

PE7 Action: Climate Vulnerability Assessment

4 Points

8 Points

16 Points



BRONZE PRIORITY



SILVER PRIORITY

A. Why is this action important?

Climate resilience begins with understanding hazards posed by a changing climate and identifying community vulnerabilities. Climate change does not affect all assets, systems, operations, or community members equally, so performing a comprehensive assessment of local vulnerabilities and risks helps identify and prioritize actions to reduce risks to the community. In conducting a vulnerability assessment, the local government must consider current and future conditions. For example, in assessing the risk of flooding along tidal coastlines, a community should include conditions associated with projected sea level rise in 2050 and 2100. The Climate Smart Communities (CSC) program recommends that local governments complete a vulnerability assessment as one of the first and most foundational steps in developing an effective strategy for adapting to climate change at the local level.

Developing a vulnerability assessment involves identifying, analyzing and prioritizing the effects of climate hazards and risks, like flooding, heat stress or short-term drought. A climate hazard is a physical event or trend that could affect a population segment or the entire community, specific areas, assets, or entire systems (for example, transportation or energy infrastructure) including the local economy and industries. A vulnerability assessment process should consider diversity, equity, inclusion and justice (DEIJ) from start to finish since vulnerabilities will likely lead to varying risks across the diverse populations in your community.

Local governments may elect to undertake this action as a standalone project, or as part of a larger effort, such as a PE7 Action: Climate Adaptation Plan, PE6 Action: Comprehensive Plan with Sustainability Elements, PE7 Action: Hazard Mitigation Plan, PE7 Action: Watershed Assessment, local waterfront revitalization plan, or others. Hazard Mitigation Plans should help identify relevant community climate hazards.

For communities to thoroughly plan for climate adaptation and resiliency, our program recommends completing PE7 Action: Evaluate Policies for Climate Resilience, PE7 Action: Climate Vulnerability Assessment, and PE7 Action: Climate Adaptation Plan. These three actions combined will empower a community to understand its risks, identify strengths and gaps in its existing planning, and create a plan to guide future actions and projects.

B. How to implement this action

Conduct a vulnerability assessment, using the steps outlined below (see additional resources and examples in Section G).

1. Research relevant studies of climate change projections to identify hazards that apply to your community. Review and summarize state and regional studies, including ClimAID (2011 and 2014) and the NYS 2100 Commission Report (2012), local studies (if available), and relevant national studies, as needed. Seek local knowledge on climate hazards via public meetings, surveys and other means (for example, a workshop where residents draw on a map where they have experienced flooding).

Some climate hazards for consideration include the following:

- Increasing temperatures, especially in winter
- Increasing frequency and durations of heat waves
- Increasing intensity of precipitation (rain/snow/ice/hail)
- Rising sea levels
- Increasing frequency and severity of coastal flooding, storm surge, wave force and erosion
- Increasing frequency and severity of riverine flooding

- Increasing frequency and severity of drought
- Fluctuating lake levels
- Increasing frequency and severity of wind-related damage
- Decreasing annual snowfall
- Increasing frequency and severity of extreme weather events (for example, severe thunderstorms and hurricanes)

For additional information on hazards, please refer to ClimAID and the NYS Hazard Mitigation Plan or your local hazard mitigation plan (Section G).

2. Using your identified climate hazards, assess the potential impacts to assets and systems in your community. For example, consider the following assets and systems:
 - a. Community infrastructure
 - Municipal services (fire, police, public works)
 - Emergency response
 - Public health (hospitals, cooling centers)
 - Drinking water
 - Transportation
 - Energy and power
 - Communication
 - Wastewater, stormwater and sewer
 - Waste disposal
 - b. Socio-economic assets and systems
 - Food supply
 - Local economy and jobs
 - Cultural and educational (schools, libraries, colleges)
 - Historic
 - Recreation
 - Tourism
 - c. Natural and working lands
 - Parks and public land
 - Farms and agriculture
 - Natural assets and systems (for example wetlands, forests, grasslands, and shrub lands, and the services they provide, like water storage and treatment, wildlife habitat)
 - d. Any other asset or system needed by the community
3. Alternatively, another way to identify and assess the vulnerabilities of each asset or system uses three criteria: exposure, sensitivity, and adaptive capacity. These terms are defined below. (More information can also be found in Section G)
 - a. **Exposure** refers to whether an asset or system is located in an area that is likely to experience the effects of a climate change hazard now or in the future.
 - b. **Sensitivity** refers to how an asset or system fares when exposed to a climate hazard.
 - c. **Adaptive capacity** refers to the ability of an asset or system to adjust to actual or expected climate stresses.
 - d. An example:
 - A firehouse is currently located on a small rise just outside the Special Flood Hazard Area (SFHA). However, the access road to the firehouse is below the Base Flood Elevation and subject to inundation by the 1% ("100-year") storm. Climate change projections indicate that by 2050 the building itself will likely be inundated by more frequent storm events (i.e., its exposure is significant). In 2050, climate change projections show the firehouse as inundated by 6 inches of water during the 1% storm (i.e., its sensitivity is significant). The firehouse is an historic brick building built on a slab with a low-lying access road. It services a community that is very developed with little available open space outside the SFHA (i.e., the adaptive capacity of the firehouse and the area around it is low).
4. Identify vulnerable populations and assess how they will be affected by current and future climate hazards. It is essential to include underrepresented and marginalized populations who may be at greater risk from climate change impacts. Groups to specifically consider include black, indigenous, and people of color (BIPOC), immigrants,

people who speak English as a second language, low-income residents, the elderly, people with disabilities or chronic health conditions, individuals experiencing homelessness, youth, seniors, rural and urban residents, and lesbian, gay, bisexual, transgender and queer (LGBTQ+) residents. Consider creating an advisory group to oversee the assessment process that represents a diverse range of voices from the community. Also review the [CSC Inclusive Community Engagement Primer](#) for a 6-page introduction to concepts and practices for the meaningful inclusion of [Disadvantaged Communities](#) in your local planning activities.

5. Share a summary of climate hazards, community assets, systems and vulnerabilities with community residents and other stakeholders via public meetings, surveys, and/or other means. Conduct outreach to confirm findings and identify additional vulnerabilities. Plan public meetings to be accessible in terms of location and transportation options, and, where possible, provide food, childcare, and/or other incentives to support participation.
6. Prioritize assets and systems based on the following factors:
 - Their exposure and sensitivity to the effects of climate hazards and their adaptive capacity
 - How critical they are in respect to the functioning and prosperity of the community
 - Their ability to reduce vulnerabilities and risks in the community, and to vulnerable populations in particular
7. Develop a report of vulnerability assessment findings. This should include the climate hazards and effects considered and an analysis of the risk and vulnerability to community assets. Post the report to the municipality's website.
8. Establish a timeline for re-assessing vulnerabilities. Updates should occur at least every 10 years or when a new understanding of hazards occurs (like a major storm) or when updated state climate projections become available (see links above to ClimAID and NYS Part 490 below in Section G). Updates should include the latest climate science data and projections, a description of local changing conditions, and any major weather events experienced. As part of an update, municipalities should review the relevant climate hazards, community assets/systems, and vulnerable populations, adding new ones where applicable. The update should also involve re-evaluating the prioritization of assets/systems. Significant changes to the assessment should undergo community input via surveys and other outreach methods, as described above.

Guidance on Assessing Flood Hazards. The New York State Department of State (DOS) has developed a risk assessment tool (see Section G) for coastal and riverine communities. The tool helps communities inventory community assets and calculate relative risk scores based on several factors that impact risk, including the following:

- The magnitude and likelihood of future storm events
- Exposure the local landscape attributes that either increase or decrease potential storm impacts
- Vulnerability the level of impairment that an asset would experience from a storm event

The output of this DOS tool helps communities prioritize flood and erosion risk reduction measures. The risk assessment process is recommended for communities that are considering risks from flooding and erosion, and particularly those that are developing or updating Local Waterfront Revitalization Programs (LWRP). Local governments are encouraged to contact DOS for guidance on the use of the risk assessment tool and planning assistance related to coastal and waterfront hazards.

Guidance on Assessing Heat Hazards. The New York State Department of Health (DOH) has developed a Heat Vulnerability Index (HVI) to identify areas in New York State (excluding New York City, which has its own HVI) with high proportions of heat-vulnerable populations. The cumulative HVI and four vulnerability components maps can be used by local and state agencies to identify and plan mitigation strategies for heat-vulnerable areas. The four vulnerability components help communities better understand the factors that drive vulnerability in their regions. Statewide HVI data at census tract resolution is readily available for download on the DOH website and county specific HVI maps in PDF format (see links below in Section G).

The DOH has also developed County Heat and Health Profiles for all counties in New York State (except those in the New York City area). These profiles describe county temperature trends, summarize heat-related health effects, identify areas with populations at highest vulnerability to heat, and list some available adaptation resources. The County Heat and Health Profiles can help communities prepare for extreme heat and prevent heat-related illness. Counties interested in obtaining county-specific HVI data, shapefiles, and more information can contact the DOH tracking program at epht@health.ny.gov

C. Timeframe, project costs, and resource needs

The timeframe, costs and resources needed for a vulnerability assessment depend on the size of the study area, the number of municipalities to be included, and the staff resources available to contribute to the assessment. A typical timeline for completing a vulnerability assessment is between six months to one year, depending on the scope and complexity of the municipality and its exposure to climate hazards.

D. Which local governments implement this action? Which departments within the local government are most likely to have responsibility for this action?

This action is applicable to all types of local governments and all departments. The department or staff that lead climate and sustainability efforts are most likely to be responsible for this action. These responsibilities may be led by the chief elected official's office, the planning department, or by a volunteer body, such as the CSC task force. Cross-department involvement and support are recommended, and stakeholder involvement is crucial. The vulnerability assessment could also be developed at a regional level, by the county or a regional organization. Regional organizations or county agencies, like soil and water conservation districts, often have useful data for local assessments.

E. How to obtain points for this action

Points are earned for this action by completing a climate vulnerability assessment that engages staff and the public. The assessment must include climate change projections of future conditions and address at least one climate hazard.

	<i>POSSIBLE POINTS</i>
Vulnerability assessment with a limited scope, covering at least one climate hazard for a limited geographic area (e.g., a waterfront) or for one community asset/system (e.g., transportation)	4
Vulnerability assessment with a moderate scope, covering one to three climate hazards for the entire geographic area of the community	8
Comprehensive vulnerability assessment, covering all relevant climate hazards for the entire geographic area of the community	16

Vulnerability assessments completed as part of a community's participation in the [NY Rising program](#) or the [DOS Local Waterfront Revitalization program](#) may qualify for this action if they meet the above criteria and are completed within the last 10 years.

F. What to submit

Submit a copy of the most recent climate vulnerability assessment report, created within 10 years prior to the application date. Also submit documentation of the public outreach process (such as public meeting invitations, list of attendees and meeting minutes, surveys or other outreach means), if this is not included in the report. The report should include a summary of the assessment process and the individuals involved, climate change projections of future conditions, a description of what climate hazards were covered, what community assets/systems were assessed for impacts, and what vulnerable populations were considered.

If the vulnerability assessment was developed more than 10 years ago, local governments may update it with any new or updated data or projections and submit the updated report for credit.

All CSC action documentation is available for public viewing after an action is approved. Action submittals should not include any information or documents that are not intended to be viewed by the public.

G. Links to additional resources or examples

Examples of Community-level Vulnerability Assessments in New York State

- [City of Long Beach's NY Rising Community Reconstruction Plan \(PDF\)](#)

- [Orange County's Vulnerability Assessment \(PDF\)](#)
- [Kingston, NY, "Planning for Rising Waters" Waterfront Flooding Task Force Final Report](#)
- [Local Multi-Hazard Transportation Example: Genesee-Finger Lakes Regional Critical Transportation Infrastructure Vulnerability Assessment \(PDF\)](#)
- [DOH Public Health Live Webcast: Climate Smart Communities: Experiencing a Changing Climate](#)

Data and Tools for New York State

- [NYSERDA Responding to Climate Change in New York State \(ClimAID Report\)](#)
- [NYS Hazard Mitigation Plan – All hazards](#)
- [NYS Part 490, Projected Sea-level Rise](#)
- [NYSDEC Floodplain Management Webpage](#)
- [NYS 2100 Commission Report – Post Superstorm Sandy Multi-Sector Resiliency Recommendations -Governor's Office of Storm Recovery - New York Rising Community Reconstruction Program](#)
- [NYSDOS Climate Geographic Information Gateway, Climate Change & Resilience with Tools, Data and Resources for Communities \(including the Risk Assessment Tool and Coastal Risk Area Maps\)](#)
- [NYSDOS, Local Waterfront Revitalization Program](#)
- [Scenic Hudson, Adaptation Planning Resources including Sea Level Rise Maps -NYSDOH Heat Vulnerability Index with Maps](#)
- [NYSDOH County-specific Heat Vulnerability Index maps](#)
- [NYSDOH County Heat and Health Profile Reports](#)
- [NYC's Climate and Health Profile reports can be found here](#)
- [NYC Heat vulnerability information](#)
- [Coastal Risk Areas, NYS DOS](#)
- [Disadvantaged Communities Mapper, NYSERDA](#)
- [Climate Safe Neighborhoods, Groundwork HV](#)
- [Environmental Justice Mapping Tools, NYS Sea Grant](#)
- [Hudson Valley Natural Resource Mapper](#)
- [Hudson Dynamic Shorelines, NYS Sea Grant](#)

Regional and National Toolkits

- [US Climate Resilience Toolkit](#)
- [Climate Mapping for Resilience and Adaptation \(CMRA\)](#) - helps with assessing local exposure to climate-related hazards.
- [US EPA \(current\) Regional Resilience Toolkit](#) - includes step-by-step guidance
- [US EPA Adapting to Climate Change 2017 Webpage](#) - includes links to key Federal resources such as the US Climate Resilience Toolkit and the National Climate Assessments
- [Vulnerability Assessment Guide: ICLEI, Preparing for Climate Change-A Guidebook for Local, Regional and State Governments](#)
- [TEMPERATE tool: ICLEI](#) - "Registered TEMPERATE users have access to ICLEI's adaptation experts who can help you create a climate vulnerability assessment or adaptation planning effort that meets your community's unique needs."

Federal Training Resources

- [US EPA Local Government Climate Adaptation Training](#)
- [FEMA Long-Term Community Resilience Exercise Resource Guide - Designing Whole Community Exercises to Prepare for the Effects of a Changing Climate](#)
- [FEMA National Risk Index](#) - online tool for identifying risks related to natural hazards by county or census track

National Resources on Environmental Justice

- [US EPA Adaptation Tools for Public Officials](#)
- [US Centers of Disease Control \(CDC\) Social Vulnerability Index Maps](#)
- [Community Resilience Estimates, US Census Bureau](#)

- [Neighborhoods at Risk, Headwater Economics](#)

Federal Transportation Resources

- [Federal Highways Administration \(FHWA\) – Resilience Pilot Studies](#)

Federal Resources for Water Utilities

- [US EPA Climate Resilience Evaluation and Awareness Tool](#)

National Resources on Sea-level Rise

- [Climate Central - Surging Seas: Sea-level Rise Risk Analysis](#)

National Resources on Drought

- [US Drought Portal \(NIDIS\), includes data, maps and tools](#)
- [Northeast Drought Portal \(NIDIS and Northeast Regional Climate Center\)](#)

National Resources on Habitats and Ecosystems

- [Climate Change Vulnerability Index: NatureServe Ecosystem-Based Management Tools Network, Climate Change Vulnerability Assessment and Adaptation Tools](#)

H. Recertification Requirements

Generally, the recertification requirements are the same as the initial certification requirements. As described above in Section B, Step 7 (Establish a timeline for re-assessing vulnerabilities), local governments should revisit their vulnerability assessment at least every 10 years or when other relevant circumstances change. An update to an existing vulnerability assessment may be eligible for points under this action as part of recertification, provided the update includes, for example, up-to-date climate change projections and an evaluation of how those projections may impact assets, systems, and vulnerable populations in the community.