



## APPENDIX E. MITIGATION CATALOG

A mitigation catalog was developed to assist the Planning Partnership with developing mitigation actions for their jurisdiction. The mitigation catalog includes a comprehensive list of mitigation actions to be considered that meet the following objectives:

- Use information obtained from the public involvement strategy
- Use information provided in the risk assessment
- Use information obtained during the Strengths, Weaknesses, Obstacles, and Opportunities (SWOO) exercise
- Seek mitigation actions consistent with the goals and objectives for the Putnam County HMP; and
- Create catalogs of mitigation actions to be used as a tool by the Planning Partnership in selection of mitigation actions.

DRAFT

## DISEASE OUTBREAK

Personal Scale	Corporate Scale	Government Scale
<ul style="list-style-type: none"> <li>• <b>Manipulate the Hazard:</b> <ul style="list-style-type: none"> <li>○ None</li> </ul> </li> <li>• <b>Reduce exposure to the hazard:</b> <ul style="list-style-type: none"> <li>○ Proper hygiene</li> <li>○ PPE</li> <li>○ Social distancing</li> </ul> </li> <li>• <b>Reduce vulnerability to the hazard:</b> <ul style="list-style-type: none"> <li>○ Focus on personal health</li> </ul> </li> <li>• <b>Increase Capability</b> <ul style="list-style-type: none"> <li>○ Storage of PPE</li> <li>○ Storage of supplies and food to reduce need to enter public spaces</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• <b>Manipulate the Hazard:</b> <ul style="list-style-type: none"> <li>○ None</li> </ul> </li> <li>• <b>Reduce exposure to the hazard:</b> <ul style="list-style-type: none"> <li>○ PPE</li> <li>○ Social distancing</li> </ul> </li> <li>• <b>Reduce vulnerability to the hazard:</b> <ul style="list-style-type: none"> <li>○ Distanced work environment</li> <li>○ Regular cleaning of work environment</li> </ul> </li> <li>• <b>Increase Capability:</b> <ul style="list-style-type: none"> <li>○ Storage of PPE</li> <li>○ Equipment for monitoring</li> <li>○ Trainings for staff</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• <b>Manipulate the Hazard:</b> <ul style="list-style-type: none"> <li>○ None</li> </ul> </li> <li>• <b>Reduce exposure to the hazard:</b> <ul style="list-style-type: none"> <li>○ PPE</li> <li>○ Social distancing</li> </ul> </li> <li>• <b>Reduce vulnerability to the hazard:</b> <ul style="list-style-type: none"> <li>○ Distanced work environment</li> <li>○ Regular cleaning of work environment</li> </ul> </li> <li>• <b>Increase Capability:</b> <ul style="list-style-type: none"> <li>○ Storage of PPE</li> <li>○ Equipment for monitoring/treatment</li> <li>○ Trainings for staff</li> <li>○ Public outreach</li> </ul> </li> </ul>

*Note: Disease Outbreak is a new hazard to the 2020 Update*

## DROUGHT

### Personal Scale

- **Manipulate the Hazard:**
  - None
- **Reduce exposure to the hazard:**
  - Consider stored water/captured water techniques during dry seasons.
  - Establishing an irrigation time/scheduling program or process so that all agricultural land gets the required amount of water. Through incremental timing, each area is irrigated at different times so that all water is not consumed at the same time. Spacing usage may also help with recharge of groundwater.
- **Reduce vulnerability to the hazard:**
  - Drought resistant landscapes
  - Reduce water system losses
  - Regularly check for leaks to minimize water supply losses
  - Install low-flow water saving showerheads and toilets
  - Turn water flow off while brushing teeth or during other cleaning activities
  - Adjust sprinklers to water the lawn and not the sidewalk or street.
  - Run the dishwasher and washing machine only when they are full.
  - Check for leaks in plumbing or dripping faucets.
  - Install rain-capturing devices for irrigation.
  - Install graywater systems in homes to encourage water reuse.
  - Rotate crops by growing a series of different types of crops on the same

### Corporate Scale

- **Manipulate the Hazard:**
  - None
- **Reduce exposure to the hazard:**
  - Consider stored water/captured water techniques during dry seasons.
- **Reduce vulnerability to the hazard:**
  - Drought resistant landscapes
  - Reduce private water system losses
  - Identify alternate water supply sources.
  - Install low-flow water saving showerheads and toilets
  - Adjust sprinklers to water the lawn and not the sidewalk or street.
- **Increase Capability:**
  - Practice active water conservation
  - Develop a COOP
  - Create a water conservation plan.

### Government Scale

- **Manipulate the Hazard:**
  - Ground Water Recharge through stormwater management
  - Implement cloud seeding techniques during dry seasons.
- **Reduce exposure to the hazard:**
  - Identify and create ground water back up sources.
  - Create /identify new impounded water supply points.
  - Developing new or upgrading existing water delivery systems to eliminate breaks and leaks.
- **Reduce vulnerability to the hazard:**
  - Water use conflict regulations
  - Reduce water system losses
  - Distribute water saving kits
  - Identify sites ideally suited for ground water recharge.
  - Implement stormwater retention in regions ideally suited for groundwater recharges.
  - Utilize drought resistant landscapes on community owned facilities.
  - Encourage citizens to take water-saving measures
- **Increase Capability:**
  - Public education on drought resistance
  - Identify alternative water supplies for time of drought. Mutual aid agreements with alternative suppliers.
  - Develop a drought contingency plan
  - Develop criteria-"triggers" for drought related actions
  - Improve accuracy of water supply forecasts

## DROUGHT

### Personal Scale

- fields every season to reduce soil erosion.
- Planting “cover crops,” such as oats, wheat, and buckwheat, to prevent soil erosion.
- **Increase Capability**
  - Practice active water conservation techniques.
  - Seek ways to operate wells in such a way to enhance their functional longevity and supply capability.

### Corporate Scale

### Government Scale

- Provide incentives to influence active water conservation techniques such as water user rate reductions.
- Establish protocol for salt water desalinization to be implemented during conditions of severe drought.
- Consider providing incentives to property owners that utilize drought resistant landscapes in the design of their homes.
- Use of water buffalo tankers
- Promote well usage techniques that strive to enhance functional longevity and supply capability of private water supply wells.
- Develop an ordinance to restrict the use of public water resources for non-essential usage, such as landscaping, washing cars, filling swimming pools, etc.

## EARTHQUAKES

Personal Scale	Corporate Scale	Government Scale
<ul style="list-style-type: none"> <li>• <b>Manipulate the Hazard:</b> <ul style="list-style-type: none"> <li>○ None</li> </ul> </li> <li>• <b>Reduce exposure to the hazard:</b> <ul style="list-style-type: none"> <li>○ Locate outside of hazard area (off soft soils)</li> </ul> </li> <li>• <b>Reduce vulnerability to the hazard:</b> <ul style="list-style-type: none"> <li>○ Retrofit structure (anchor house structure to foundation)</li> <li>○ Secure household items that can cause injury or damage such as water heaters, bookcases, and other appliances</li> <li>○ Build to higher design standards</li> </ul> </li> <li>• <b>Increase Capability</b> <ul style="list-style-type: none"> <li>○ Practice "drop, cover and hold"</li> <li>○ Develop household mitigation plan, such as creating a retrofit savings account, communication capability with outside, 72 hr. self-sufficiency during an event</li> <li>○ Increase capability by having cash reserves for reconstruction</li> <li>○ Become informed on the hazard and risk reduction alternatives available.</li> <li>○ Develop a post-disaster action plan for your household.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• <b>Manipulate the Hazard:</b> <ul style="list-style-type: none"> <li>○ None</li> </ul> </li> <li>• <b>Reduce exposure to the hazard:</b> <ul style="list-style-type: none"> <li>○ Locate/relocate mission critical functions outside hazard area where possible.</li> </ul> </li> <li>• <b>Reduce vulnerability to the hazard:</b> <ul style="list-style-type: none"> <li>○ Build redundancy for critical functions/facilities</li> <li>○ Retrofit critical buildings/areas housing mission critical functions.</li> </ul> </li> <li>• <b>Increase Capability:</b> <ul style="list-style-type: none"> <li>○ Adopt higher standard for new construction -- Consider "performance-based design" when building new structures</li> <li>○ Increase capability by having cash reserves for reconstruction</li> <li>○ Inform your employees on the possible impacts of earthquake and how to deal with them at your work facility.</li> <li>○ Develop a Continuity of Operations Plan (COOP)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• <b>Manipulate the Hazard:</b> <ul style="list-style-type: none"> <li>○ None</li> </ul> </li> <li>• <b>Reduce exposure to the hazard:</b> <ul style="list-style-type: none"> <li>○ Locate critical facilities or functions outside of hazard area where possible.</li> </ul> </li> <li>• <b>Reduce vulnerability to the hazard:</b> <ul style="list-style-type: none"> <li>○ Harden infrastructure</li> <li>○ Provide redundancy for critical functions</li> <li>○ Adopt higher regulatory standards for structures</li> <li>○ 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</li> </ul> </li> <li>• <b>Increase Capability:</b> <ul style="list-style-type: none"> <li>○ Provide better hazard maps</li> <li>○ Provide technical information and guidance</li> <li>○ Enact tools to help manage development in hazard areas: tax incentives, information</li> <li>○ Include retrofitting/replacement of critical system elements in CIP</li> <li>○ Develop strategy to take advantage of post disaster opportunities</li> <li>○ Warehouse critical infrastructure components such as pipe, power line, and road repair material.</li> <li>○ Develop and adopt a Continuity of Operations / Continuity of Government Plan (COOP/COG)</li> </ul> </li> </ul>

		<ul style="list-style-type: none"><li>○ Initiate triggers guiding improvements such as: (&lt; 50% substantial damage/improvements)</li><li>○ Further enhance seismic risk assessment to target high hazard buildings for mitigation opportunities.</li><li>○ Develop a post disaster action plan that includes a grant funding and debris removal components.</li><li>○ Utilize warning systems such as NY Alert</li><li>○ Educate builders and developers on seismic construction standards</li></ul>
--	--	--

## EXTREME TEMPERATURES

Personal Scale	Corporate Scale	Government Scale
<ul style="list-style-type: none"> <li>• <b>Manipulate the Hazard:</b> <ul style="list-style-type: none"> <li>○ None</li> </ul> </li> <li>• <b>Reduce exposure to the hazard:</b> <ul style="list-style-type: none"> <li>○ Insulate structure</li> <li>○ Provide redundant power.</li> <li>○ Plant appropriate trees near home ("Right tree, right place" National Arbor Day Foundation Program).</li> </ul> </li> <li>• <b>Reduce vulnerability to the hazard:</b> <ul style="list-style-type: none"> <li>○ Air condition non-conditioned buildings.</li> <li>○ Install backup heat (e.g. wood burning stoves)</li> <li>○ Incorporate "green building" methods (e.g. green roofs)</li> </ul> </li> <li>• <b>Increase Capability</b> <ul style="list-style-type: none"> <li>○ Be aware of impending heat waves.</li> <li>○ Understand best management practices for what to do and not do during a heat wave.</li> <li>○ Have fans available for use during peak demands in leu of air conditioning.</li> <li>○ Install back-up generators</li> <li>○ Know the location of cooling and warming shelters</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• <b>Manipulate the Hazard:</b> <ul style="list-style-type: none"> <li>○ None</li> </ul> </li> <li>• <b>Reduce exposure to the hazard:</b> <ul style="list-style-type: none"> <li>○ Create redundancy to power supply to deal with power grid vulnerability during high demands</li> </ul> </li> <li>• <b>Reduce vulnerability to the hazard:</b> <ul style="list-style-type: none"> <li>○ Air condition non-conditioned buildings.</li> <li>○ Incorporate "green building" methods (e.g. green roofs)</li> </ul> </li> <li>• <b>Increase Capability:</b> <ul style="list-style-type: none"> <li>○ Inform employees of the seriousness of heat waves.</li> <li>○ Monitor weather forecasts.</li> <li>○ Establish a COOP.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• <b>Manipulate the Hazard:</b> <ul style="list-style-type: none"> <li>○ None</li> </ul> </li> <li>• <b>Reduce exposure to the hazard:</b> <ul style="list-style-type: none"> <li>○ Create redundancy to power supply to deal with power grid vulnerability during high demands</li> </ul> </li> <li>• <b>Reduce vulnerability to the hazard:</b> <ul style="list-style-type: none"> <li>○ Air condition public buildings.</li> <li>○ Incorporate "green building" methods (e.g. green roofs)</li> </ul> </li> <li>• <b>Increase Capability:</b> <ul style="list-style-type: none"> <li>○ Inform the public on the seriousness of heat-waves</li> <li>○ Identify populations vulnerable to extreme heat (elderly, poor) for early warning during potential heat waves.</li> <li>○ Enhance weather forecasting capability</li> <li>○ Distribute fans to vulnerable populations.</li> <li>○ Promote selective approaches to cooling your residences and businesses during peak demands.</li> </ul> </li> </ul>

## FLOOD

### Personal Scale

- **Manipulate the Hazard:**
  - Clear stormwater drains and culverts
- **Reduce exposure to the hazard:**
  - Locate or re-locate outside of hazard area
  - Institute low impact development techniques on property
- **Reduce vulnerability to the hazard:**
  - Retrofit existing structures and utilities above Base Flood Elevation (BFE)
  - Floodproof existing structures (wet- or dry floodproofing).
  - Store hazardous materials above BFE or outside of floodprone areas
- **Increase Capability**
  - Develop household mitigation plan, such as retrofit savings, communication capability with outside, 72-hr. self-sufficiency during and after an event
  - Buy flood insurance

### Corporate Scale

- **Manipulate the Hazard:**
  - Clear stormwater drains and culverts
- **Reduce exposure to the hazard:**
  - Locate business critical facilities or functions outside hazard area
  - Institute low impact development techniques on property
- **Reduce vulnerability to the hazard:**
  - Build redundancy for critical functions/ retrofit critical buildings.
  - Provide flood-proofing measures when new critical infrastructure must be located in floodplains.
  - Harden structures and infrastructure (wet and dry-floodproofing)
  - Store hazardous materials above BFE or outside of floodprone areas
- **Increase Capability:**
  - Increase capability by having cash reserves for reconstruction
  - Develop and adopt a Continuity of Operations Plan (COOP)
  - Solicit "cost-sharing" through partnerships with private sector stakeholders on projects with multiple benefits.
  - **Dam owner/operators should continue to be aware of and understand dam inspection and reporting requirements.**
  - **Ensure that all dam EAP's are kept in compliance with NYSDEC Regulations.**

### Government Scale

- **Manipulate the Hazard:**
  - Clear stormwater drains and culverts
  - Dredging, levee construction, providing retention areas...
  - Structural flood control: levee's, dams, channelization, revetments.
  - Construct regional stormwater control facilities
  - **Lead and develop a county-wide stream clearing strategy including the development of thresholds for response/action.**
- **Reduce exposure to the hazard:**
  - Locate/re-locate critical facilities outside of hazard area
  - Acquire or relocate identified repetitive loss properties.
  - Promote open space uses in identified high hazard areas via techniques such as: PUD's, easements, setbacks, greenways, sensitive area tracks.
  - Adopt land development criteria such as PUD's, Density transfers, clustering
  - Institute low impact development techniques on property
  - Acquire vacant land or promote open space uses in developing watersheds to control increases in runoff
  - **Pass an ordinance to incorporate additional zoning classifications into flood zones within each municipality.**
  - **Increase floodplain standards within municipal ordinances and include provisions for enforcing best practice standards by requiring a minimum freeboard of 2' to align with NY State Standards.**



# FLOOD

## Personal Scale

## Corporate Scale

## Government Scale

- **Continue development application reviews by County Planning Board to reduce risky development practices.**
- **Reduce vulnerability to the hazard:**
  - Harden structures and infrastructure (wet and dry-floodproofing)
  - Provide redundancy for critical functions and infrastructure
  - Adopt appropriate regulatory standards such as cumulative substantial improvement/damage, freeboard, lower substantial damage threshold, compensatory storage.
  - Stormwater management regulations and master planning.
  - Adopt "no-adverse impact" floodplain management policies that strive to not increase the flood risk on down-stream communities.
  - Participate in the Community Rating System (CRS)
  - Implement as-built regulatory requirements
  - Implement site review ordinances/requirements
  - Establish stream maintenance programs with stakeholders (e.g. Soil and Water Conservation District) - support county leads of such efforts
  - Incorporate retrofitting/replacement of critical facilities and infrastructure in Capital Improvement Plans (CIPs)
  - **Promote the use of vegetation/plants as green erosion control measures to reduce localized flooding.**

# FLOOD

## Personal Scale

## Corporate Scale

## Government Scale

- **Work with the SWCD to address removal of debris, log jams, etc. in flood vulnerable stream sections**
- **Increase Capability:**
  - Produce better hazard maps, and improve access to flood hazard mapping
  - Capture/survey "high-water" marks during flood events.
  - Provide technical information and guidance on appropriate mitigation options available to businesses and homeowners
  - Enact tools to help manage development in hazard areas (stronger controls, tax incentives, information)
  - Establish an additional layer of zoning within flood hazard areas (Cicero as an example)
  - Develop strategy to take advantage of post disaster opportunities
  - Improve compliance with and enforcement of the NFIP
  - Develop mitigation partnerships with regional stakeholders (i.e.: CNY RPDB)
  - Join Community Rating System (CRS) program, or improve level of participation in CRS
  - Develop and implement a public information strategy for flood hazard awareness, flood insurance (NFIP) and mitigation
  - Maintain existing data as well as gather new data needed to define risks and vulnerability.

## FLOOD

### Personal Scale

### Corporate Scale

### Government Scale

- Create a building and elevation inventory of structures in the floodplain
- Identify flood prone areas that may be in need of new flood studies
- Establish a program to identify and educate owners of flood-prone properties of potential mitigation options (e.g. elevations, relocations)
- Charge a hazard mitigation fee on all new permits to create a hazard mitigation funding source for initiatives or grant cost share requirements.
- Integrate floodplain management policies into other planning mechanisms within the planning area.
- Establish a Stormwater Utility to deal with urban drainage/flooding issues
- Establish incentives to promote flood hazard mitigation of private property (e.g. permit fee waivers).
- Adopt ordinances/standards for cumulative damages and/or improvements
- Upgrade NFIP Floodplain ordinance, as well as other ordinances to current or above current standards.
- Develop and adopt a COOP
- Join "Storm Ready" Program
- Participate in county and regional training programs
- Provide additional training/certification to NFIP floodplain administrators and code officials.

## FLOOD

### Personal Scale

### Corporate Scale

### Government Scale

- Implement annual training to account for high turnover of municipal officials.
- Maintain and enhance flood forecasting ability, including the establishment and maintenance of critical stream gages
- Promote awareness and participation in alert systems such as NYAlert
- Support and participate in regional flood management efforts, such as the Flood Mitigation Task Force or similar efforts
- Support and implement hazard disclosure for the sale/re-sale of property in identified risk zones.
- Provide continued and enhanced training for emergency responders
- Establish a revolving "bank" or budget line item to fund grant application support

## HARMFUL ALGAL BLOOM

Personal Scale	Corporate Scale	Government Scale
<ul style="list-style-type: none"> <li>• <b>Manipulate the Hazard:</b> <ul style="list-style-type: none"> <li>○ None</li> </ul> </li> <li>• <b>Reduce exposure to the hazard:</b> <ul style="list-style-type: none"> <li>○ Comply with harmful algal bloom rules and regulations to minimize the exposure to HAB.</li> </ul> </li> <li>• <b>Reduce vulnerability to the hazard:</b> <ul style="list-style-type: none"> <li>○ Form citizen action groups to promote awareness and best practices on local levels.</li> </ul> </li> <li>• <b>Increase Capability</b> <ul style="list-style-type: none"> <li>○ Regularly check the NYSDEC HAB Notifications Page for information regarding</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• <b>Manipulate the Hazard:</b> <ul style="list-style-type: none"> <li>○ None</li> </ul> </li> <li>• <b>Reduce exposure to the hazard:</b> <ul style="list-style-type: none"> <li>○ None</li> </ul> </li> <li>• <b>Reduce vulnerability to the hazard:</b> <ul style="list-style-type: none"> <li>○ None</li> </ul> </li> <li>• <b>Increase Capability:</b> <ul style="list-style-type: none"> <li>○ Build and maintain partnerships with other stakeholders to coordinate information sharing, and response for Harmful Algal Bloom events throughout the county/region.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• <b>Manipulate the Hazard:</b> <ul style="list-style-type: none"> <li>○ None</li> </ul> </li> <li>• <b>Reduce exposure to the hazard:</b> <ul style="list-style-type: none"> <li>○ Create/disseminate planting guides which explain Harmful Algal Bloom safety both recreationally and for drinking water purposes.</li> </ul> </li> <li>• <b>Reduce vulnerability to the hazard:</b> <ul style="list-style-type: none"> <li>○ Pass municipal ordinances to enforce best practices for invasive species at the local level.</li> </ul> </li> <li>• <b>Increase Capability:</b> <ul style="list-style-type: none"> <li>○ Build and maintain partnerships with other stakeholders to coordinate information sharing, and response for Harmful Algal Bloom throughout the county/region.</li> <li>○ Work with federal/state agencies to disseminate information to local municipalities regarding Harmful Algal Bloom</li> <li>○ Disseminate information to the general public to educate them on Harmful Algal Bloom</li> <li>○ Work with stakeholders to identify and expand resources for prevention and early detection of Harmful Algal Bloom</li> </ul> </li> </ul>

Note: Harmful Algal Bloom is a new hazard to the 2020 Update

## SEVERE STORMS

### Personal Scale

- **Manipulate the Hazard:**
  - None
- **Reduce exposure to the hazard:**
  - None
- **Reduce vulnerability to the hazard:**
  - Retrofit structures (improved roofing, installing storm shutters, 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.
- **Increase Capability**
  - 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

- **Manipulate the Hazard:**
  - None
- **Reduce exposure to the hazard:**
  - None
- **Reduce vulnerability to the hazard:**
  - Relocate critical infrastructure, such as power lines, underground
  - Reinforce or relocate critical infrastructure such as powerlines so that it meets performance expectations.
- **Increase Capability:**
  - 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.
  - During power outages, utility companies to assign staff to work with county and local highway departments.

### Government Scale

- **Manipulate the Hazard:**
  - None
- **Reduce exposure to the hazard:**
  - None
- **Reduce vulnerability to the hazard:**
  - Harden infrastructure such as locating utilities underground.
  - Trimming trees back from power lines
  - Designate evacuation 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
- **Increase Capability:**
  - Implement a program that proactively manages 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

**SEVERE STORMS**

**Personal Scale**

**Corporate Scale**

**Government Scale**

- 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
- Increase sheltering capabilities
- Increase capability to respond to power outages and downed power lines. Establish partnerships with utility providers through pro-active planning.

## SEVERE WINTER STORMS

### Personal Scale

- **Manipulate the Hazard:**
  - None
- **Reduce exposure to the hazard:**
  - Plant appropriate trees near home and power lines (“Right tree, right place” National Arbor Day Foundation)
- **Reduce vulnerability to the hazard:**
  - Insulate House to provide greater thermal efficiency and reduce heat loss.
  - Provide redundant heat and power
  - Insulate Structure
  - Ensure natural gas input/release valves do not get covered in snow
- **Increase Capability**
  - Trim or remove trees that could affect power lines
  - Prepare emergency food and supplies to be self-sufficient for at least 72 hours in the event of a severe winter storm.
  - Be aware of inclement weather conditions and move your vehicles off of the street as severe weather systems approach.
  - Retrofit structures

### Corporate Scale

- **Manipulate the Hazard:**
  - None
- **Reduce exposure to the hazard:**
  - None
- **Reduce vulnerability to the hazard:**
  - Relocate critical infrastructure, such as power lines, underground
  - Reinforce or relocate critical infrastructure such as powerlines so that it meets performance expectations.
  - Install tree wire
- **Increase Capability:**
  - Trim or remove trees that could affect power lines
  - Create redundancy in utilities and communications
  - Develop a Continuity of Operations Plan (COOP) to address operations before, during and after coastal storm events.
  - Utilize weather radios at the work place to keep your employees aware of severe weather conditions.

### Government Scale

- **Manipulate the Hazard:**
  - None
- **Reduce exposure to the hazard:**
  - None
- **Reduce vulnerability to the hazard:**
  - Harden infrastructure such as locating utilities underground where appropriate.
  - Trimming trees back from power lines
  - Designate snow routes and strengthen critical road sections and bridges.
  - Adopt codes and regulations that address the issues of parking of vehicles along roadways during severe weather events.
  - Develop or enhance the capacity/capability of stormwater conveyance systems.
  - Provide backup power sources at vital critical facilities.
- **Increase Capability:**
  - Support programs such as "Tree Watch" that proactively manage problem areas by use of selective removal of hazardous trees, tree replacement, etc.
  - Establish and enforce building codes that require all roofs to withstand snow loads--Develop/Improve/Enforce building Codes in Hazard Areas
  - 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



## SEVERE WINTER STORMS

### Personal Scale

### Corporate Scale

### Government Scale

- planting near overhead power, cable, and phone lines
- Provide weather radios to vulnerable populations
- Enhance public awareness campaigns to address those issues of alert and warning and actions to take during severe weather events.
- Utilize the best available technology to enhance the warning systems for all severe weather events (i.e.: tornado warning systems).
- Coordinate severe weather warning capabilities and the dissemination of warning amongst those agencies within the planning are with the highest degree of capability.
- Encourage local ordinances for planting tree near lines and join Tree City USA.
- Increase tree management programs.
- Join the Community Rating System
- Join "Storm-Ready"
- Retrofit critical structures and promote hazard resistant construction
- Keep open communications and education of hazards for mobile home communities
- Retrofit above-ground utilities to underground facilities if appropriate
- Create a salt reserve or research alternates to stretch salt reserve.
- Ensure accessibility to hospital.
- Provide better debris logistics and removal.
- Provide better communication systems and back-up communication

**SEVERE WINTER STORMS**

**Personal Scale**

**Corporate Scale**

**Government Scale**

systems to inform public of hazards and to communicate during the hazard event.

## TERRORISM

Personal Scale	Corporate Scale	Government Scale
<ul style="list-style-type: none"> <li>• <b>Manipulate the Hazard:</b> <ul style="list-style-type: none"> <li>○ None</li> </ul> </li> <li>• <b>Reduce exposure to the hazard:</b> <ul style="list-style-type: none"> <li>○ None</li> </ul> </li> <li>• <b>Reduce vulnerability to the hazard:</b> <ul style="list-style-type: none"> <li>○ None</li> </ul> </li> <li>• <b>Increase Capability</b> <ul style="list-style-type: none"> <li>○ Increase awareness of vulnerability to threats</li> <li>○ Neighborhood watch program</li> <li>○ Keep informed</li> <li>○ Develop an emergency response plan</li> <li>○ Report suspicious activities</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• <b>Manipulate the Hazard:</b> <ul style="list-style-type: none"> <li>○ None</li> </ul> </li> <li>• <b>Reduce exposure to the hazard:</b></li> <li>• Incorporate anti-terrorism and security mitigation measures in site and layout design of facilities</li> <li>• Consider site security in landscape design of facilities</li> <li>• <b>Reduce vulnerability to the hazard:</b> <ul style="list-style-type: none"> <li>○ Restrict access by implementing controlled access zones</li> <li>○ Increase security measures</li> <li>○ Install physical barriers around critical facilities</li> <li>○ Employ parking restrictions as a means to reduce vulnerability</li> </ul> </li> <li>• <b>Increase Capability:</b> <ul style="list-style-type: none"> <li>○ Become a partner in mitigation and prevention</li> <li>○ Educate employees about response.</li> <li>○ Develop an emergency response plan</li> <li>○ Develop a Continuation of Operations Plan</li> <li>○ Use liberal signage techniques to inform and increase capability of users of facilities</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• <b>Manipulate the Hazard:</b> <ul style="list-style-type: none"> <li>○ None</li> </ul> </li> <li>• <b>Reduce exposure to the hazard:</b> <ul style="list-style-type: none"> <li>○ Construct new critical facilities with Clear Zones</li> <li>○ Retrofit existing critical facilities</li> </ul> </li> <li>• <b>Reduce vulnerability to the hazard:</b> <ul style="list-style-type: none"> <li>○ Restrict access by implementing controlled access zones</li> <li>○ Reduce single-point vulnerabilities such as redundancy for critical lifelines and infrastructure</li> <li>○ Install physical barriers around critical facilities</li> </ul> </li> <li>• <b>Increase Capability:</b> <ul style="list-style-type: none"> <li>○ Educate public on threats and vulnerability</li> <li>○ Enhance emergency response capability by contingency planning for specific events based on identified vulnerabilities</li> <li>○ Consider performance-based zoning as a land use alternative to mitigate impacts of human-caused hazards</li> <li>○ Employ Crime Prevention Through Environmental Design (CPTED) techniques in design of public facilities</li> <li>○ Consider providing incentives for mitigation</li> </ul> </li> </ul>

## WILDFIRE

Personal Scale	Corporate Scale	Government Scale
<ul style="list-style-type: none"> <li>• <b>Manipulate the Hazard:</b> <ul style="list-style-type: none"> <li>○ Clear potential fuels on property; dry, overgrown underbrush; diseased trees</li> </ul> </li> <li>• <b>Reduce exposure to the hazard:</b> <ul style="list-style-type: none"> <li>○ Clean and maintain defensible space around structures</li> <li>○ Locate outside hazard area</li> <li>○ Mow regularly</li> </ul> </li> <li>• <b>Reduce vulnerability to the hazard:</b> <ul style="list-style-type: none"> <li>○ Create and maintain defensible space around structures, provide water on site.</li> <li>○ Use fire-retardant building materials</li> <li>○ Create defensible spaces around your home.</li> </ul> </li> <li>• <b>Increase Capability</b> <ul style="list-style-type: none"> <li>○ Employ Firewise techniques to safeguard your home</li> <li>○ Identify alternative water supply points proximate to your home such as swimming pools, lakes, streams</li> <li>○ Support your local fire department</li> <li>○ Be aware of weather conditions that support/enhance the probability of wildfires</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• <b>Manipulate the Hazard:</b> <ul style="list-style-type: none"> <li>○ None</li> </ul> </li> <li>• <b>Reduce exposure to the hazard:</b> <ul style="list-style-type: none"> <li>•</li> </ul> </li> <li>• <b>Reduce vulnerability to the hazard:</b> <ul style="list-style-type: none"> <li>○ Create and maintain defensible space around structure and infrastructure and provide water onsite</li> <li>○ Use fire-retardant building materials</li> <li>○ Provide stored water to be utilized for firefighting with appropriate fire department connections at facilities not equipped with fire hydrants or inadequate fire hydrant spacing</li> </ul> </li> <li>• <b>Increase Capability:</b> <ul style="list-style-type: none"> <li>○ Support Firewise community initiatives</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• <b>Manipulate the Hazard:</b> <ul style="list-style-type: none"> <li>○ None</li> </ul> </li> <li>• <b>Reduce exposure to the hazard:</b> <ul style="list-style-type: none"> <li>○ Clear fuels (dry underbrush, diseased trees) on land that can trigger and maintain wildfires</li> <li>○ Implement Best Management Practices on public lands</li> </ul> </li> <li>• <b>Reduce vulnerability to the hazard:</b> <ul style="list-style-type: none"> <li>○ Create and maintain defensible space around structure and infrastructure</li> <li>○ Higher regulatory standards</li> <li>○ Establish water main supply and hydrants in areas without hydrants</li> <li>○ Decrease hydrant spacing</li> </ul> </li> <li>• <b>Increase Capability:</b> <ul style="list-style-type: none"> <li>○ More public outreach and education efforts including an active "Firewise" program</li> <li>○ Identify fire response and alternative evacuation routes</li> <li>○ Seek alternative water supplies in urban wildland interface areas.</li> <li>○ Become a "Firewise" community</li> <li>○ Increase capability to fight wildfires utilizing equipment that can support wildfire fighting such as: tankers, engines with "pump-and-run" capabilities, dump tanks for tanker shuttle operations.</li> <li>○ Develop/implement wildfire management plans.</li> <li>○ Establish Mutual Aid Agreements with the Tender Task Force</li> <li>○ Develop a Water Supply Plan</li> </ul> </li> </ul>