeowners and local community-based groups	- SWCD Tree and Shrub Program - SWCD Stormwater Management and Urban Drainage Program - FEMA FMA - NYS EFC GIGP - NYS HCR Resilient Retrofit Program	- Amount invested in “Resilient Focus Areas” through grants, loans, and rebates. - Number of homes retrofitted.
- Stormwater Coalition - Local municipalities	Rain gauge unit cost: \$7,500 Stream gauge unit cost: \$30,000	- FEMA PDM - FEMA FMA	- Number of rain gauges installed. - Number of stream gauges installed.
- NYS DOT - NYS Thruway Authority - CCE - Stormwater Coalition - Local municipalities	\$1,000,000	- NYS CSC - FEMA PDM - FEMA FMA - FEMA HMGP	- Number of culverts identified for repair or replacement. - Number of culverts right-sized. - Number of culverts retrofitted for aquatic habitat connectivity.
- CDTA - NYS DOT - Local municipalities	\$150K to \$200K for vulnerability assessment <i>*Cost per resilience project will vary.</i>	- UPWP - FHWA - Federal Transit Administration - NYS CSC	- Number of roadway resiliency projects implemented. Fox Creek Road: Replacement of twin barrel culvert over Fox Creek Road. Broadway: Linear feet of green infrastructure incorporated along the corridor. Broadway: Miles of bike and/or BRT lanes installed along corridor.

Action Plan

Project	Key Actions	Lead
09 page 180 Increase resilience at municipal facilities.	01 Assess municipal buildings and sites for resilient retrofit opportunities or site improvements.	• Albany County • Local municipalities
	 Site Specific Project: MVP Parking Garage Install green roof on parking garage.	
	 Site Specific Project: DOH Parking Lot Install permeable paving, vegetated bio-retention islands, and other green infrastructure to reduce pavement areas.	
10 page 198 Plan for sea level rise at the County's North and South WWTPs.	 Site Specific Project: Watervliet Fire Dept. Partner with the Watervliet Fire Department to find and secure funding for construction of a new fire department in a climate-resilient location.  HIGH PRIORITY ACTION	Albany County Water Purification District
	01 Continue to implement the WWOPs.	
	02 Evaluate installation of a low lift effluent pump station at the South WWTP.  HIGH PRIORITY ACTION	
	03 Evaluate installation of a low lift effluent pump station at the North WWTP.	
	04 Evaluate need for flood wall and/or stormwater pump stations at both the North and South WWTPs.	

Key Partners	PLANNING-LEVEL Cost Estimate	POTENTIAL Funding Sources	Performance Metrics
County departments	MVP Parking Garage: \$112K to \$325K DOH Parking Lot: \$2.2M to \$4M Watervliet Fire Dept.: \$13.5M to \$14M <i>*Cost varies based on resilience project.</i>	- NYS CSC - NYS EFC GIGP - NYS Environmental Bond Act - NYS HCR Resilient Retrofits Program - FEMA HMGP	- Number of municipal buildings retrofitted for climate resilience. - Number of municipal sites outfitted for climate resilience. MVP Parking Garage: Reduction in stormwater runoff from roof through garage levels. DOH Parking Lot: Reduction in pavement area and urban heat island effect. Number of trees planted. Watervliet Fire Dept: Reduction in operational delays. Increased capacity of fire department and emergency response services.
- NYS DEC - FEMA - Albany Pool LTCP Partners - Mohawk River Watershed Coalition - Hudson River-Black River Regulating District	North WWTP low lift effluent pump station: \$9M to \$11M South WWTP low lift effluent pump station: \$7M to \$9M North WWTP flood wall and stormwater pump station: \$5M to \$7M South WWTP flood wall and stormwater pump station: \$5M to \$7M	- NYS CSC - FEMA HMGP - NYS EFC - NYS Environmental Bond Act	Reduction in number of storm and high-water events that impact operations at the WWTPs.

Action Plan

Project	Key Actions	Lead
Health and Social Services Projects 11 page 206 Increase resilience to extreme temperature events.	01 Develop an Extreme Heat and Cold Emergency Response Plan. <i>! HIGH PRIORITY ACTION</i>	Albany County Dept. of Social Services, Dept. of Health, and Emergency Management Office
	02 Expand the network of cooling and warming facilities. 03 Provide financial assistance to home- and property-owners to install energy efficient appliances. 04 Invest in public spaces to expand the urban forest.	
12 page 212 Prepare for long-term and large-scale displacements.	01 Develop a Flood Emergency Response and Recovery Plan. <i>! HIGH PRIORITY ACTION</i>	Albany County Dept. of Social Services and Emergency Management Office
	02 Designate county-wide evacuation routes. 03 Enhance emergency communications. 04 Identify sites for temporary housing.	
Natural & Cultural Systems Projects 13 page 216 Expand the county-wide trail network.	01 Conduct feasibility studies for the unexplored segments of the Albany County Core Trails. 02 Implement the Albany Loop Trail. <i>! HIGH PRIORITY ACTION</i>	- Albany County - CDTC
	03 Implement the Patroon Creek Greenway. <i>! HIGH PRIORITY ACTION</i> 04 Expand connections to the Helderberg-Hudson Rail Trail. 05 Create a County-wide Trails Committee. 06 Create a trail and bike lane maintenance program.	

Key Partners	PLANNING-LEVEL Cost Estimate	POTENTIAL Funding Sources	Performance Metrics
• County departments • Red Cross • UAlbany • Community organizations • Local municipalities • CDTA	\$75,000 for preparation of Extreme Heat and Cold Emergency Response Plan	• Albany County budget • NYS CSC • FEMA HMGP	• Creation of Emergency Response Plan. • Number of additional cooling/warming facilities. • Monies awarded to home- and property-owners for energy efficiency upgrades.
• County departments • Red Cross • UAlbany • FEMA • Community organizations • Local municipalities • CDTA • Advance Albany Alliance	\$125,000 for preparation of Flood Emergency Response and Recovery Plan <i>*If prepared in tandem with the Extreme Heat and Cold Emergency Response Plan, cost could be reduced.</i>	• Albany County budget • NYS CSC • FEMA HMGP	• Creation of Emergency Response and Recovery Plan. • Designation of county-wide evacuation routes.
• CDRPC • MHLC • Trail advocacy organizations • Local municipalities	<i>*Cost varies depending on trail design and type. Some simple trails with limited amenities may cost \$1.5 million per mile, while more complex urban trails (like the Patroon Creek Greenway) can cost anywhere from \$3 million to \$9 million per mile.</i>	• UPWP • TAP/CMAQ • CHIPS • RTP • STBG • RAISE • EPF • GIGP • Market New York • NYS CSC • NYS OPRHP Grants • IIJA / Bipartisan Infrastructure Law	• Miles of trails created. • Number of additional trail connections created.

Action Plan

Project	Key Actions	Lead
Natural & Cultural Systems Projects	14 Create a “Green Streets Initiative.” page 224 01 Partner with municipalities to implement green infrastructure along public rights-of-way and on public property through the “Green Streets Initiative.” ! HIGH PRIORITY ACTION 02 Focus investment in “Resilient Focus Areas.”	- Albany County - SWCD - CDTC
	15 Develop a County-wide Open Space Plan. page 230 01 Update the County’s Open Space Plan. ! HIGH PRIORITY ACTION – NECESSARY STEP TO PARTICIPATE IN STATE’S UPCOMING OPEN SPACE PLANNING PROJECT 02 Identify priority areas to preserve existing open space and to create new open space.	- Albany County - MHLC
Economic Systems Projects	16 Create a “Business Resiliency Program.” page 236 01 Expand AACAA’s existing Business Retention and Expansion Program (BRE) to include considerations for resilience and disaster planning. ! HIGH PRIORITY ACTION 02 Create a central hub to help businesses evaluate disaster risk, support disaster preparedness, and connect to resources.	Advance Albany County Alliance (AACAA)
	17 Develop a “Sustainable Albany” campaign. page 240 01 Create a “Sustainable Albany” website and marketing materials to promote sustainable initiatives, projections, and businesses in Albany County. 02 Develop a “Green Business” certification program. 03 Find a physical location for the Sustainable Albany Visitor Center.	- Albany County - Discover Albany

Key Partners	PLANNING-LEVEL Cost Estimate	POTENTIAL Funding Sources	Performance Metrics
- Local municipalities - CCE	<i>*Cost varies depending on type of green infrastructure installed.</i>	- NYS EFC GIGP - NYS CSC - NYS Environmental Bond Act - IIJA Healthy Streets Program	Linear feet of green infrastructure installed.
- Land conservancies - Preserves - Advocacy groups - Local municipalities - SWCD - Stormwater Coalition - NYSERDA - CCE - CDTC - CDTA - SUNY Albany - Discover Albany	\$125K to \$150K to prepare the Open Space Plan	- NYS Environmental Bond Act - NYS DOS Smart Growth Grant Program - NYS EPF	- Creation of Open Space Plan. - Acres of existing open space preserved. - Acres of new open space created. - Number of County and/or local policies/regulations created to support open space preservation.
- Albany County - Local businesses - Local economic development officials who participate in the BRE program	Staff time	- ESD - AACA	- Number of businesses participating in the “Business Resiliency Program.” - Reduction in impacts to participating businesses following climate events.
- City of Albany Sustainability Committee - SUNY Albany - Five Rivers Environmental Center - Local organizations and businesses	\$225K for build-out of Sustainable Albany Visitor Center in existing building Staff time for creation and operation of website and “Green Business” program	Market New York	- Increased traffic driven to sustainable destinations/ businesses advertised on the “Sustainable Albany” website. - Number of businesses enrolled in the “Green Business” program.

Action Plan

Project	Key Actions	Lead
18 page 244 Create a network of demonstration projects.	01 Identify future opportunities and sites for demonstration projects. <i>! HIGH PRIORITY ACTION</i> 02 Create an interactive map of existing demonstration projects and integrate it into the “Sustainable Albany” website. 03 Create consistent branding for demonstration project sites. 04 Use demonstration project sites to collect climate data.	- Albany County - Discover Albany
19 page 248 Advance the resiliency recommendations in the County Agricultural and Farmland Protection Plan.	01 Enhance protection of Prime and Productive soils. 02 Improve participation in existing farmland conservation programs. 03 Create a Critical Farm Program. 04 Create a county-wide lease of development rights program.	- Albany County - MHLC - SWCD - CDRPC
20 page 252 Create an “Agriculture Resiliency Program.”	01 Create educational resources and provide technical assistance to farmers to implement sustainable agricultural practices. 02 Provide small grants for farms to take proactive measures to prepare for climate change, including installing agricultural cisterns and producing crops to support the local food industry. <i>! HIGH PRIORITY ACTION</i> 03 Provide agricultural disaster recovery assistance following climate events. 04 Create an Albany County Food Policy Council. 05 Support the expansion of community gardens.	- Albany County - CCE

Key Partners	PLANNING-LEVEL Cost Estimate	POTENTIAL Funding Sources	Performance Metrics
• SUNY Albany • Albany Pine Bush • Five Rivers Environmental Education Center • MHLC • City of Albany Sustainability Committee • Local municipalities	\$25K to \$50K for interactive map <i>*Cost of demonstration projects varies by project type.</i>	• Market New York • NYS EFC GIGP • NYS CSC • NYS Environmental Bond Act	• Number of new demonstration projects added to the network.
• Land conservancies • Preserves • Advocacy groups • Local municipalities • SWCD • Stormwater Coalition • NYSERDA • CCE • CDTC • CDTA • SUNY Albany	<i>*Cost varies depending on recommended action. See the Albany County Agricultural and Farmland Protection Plan for more information.</i>	• SWCD Agricultural Environmental Management • NYS Farmers Market Resiliency Grant Program • USDA Farm Loans • Industry associations and foundations	• Acres of priority farmland protected. • Number of municipalities with farmland protection plans and/or policies.
• SWCD • Local municipalities	Increased County funding to existing programs. Increased County contribution to SWCD.	• Albany County budget • FEMA HMGP • SWCD Agricultural Environmental Management	• Number of farms implementing climate-resilient projects. • Reduction in impacts to farms and agricultural assets following climate events. • Amount of agricultural products sold locally.

Potential Funding Sources

Funding Source	Eligible Activities	Award
CSC Climate Smart Communities Grant Program NYS DEC	Implementation of projects related to the reduction of greenhouse gas emissions and climate change adaptation.	Varies, 50% local match required
GIGP Green Innovation Grant Program NYS EFC	Implementation of stormwater infrastructure and cutting-edge green technologies, including street trees, rain gardens, bio-retention, permeable pavements, and green roofs.	Varies, local match between 10% and 60%
EPF Environmental Protection Fund NYS OPRHP	Land acquisition, planning, development of new parks and rehabilitation of existing parks.	Up to \$600K per project. If total project cost exceeds \$4M, up to \$1M may be requested.
RTP Recreational Trails Grant Program NYS OPRHP	Development and maintenance of recreational trails and trail-related facilities for both non-motorized and motorized recreational trail uses.	Up to 80% of total project costs, with maximum award of \$250K
TIP Statewide Transportation Improvement Program NYS DOT in partnership with FHWA and CDTC	Projects identified by NYS DOT and CDTC in the New Visions 2050 metropolitan transportation plan.	Varies, local match required
TAP/CMAQ Transportation Alternatives Program and Congestion Mitigation and Air Quality Improvement NYS DOT in partnership with FHWA	Projects that contribute to increasing the use of non-vehicular transportation alternatives (i.e., sidewalks, shared-use paths and trails, public transit), reduce vehicle emissions, and/or mitigate traffic congestion.	Up to 80% of total project costs

Funding Source	Eligible Activities	Award
CHIPS Consolidated Local Street and Highway Improvement Program NYS DOT	Construction and repair of highways, bridges, highway-railroad crossings, and other facilities that are not on the State highway system.	Expenses are fully reimbursable if part of an eligible project
CWSSI County-Wide Shared Services Initiative NYS DOS	Development of a Property Tax Savings Plan to identify, propose, and implement actions to save taxpayer money through shared services between local governments within the county.	One-time match of net savings resulting from new actions implemented pursuant to the Plan
Climate Justice Fellowship NYSERDA	Fund a full-time Fellow who will advance climate justice and clean energy priorities with a focus in disadvantaged communities.	\$40,000 per Fellow per 12-month period
Clean Energy Internship Program NYSERDA	Fund internships for students and recent graduates to prepare the next generation of clean energy professionals.	Up to 90% of intern wages
Environmental Bond Act NYS	Projects that mitigate climate change, reduce flood risk, improve water quality, support resilient infrastructure, conserve open space, and protect natural systems.	Varies
Resilient Retrofit Program NYS HCR	Retrofit low- and middle-income single-family homes to make them more resilient to flood damage, improve energy efficiency, and electrify heating and cooling systems.	Up to \$9M for loan proceeds; up to \$1M for program administration

Potential Funding Sources

	Funding Source	Eligible Activities	Award
New York State Programs	Smart Growth Comprehensive Planning Grant Program NYS DOS	Plan and/or zoning ordinance development, community engagement, coordination with government entities, and environmental review.	Varies, local match at least 10%
	Market New York Tourism Grant Program NYS ESD	Tourism marketing initiatives, capital/construction projects, and special events, including conferences, conventions, festivals, agritourism, and consumer and industry trade shows.	Varies, local match required
	Regional Council Capital Fund NYS ESD	Capital-based economic development initiatives intended to create or retain jobs; prevent, reduce or eliminate unemployment and underemployment; and/or increase business activity.	Varies
	Farmers' Market Resiliency Grant Program NYS DAM	Development and enhancement of farmers' market infrastructure to increase resiliency and expand reach.	Up to \$100,000, local match required
Federal Programs	FMA Flood Mitigation Assistance Grant FEMA	Projects that reduce or eliminate the risk of repetitive flood damage to buildings insured by the National Flood Insurance Program (NFIP).	Varies, generally 75% federal / 25% non-federal cost share
	HMGP Hazard Mitigation Grant Program FEMA	Development of Hazard Mitigation Plans and implementation of projects that mitigate flood risks including: retrofitting existing buildings and infrastructure, acquiring hazard-prone property, improving drainage, and restoring streams and floodplains.	Varies, generally 75% federal / 25% non-federal cost share

Funding Source	Eligible Activities	Award
PDM Pre-Disaster Mitigation Grant Program FEMA	Planning and implementation of sustainable, cost-effective measures to reduce the risk to individuals and property from future natural hazards.	Varies, generally 75% federal / 25% non-federal cost share
JT Brownfield Jobs Training Grants EPA	Funding to recruit, train, and place unemployed and under-employed residents of areas affected by brownfields in environmental fields, including sustainable cleanup and reuse, solid waste management, and chemical safety.	Up to \$500,000
RAISE Rebuilding American Infrastructure with Sustainability and Equity Grant Program US DOT	Surface transportation infrastructure projects that improve safety, environmental sustainability, quality of life, mobility and community connectivity, and/or economic competitiveness.	For capital grants, minimum award of \$5M in urban areas and \$1M in rural areas. Generally, 20% local match required.
STBG Statewide Transportation Improvement Program FHWA	Transportation improvement projects that enhance road safety for all users, promote complete streets, encourage public transit, support climate resilience and reduced emissions, and advance equity.	Varies, generally 80% Federal share
IIJA Infrastructure Investment and Jobs Act Bipartisan Infrastructure Deal	Projects that improve transportation infrastructure, expand broadband access, promote clean energy, and expand access to clean drinking water, especially if they address the climate crisis and/or advance environmental justice.	Varies
Farm Loan Programs USDA	A variety of loans to help farmers and ranchers get the financing they need to start, expand, or maintain a family farm.	Varies

Potential Funding Sources

Funding Source	Eligible Activities	Award
UPWP Unified Planning Work Program CDTC	Transportation planning activities that further develop the policies and recommendations contained in the adopted metropolitan transportation plan, New Visions 2050.	Varies
AEM Agricultural Environmental Management Program SWCD in partnership with NYS DAM	Farm environmental assessments, development of environmental farm plans, design and implementation of best management practices, and development of education programs for environmentally-responsible farming.	Varies
Tree and Shrub Program SWCD	Purchase of seedlings and transplants, ground covers, fruits and berries, and wildflower seed mixes as well as supplies including rain barrels, tree tubes, marking flags, and fertilizer tablets.	Reduced rates on items noted to left
Stormwater Management and Urban Drainage Program SWCD	Projects that address stormwater including demonstration rain gardens, rain barrel programs, the development and distribution of educational materials, and workshops for construction contractors and municipal officials.	Varies

Local Programs

Glossary of Acronyms

AACA	Advance Albany County Alliance
AEM	Agricultural Environmental Management
BOE	Albany County Board of Elections
BRE	Business Retention and Expansion
CCE	Cornell Cooperative Extension
CDRPC	Capital District Regional Planning Commission
CDTA	Capital District Transportation Authority
CDTC	Capital District Transportation Committee
CHIPS	Consolidated Local Street and Highway Improvement Program
CSC	Climate Smart Communities
DOH	Albany County Department of Health
EPA	Environmental Protection Agency
EPF	Environmental Protection Fund
ESD	Empire State Development
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
GIGP	Green Innovation Grant Program
HMGP	Hazard Mitigation Grant Program
IJA	Infrastructure Investment and Jobs Act
LTCP	Long Term Control Plan
MHLC	Mohawk Hudson Land Conservancy
NYS	New York State

NYS DAM	New York State Department of Agriculture and Markets
NYS DEC	New York State Department of Environmental Conservation
NYS DOS	New York State Department of State
NYS DOT	New York State Department of Transportation
NYS EFC	New York State Environmental Facilities Corporation
NYS HCR	New York State Homes and Community Renewal
NYS OPRHP	New York State Office of Parks, Recreation & Historic Preservation
NYSERDA	New York State Energy Research & Development Authority
PDM	Pre-Disaster Mitigation
RAISE	Rebuilding American Infrastructure with Sustainability and Equity Grant Program
RTP	Recreational Trails Program
STBG	Statewide Transportation Improvement Program
SWCD	Albany County Soil & Water Conservation District
TAP/CMAQ	Transportation Alternatives Program and Congestion Mitigation and Air Quality Improvement
UPWP	Unified Planning Work Program
US DOT	United States Department of Transportation
USDA	United States Department of Agriculture
USGS	United States Geological Survey
WWTP	Wastewater Treatment Plant

