

APPENDIX D: MITIGATION CATALOG

This appendix provides a comprehensive list of mitigation actions considered by Cayuga County and participating jurisdictions that met the goals and objectives of the Plan.



Cayuga County 2013 Hazard Mitigation Plan

Catalog of Risk Reduction Measures

Risk is defined as being a function of the:

- Hazard
- Exposure
- Vulnerability, and
- Capability

Therefore risk can be reduced through mitigation by manipulating the hazard, reducing exposure to the hazard, reducing the vulnerability and/or increasing capability. And, where mitigation is not yet possible, the risk can be reduced through preparation, response or/and recovery. *The list is not meant to be exhaustive, but to inspire thought.*

Risk Reduction Measures	Hazard Category			
	Flooding			
	Manipulate Hazard	Reduce Exposure	Reduce Vulnerability	Increase Capability
Personal Scale	1.) Clear stormwater drains and culverts	1.) Locate outside of hazard area	1.) Retrofit structure (Elevate structure above BFE)	1.) Enforce NFIP
	2.) Implementation of Rain Gardens and Rain Barrels.	2.) Elevate utilities above BFE 3.) Institute low impact development techniques on property	2.) Elevate items with house above BFE 3.) Build new homes above BFE	2.) Buy flood insurance 3.) Develop household mitigation plan, such as retrofit savings, communication capability with outside, 72 hr self-sufficiency during and after an event
	3.) Reduction of impermeable areas.		4.) Flood proof existing structures.	4.) Familiarize with building codes and standards to allow for compliance with construction. 5.) Support and Implement hazard disclosure for the sale/re-sale of property in the identified risk zones.
Corporate Scale	1.) Clear stormwater drains and culverts	1.) Locate business critical facilities or functions outside hazard area	1.) Build redundancy for critical functions/ retrofit critical buildings.	1.) Increase capability by having cash reserves for reconstruction
	2.) Implementation of Rain Gardens.	2.) Institute low impact development techniques on property	2.) Provide flood-proofing measures when new critical infrastructure must be located in floodplains.	2.) Support and implement hazard disclosure for the sale/re-sale of property in identified risk zones.
	3.) Reduction of impermeable areas.			3.) Solicit "cost-sharing" through partnerships with private sector stake holders on projects with multiple benefits. 4.) Familiarize with building codes and standards to allow for compliance with construction.
Government Scale	1.) Clear stormwater drains and culverts	1.) Locate/re-locate critical facilities outside of hazard area	1.) Harden infrastructure	1.) Produce better hazard maps
	2.) Dredging, levee construction, providing retention areas...	2.) Acquire or relocate identified repetitive loss properties.	2.) Provide redundancy for critical functions and infrastructure	2.) Capture/survey "high-water" marks during flood events.
	3.) Structural flood control: levee's, dams, channelization, revetments.	3.) Promote open space uses in identified high hazard areas via techniques such as:PUD's, easements, setbacks, greenways, sensitive area tracks.	3.) Adopt appropriate regulatory standards such as cumulative substantial improvement/damage, freeboard, lower substantial damage threshold, compensatory storage.	3.) Provide technical information and guidance
	4.) Construct regional stormwater control facilities	4.) Adopt land development criteria such as PUD's, Density transfers, clustering	4.) Stormwater management regulations and master planning.	4.) Enact tools to help manage development in hazard areas (stronger controls, tax incentives, information)
	5.) Reduce impermeable areas.	5.) Institute low impact development techniques on property	5.) Adopt "no-adverse impact" floodplain management policies that strive to not increase the flood risk on down-stream	5.) Incorporate retrofitting/replacement of critical system elements in CIP
	6.) Promote green construction practices.	6.) Acquire vacant land or promote open space uses in developing watersheds to control increases in runoff	6.) Participate in the Community Rating System (CRS)	6.) Develop strategy to take advantage of post disaster opportunities
	7.) Examine all county projects with respect of stormwater management.		7.) Implement as-built regulatory requirements.	7.) Warehouse critical infrastructure components
	8.) Promote and maintain drainage system maintenance and upkeep.		8.) Implement site review ordinances/requirements	8.) Develop and adopt a COOP

Risk Reduction Measures	Hazard Category			
	Flooding			
	Manipulate Hazard	Reduce Exposure	Reduce Vulnerability	Increase Capability
Government Scale			9.) Install early warning system for the Mill Street Dam posing a threat to Main Fire house and Police Station in the City	9.) Join CRS program
			10.) Address the vulnerabilities of Upper Pump Station in Auburn.	10.) Maintain existing data as well as gather new data needed to define risks and vulnerability.
			11.) Address the vulnerabilities of water treatment and wastewater treatment plants in Moravia	11.) Train emergency responders
			12.) N. Division Street Bridge realignment project in Auburn.	12.) Create a building and elevation inventory of structures in the floodplain
				13.) Develop fees for sewerage.
				14.) Integrate floodplain management policies into other planning mechanisms within the planning area.
				15.) Establish incentives to promote flood hazard mitigation of private property.
				16.) Develop mitigation partnerships with Stakeholders
				17.) Join "Storm Ready" Program
				18.) Implement annual training to account for high turnover of municipal officials.
				19.) Educate public on Flood Hazards
				20.) Develop flood response plan.
				21.) Prepare inundation maps for use by local emergency personnel
				22.) Disseminate evacuation procedures
				23.) Ensure public safety and ambulance drivers know safe evacuation routes.
				24.) Install local radio transmitter for local radio information dissemination
				25.) Locate EOC and shelters on high ground.
				26.) Install rain gage/flood warning system
				27.) Gather and input resident cell phone numbers into reverse 911.
				28.) Provide better communication systems and back-up communication systems to inform public of hazards and to communicate during the hazard event.

Risk Reduction Measures	Hazard Category			
	Flooding			
	Manipulate Hazard	Reduce Exposure	Reduce Vulnerability	Increase Capability
Government Scale				29.) Produce municipal and county post-disaster manuals to provide efficient recovery procedures and reimbursement of funds.
				30.) Implement safe document archiving systems to preserve important records on municipal, county, and agency levels.
				31.) Develop better education and outreach regarding flood insurance and NFIP programs.
				32.) Pursue flood/stormwater study on regional/watershed level. Continue to petition the Federal Government to include maintenance of River Gages as a budget line item.
				33.) Install water level gauging equipment on Hemlock Creek and Dutch Hollow Brook
				34.) Promote the participation of Floodplain Administrators within the planning process and other activities.
				35.) Identify and provide ample training for designated floodplain administrators.
				36.) Use Town of Sennett's stormwater impact fee program to provide for long-term maintenance of stormwater systems.
			37.) Continue to regulate and incorporate stormwater management in planning processes.	

Risk Reduction Measures	Hazard Category			
	Severe Storms			
	Manipulate Hazard	Reduce Exposure	Reduce Vulnerability	Increase Capability
Personal Scale	None	None	1.) Insulate house	1.) Trim or remove trees that could effect power lines
			2.) Provide redundant heat and power.	2.) Promote 72 hour self-sufficiency
			3.) Insulate structure	3.) Obtain a NOAA weather radio.
			4.) Plant appropriate trees near home and power lines ("Right tree, right place" National Arbor Day Foundation Program.	4.) Obtain a secondary power source such as a generator.
Corporate Scale	None	None	1.) Relocate critical infrastructure, such as power lines, underground	1.) Trim or remove trees that could affect power lines
			2.) Reinforce or relocate critical infrastructure such as power lines so that it meets performance expectations.	2.) Create redundancy
			3.) Incorporate tree maintenance such as tree wire, trimming, or removal	3.) Equip your facilities with a NOAA weather radio
			4.) Obtain secondary power source such as a generator	4.) Equip vital facilities with emergency power sources.
Government Scale	None	None	1.) Harden infrastructure such a locating utilities under ground.	1.) Support programs such as "Tree Watch" that proactively manage problem areas by use of selective removal of hazardous trees, tree replacement, etc.
			2.) Trimming trees back from power lines	2.) Establish and enforce building codes that require all roofs to withstand high wind and snow loads
			3.) Designate snow routes and strengthen critical road sections and bridges.	3.) Increase communication alternatives
			4.) Adopt ordinances that regulate the type and quantity of tress planted near utility lines	4.) Modify land use and environmental regulations to support vegetation management activities that improve reliability in utility corridors.
			5.) Relocate critical infrastructure, such as power lines, underground	5.) Modify landscape and other ordinances to encourage appropriate planting near overhead power, cable, and phone lines
			6.) Create and implement tree maintenance/removal guidelines.	6.) Provide NOAA weather radios to the public
			7.) Implement practices of installing utilities underground for new development.	7.) Create/Enhance "mutual aid" agreements for response to all emergencies
				8.) Create/Identify evacuation routes to be utilized during Severe Storm events.
				9.) Join "Storm-Ready" program
				10.) Provide early warning of impending severe storm events to identified critical or essential facilities. This would include facilities such as large employments centers,

Risk Reduction Measures	Hazard Category			
	Severe Storms			
	Manipulate Hazard	Reduce Exposure	Reduce Vulnerability	Increase Capability
Government Scale			9.) Promote emergency power supplies to private property.	11.) Promote emergency power supplies to private property.
			10.) Provide training on new technologies such as Brine de-icing	12.) Improve cell phone service
			11.) Retrofit critical structures with hazard resistant components.	13.) Provide training on new technologies such as Brine de-icing
				14.) Recruit additional emergency personnel or use mutual aid agreements
				15.) Increase sheltering capabilities
				16.) Improve highway dept. knowledge
				17.) Provide diversified energy such as wind and solar.
				18.) Increase capability to respond to power outages and downed power lines. Establish partnerships with utility providers through proactive planning.
				19.) Provide backup power to schools and shelter facilities in the north and south regions of the county
				20.) Increase capabilities of Auburn DPW to execute the tree maintenance program
				21.) Develop programs/procedures to capture and archive loss data from events.
				22.) Create prioritization of facilities to return power during power outage
				23.) Provide a better communication system.
				24.) Develop or enhance the capacity/capability of stormwater conveyance systems
				25.) Obtain and install backup power sources and critical facilities.
			26.) Join CRS.	
			27.) Keep open communication and education of hazards for mobile home communities.	
			28.) Promote hazard resistant components in construction practices.	
			29.) Create and implement plan to retrofit utilities underground.	
			30.) Integrate tree maintenance between municipalities, county agencies, and utility companies.	

Risk Reduction Measures	Hazard Category			
	Severe Winter Storms			
	Manipulate Hazard	Reduce Exposure	Reduce Vulnerability	Increase Capability
Personal Scale	None	None	1.) Insulate house	1.) Trim or remove trees that could effect power lines
			2.) Provide redundant heat and power.	2.) Promote 72 hour self-sufficiency
			3.) Insulate structure	3.) Be aware of inclement weather conditions, and move your vehicles off of the street as severe weather systems approach.
			4.) Plant appropriate trees near home and power lines ("Right tree, right place" National Arbor Day Foundation Program).	4.) Retrofit structures
				5.) Obtain a NOAA weather radio.
Corporate Scale	None	None	1.) Relocate critical infrastructure, such as power lines, underground	1.) Trim or remove trees that could affect power lines
			2.) Reinforce or relocate critical infrastructure such as power lines so that it meets performance expectations.	2.) Create redundancy in utilities and communications
			3.) Implement tree maintenance, tree removal, or install tree wire.	3.) Develop a Continuity of Operations Plan (COOP) to address operations before, during and after storm events.
			4.) Obtain a secondary power source such as a generator.	4.) Utilize weather radios at the work place to keep your employees apprised of severe weather conditions.
				5.) Obtain and install secondary power sources such as generators in vital facilities
Government Scale	None	None	1.) Harden infrastructure such a locating utilities under ground where appropriate.	1.) Support programs such as "Tree Watch" that proactively manage problem areas by use of selective removal of hazardous trees, tree replacement, etc.
			2.) Trimming trees back from power lines	2.) Establish and enforce building codes that require all roofs to withstand snow loads-- Develop/Improve/Enforce building Codes in Hazard Areas
			3.) Designate snow routes and strengthen critical road sections and bridges.	3.) Increase communication alternatives
			4.) Adopt codes and regulations that address the issues of parking of vehicles along roadways during severe weather events.	4.) Modify land use and environmental regulations to support vegetation management activities that improve reliability in utility corridors.
			5.) Develop or enhance the capacity/capability of stormwater conveyance systems.	5.) Modify landscape and other ordinances to encourage appropriate planting near overhead power, cable, and phone lines
			6.) Provide backup power sources at vital critical facilities.	6.) Provide weather radios to vulnerable populations
			7.) Install underground utilities for new development.	7.) Enhance public awareness campaigns to address those issues of alert and warning and actions to take during severe weather events.
			8.) Enhance public awareness of alerts, warning systems, and preventative measures to utilize during storm events.	8.) Utilize the best available technology to enhance the warning systems for all severe weather events (i.e.: tornado warning systems).
			9.) Coordinate severe weather warning capabilities with agencies possessing the highest capabilities to relay information to the public.	9.) Coordinate severe weather warning capabilities and the dissemination of warning amongst those agencies within the planning are with the highest degree of capability.
				10.) Join the Community Rating System
				11.) Join "Storm-Ready"

Risk Reduction Measures	Hazard Category			
	Severe Winter Storms			
	Manipulate Hazard	Reduce Exposure	Reduce Vulnerability	Increase Capability
Government Scale				<p>12.) Retrofit critical structures and promote hazard resistant construction</p> <p>13.) Keep open communications and education of hazards for mobile home communities</p> <p>14.) Retrofit above-ground utilities to underground facilities if appropriate</p> <p>15.) Create a salt reserve or research alternates to stretch salt reserve.</p> <p>16.) Create prioritization of facilities to return power during power outage situations.</p> <p>17.) Integrate tree maintenance between local municipalities, county agencies, and utility providers.</p> <p>18.) Update critical facility inventory to include an accurate record of backup power.</p> <p>19.) Implement tree maintenance/removal guidelines.</p> <p>20.) Implement policy to install utilities underground for new development.</p> <p>21.) Enhance public awareness of alerts, warning systems, and preventative measures to utilize during storm events.</p> <p>22.) Coordinate severe weather warning capabilities with agencies possessing the highest capabilities to relay information to the public.</p> <p>23.) Provide early warning of impending severe storm events to identified critical or essential facilities.</p> <p>24.) Promote installation of emergency power supplies to private properties.</p> <p>25.) Improve cell phone service.</p> <p>26.) Provide training on new technologies such as brine de-icing.</p> <p>27.) Increase sheltering capabilities</p> <p>28.) Provide alternate power sources such as wind and solar on government buildings.</p> <p>29.) Establish partnerships with utility providers to increase capabilities of responding to power outages.</p> <p>30.) Provide backup power to schools and shelter facilities, specifically facilities in the northern and southern portions of the county.</p> <p>31.) Implement a warning system to relay messages such as road closures and business closures.</p>

Risk Reduction Measures	Hazard Category			
	Ground Failure			
	Manipulate Hazard	Reduce Exposure	Reduce Vulnerability	Increase Capability
Personal Scale		1.) Locate outside of hazard area	1) Consider hazard areas in land purchase	1) Support and implement hazard disclosure for the sale/re-sale of property in identified risk zones
Corporate Scale		1.) Locate outside of hazard area	1) Consider hazard areas in land-acquisition and site development.	1) Support and implement hazard disclosure for the sale/re-sale of property in identified risk zones
Government Scale		1) Consider hazard areas in land-use planning, zoning and development siting	1) Consider hazard areas in land-use planning and development siting	1) Increase understanding of hazard areas(e.g. Landslide Susceptibility Maps) -geotechnical surveys, LIDAR and mapping
		2) Acquire structures in highest hazard areas (demolish and convert to restricted open space)	2) Build structures in land subsidence areas on piers anchored to bedrock	2) Work with stakeholders such as USGS and NYS Geological Survey to develop appropriate risk reduction strategies.
		3) Relocation of Structures	3) Stabilize vulnerable slopes near structures and infrastructure.	3) Support and implement hazard disclosure for the sale/re-sale of property in identified risk zones
		4) Open Space Preservation	4) Work with stakeholders to develop appropriate risk reduction strategies.	4) Develop county-level programs to document slide events (landslide inventory), and maintain its currency
				5.) Increase knowledge and understanding of vulnerable areas and karst environments
				6.) Incorporate ordinances and/or zoning restrictions with future development in hazard areas.

Risk Reduction Measures	Hazard Category			
	Transportation Accidents			
	Manipulate Hazard	Reduce Exposure	Reduce Vulnerability	Increase Capability
Personal scale			1. Stay current on traffic reports.	1. Educate household on appropriate actions to take in the event of a hazardous material spill.
			2. Become informed of proper communication channels in which transportation hazards are reported throughout community.	2. Become informed on the hazard and risk reduction alternatives available.
				3. Plan alternate routes throughout Town/County in case of road closures/traffic/haz-mat incidents.
Corporate Scale			1. Stay current on traffic reports.	1. Educate employees on appropriate actions to take in the event of a hazardous material spill.
			2. Become informed of proper communication channels in which transportation hazards are reported throughout community.	
Government Scale			1. Stay current on traffic reports.	1. Assess the municipality's capability to shelter residents to ensure that adequate shelter is available in times of displacement.
			2. Ensure that carriers involved in the transportation of hazardous materials comply with all applicable laws through proactive police enforcement of commercial carrier rules and regulations.	2. Evaluate and implement evacuation plans, routes, policies, and procedures.
			3.) Monitor truck traffic on routes 38, 34, and New York State Thruway.	3. Continue training in the National Incident Command System (ICS), under National Incident Management System (NIMS).
				4. Evaluate equipment and materials available for road closures/traffic delays.
				5. Increase communication with NYSDOT to improve traffic control and circulation on critical roadways. Participate in any studies or steering committees regarding State highways that impact transpiration into/out-of and/or through the municipality.

Risk Reduction Measures	Hazard Category			
	Transportation Accidents			
	Manipulate Hazard	Reduce Exposure	Reduce Vulnerability	Increase Capability
Government Scale				6. Continue to attend hazmat response training and cooperate with the Cayuga County Hazardous Materials Response Teams.
				7. Invest in response equipment (e.g., foam trailers) to respond to hazmat incidents within the county.
				8. Maintain/enhance mutual aid agreements.
				9. Establish or improve reporting of minor accidents and engineering investigations of collisions to determine patterns to improve signals, traffic markings, and identify educational efforts needed to reduce accidents.
				10. Conduct an enhanced freight study to better understand the types and volumes of hazardous waste that travel through the town/county and what routes are used to transport such materials.
				11. Provide public education and outreach materials regarding the appropriate actions to take in the event of a hazardous material spill.
			12. Enhance public safety through awareness, by releasing timely public service announcements via various media (television, radio) and supplying suggestions for alternate routes.	

Risk Reduction Measures	Hazard Category			
	Transportation Accidents			
	Manipulate Hazard	Reduce Exposure	Reduce Vulnerability	Increase Capability
Government Scale				13. Support procurement of hardware and software to support a regional/state transportation accident database to track accidents and estimate costs to respond and remediate. (Currently the State provides free software to track transportation and accidents and detect trends, but the hardware requirements are significant).
				14.) Continue to implement and expand local responder training on the use of ERG and hazmat event protocol.
				15.) Improve county participation in training offered by Norfolk Southern and CSX (Shipping Companies)
				16.) Improve communication systems.

Acronyms	
BFE	Base Flood Elevation
CIP	Capital Improvement Plan
COOP	Continuity of Operations Plan
CRS	Community Rating System
EOC	Emergency Operations Center
ICS	Incident Command System
LIDAR	Light Detection and Ranging
NFIP	National Flood Insurance Program
NIMS	National Incident Management System
NOAA	National Oceanic and Atmospheric Administration
NYS	New York State
NYSDOT	New York State Department of Transportation
PUD	Planned Unit Development
USGS	United States Geological Survey