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

Greene County Natural Hazards Mitigation Plan

January-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.***

Risk Reduction Measures	Hazard Category			
	Drought			
	Manipulate Hazard	Reduce Exposure	Reduce Vulnerability	Increase Capability
Personal Scale	None	1.) Consider stored water/captured water techniques during dry seasons.	1.) Drought resistant landscapes 2.) Reduce Water system losses 3.) Modify plumbing sysytems, ie water saving kits	1.) Practice active water conservation techniques. 2.) Seek ways to operate wells in such a way to enhance their functional longevity and supply capability.
Corporate Scale	None	1.) Consider stored water/captured water techniques during dry seasons.	1.) Drought resistant landscapes 2.) reduce private water system losses 3.) identify alternate water supplysources.	1.) Practice active water conservation 2.) develop a water conservation plan. 3.) develop a COOP
Government Scale	1.) Ground Water Recharge through stormwater management 2.) implement cloud seeding techniques during dry seasons.	1.) Identify and create ground water back up sources. 2.) Create /identify new impounded water supply points.	1.) water use conflict regulations 2.) reduce water system losses 3.) Distribute water saving kits 4.) identify sites ideally suited for ground water recharge. 5.) Implement stormwater retention in regions ideally suited for groundwater recharges. 6.) Utilize drought resistant landsacpes on community owned facilities.	1.) Public education on drought resistance 2.) Identify alternative water supplies for time of drought. Mutual aid agreements with alternative supliers. 3.) Develop a drought contigency plan 4.) develop criteria-"triggers" for drought related actions 5.) Improve accuracy of water supply forecasts 6.) Provide incentives to influence active water conservation techniques such as water user rate reductions. 7.) Esatblish protocol for salt water de-salinization to be implemented during conditions of severe drought. 8.) consider providing incentives to property owners that utilize drought resistant landscapes in the design of their homes. 9.) Use of Water buffalo Tankers 10.) Promote well usage techniques that strive to enhance functional longevity and supply capability of private water supply wells.

Risk Reduction Measures	Hazard Category: Earthquake			
	Manipulate Hazard	Reduce Exposure	Reduce Vulnerability	Increase Capability
Personal scale	None	1.) Locate outside of hazard area (off soft soils)	1.) Retrofit structure (anchor house structure to foundation) 2.) Secure household items that can cause injury or damage such as water heaters, bookcases, and other appliances 3.) Build to higher design	1.) Practice "drop, cover and hold" 2.) Develop household mitigation plan, such as creating a retrofit savings account, communication capability with outside, 72 hr self-sufficiency during an event 3.) Increase capability by having cash reserves for reconstruction 4.) become informed on the hazard and risk reduction alternatives avaialble. 5.) develop a post-disater action plan for your houshold.
Corporate scale	None	1.) Locate/relocate mission critical functions outside hazard area where possible.	1.) Build redundancy for critical functions/facilities 2.) Retrofit critical buildings/areas housing mission critical functions. 3.) Anchor or stabilize utility equipment (electrical transformers and generators) to withstand earthquake forces and movements. Examples: anchor electrical transformers; combine equipment on one foundation 4.) Reinforce, restrain, or improve utility transmission lines and connections to withstand earthquake forces, soil movements and differential settlements. Examples: install expansion joints; reinforce 5.) Anchor or improve vertical/elevated tank structures or stand pipes to withstand earthquake forces and movements. 6.) Anchor critical equipment (e.g., computers) and shelving in offices, warehouses, and maintenance buildings in	1.) Adopt higher standard for new construction -- Consider "performance based design' when building new structures 2.) Increase capability by having cash reserves for reconstruction 3.) Inform your employees on the possible impacts of earthquake and how to deal with them at your work facility. 4.) Develop and adopt a Continuity of Operations Plan (COOP)
		1.) Locate critical facilities or functions outside of hazard area where possible.	1.) Harden infrastructure 2.) Provide redundancy for critical functions 3.) Higher regulatory standards for structures 4.) Enforce the seismic design provisions in the International Building Code for all new buildings and infrastructure. 5.) Anchor critical equipment (e.g., computers) and shelving in offices, warehouses, and maintenance buildings in	1.) Provide better hazard maps 2.) Provide technical information and guidance 3.) Enact tools to help manage development in hazard areas: tax incentives, information 4.) Include retrofitting/replacement of critical system elements in CIP 5.) Develop strategy to take advantage of post disaster opportunities

Risk Reduction Measures	Hazard Category			
	Earthquake			
	Manipulate Hazard	Reduce Exposure	Reduce Vulnerability	Increase Capability
Government	None		6.) Identify critical facilities constructed of un-reinforced masonry using local knowledge and/or pictometry/orthophotos. These facilities may not be functional during response/recovery efforts after an earthquake and alternative resources/assets should be identified in emergency response/recovery plans. 7.) Identify privately owned structures/residences constructed of un-reinforced masonry using local knowledge and/or pictometry/orthophotos. These buildings may not withstand earthquakes of certain magnitudes and plans to provide emergency response/recovery efforts for these properties should be in place.	6.) Ware house critical infrastructure components such as pipe, power line, and road repair material. 7.) Develop and adopt a Continuity of Operations Plan (COOP) 8.) Initiate triggers guiding improvements such as: (< 50% substantial damage/improvements) 9.) Further enhance seismic risk assessment to target high hazard buildings for mitigation opportunities. 10.) Develop a post disaster action plan that includes a grant funding and debris removal components. 11.) Educate builders and developers on seismic construction standards 12.) Add earthquakes to emergency response plans for training and drills for employees. 13.) Increase public awareness of potential earthquake hazards 14.) Enhance public education and outreach efforts to increase awareness of earthquake hazards and risks in Greene County. 15.) Enhance emergency preparedness/response capabilities by training building officials, engineers, architects, building owners, emergency managers, and/or interested citizens the Rapid Visual Screening (RVS) methodology outlined by FEMA in the Rapid Visual Screening of Buildings for Potential Seismic Hazards: A Handbook. Second Edition. RVS is used to identify, inventory and rank buildings posing risk of death, injury, or severe curtailment in use following an earthquake. 16.) Train building code officials on seismic standards/ design provisions in the International Building Code.

Risk Reduction Measures	Hazard Category			
	Extreme Temperatures			
	Manipulate Hazard	Reduce Exposure	Reduce Vulnerability	Increase Capability
Personal Scale	None	1.) Vacation in Cooler climates during summer months. 2.) Insulate house 3.) Provide redundant power. 4.) Insulate structure 5.) Plant appropriate trees near home ("Right tree, right place" National Arbor Day Foundation Program).	1.) Air Condition non-conditioned buildings. 2.) put in back-up wood burning stoves	1.) Be aware of impending heat waves. 2.) Inform yourself on the do's and don'ts during heat waves. 3.) Have fans available for use during peak 4.) Install back-up generators
Corporate Scale	None	1.) Create redundancy to power supply to deal with power grid vulnerability during high demands	1.) Air Condition non-conditioned buildings.	1.) Inform employess of the seriousness of heat waves. 2.) Monitor weather forecasts. 3.) Establish an COOP.
Government Scale	None	1.) Create redundancy to power supply to deal with power grid vulnerability during high demands	1.) Air condition public buildings.	1.) inform the public on the seriousness of heat-waves. 2.) Identify populations vulnerable to extreme heat (elderly, poor) for early warning during potential heat waves. 3.) Enhance weather forecasting capability 4.) Distribute fans to vulnerable populations. 5.) Promote selective approaches to cooling your home during peak demands.

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 2.) Elevate utilities above BFE 3.) Institute low impact development techniques on property	1.) Retrofit structure (Elevate structure above BFE) 2.) Elevate items with house above BFE 3.) Build new homes above BFE 4.) Floodproof existing structures.	1.) Enforce NFIP 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
Corporate scale	1.) Clear stormwater drains and culverts	1.) Locate business critical facilities or functions outside hazard area 2.) Institute low impact development techniques on property	1.) Build redundancy for critical functions/ retrofit critical buildings. 2.) Provide flood-proofing measures when new critical infrastructure must be located in floodplains.	1.) Increase capability by having cash reserves for reconstruction 2.) Suport and implement hazard disclosure for the sale/re-sale of property in identified risk zones. 3.) Solicit 'cost-sharing" through partnerships with private sector stake holders o0n projects with multiple benefits.
Government Scale	1.) Clear stormwater drains and culverts 2.) Dredging, levee construction, providing retention areas… 3.) Structural flood control: levee's, dams, channelization, revetments. 4.) Construct regtional stormwater control facilites	1.) Locate/re-locate critical facilities outside of hazard area 2.) Acquire or relocate identified repetitive loss properties. 3.) Promote open space uses in identified high hazard areas via techniques such as:PUD's, easements, setbacks, greenways, sensitive area tracks. 4.) Adopt land development criteria such as PUD's, Density transfers, clustering 5.) Institute low impact development techniques on property 6.) Acquire vacant land or promote open space uses in developing watersheds to control increases in runoff	1.) Harden infrastructure 2.) Provide redundancy for critical functions and infrastructure 3.) Adopt appropriate regulatory standards such as cumulative substantial improvement/damage, freeboard, lower substantial damage threshold, compensatory storage. 4.) Stormwater management regulations and master planning. 5.) Adopt "no-adverse impact" floodplain management policies that strive to not increase the flood risk on down-stream communities. 6.) Participate in the Community Rating System (CRS) 7.) Implelment as-built regulatory requirements, 8.) Implement site review ordinances/requirements	1.) Produce better hazard maps 2.) Capture/survey "high-water" marks during flood events. 3.) Provide technical information and guidance 4.) Enact tools to help manage development in hazard areas (stronger controls, tax incentives, information) 5.) Incorporate retrofitting/replacement of critical system elements in CIP 6.) Develop strategy to take advantage of post disaster opportunities 7.) Warehouse critical infrastructure components 8.) Develop and adopt a COOP 9.) Join CRS program 10.) Maintain existing data as well as gather new data needed to define risks and vulnerability. 11.) Train emergency responders

Risk Reduction Measures	Hazard Category			
	Flooding			
	Manipulate Hazard	Reduce Exposure	Reduce Vulnerability	Increase Capability
				12.) Create a building and elevation inventory of structures in the floodplain 13.) develop and implement a public information strategy 14.) Charge a Hazard mitigation fee on all new permits to create a hazard mitigation funding source for initiatives or grant cost share requirments. 15.) Integrate floodplian mangement policies into other planning mechanisms within the planning area. 16.) Establish a Stormwater Utility to deal with urban drainage/flooding issues 17.) Establish incentives to promote flood hazard mitigation of private property. 18.) Develop mitigation partnerships with Stakeholders 19.) Join "Storm Ready" Program 20.) Participate in County Training Programs 21.) Implement annual training to account for high turnover of municipal officials. 22.) Educate public on Flood Hazards

Risk Reduction Measures	Hazard Category			
	Severe Storms			
	Manipulate Hazard	Reduce Exposure	Reduce Vulnerability	Increase Capability
Personal Scale	None	None	1.) Insulate house 2.) Provide redundant heat and power. 3.) Insulate structure 4.) Plant appropriate trees near home and power lines ("Right tree, right place" National Arbor Day Foundation Program.	1.) Trim or remove trees that could effect power lines 2.) Promote 72 hour self-sufficiency 3.) Obtain a NOAA wether radio. 4.) Obtain an emergency generator.
Corporate Scale	None	None	1.) Relocate critical infrastructure, such as power lines, underground 2.) Reinforce or relocate critical infrastructure such as powerlines so that it meets performance expectations. 3.) Install tree wire	1.) Trim or remove trees that could affect power lines 2.) Create redundancy 3.) Equip your facilities with a NOAA weather radio 4.) Equip vital facilites with emergency power sources. 5.) Montor 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	1.) Harden infrastructure such a locating utilities under ground. 2.) Trimming trees back from power lines 3.) Designate snow routes and strengthen critical road sections and bridges. 4.) Adopt ordinances that regulate the type and quantity of tress planted near utility lines 5.) Relocate critical infrastructure, such as power lines, underground	1.) Support programs such as "Tree Watch" that proactively manage problem areas by use of selective removal of hazardous trees, tree replacement, etc 2.) Establish and enforce building codes that require all roofs to withstand snow loads 3.) Increase communication alternatives 4.) Modify land use and environmental regulations to support vegetation management activities that improve reliability in utility corridors. 5.) Modify landscape and other ordinances to encourage appropriate planting near overhead power, cable, and phone lines 6.) Provide NOAA weather radios to the public 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

Risk Reduction Measures	Hazard Category			
	Severe Storms			
	Manipulate Hazard	Reduce Exposure	Reduce Vulnerability	Increase Capability
				10.) 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. 11.) Promote emergency power supplies to private property. 12.) Improve cell phone service 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 pro-active planning.

Risk Reduction Measures	Hazard Category			
	Severe Winter Storms			
	Manipulate Hazard	Reduce Exposure	Reduce Vulnerability	Increase Capability
Personal scale	None	None	1.) Insulate house 2.) Provide redundant heat and power. 3.) Insulate structure 4.) Plant appropriate trees near home and power lines ("Right tree, right place" National Arbor Day Foundation Program).	1.) Trim or remove trees that could effect power lines 2.) Promote 72 hour self-sufficiency 3.) Be aware of inclement weather conditions, and move your vehicles off of the street as severe weather systems approach. 4.) Retrofit structures
Corporate Scale	None	None	1.) Relocate critical infrastructure, such as power lines, underground 2.) Reinforce or relocate critical infrastructure such as powerlines so that it meets performance expectations. 3.) Install tree wire	1.) Trim or remove trees that could affect power lines 2.) Create redundancy in utilities and communications 3.) Develop a Continuity of Operations Plan (COOP) to address operations before, during and after coastal storm events. 4.) Utilize weather radios at the work place to keep your employees apprised of severe weather conditions.
Government	None	None	1.) Harden infrastructure such a locating utilities under ground where appropriate. 2.) Trimming trees back from power lines 3.) Designate snow routes and strengthen critical road sections and bridges. 4.) Adopt codes and regulations that address the issues of parking of vehicles along roadways during severe weather events. 5.) Develop or enhance the capacity/capability of stormwater conveyance systems. 6.) Provide backup power sources at vital critical facilities.	1.) Support programs such as "Tree Watch" that proactively manage problem areas by use of selective removal of hazardous trees, tree replacement, etc 2.) Establish and enforce building codes that require all roofs to withstand snow loads--Develop/Improve?Enforce building Codes in Hazard Areas 3.) Increase communication alternatives 4.) Modify land use and environmental regulations to support vegetation management activities that improve reliability in utility corridors. 5.) Modify landscape and other ordinances to encourage appropriate planting near overhead power, cable, and phone lines 6.) Provide weather radios to vulnerable populations

Risk Reduction Measures	Hazard Category			
	Severe Winter Storms			
	Manipulate Hazard	Reduce Exposure	Reduce Vulnerability	Increase Capability
				7.) Enhance public awareness campaigns to address those issues of alert and warning and actions to take during severe weather 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 and the dissemination of warning amongst those agencies within the planning are with the highest degree of capability. 10.) Promote flood insurance. 11.) Join the Community Rating System 12.) Join "Storm-Ready" 13.) Retrofit critical structures and promote hazard resistant construction

Risk Reduction Measures	Hazard Category			
	Ground Failure			
	Manipulate Hazard	Reduce Exposure	Reduce Vulnerability	Increase Capability
Personal Scale	None	None	None	None
Corporate Scale	None	None	None	None
Government	None	1.) Consider hazard areas in land-use planning, zoning and development siting 2.) Acquisition of structures in highest hazard areas (demolish and convert to restricted open space) 3.) Relocation of Structures 4.) Open Space Preservation	1.) Consider hazard areas in land-use planning and development siting 2.) Build structures in land subsidence areas on piers anchored to bedrock	1.) Increase understanding of hazard areas - LIDAR and geotechnical surveys, mapping