

Town of Ulster Climate Smart Resiliency Planning: Gap Analysis

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Overview

Extreme weather events and mounting natural hazards cause social, environmental, and infrastructure damages and losses. Municipalities, regional planning organizations, states, and federal agencies will need to increase their resiliency and adapt to these conditions in order to avoid damages today and into the future. For communities in the Hudson Valley, this need is strikingly evident. Recent events such as Tropical Storm Irene and Superstorm Sandy have reinforced this urgency and compelled leading communities to proactively plan and mitigate potential risks. Ultimately, this type of leadership will reduce the exposure and vulnerability of citizens, infrastructure, and ecosystems, and will serve as a model for communities across the Hudson Valley, New York State, and the country.

Background on the Town of Ulster

The Town of Ulster is a municipality in Ulster County, NY made up of a number of hamlets. The diversity of environments, industries and populations across the different hamlets means the Town must take into account a number of economic, environmental, resilience and other concerns in its governance. The Town is home to one of the commercial centers of the Hudson Valley along Rt. 9W as well as the former home of IBM, now called Tech City, not to mention agriculture and farming communities, which all provide unique opportunities for economic development. Environmentally the Town also sits on the banks of the Hudson River and hosts a stretch of the lower Esopus Creek and the Roundout Creek, which potentially presents a wide-range of challenges from changing climates.

Projected Future Conditions

Current climate and environmental conditions are projected to change in ways that will profoundly influence current interactions with natural resources. This includes the magnitude and intensity of storms and drought, rising sea level affecting Hudson River and tidal tributaries, and other changes. Various platforms are available to better understand and evaluate how different scenarios are likely to impact Hudson Valley communities, including:

- The Nature Conservancy's [Natural Resource Navigator](#)
- Scenic Hudson's [Sea Level Rise Mapper](#)
- Columbia University's [Hudson River Flood Decision Support Tool](#), and
- New York State [Climate Change Clearinghouse](#).

The New York State Water Resources Institute and the previously referenced tools layout general trends and rough estimates that can be employed for adaptation planning. For example, riverfront communities in the Mid-Hudson region should be preparing for a minimum of 3-6 feet of mean sea level rise by 2100. All communities in the Hudson Valley should consider the potential ramifications of:

- Increased severity and frequency of big storms, including
 - More winter precipitation (if rain, then more flooding, if snow, then 10" of snow or more per storm) and
 - More flooding due to increased precipitation and increased development and impervious surfaces;
- Hotter summers;
- Increased frequency and length of heat waves and droughts; and
- Shorter, milder winters.

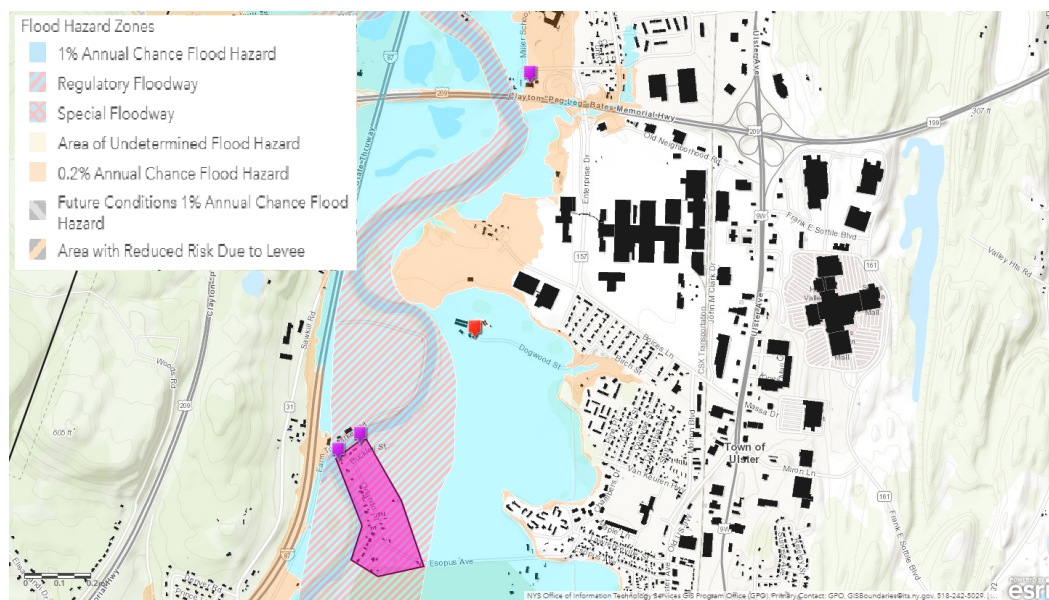


Figure 1. Current and future flood risks for the Town of Ulster with key hazard areas highlighted in red and purple.

The Town of Ulster faces a number of threats related to flooding, sea level rise and increased temperatures. The threat of flooding is especially serious along the Esopus Creek where NYDEP priorities have potentially increased the risk of the creek flooding in the Town. Sea level rise also increases the risk of financial and infrastructural losses due to expanding floodplains (see table below). Temperature increases also pose risks to the Town's most vulnerable populations, such as the elderly and people with disabilities.

Potential Hudson River Flood Impacts for the Town of Ulster			
Type of Impact	24" of SLR with current 100 YR Storm	48" of SLR with current 100 YR Storm	72" of SLR with current 100 YR Storm
Infrastructure			
Total Damaged Buildings	54	62	65
Estimated Losses	\$1,346,536	\$1,912,761	\$2,454,926
Well, Dam, Bridge Damage	3	3	3
Roads (linear miles)	2	2	3
Environmental			
Inundated Land Acres (acres)	185	191	200
Inundated Impervious Surface Area (acres)	5	6	7
Inundated NWI and Tidal Wetlands (acres)	46	46	47
Social			
Social Vulnerability Index of Impacted Census	4 (Medium)	4 (Medium)	4 (Medium)
Social Vulnerability Index of Entire Municipality	5 (Medium)	5 (Medium)	5 (Medium)

Figure 2. Community assets (Infrastructure, Environment, and Social) at risk with various sea level rise scenarios and current 100-year storm in the Town of Ulster, as modeled by the Hudson River Flood Decision Support Tool. The output was produced using Columbia University's Center for International Earth Science Information Network Hudson River Flood Decision Support Tool 2.0.

Process

Who We Are

We are a group of graduate students at Bard College's Center for Environmental Policy (CEP) specializing in climate policy. Bard CEP is a science-based, interdisciplinary master's program that combines a rigorous mix of quantitative and qualitative skills with experience-based learning. This semester, as part of a practicum for the class "The Politics of Solutions" the Ulster County Department of the Environment created an opportunity for the students, in collaboration with Professor Dr. Monique Segarra to create gap analysis of the Town's strengths and opportunities, as well as identify recommendations and funding sources for enhanced resilience in the Town of Ulster.

We also live in the Hudson Valley and have spent time visiting the parks, trails and commercial areas of the Town and have friends that live in the Town. While working on this project, we spent more time exploring the Town, and saw areas like Tech City, Glidepath, the solar farms, parks and other sites of interest. Combining these experiences with our research we understand how unique the Town of Ulster is, and the distinct strengths and opportunities the town has for resilience to environmental hazards presented by changing climates. Furthermore, as residents we also care deeply about the area and it has been inspiring to work on a project that can directly support the growth and resilience of the local community.

Central Objectives

- Define extreme weather and articulate local natural and climate-related hazards
- Identify existing and future vulnerabilities and strengths
- Develop prioritized actions for the municipalities and broader stakeholder networks
- Identify opportunities for the community to advance actions to reduce risk and increase resilience

This report provides an overview of the current community strengths and opportunities, and the recommended actions to improve resilience to natural and climate-related hazards in the Town and Ulster today and in the future. The summary of findings will benefit from further comments, feedback, and updates from workshop attendees and additional stakeholders alike. The participation of all those concerned in the communities will help continue and expand collective leadership on hazards and community resilience.

Climate Smart Communities

The framework used for the analysis was taken from the [Climate Smart Communities](#) initiative. This initiative is a program of the New York State departments of Environmental Conservation, Health, State and Transportation; State Public Service Commission; and State Energy Research and Development Authority; that helps local governments take action to reduce greenhouse gas emissions and adapt to changing environmental conditions and risks.

Climate Smart Resiliency Planning Tool

The **Climate Smart Resiliency Planning (CSRP)** Tool is part of the Climate Smart Communities initiative. The following process was conducted to complete the Climate Smart Resiliency Planning Tool:

- The following Town of Ulster and Ulster County Plans were reviewed as part of this project, and detailed information and references are compiled and linked in the CSRP.
 - Town of Ulster Comprehensive Plan (2007)
 - Town of Ulster Zoning Code (1991, updated 2014)
 - Town of Ulster Subdivision of Land (1991, updated 2012)
 - Town of Ulster Flood Damage Prevention Law (2009, updated 2018)
 - Town of Ulster Stormwater Management Law
 - Town of Ulster 9W Corridor Enhancement Plan
 - Ulster County Multi-Jurisdictional Hazard Mitigation Plan (Updated 2017)
 - Jurisdictional Annex 1.2.23, Town of Ulster (Updated 2013)
 - Ulster County Comprehensive Emergency Management Plan (2014)
- The CSRP Tool self-assessment was completed (TownOfUlster-CSRPTool_V2). The tool includes six tabs: Plan Checklist, Vulnerability & Risk Assessment, Public Outreach, Plan Integration, Preparedness & Recovery, Hazard Mitigation.
- All Plans listed in the Checklist tab were reviewed against both general and Plan-specific questions across the five remaining tabs.
- An analysis of the CSRT was completed including areas of strength and areas of opportunity, as well as specific recommendations for each section of the tool.

Areas of Strength

- The Town has a **Comprehensive Plan** that provides recommendations for protecting natural resources and environmentally sensitive areas. These recommendations include:
 - Protecting groundwater resources to ensure that the quantity and quality of water is available to serve future needs.
 - Protecting the Town's scenic views, rural-community atmosphere, and natural quality for its intrinsic and economic value.
 - Providing greater protection of ridgelines from inappropriate development.
 - Preserving open space to buffer development and preserve the area's scenic vistas.
 - Promoting innovative land use management and building construction techniques in the Town to enhance and preserve the natural environment and utilize energy efficiently, while accommodating future development.
 - Factoring in the presence of floodplains when the Town Zoning Board reviews site plans and subdivision applications and insisting on appropriate mitigation measures for any development in floodplains within the Town.
- The Town has a **Zoning Law** that lays out conservation overlay districts and encourages the use of cluster subdivisions to retain large tracts of open space.
- The Town has a **Flood Damage Prevention Law** aimed at minimizing public and private loss due to flood conditions.
- The Town has a **Stormwater Management Law** aimed at controlling erosion and sediment.
- The Town participates in the **Ulster County Hazard Mitigation Plan** and has provided updates and actions to comply with the planning process in the past.
- The Town's **Highway Department** is effective and proactive with paving, snow plowing, collecting trees and wood chipping and runs community programs like free mulch pickup at the transfer station.
- The Town installed **flood awareness signs** at various locations along the Esopus Creek.
- The Town participates in the [**FEMA National Flood Insurance Program \(NFIP\)**](#). The NFIP provides flood insurance to property owners, renters and businesses, and having this coverage helps them recover faster once floodwaters recede. The NFIP works with communities required to adopt and enforce floodplain management regulations that help mitigate flooding effects.
- The Town has **engaged in FEMA programs for training** town administrators and staff about flood risk and management practices.
- The Town has a number of **renewable energy and energy storage projects** completed or underway, including the Cypress Creek Renewables/Landau Solar Farm in Eddyville and the GlidePath's Lincoln Park Project. **Regarding the GlidePath Lincoln Park Project, Ulster Supervisor James Quigley said, "The Town of Ulster is proud to play host community to this transformative energy project. We hope that this is the beginning of the development of many more projects that will reduce carbon emissions."**

Areas of Opportunity

- Resiliency Planning
 - The Town can pass a municipal resolution to join the [NY Climate Smart Communities certification program](#) and become a Registered Climate Smart Community. Climate Smart Communities receive:
 - Better scores on grant applications for some state funding programs, like [DEC's CSC Grants](#).
 - Benefits like attracting green business and increased funding for resiliency planning.
 - State-level recognition for the community's leadership.
 - Organize a [Nature Conservancy Community Resilience Building Workshop](#), which helps community participants identify hazards, challenges, strengths, and priority actions for community resilience and is funded by the Nature Conservancy, a major environmental conservation organization.
- Floodplain Resilience & Development
 - Focus on **retrofitting and/or moving public buildings** like town hall and the police station from the floodplain (Mapping Appendix, Figure 2).
 - Plan for **green development** (e.g. parks, river-based recreation) along water features like the Esopus, Hudson and Rondout that will help connect people to water AND mitigate flood risks (Mapping Appendix, Figures 2 and 3).
- Focus on **new strategies for public outreach and engagement** such as **updating the town website** and/or implementing a text/email messaging system.
- Implement more **recommendations from the Town Comprehensive Plan** to help facilitate climate resiliency.
 - Create Riparian Protection Zones along the Esopus Creek and Rondout Creek (Mapping Appendix, Figures 2 and 3).
 - Develop Local Waterfront Revitalization Plans (LWRP) for the Hudson River and Rondout Creek.
 - Encourage Leadership in Energy and Environmental Design (LEED) techniques in the design, construction and operation of new buildings in the Town.
- **Update the Town Zoning Law** to include more recommendations from the Town Comprehensive Plan.
- Complete a **Ulster County Multi-Jurisdictional Hazard Mitigation Plan Update** (See Jurisdictional Annex 1.2.23). The last update was filed by James F. Maloney in 2013 and included a number of actions that were in progress. Update the status of those actions.
- **Grants** can be useful stepping stones for moving towards these goals. We understand that applying for grants is time consuming. One potential solution could be finding community volunteers who can pursue grants.
- Utilize additional **free training opportunities** for municipal staff related to floodplain and emergency management issues.

Detailed Recommendations & Sources of Funding

Resiliency planning not only benefits the community and reduces risks, it is also a unique opportunity to participate in the growing green economy in Ulster County and position the Town of Ulster as a hub for green business. The [U.S. Climate Resiliency Toolkit](#) lists flooding, warming temperatures, and precipitation variability as growing challenges that can increase the vulnerability of the region's residents, infrastructure, and ecosystems. Therefore states, counties and cities are starting to build resilience by incorporating changing conditions into their planning processes. Below we list a number of recommendations for increasing The Town's resilience and improving community durability as well as information on some potential funding sources.

Climate Smart Communities Program

Climate Smart Communities (CSC) is a New York State program that helps local governments take action to reduce greenhouse gas emissions and adapt to changing environmental conditions. The program offers free technical assistance and grants, as well as rebates for electric vehicles. **Most importantly, CSC program participation and actions offer the Town a wide range of funding opportunities to support resiliency planning and related development work.**

- Pass a municipal resolution to join the **CSC** program and become a **Registered Climate Smart Community**.
- Take specific [CSC Actions](#) to become a **Certified Climate Smart Community**. Certified Climate Smart Communities represent New York's foremost leaders in local environmental action; they have gone beyond the CSC pledge by completing and documenting a suite of actions that mitigate and adapt to changing conditions at the local level.
- We acknowledge that there are potential costs associated with CSC actions, however many actions align with existing town initiatives and there are several potential funding sources for achieving CSC certification.
 - Partners For Climate Action Hudson Valley offers a [Local Champions Grant](#) to fund a town Climate Smart Communities Task Force Coordinator.
 - The [DEC CSC Grant Program](#) offers funding for achieving specific CSC actions.
 - Several New York State agencies also provide funding to support completion of CSC certification actions, including the [Department of Environmental Conservation](#) (DEC), the [Energy Research and Development Agency](#) (NYSERDA), and the [Department of State](#) (DOS).
 - **Applications for some state funding programs from Climate Smart Communities earn higher scores for these grants.**

Benefits of participating in the Climate Smart Communities Certification program include the following:

- Better scores on grant applications for some state funding programs.
- A robust framework to organize local environmental action and highlight priorities.
- Cost savings through greater efficiency.
- Greater engagement with residents who care about the future of their hometowns.
- Reduction of future flood risk through climate change adaptation strategies.
- Conservation of green spaces for recreation and biodiversity.
- Investment in an economy that supports sustainability and green businesses.
- Improved air quality from switching to clean energy.
- Greater energy independence and energy security.

CSC Actions that can be associated with existing town laws, plans, initiatives & priorities:

- Pledge Elements (PE) 3: Decrease energy use.
 - Actions: Various Actions to Decrease Energy Use
- PE4: Shift to clean, renewable energy.
 - Action: Renewable Energy Feasibility Studies
 - Action: Solar Energy Installation
- PE6: Implement climate-smart land use.
 - Action: Comprehensive Plan with Sustainability Elements
 - Action: Preserve Natural Areas Through Zoning or Other Regulation
 - Action: Develop a Local Forestry or Tree Planting Program
- PE7: Enhance community resilience to climate change.
 - Action: Conserve Natural Areas
 - Action: Culverts and Dams
 - Action: Riparian Buffers
 - Action: Strategic Relocation
 - Action: National Flood Insurance Program Community Rating System

CSC Actions associated with specific recommendations laid out in the Gap Analysis.

- PE6: Implement climate-smart land use.
 - Action: Planning and Infrastructure for Bicycling and Walking
 - Action: Natural Resources Inventory
- PE7: Enhance community resilience to climate change.
 - Action: Climate Vulnerability Assessment
 - Action: Evaluate Policies for Climate Resiliency
 - Action: Watershed-based Flood Mitigation Plan
 - Action: Design Flood Elevation & Flood Maps
 - Action: Source Water Protection
- PE8: Support a green innovation economy.
 - Action: Green Economic Development Plans
 - Action: Brownfield Clean-up and Redevelopment
 - Action: Incentives for Green Business.

Floodplain Resilience & Green Development

- **Consider relocating and/or retrofitting municipal buildings and roads potentially at risk for flooding** (See Map Appendix Figure 2). Including:
 - **Relocate the town hall and police station from the floodplain** (potentially to the former Tech City site; see Map Appendix Figure 2) and convert the current site into greenspace that incorporates flood and erosion control (**PE7 Action: Strategic Relocation**).
 - **Retrofit Ulster's Wastewater Treatment Plant** (see Map Appendix Figure 2) based on the existing action plan laid out in the Ulster County Multi-Jurisdictional Hazard Mitigation Plan, Jurisdictional Annex 1.2.23, Town of Ulster (**PE7 Action: Source Water Protection**).
- Update the **Town Zoning Law** to include more recommendations from the **Town Comprehensive Plan (PE6 Action: Preserve Natural Areas Through Zoning or Other Regulation)**, such as:
 - Create a Ridgeline Protection Overlay District.
 - Encourage the use of retention/detention basins that are an integral part of the overall site plan or subdivision plan; and „ Identify important aquifer recharge areas and create aquifer protection overlay districts.
 - Strictly enforce NYSDEC requirements for a 100-foot buffer between development and watercourses.
 - Restrict the development of buildings and other impervious surfaces within the 100-year floodplain.
 - Require Stormwater Pollution Prevention Plans (SWPPP) in accordance with the NYSDEC State Pollution Discharge Elimination System (SPDES) general permit for commercial/industrial developments or major subdivision applications.

- Establish a Green Economic Development Plan (**PE8 Action: Green Economic Development Plans**)
 - **Green industries** are businesses that produce goods or provide services that benefit the environment, conserve natural resources, and/or mitigate climate change. Such goods and services are those that support research, development or deployment of renewable sources of energy, energy efficiency, recycling, pollution prevention or abatement, reduction of greenhouse gas (GHG) emissions, natural resource conservation, environmental compliance, or training and education in these fields.
 - Local governments can incorporate specific plans for development of green industries into their **short-term and long-term economic development plans**. Identifying needs for particular green industries or markets, and assessing existing assets should be part of this planning process.
- Tech City
 - The former Tech City property is a potential opportunity to attract green business and development to the Town.
 - A portion of Tech City could potentially serve as flood safe location for the Town Hall and/or Police Department
 - Work with the [Ulster County Economic Development Alliance](#) to establish plans for green economic development of the tech city space.
 - Work with the EPA to continue cleanup and redevelopment of the TechCity property (**PE8 Action: Brownfield Clean-up and Redevelopment**).
- Park Space
 - **Working with land trusts or other conservation organizations** could provide extra funding for greenspaces, recreation and park projects.
 - More of Tech City's grounds may be converted into park space as an added amenity to attract business (**PE8 Action: Green Economic Development Plans**)
 - A park may be placed on Esopus Creek near the Kingston Landtrust DEC tree nursery on Buckley (Map Appendix Figure 2a) (**PE6 Action: Develop a Local Forestry or Tree Planting Program**).
 - Pedestrian access to the waterfront in Eddyville could also double as flood protection for segments of Creek Locks Road directly on the Rondout (Map Appendix Figure 3) (**PE6 Action: Planning Infrastructure for Bicycling and Walking**).
 - **The original Glide Path site can be protected** and turned into community greenspace either through zoning or by partnering with a land trust or conservation organization that could provide funding for the project.
 - Create Riparian Protection Zones along the Esopus Creek and Rondout Creek (**PE7 Action: Riparian Buffers**).
- Citizens / Volunteer Groups
 - Create a [Town of Ulster Conservation Advisory Council \(CAC\)](#), which can serve as an important advisory body to local governing boards, planning boards, and zoning boards of appeals. By providing an environmental perspective on

land- use proposals, comprehensive plans, stewardship of natural areas, and other issues, CACs contribute to local land use decision-making, conservation, and quality of life for residents in the community.

- Create a “Friends Of...” volunteer group to support the Town in stewardship and management of land protected by the Town.
- Create a [Local Waterfront Revitalization Plan](#) (LWRP) and access funding through the **NYS Department of State**.
- Consider participating in the [FEMA National Flood Insurance Program Community Rating System](#), a voluntary incentive program that recognizes and encourages community floodplain management activities that give the community access to discount flood insurance rates (**PE7 Action: National Flood Insurance Program Community Rating System**).
- **Funding and other opportunities for floodplain resilience and green development:**
 - [Hudson River Estuary Local Stewardship Planning Grant](#) is designed to help local organizations and communities advance four categories of projects and programs through planning, feasibility studies, and/or design:
 - Hudson River shoreline communities to adapt land uses and decision-making to factor in climate change, flooding, heat, drought, and sea-level rise projections;
 - Making water infrastructure more resilient to flooding and/or sea-level rise;
 - Watershed and source water management planning.
 - Conservation of natural resources by creating a natural resources inventory, open space inventory/index, open space plan, conservation overlay zone, open space funding feasibility study, or connectivity plan
 - [Local / National and Private Funding Strategies For Flood Mitigation Toolkit](#).
 - [U.S. Climate Resilience Toolkit Funding Opportunities](#).
 - [NYDEC Trees For Tribs program](#). A statewide program that has been working to reforest New York's tributaries - small creeks and streams that flow into larger rivers and lakes. The program's goal is to plant trees and shrubs along streams to create a forested riparian (streamside) buffer that helps decrease erosion, reduce flooding damage, improve wildlife and stream habitat, and protect water quality.
 - FEMA offers a number of potential grants for floodplain resilience, including: FEMA Hazard Mitigation Grant Program, FEMA pre-disaster Mitigation Grant Program, FEMA Flood Mitigation Assistance Program, and FEMA Building Resilient Infrastructure and Communities Program to implement floodplain resilience projects.
- **Other watershed resources:**
 - [Hudson River Watershed Alliance](#)
 - [Lower Esopus Watershed Alliance](#)
 - [Building Blocks for Sustainable Communities](#) provides tools and technical assistance for community development projects that contribute to environmental and economic sustainability. The program helps communities improve flood

resilience, develop green buildings, protect water quality, and create a green street strategy.

Town Comprehensive Plan

- Update the Town Comprehensive Plan to include more sustainability elements (**CSC PE6 Action: Comprehensive Plan with Sustainability Elements**). Including:
 - Support alternative modes of transportation (including strategies for bicycles, pedestrians, public transit, and electric vehicles) (**PE6 Action: Planning and Infrastructure for Bicycling and Walking**).
 - Pedestrian access to the waterfront in Eddyville could also double as flood protection for segments of Canal Locks Road directly on the Rondout (Map Appendix Figure 3) (**PE6 Action: Planning Infrastructure for Bicycling and Walking**)
 - Conserve natural areas (including strategies to designate open space and protect it from development) (**PE7 Action: Conserve Natural Areas**).
 - Promote a healthy and safe community.
 - Foster green economic development (**PE8 Action: Green Economic Development Plans**).
 - Decrease dependence on fossil fuels and support energy efficiency and renewable energy production.
 - Protect drinking water sources from pollution (**PE7 Action: Source Water Protection**).
- Implement more of the original recommendations from the Town Comprehensive Plan to help facilitate climate resilience.
 - Create Riparian Protection Zones along the Esopus Creek and Rondout Creek (**PE7 Action: Riparian Buffers**).
 - Create a [Local Waterfront Revitalization Plan](#) (LWRP) and access funding through the **NYS Department of State**.
 - Perform and energy audits of existing buildings and encourage Leadership in Energy and Environmental Design (LEED) techniques in the design, construction and operation of new buildings in the Town (**CSC PE3 Actions: Decrease Energy Use**)

Disaster Preparedness, Vulnerability, Risk Assessment & Recovery

- Establish a **localized hazard risk and vulnerability assessment** specific to the Town of Ulster containing cumulative risk assessments.
 - Include how these events will affect internal operations, people, public health, the environment, the economy, and capital and operating costs.
 - Consider using the [NY DOS Assessment Tool](#).
- Create a [Natural Resource Inventory](#) (**CSC PE6 Action: Natural Resources Inventory**).
 - A natural resources inventory (NRI) compiles information on important, naturally occurring features within a given locality (e.g., municipality, watershed, or region),

such as geology, soils, streams, wetlands, forests, and wildlife. Cultural resources such as scenic and recreational assets are often included, as well. NRIs are comprised of maps, data, and a report that describes the resources and the project. The NRI may be integrated into a comprehensive, open space, or watershed plan, or be a stand-alone reference.

- By visualizing an area's resources—where they occur and how they relate to each other, their surroundings, and existing development—an NRI provides a strong foundation for informed land-use planning and decision-making. NRIs also serve as the basis for identifying conservation priorities and strategies like zoning updates, open space protection, or the need for more detailed studies such as wildlife habitat assessment.
- Connect with local conservation organizations that may have already done this work.
- **Resource:** [Nature Conservancy Natural Resource Manager](#)
- Complete the **planned actions regarding floodproofing of critical infrastructure** laid out in the Ulster County Multi-Jurisdictional Hazard Mitigation Plan, Jurisdictional Annex 1.2.23, Town of Ulster.
- Participate in the [National Weather Service Storm Ready Community](#) program, which helps communities take a proactive approach to prepare for extreme weather and natural disasters.
- **Evacuation planning:**
 - Create a formal **Town Evacuation Plan** with routes out of known hazard areas.
 - Install additional **evacuation route signage** to facilitate evacuation during and emergency. Including **adding flood hazard and evacuation signage** at Buckley Street, Orlando Street, Abeel Street and Canal Locks Road. These areas frequently flood and local residents should be aware of the risks and how to evacuate safely (Map Appendix Figures 2a and 3).
- Develop a **Long Term Recovery Plan** that provides guidelines on steps the community will take to reestablish a pre-disaster condition or better, and enable the community to sustain itself.
- **Perform maintenance and upgrade town culverts and dams** that were damaged during Hurricane Sandy (**PE7 Action: Culverts and Dams**).

Public Outreach and Engagement

- **Update the Town website** and use it as a resource for publicizing flood risks and evacuation plans. Including further links to the following resources on the website meet CSP goals:
 - ASPCA's disaster preparedness steps for domesticated animals.
 - FEMA's "Are You Ready" guide.
 - FEMA's Homeowner's Guide to Retrofitting.
 - Provide residents with guidance on the development of personal and family evacuation plans or what to include in emergency or evacuation kits (FEMA's Ready.gov checklist).

- **Create flood information signage** such as high water marks, signs to flood evacuation zones and routes, and signs pointing to emergency shelters.
- Provide information on floodplain risks to residents and real estate businesses in order to encourage informed decision-making.
- Share information and PSAs on the radio, television and in print to reach Ulster's older audiences that may not be computer literate.
- Inform the public of the [NY-Alert program](#) and how to sign up.

Free Training Programs For Town Officials & Employees

- Continue to train municipal managers on the use of available risk and vulnerability tools. [FEMA Emergency Management Institute](#) offers free training on the Community Rating System and Advanced Floodplain Management
- Participate in [FEMA's Community Emergency Response Team \(CERT\)](#) training to better prepare for disasters.
- Participate in FEMA training programs for retrofitting flood-prone residential buildings, and the Coastal Construction Manual, as well as NYSDEC's Post Flood Stream Intervention Training.

Other Potential Funding Opportunities

- [NYSDEC HREP GRANTS](#) (Hudson River Estuary Program):
- Local Stewardship Planning grants
 - Amount available: \$10,500 to \$50,000 per project, 15% match.
 - Eligible Projects: Advance four categories of projects and programs through planning, feasibility studies, and/or design:
 - Hudson River shoreline communities to adapt land uses and decision-making to factor in climate change, flooding, heat, drought, and sea-level rise projections.
 - Making water infrastructure more resilient to flooding and/or sea-level rise.
 - Watershed and source water management planning.
 - Conservation of natural resources by creating a natural resources inventory, open space inventory/index, open space plan, conservation overlay zone, open space funding feasibility study, or connectivity plan.
- River Education grants
 - Amount available: \$10,500 to \$40,000 per project, 15% match.
 - Eligible projects: Enhance education about the estuary along the tidal waters of the Hudson and make opportunities to learn about the Hudson River Estuary more accessible. The funding may be used to design, equip and/or construct educational facilities (including signage, exhibits, and river-focused art installations), support development of plans or curriculum, purchase of equipment, and/or development of web sites or mobile phone apps.

- River Access grants
 - Amount available: \$10,500 to \$50,000 per project, 15% match.
 - Eligible projects: Provide new or improved accessibility at new or existing access sites for boating, fishing, swimming, and/or wildlife-dependent recreation along the shoreline of the Hudson estuary, including the tidal portion of its tributaries.

Conclusion

Our findings from reviewing Town of Ulster laws, regulations and policies and completing the Climate Smart Community Resiliency Planning Tool show that there are a number of areas that The Town can take action to improve resiliency and plan for future dangers while simultaneously facilitating economic development. Many of these areas are already addressed in some way by existing Town laws, regulations and policies, and others could provide clear benefits for the Town and its residents. While some of these actions may be costly, we have laid out funding sources that could potentially be pursued by town staff or community volunteers in order to mitigate some of the costs. However, as this gap analysis shows, many of these initiatives would save lives, increase revenue and mitigate the need for new expenditures in the face of future danger and damages.

Appendix: Floodplain Maps

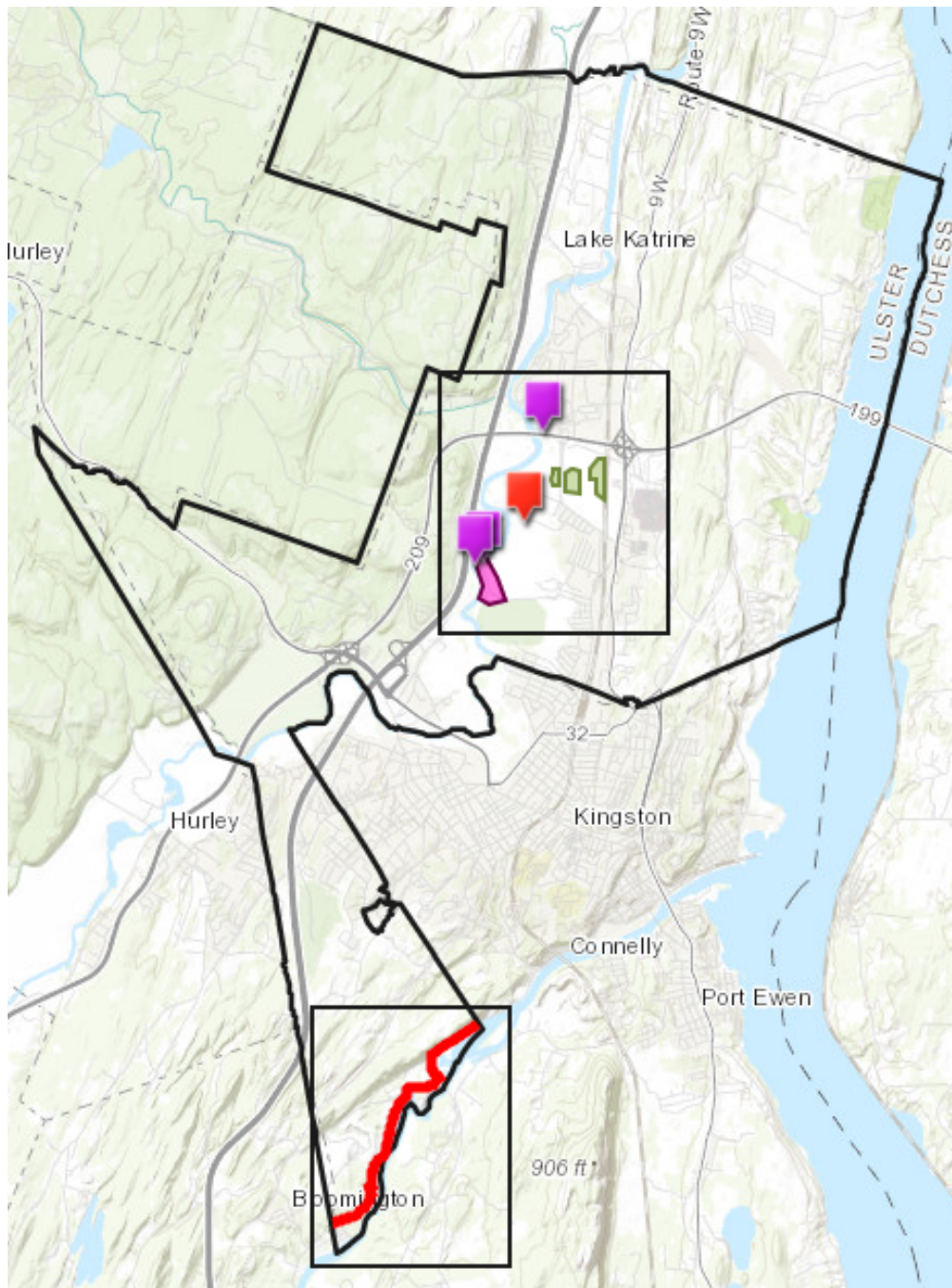


Figure 1

Pictured here are several flood risks and opportunities. Each box represents one for the following figures that shows a more detailed view of specific areas. The upper box (Figure 2) corresponds to central Ulster, and the lower box (Figure 3) corresponds to southern Ulster along Rondout Creek.

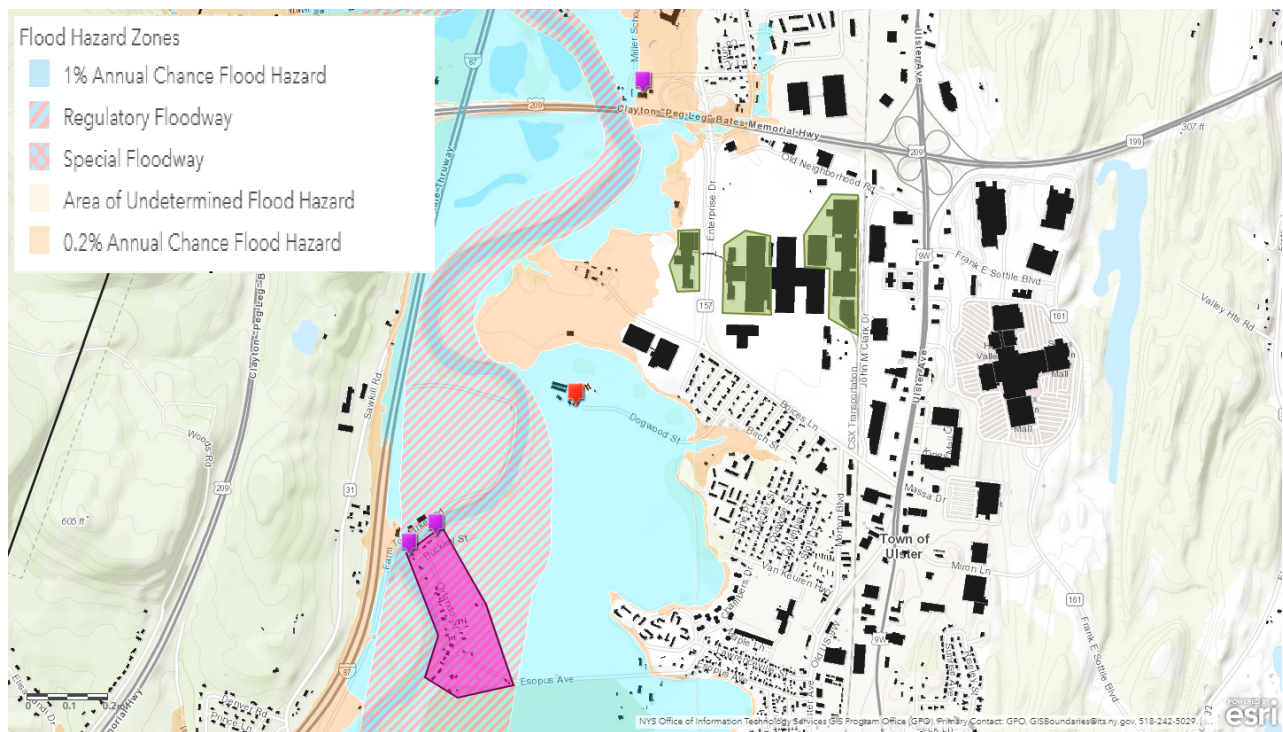


Figure 2

This map detail of Central Ulster overlays FEMA flood hazard maps with potential risks and opportunities present in and around Esopus Creek. The red tag points to the Whittier Wastewater Treatment Plant, which is clearly in the floodplain. Purple tags are the current site of the Town Hall and Police Station also in the floodplain. While the purple area is the potential site for the recommended park with flood mitigation and community access to the Esopus. The Tech City buildings shaded in green have potential for green economic development, and could potentially be used as a site for relocating the Town Hall and Police Station. Tech City is both large and outside the floodplain, and still has some serviceable buildings.

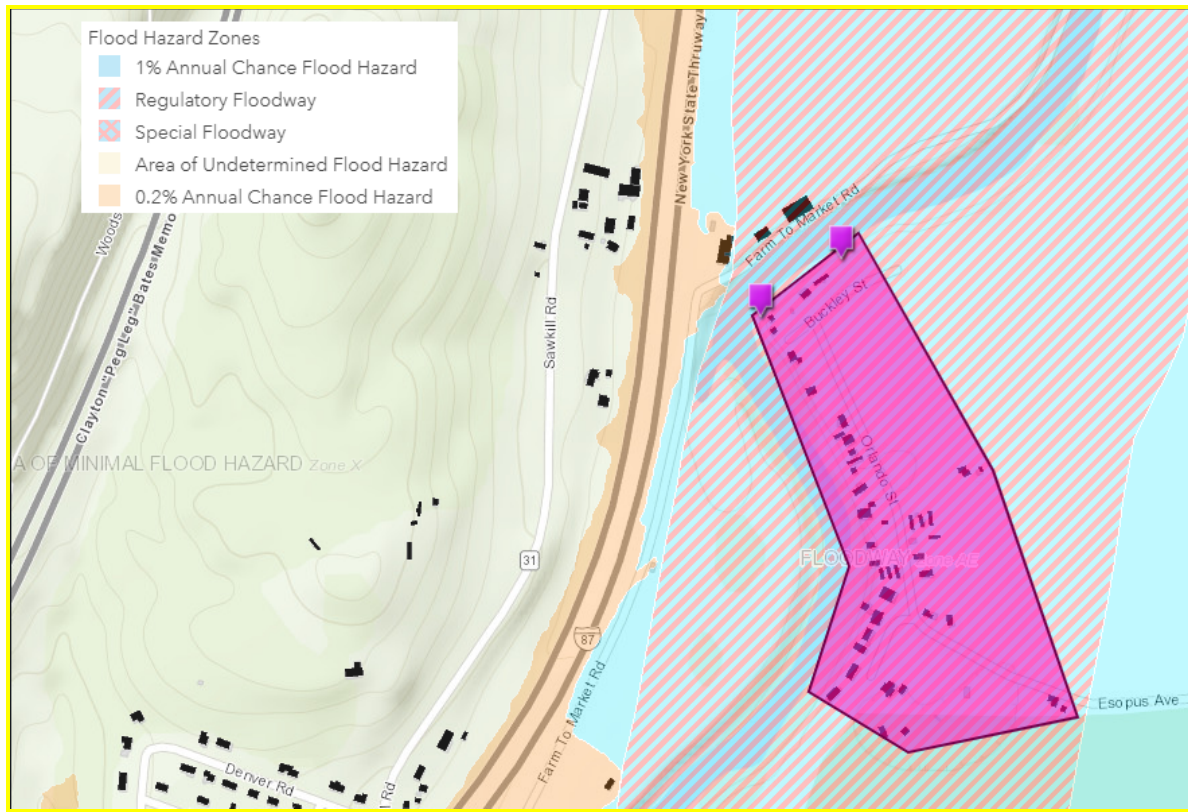


Figure 2a

This map provides a close-up view of the neighborhood on Buckley and Orlando Streets. These streets are shaded because there is still risk to houses that remain in place and unraised, however the Community Action Plan to purchase or raise houses is in progress. Also, the tag on the left highlights a possible park location on currently vacant land between a bend in Esopus Creek and the Kingston Land Trust's tree nursery. The tag on the right shows a current access point to Esopus Creek that could be further developed into a functional park.

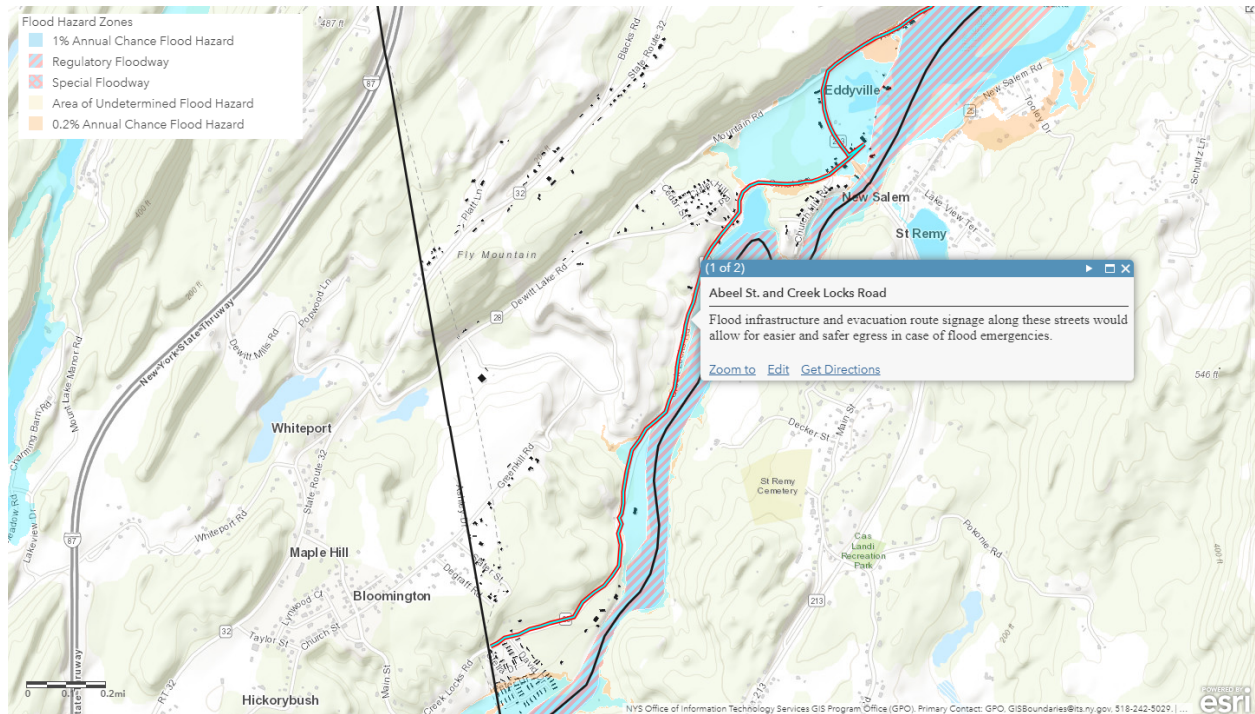


Figure 3

This map overlays the FEMA flood map with potential flood risks. The red line above marks Abeel Street and Creek Locks Road. The black dots within Ulster's borders represent homes. Many of the homes are within the floodplain, and are thus cut off during major storms when these roads flood.