

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

Onondaga County Natural Hazards Mitigation Plan

September-09

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.*

Catalog of Risk Reduction Measures	Hazard Category			
	Flooding			
	Manipulate Hazard	Reduce Exposure	Reduce Vulnerability	Increase Capability
Personal scale	Clear stormwater drains and culverts	<p>Locate or re-locate outside of hazard area</p> <p>Institute low impact development techniques on property</p>	<p>Retrofit existing structures and utilities above Base Flood Elevation (BFE)</p> <p>Floodproof existing structures (wet- or dry floodproofing).</p> <p>Store hazardous materials above BFE or outside of floodprone areas</p>	<p>Develop household mitigation plan, such as retrofit savings, communication capability with outside, 72-hr self-sufficiency during and after an event</p> <p>Buy flood insurance</p>
Corporate scale	Clear stormwater drains and culverts	<p>Locate business critical facilities or functions outside hazard area</p> <p>Institute low impact development techniques on property</p>	<p>Build redundancy for critical functions/ retrofit critical buildings.</p> <p>Provide flood-proofing measures when new critical infrastructure must be located in floodplains.</p> <p>Harden structures and infrastructure (wet and dry-floodproofing)</p> <p>Store hazardous materials above BFE or outside of floodprone areas</p>	<p>Increase capability by having cash reserves for reconstruction</p> <p>Develop and adopt a Continuity of Operations Plan (COOP)</p> <p>Solicit "cost-sharing" through partnerships with private sector stakeholders on projects with multiple benefits.</p>
Government Scale	<p>Clear stormwater drains and culverts</p> <p>Dredging, levee construction, providing retention areas...</p> <p>Structural flood control: levee's, dams, channelization, revetments.</p> <p>Construct regional stormwater control facilities</p>	<p>Locate/re-locate critical facilities outside of hazard area</p> <p>Acquire or relocate identified repetitive loss properties.</p> <p>Promote open space uses in identified high hazard areas via techniques such as: PUD's, easements, setbacks, greenways, sensitive area tracks.</p> <p>Adopt land development criteria such as PUD's, Density transfers, clustering</p> <p>Institute low impact development techniques on property</p> <p>Acquire vacant land or promote open space uses in developing watersheds to control increases in runoff</p>	<p>Harden structures and infrastructure (wet and dry-floodproofing)</p> <p>Provide redundancy for critical functions and infrastructure</p> <p>Adopt appropriate regulatory standards such as cumulative substantial improvement/damage, freeboard, lower substantial damage threshold, compensatory storage.</p> <p>Stormwater management regulations and master planning.</p> <p>Adopt "no-adverse impact" floodplain management policies that strive to not increase the flood risk on down-stream communities.</p> <p>Participate in the Community Rating System (CRS)</p> <p>Implement as-built regulatory requirements</p> <p>Implement site review ordinances/requirements</p> <p>Establish stream maintenance programs with stakeholders (e.g. Soil and Water Conservation District) - support county leads of such efforts</p>	<p>Produce better hazard maps, and improve access to flood hazard mapping</p> <p>Capture/survey "high-water" marks during flood events.</p> <p>Provide technical information and guidance on appropriate mitigation options available to businesses and homeowners</p> <p>Enact tools to help manage development in hazard areas (stronger controls, tax incentives, information)</p> <p>Establish an additional layer of zoning within flood hazard areas (Cicero as an example)</p> <p>Develop strategy to take advantage of post disaster opportunities</p> <p>Improve compliance with and enforcement of the NFIP</p> <p>Develop mitigation partnerships with regional stakeholders (ie: CNYRPD)</p> <p>Join Community Rating System (CRS) program, or improve level of participation in CRS</p> <p>Develop and implement a public information strategy for flood hazard awareness, flood insurance (NFIP) and mitigation</p>

Catalog of Risk Reduction Measures	Hazard Category			
	Flooding			
	Manipulate Hazard	Reduce Exposure	Reduce Vulnerability	Increase Capability
			Incorporate retrofitting/replacement of critical facilities and infrastructure in Capital Improvement Plans (CIPs)	<p>Maintain existing data as well as gather new data needed to define risks and vulnerability.</p> <p>Create a building and elevation inventory of structures in the floodplain</p> <p>Establish a program to identify and educate owners of flood-prone properties of potential mitigation options (e.g. elevations, relocations)</p> <p>Charge a hazard mitigation fee on all new permits to create a hazard mitigation funding source for initiatives or grant cost share requirements.</p> <p>Integrate floodplain management policies into other planning mechanisms within the planning area.</p> <p>Establish a Stormwater Utility to deal with urban drainage/flooding issues</p> <p>Establish incentives to promote flood hazard mitigation of private property (e.g. permit fee waivers).</p> <p>Adopt ordinances/standards for cumulative damages and/or improvements</p> <p>Develop and adopt a COOP</p> <p>Join "Storm Ready" Program</p> <p>Participate in county and regional training programs</p> <p>Provide additional training/certification to NFIP floodplain administrators and code officials.</p> <p>Implement annual training to account for high turnover of municipal officials.</p> <p>Maintain and enhance flood forecasting ability, including the establishment and maintenance of critical stream gages</p> <p>Promote awareness and participation in alert systems such as NYAlert</p> <p>Support and participate in regional flood management efforts, such as the Flood Mitigation Task Force or similar efforts</p> <p>Support and implement hazard disclosure for the sale/re-sale of property in identified risk zones.</p> <p>Provide continued and enhanced training for emergency responders</p> <p>Establish a revolving "bank" or budget line item to fund grant application support</p>
Government Scale				

Risk Reduction Measures	Hazard Category			
	Severe Storms (including Severe Winter Storms)			
	Manipulate Hazard	Reduce Exposure	Vulnerability	Capability
Personal scale	None	None	Retrofit structures (improved roofing, glazing, insulation, etc.) Provide for redundant heat and power Contact municipality or utilities to trim or remove trees that could affect power lines Plant appropriate trees near home and power lines ("Right tree, right place" National Arbor Day Foundation Program.	Improve awareness of impending severe weather (e.g. joining NYAlert, obtain a NOAA weather radio) Promote 72-hour self-sufficiency Provide for redundant heat and power
Corporate Scale	None	None	Relocate critical infrastructure, such as power lines, underground Reinforce or relocate critical infrastructure such as powerlines so that it meets performance expectations.	Contact municipality or utilities to trim or remove trees that could affect power lines Create redundancy (e.g. backup generators) Improve awareness of impending severe weather (e.g. joining NYAlert, obtain a NOAA weather radio) Develop a Continuity of Operations Plan (COOP) Monitor impending storm events so that you can release employees in such a manner as to not negatively impact emergency response personnel/services.
Government	None	None	Harden infrastructure such a locating utilities under ground. Trimming trees back from power lines Designate snow routes and strengthen critical road sections and bridges. Adopt ordinances that regulate the type and quantity of trees planted near utility lines Relocate critical infrastructure, such as power lines, underground	Support programs such as "Tree Watch" that proactively manage problem areas by use of selective removal of hazardous trees, tree replacement, etc Enforce building codes that require all roofs to withstand snow loads. Increase communication alternatives Modify land use and environmental regulations to support vegetation management activities that improve reliability in utility corridors. Modify landscape and other ordinances to encourage appropriate planting near overhead power, cable, and phone lines Promote awareness and participation in alert systems such as NYAlert Provide NOAA weather radios to the public Create/Enhance "mutual aid" agreements for response to all emergencies Create/identify evacuation routes to be utilized during severe storm events. Develop debris management plans. Join "Storm-Ready" program Provide early warning of impending severe storm events to identified critical or essential facilities. This would include facilities such as large employments centers, schools, hospitals Promote emergency power supplies to private property. Improve, expand or harden communications facilities and services Recruit additional emergency personnel or use mutual aid agreements

Risk Reduction Measures	Hazard Category			
	Severe Storms (including Severe Winter Storms)			
	Manipulate Hazard	Reduce Exposure	Vulnerability	Capability
				Increase sheltering capabilities Increase capability to respond to power outages and downed power lines. Establish partnerships with utility providers through pro-active planning.

Risk Reduction Measures	Hazard Category			
	Earthquake			
	Manipulate Hazard	Reduce Exposure	Reduce Vulnerability	Increase Capability
Personal scale	None	Locate outside of hazard area (off soft soils)	<p>Retrofit structure (anchor house structure to foundation)</p> <p>Secure household items that can cause injury or damage such as water heaters, bookcases, and other appliances</p> <p>Build to higher design standards</p>	<p>Practice "drop, cover and hold"</p> <p>Develop household mitigation plan, such as creating a retrofit savings account, communication capability with outside, 72 hr self-sufficiency during an event</p> <p>Increase capability by having cash reserves for reconstruction</p> <p>Become informed on the hazard and risk reduction alternatives available.</p> <p>Develop a post-disaster action plan for your household.</p>
Corporate scale	None	Locate/relocate mission critical functions outside hazard area where possible.	<p>Build redundancy for critical functions/facilities</p> <p>Retrofit critical buildings/areas housing mission critical functions.</p>	<p>Adopt higher standard for new construction -- Consider "performance based design" when building new structures</p> <p>Increase capability by having cash reserves for reconstruction</p> <p>Inform your employees on the possible impacts of earthquake and how to deal with them at your work facility.</p> <p>Develop a Continuity of Operations Plan (COOP)</p>
Government	None	Locate critical facilities or functions outside of hazard area where possible.	<p>Harden infrastructure</p> <p>Provide redundancy for critical functions</p> <p>Adopt higher regulatory standards for structures</p> <p>Conduct "rapid screening" programs for critical facilities to identify facilities that may be particularly prone to EQ damage, then develop investigation/action plans to address such structures</p>	<p>Provide better hazard maps</p> <p>Provide technical information and guidance</p> <p>Enact tools to help manage development in hazard areas: tax incentives, information</p> <p>Include retrofitting/replacement of critical system elements in CIP</p> <p>Develop strategy to take advantage of post disaster opportunities</p> <p>Warehouse critical infrastructure components such as pipe, power line, and road repair material.</p> <p>Develop and adopt a Continuity of Operations / Continuity of Government Plan (COOP/COG)</p> <p>Initiate triggers guiding improvements such as: (< 50% substantial damage/improvements)</p> <p>Further enhance seismic risk assessment to target high hazard buildings for mitigation opportunities.</p> <p>Develop a post disaster action plan that includes a grant funding and debris removal components.</p> <p>Utilize warning systems such as NY Alert</p> <p>Educate builders and developers on seismic construction standards</p>

Risk Reduction Measures	<i>Hazard Category</i>			
	Ground Failure			
	Manipulate Hazard	Reduce Exposure	Reduce Vulnerability	Increase Capability
Government		<p>Consider hazard areas in land-use planning, zoning and development siting</p> <p>Acquire structures in highest hazard areas (demolish and convert to restricted open space)</p> <p>Relocation of Structures</p> <p>Open Space Preservation</p>	<p>Consider hazard areas in land-use planning and development siting</p> <p>Build structures in land subsidence areas on piers anchored to bedrock</p> <p>Stabilize vulnerable slopes near structures and infrastructure.</p> <p>Work with stakeholders such as USGS and SWCD to develop appropriate risk reduction strategies.</p>	<p>Increase understanding of hazard areas(e.g. Landslide Susceptibility Maps) -geotechnical surveys, LIDAR and mapping</p> <p>Work with stakeholders such as USGS, NYS - Geological Survey and SWCD to develop appropriate risk reduction strategies.</p> <p>Support and implement hazard disclosure for the sale/re-sale of property in identified risk zones</p> <p>Develop county-level programs to document slide events (landslide inventory), and maintain its currency</p>

Catalog of Risk Reduction Measures	Hazard Category			
	Extreme Temperatures			
	Manipulate Hazard	Reduce Exposure	Reduce Vulnerability	Increase Capability
Personal Scale	None	<p>Insulate structure</p> <p>Provide redundant power.</p> <p>Plant appropriate trees near home ("Right tree, right place" National Arbor Day Foundation Program).</p>	<p>Air condition non-conditioned buildings.</p> <p>Install backup heat (e.g. wood burning stoves)</p> <p>Incorporate "green building" methods (e.g. green roofs)</p>	<p>Be aware of impending heat waves.</p> <p>Inform yourself on the do's and don'ts during heat waves.</p> <p>Have fans available for use during peak demands in lue of air conditioning.</p> <p>Install back-up generators</p> <p>Know the location of cooling and warming shelters</p>
Corporate Scale	None	<p>Create redundancy to power supply to deal with power grid vulnerability during high demands</p>	<p>Air condition non-conditioned buildings.</p> <p>Incorporate "green building" methods (e.g. green roofs)</p>	<p>Inform employess of the seriousness of heat waves.</p> <p>Monitor weather forecasts.</p> <p>Establish a COOP.</p>
Government Scale	None	<p>Create redundancy to power supply to deal with power grid vulnerability during high demands</p>	<p>Air condition public buildings.</p> <p>Incorporate "green building" methods (e.g. green roofs)</p>	<p>Inform the public on the seriousness of heat-waves</p> <p>Identify populations vulnerable to extreme heat (elderly, poor) for early warning during potential heat waves.</p> <p>Enhance weather forecasting capability</p> <p>Distribute fans to vulnerable populations.</p> <p>Promote selective approaches to cooling your residences and businesses during peak demands.</p>