

3.0 MITIGATION STRATEGIES

The planning team developed mitigation goals and strategies to address the identified risks and vulnerabilities for the county and each jurisdiction. While there are common themes between the different jurisdictions, each community included actions designed to address their specific local risks and vulnerabilities.

3.1 STATUS OF PAST MITIGATION EFFORTS

The 2015 Knox County Multi-Jurisdictional Natural Hazard Mitigation Plan identified mitigation goals, objectives, and strategies for Knox County and individual jurisdictions. As part of the planning process for this updated plan, the planning team reviewed the 2015 strategies. The table below includes a status update for each strategy.

Table 3-1: Status of Past Mitigation Strategies

| Strategy | Status | Explanation |
|---|---------|-------------------------------|
| KNOX COUNTY | | |
| 1. Knox County will accurately and thoroughly identify flood prone areas in the county, including all non-municipal jurisdictions, and identify development practices that allow or facilitate flooding through interference with natural drainage as structures are improved, renovated, and/or built. | Ongoing | Include in revised strategies |
| 2. Knox County will develop and complete structural projects to mitigate against flooding in areas where repetitive loss has occurred or where structures and development have been built on high-risk properties, including acquisition and demolition when appropriate and effective. | Ongoing | Include in revised strategies |
| 3. Knox County will conduct public information campaigns to improve and expand property owners' participation in voluntary facilitation of adequate and effective drainage through maintenance of individual and private property. | Ongoing | Include in revised strategies |
| 4. Knox County will collaborate with economic development leaders to ensure that new construction and commercial development includes conservation and mitigation practices to prevent flooding. | Ongoing | Include in revised strategies |
| 5. Knox County will maintain and support county-wide communications capabilities to notify and warn county residents of dangers and natural hazards through public warning and mass notification systems that are compatible and functional in concert with new technology such as text messages, electronic mail, social media, and other means to convey information in a timely fashion. | Ongoing | Include in revised strategies |
| 6. Knox County will conduct a public awareness campaign that includes information about warning and mass notification methods, evacuation and other protective measures, and response to emergencies and disasters. | Ongoing | Include in revised strategies |

| Strategy | Status | Explanation |
|---|---------------|---|
| 7. Knox County will conduct a public information campaign to educate the general public about evacuation and shelter locations, safe rooms and storm shelters, community centers, and respite and gathering locations during disasters and emergencies. | Ongoing | Include in revised strategies |
| 8. Knox County will complete improvements to the county addressing system and mapping capabilities to enhance and improve first responders' ability to rapidly identify and locate specific properties during emergencies. | Ongoing | Include in revised strategies |
| 9. Knox County will establish a shelter and comfort station system that meets the need for a variety of disasters in local jurisdictions including townships, villages, and cities so the centers are readily available to residents during emergencies without significant dangerous travel. | Ongoing | Partially complete; include in revised strategies |
| 10. Knox County will establish a debris management plan that facilitates rapid recovery from severe storms, and facilitates the restoration of utilities as quickly as possible to improve recovery of the community after such an incident. | Complete | County debris management plan completed |
| 11. Knox County will conduct a public awareness campaign that conveys the critical points of a drought and the need for regular water conservation in preparation for times of severe drought. | Ongoing | Include in revised strategies |
| 12. Knox County will improve the dependability of utilities through establishment of resilient utility lines and delivery systems that withstand the stress of severe storms and disasters. | Ongoing | Include in revised strategies |
| CENTERBURG | | |
| 1. The Village of Centerburg will develop projects to lessen the damages to property from flooding, including consideration of acquisition and demolition. | Ongoing | Include in revised strategies |
| 2. The Village of Centerburg will educate the community about the notification systems that warn residents of impending disasters and the actions they should take immediately to protect themselves and their property. | Ongoing | Include in revised strategies |
| 3. The Village of Centerburg will establish sites to be used as shelters, comfort stations, and service centers during disasters and will strive to equip these sites with the features necessary to adequately serve the community during storms, power outages, and other disasters. | Ongoing | Include in revised strategies |
| 4. The Village of Centerburg will identify and implement a water supply plan for emergency purposes that supports, supplements, or services in place of a municipal or county water supply in cases of later fires. | Complete | Water service is now provided by DelCo |
| DANVILLE | | |
| 1. The Village of Danville will educate the community about notification systems that warn residents of impending disasters and the actions they should take immediately to protect themselves and their property. | Ongoing | Include in revised strategies |

| Strategy | Status | Explanation |
|--|---------------|-------------------------------------|
| 2. The Village of Danville will educate property owners about and advocate for good regular maintenance practices that result in preventing excessive damages to structures during storms, such as ditch bank maintenance, trimming trees, and clearing excessive vegetation from streams, waterways, and embankments. | Ongoing | Include in revised strategies |
| 3. The Village of Danville will develop projects to lessen damages to property from flooding, including acquisition and demolition. | Ongoing | Include in revised strategies |
| FREDERICKTOWN | | |
| 1. The Village of Fredericktown will identify locations and develop plans for community gathering locations throughout the village to provide residents with shelter, information, and services during weather related events. | Ongoing | Include in revised strategies |
| 2. The Village of Fredericktown will prohibit construction of new homes inside flood zones. | Completed | Addressed in floodplain regulations |
| 3. The Village of Fredericktown will identify and develop a redundant water system connection. | Ongoing | Include in revised strategies |
| 4. The Village of Fredericktown will develop a long-range plan for storm sewer protection and maintenance. | Ongoing | Include in revised strategies |
| 5. The Village of Fredericktown will strive to maintain and improve aged and low volume water supply lines for reasons of public health and fire protection. | Ongoing | Include in revised strategies |
| 6. The Village of Fredericktown will develop and strive to implement a street repair and maintenance plan to maintain proper storm water flow and to minimize roadway erosion damage due to storms. | Ongoing | Include in revised strategies |
| 7. The Village of Fredericktown will strive to create hardened electrical service to critical facilities through acquisition and installation of alternate power sources. | Ongoing | Include in revised strategies |
| GAMBIER | | |
| 1. The Village of Gambier will work with utility providers to harden utility services and prevent excessive outages during storms and inclement weather. | Ongoing | Include in revised strategies |
| GANN/BRINKHAVEN | | |
| 1. The Village of Gann will educate the community about notification systems that warn residents of impending disasters and the actions they should take immediately to protect themselves and their property. | Ongoing | Include in revised strategies |
| MARTINSBURG | | |
| 1. The Village of Martinsburg will investigate and implement means to create and provide safe rooms for residents who live in mobile homes, homes built on concrete slabs, and other structures that lack storm shelters used as protection in wind and other severe storms. | Ongoing | Include in revised strategies |

| Strategy | Status | Explanation |
|--|---------|-------------------------------|
| 2. The Village of Martinsburg will establish sites to be used as shelters, comfort stations, and service centers during disasters, and will strive to equip these sites with the features necessary to adequately serve the community during storms, power outages, and other disasters. | Ongoing | Include in revised strategies |
| 3. The Village of Martinsburg will develop storm sewer systems to more adequately manage runoff water for all areas and thus prevent/lessen flooding in residential and/or commercial properties. | Ongoing | Include in revised strategies |
| MOUNT VERNON | | |
| 1. The City of Mount Vernon will develop projects to lessen the damages to property from flooding, including acquisition and demolition projects for repetitive loss properties when and where appropriate. | Ongoing | Include in revised strategies |
| 2. The City of Mount Vernon will work with utility providers to harden utility services and to prevent excessive outages during storms and inclement weather. | Ongoing | Include in revised strategies |
| 3. The City of Mount Vernon will consider development of a comprehensive plan for land use within the jurisdiction, taking into account the consequences of development and the effect on existing properties and businesses, as well as the consequences on the communities downstream in Knox County and in counties beyond Knox County. | Ongoing | Include in revised strategies |

3.2 RISK PRIORITIES

The Hazard Identification and Risk Assessment (HIRA) provides a detailed explanation of the hazards and risks identified by the planning team. This section builds on that information and identifies mitigation strategies that could reduce vulnerability to the identified hazards. When developing and prioritizing strategies, participants considered actions that would benefit the greatest number of people and considered how the strategy would be funded. In some cases, funding would come from a jurisdiction's general budget while others would require special funding, including state and federal grants. Ultimately, the planning team determined that strategies should be prioritized according to the hazard rank in the HIRA. The hazards were ranked using a comprehensive process that included frequency, response duration, speed of onset, magnitude, business impact, human impact, and property impact.

For each jurisdiction, a goal related to each specific hazard was developed. Within each goal, multiple mitigation strategies were created based on the proposed actions to reduce vulnerability. When prioritizing the strategies, the planning team considered cost of implementation and feasibility in completing the action. In general, strategies that were less expensive or easier to implement were prioritized higher because they were more likely to be completed. Projects requiring state or federal grant funding, extensive multi-agency collaboration, or other more complicated processes were considered lower priority because they would take more time to complete.

At strategy review meetings and during the final review phase of the plan, jurisdictions and stakeholders had the opportunity to revise strategies and adjust the prioritization. The final strategies presented in this section reflect those adjustments and revisions.

3.3 MITIGATION GOALS AND STRATEGIES

Mitigation strategies were developed based on input from planning team members, jurisdiction representatives, and stakeholders. Strategies were then presented to the community for review and comment. This section identifies the mitigation goals and strategies for the county and each incorporated jurisdiction, along with the priority, action type, lead agency, timeline, and potential funding source for each. While strategies are listed by jurisdiction for planning purposes, a specific strategy may be delegated to another entity, such as a special district, nonprofit organization, or alternate community partner, if it becomes an actionable project.

Strategy Descriptors

When developing strategies, the planning team considered who would be responsible for leading mitigation efforts, how the work would be funded, and in what order jurisdictions would address potential actions. These elements are defined below and identified for each strategy. Some of this information may change as strategies are implemented.

Priority: Jurisdictions ranked hazards according to local priorities. Goals are listed alphabetically by hazard to simplify use of the plan. Jurisdictions will address strategies in order of priority when feasible. For example, if flood is the top hazard in a community, flood strategies will be considered the highest priority. Strategies may be completed in any order, which will be especially likely when outside funding or grants are necessary to execute a project.

Action Type: Each strategy is assigned to a type category based on the activity described:

- Natural Resource Protection – Reduce the impacts of natural hazard by preserving or restoring natural areas
- Prevention – Avoid hazard problems or stop impact from worsening
- Property Protection – Protect structures by modifying or strengthening building to withstand impact
- Public Information – Advise the public about hazards, hazardous areas, and mitigation techniques to protect people and property
- Structurally Engineered Project – Lessen the impact of a hazard by modifying the environment or progression of the hazard event through designed and engineered projects
- Public Safety Enhancement – Improve, enhance, update or expand the services or support of services provided by law enforcement, fire departments and/or emergency medical services

Lead Agency: The entity charged with ensuring that officials look for opportunities to complete the strategy over the five-year planning cycle. This agency may not execute the strategy or provide project oversight but coordinates the overall effort to initiate the activity. In some cases, two agencies are listed as the lead agency. This may occur because there are two clear stakeholders in a community, such as the municipality and a non-profit organization, who would implement this strategy.

Timeline: The timeframe in which a mitigation strategy could realistically be implemented. The actual time frame may vary from what is described in the plan, depending on funding, grant opportunities, or changes in priorities.

Funding Source: The most likely funding sources for the strategy.

- FMA – Flood Mitigation Assistance Grant
- PDM – Pre-Disaster Mitigation Grant
- HMGP – Hazard Mitigation Grant Program
- SRL – Severe Repetitive Loss Grant
- RFC – Repetitive Flood Claims Program
- ICC – Increased Cost of Compliance (including rate increases or premiums)
- LOC – Local Funds
- ST – State Funds
- Other (including private funds and non-governmental agency funding)

3.3.1 Knox County

Table 3-2: Knox County Mitigation Strategies

| Priority | Action Type | Lead | Start Date | End Date | Funding |
|---|----------------------------------|---|------------|------------|-------------------|
| EARTHQUAKE: Knox County will take action to assess and mitigate the effects of earthquakes. | | | | | |
| 32. Identify the structures and infrastructure in the county that would likely be damaged or destroyed in an earthquake of moderate to severe magnitude. | | | | | |
| 48 | Property Protection | County Engineer | 05-22-2020 | 05-21-2025 | LOC |
| 33. Identify likely debris that would result from an earthquake of moderate magnitude and identify potential means and methods to manage that debris. | | | | | |
| 49 | Property Protection | Solid Waste Director | 05/22/20 | 05/21/2025 | ICC |
| FLOOD: Knox County will take action to reduce the effects of all types of flooding. | | | | | |
| 1. Construct or maintain water control structures (reservoirs, retention/detention ponds, dams, levees, dikes, floodwalls, etc.) in new or existing property to lessen the effects of flash and storm sewer back up flooding. | | | | | |
| 12 | Structurally Engineered Projects | County Engineer Park District Director | 05-22-2020 | 05-21-2025 | PDM; HMGP; FMA |
| 2. Elevate structures (buildings, roadways, bridges, culverts etc.) to remove them from flood-prone areas. | | | | | |
| 13 | Structurally Engineered Projects | County Engineer | 05-22-2020 | 05-21-2025 | PDM; HMGP; FMA |
| 3. Utilize acquisition, demolition, and relocation for properties that suffer repetitive flood loss and/or experience repeated damage to structures from all types of flooding. | | | | | |
| 14 | Prevention | County Engineer | 05-22-2020 | 05-21-2025 | PDM; HMGP; FMA |
| 4. Clear debris, fallen trees, excess sediment, etc. from waterways to improve flow. | | | | | |
| 15 | Property Protection | County Engineer | 05-22-2020 | 05-21-2025 | PDM; HMGP; FMA |
| 5. Develop, implement, and maintain the capability to prevent flood damages to properties through use of sandbags and other wind- and water-proofing techniques. | | | | | |
| 16 | Property Protection | Park District Director | 05-22-2020 | 05-21-2025 | LOC |
| 6. Support and conduct programs that lessen erosion and sedimentation along shorelines, riverbanks, and areas that flood regularly. | | | | | |
| 17 | Property Protection | Park District Director | 05-22-2020 | 05-21-2025 | LOC |
| 7. Support and promote the preservation of natural habitat and wetlands, especially along waterways, and support the restoration of natural habitat and wetlands where development has encroached upon those areas. | | | | | |
| 18 | Natural Resource Protection | Park District Director | 05-22-2020 | 05-21-2025 | LOC |
| 8. Identify and implement means to collect crop debris in runoff water and manage it before it clogs ditches, streams, culverts, and other waterways. | | | | | |
| 19 | Natural Resource Protection | Park District Director | 05-22-2020 | 05-21-2025 | LOC |
| 9. Manage stream flow through channelization, sediment removal, debris and obstruction removal, and stream ecology management practices. | | | | | |
| 20 | Structurally Engineered Projects | County Engineer Park District Director | 05-22-2020 | 05-21-2025 | PDM; HMGP; FMA |

| Priority | Action Type | Lead | Start Date | End Date | Funding |
|--|-----------------------------|---|------------|------------|-------------------|
| 10. Continue to collaborate with watershed and conservancy districts and other counties that share an interest in common waterways to facilitate cleaning, maintaining, and correcting watershed problems. | | | | | |
| 21 | Natural Resource Protection | SWCD Director Park District Director | 05-22-2020 | 05-21-2025 | ICC; LOC |
| 11. Adopt and/or enforce floodplain, zoning, and building regulations to manage development in areas without regulations or standards and take part in revision of flood maps, monitoring the need for local construction regulation and maintaining adequate efforts to reduce vulnerability through management of development. | | | | | |
| 22 | Prevention | Regional Planning Director | 05-22-2020 | 05-21-2025 | LOC |
| 12. Maintain participation, join, or resolve sanctions with NFIP; establish CRS participation; and/or engage in federal floodplain activities to support flood prevention. | | | | | |
| 23 | Prevention | Commissioners | 05-22-2020 | 05-21-2025 | LOC |
| 13. Add rapidly deployable signs to quickly mark flooded roadways. | | | | | |
| 24 | Property Protection | County Engineer | 05-22-2020 | 05-21-2025 | LOC |
| 14. Protect waterway banks and land near waterways from deterioration due to rapid or excessive flow by planting vegetation, installing dormant woody stakes and posts, planting trees, shrubs and grasses along banks and berms, or using deflectors to prevent deterioration, or other similar methods to accomplish the same. | | | | | |
| 25 | Natural Resource Protection | SWCD Director Park District Director | 05-22-2020 | 05-21-2025 | PDM; HMGP; FMA |
| 15. Utilize biotechnical methods (placement of willow posts, hardwood tree plantings, fascines, brush layering, evergreen revetments, log revetments, tree kickers, lunker structures, or placed rocks as examples) to minimize the deterioration or destruction of stream banks due to excessive flow. | | | | | |
| 26 | Natural Resource Protection | SWCD Director Park District Director | 05-22-2020 | 05-21-2025 | PDM; HMGP; FMA |
| 16. Utilize natural habitats and/or vegetative buffers inside waterways to slow the rapid flow of floodwater and/or hold excess storm water. | | | | | |
| 27 | Natural Resource Protection | SWCD Director Park District Director | 05-22-2020 | 05-21-2025 | PDM; HMGP; FMA |
| 17. Utilize stream bank protection measures such as gabion revetments, riprap revetments, crib walls, and other structural methods to protect the banks and berms as well as current use of the areas. | | | | | |
| 28 | Natural Resource Protection | SWCD Director Park District Director | 05-22-2020 | 05-21-2025 | PDM; HMGP; FMA |
| 18. Advocate the use of green materials and practices in development, such as green parking policies, green roof materials, and alternate paving materials that promote absorption instead of runoff. | | | | | |
| 29 | Natural Resource Protection | Park District Director | 05-22-2020 | 05-21-2025 | LOC |
| 19. Advocate for, support, and implement slope protection actions along waterways and other vulnerable areas with the purpose of protecting not only the shoreline but also the constructed improvements to the property. | | | | | |
| 30 | Natural Resource Protection | Park District Director | 05-22-2020 | 05-21-2025 | LOC |

| Priority | Action Type | Lead | Start Date | End Date | Funding |
|---|----------------------------------|---|------------|------------|----------------|
| 20. Maintain and improve soil quality through crop rotation, crop residue management, contour buffer strips, contour farming and strip-cropping, use of cover crops, installation of field borders, rotation grazing, pasture planting, establishment of grassy waterways, grade stabilization structures, water and sediment control basins, critical area planting, diversion, terracing, manure storage and runoff control, nutrient management, pest management, well abandonment, riparian buffers, wetland restoration, windbreaks, woodlot management, tree planting, and creation of upland wildlife habitat. | | | | | |
| 31 | Natural Resource Protection | SWCD Director | 05-22-2020 | 05-21-2025 | PDM; HMGP; FMA |
| 21. Encourage management of surface runoff and chemical residue through techniques such as installation of grassy waterways, creation of infiltration basins and trenches, porous pavement installation, filtration techniques like use of catch basin inserts, sand and organic filters, rain gardens and vegetated filter strips. | | | | | |
| 32 | Natural Resource Protection | SWCD Director Park District Director | 05-22-2020 | 05-21-2025 | PDM; HMGP; FMA |
| HAZARDOUS MATERIALS: Knox County will take action to prevent, manage, and reduce the consequences from spills and leaks of hazardous materials. | | | | | |
| 34. Ensure that signage on highways and roadways is clear and easy to follow to decrease the likelihood of vehicle accidents due to unsure routes of travel. | | | | | |
| 40 | Property Protection | County Engineer | 05-22-2020 | 05-21-2025 | LOC |
| INFRASTRUCTURE: Knox County will act to harden, improve, and replace various forms of infrastructure to reduce damages and consequences from storms and disasters. | | | | | |
| 35. Maintain, repair, upgrade, and/or replace storm sewers and wastewater management systems; add street curbs or replace deteriorating ones; and repair or replace stormwater basins. | | | | | |
| 1 | Structurally Engineered Projects | County Engineer | 05-22-2020 | 05-21-2025 | PDM; HMGP |
| 36. Ensure that high hazard and classified dams have current emergency plans that identify inundation areas and facilitate emergency actions in the event of a failure | | | | | |
| 2 | Property Protection | EMA Director | 05-22-2020 | 05-21-2025 | PDM; HMGP |
| 37. Maintain, repair, and replace dams and upground reservoirs that are structurally compromised or that place the public in danger during a structural failure. | | | | | |
| 3 | Structurally Engineered Projects | County Engineer Park District Director | 05-22-2020 | 05-21-2025 | PDM; HMGP |
| 38. Improve and repair roadways and worn bridges and culverts that are damaged by rapid runoff and heavy precipitation. | | | | | |
| 4 | Structurally Engineered Projects | County Engineer | 05-22-2020 | 05-21-2025 | PDM; HMGP |
| 39. Advocate and support improvements to utility systems (distribution lines, generating plants, pumps, filters, and other system components) that result in more dependable, resilient infrastructure for the purpose of maintaining lifelines during disaster response and recovery. | | | | | |
| 5 | Structurally Engineered Projects | County Engineer | 05-22-2020 | 05-21-2025 | PDM; HMGP |
| 40. Identify alternate/back-up utility resources for use when a primary energy source is compromised (generators, redundant suppliers, etc.) | | | | | |
| 6 | Property Protection | Water/Wastewater Superintendent | 05-22-2020 | 05-21-2025 | LOC |

| Priority | Action Type | Lead | Start Date | End Date | Funding |
|---|----------------------------------|---|------------|------------|-----------------|
| 41. Conduct hydrology and hydraulics, storm water and sewer, inundation, and other studies to determine the root cause of flooding and water management problems as well as the vulnerable populations and property. | | | | | |
| 7 | Structurally Engineered Projects | County Engineer | 05-22-2020 | 05-21-2025 | PDM; HMGP |
| 42. Maintain, repair, upgrade, and/or replace water treatment and distribution systems. | | | | | |
| 8 | Structurally Engineered Projects | County Engineer | 05-22-2020 | 05-21-2025 | PDM; HMGP |
| 43. Replace, improve, or create sanitary sewer systems for neighborhoods, subdivisions or jurisdictions to replace septic systems or outdated sewer systems. | | | | | |
| 9 | Structurally Engineered Projects | County Engineer | 05-22-2020 | 05-21-2025 | PDM; HMGP |
| 44. Repair, replace, retrofit, or upgrade communications equipment including towers, transmission lines, distribution lines, receivers and transmitters to provide improved or redundant capabilities to communicate at all times. | | | | | |
| 10 | Property Protection | Water/Wastewater Superintendent | 05-22-2020 | 05-21-2025 | PDM; HMGP; HSGP |
| 45. Develop infrastructure redundancy through the development of alternate vendors for services and products like portable generators, fuel supplies, bottled water, etc. | | | | | |
| 11 | Property Protection | EMA Director | 05-22-2020 | 05-21-2025 | PDM; HMGP |
| LAND SUBSIDENCE: Knox County will reduce the effects of various forms of land subsidence including, but not limited to, erosion, water damage, the effects of karst formations, and land that washes away due to water movement. | | | | | |
| 29. Provide programs that reduce erosion and sedimentation along shorelines, riverbanks, ditch banks, road berms, and areas that wash away | | | | | |
| 45 | Natural Resource Protection | SWCD Director | 05-22-2020 | 05-21-2025 | PDM; HMGP |
| 30. Support and implement slope protection actions along waterways and other vulnerable areas where natural occurrences endanger property, structures, or where other geological vulnerabilities exist. | | | | | |
| 46 | Natural Resource Protection | SWCD Director Park District Director | 05-22-2020 | 05-21-2025 | PDM; HMGP |
| 31. Develop collaborative efforts with environmental advocates to accurately identify risk to groundwater resources in the county and collaborate to prevent contamination of the groundwater. | | | | | |
| 47 | Natural Resource Protection | Health Commissioner | 05-22-2020 | 05-21-2025 | PDM; HMGP |
| SEVERE STORMS (THUNDERSTORM, TORNADO, WIND): Knox County will take action to reduce the consequences and damages from severe thunderstorms, windstorms, and other severe weather. | | | | | |
| 22. Support the construction of safe rooms for single- and multi-family homes and areas such as mobile home parks, parks and recreation areas, campgrounds, apartments, condominium neighborhoods, etc. | | | | | |
| | Property Protection | EMA Director Park District Director | 05-22-2020 | 05-21-2025 | PDM |
| 23. Repair or retrofit public properties with wind-resistant materials (i.e. metal roofing, siding, wind-resistant glass, etc.) to decrease damage due to wind or other storms. | | | | | |
| | Property Protection | County Engineer Park District Director | 05-22-2020 | 05-21-2025 | PDM |

| Priority | Action Type | Lead | Start Date | End Date | Funding |
|--|----------------------------------|---|------------|------------|-----------------------|
| 24. Maintain trees and vegetation on public property and remove dead or diseased trees that are vulnerable to wind damage. | | | | | |
| | Property Protection | County Engineer Park District Director | 05-22-2020 | 05-21-2025 | LOC |
| 25. Develop agreements for safety shelters to be used for a variety of disaster-related purposes during severe storms and/or evacuations, including areas like stadiums and parks used for recreation, public gatherings, or other assemblies. | | | | | |
| | Property Protection | EMA Director Park District Director | 05-22-2020 | 05-21-2025 | LOC |
| 26. Improve and/or maintain warning and notification systems to warn the public about impending dangers and threats. | | | | | |
| | Public Information | EMA Director | 05-22-2020 | 05-21-2025 | PDM; HMGP; EMPG |
| 27. Enhance warning and notification systems through improvements to digital technology and other hardware and software used in the operation of warning and notification systems. | | | | | |
| | Public Information | EMA Director | 05-22-2020 | 05-21-2025 | PDM; HMGP; EMPG |
| 28. Work with the community to identify resources for affordable debris disposal after storms, possibly through creation of special programs for facilities that will receive debris after storms. | | | | | |
| | Property Protection | Solid Waste Director | 05-22-2020 | 05-21-2025 | ICC |
| WATER QUALITY: Knox County will take action to protect the sources of water so that a safe potable water supply is available for residents. | | | | | |
| 46. Advocate for improvements to water treatment plants to include enhanced testing and monitoring and to improve treatment capabilities. | | | | | |
| 41 | Natural Resource Protection | Water/Wastewater Superintendent | 05-22-2020 | 05-21-2025 | PDM; HMGP |
| 47. Advocate and support continuing research into all causes of water quality issues, including analysis of practices by industrial, personal, manufacturing, and agricultural communities. | | | | | |
| 42 | Natural Resource Protection | Health Commissioner | 05-22-2020 | 05-21-2025 | LOC |
| 48. Develop inter-connected and redundant water systems that are able to switch over when one is contaminated to provide a safe water supply for the population. | | | | | |
| 43 | Structurally Engineered Projects | County Engineer | 05-22-2020 | 05-21-2025 | PDM; HMGP |
| 49. Support the implementation of measures to manage distressed watershed in the county and advocate for support programs to help farmers implement nutrient management programs while maintaining agricultural economic well-being. | | | | | |
| 44 | Natural Resource Protection | SWCD Director | 05-22-2020 | 05-21-2025 | PDM; HMGP |

3.3.2 Centerburg

Table 3-3: Centerburg Mitigation Strategies

| Priority | Action Type | Lead | Start Date | End Date | Funding |
|---|----------------------------------|-----------------------|------------|------------|-----------------|
| FLOOD: Centerburg will take action to reduce the effects of all types of flooding. | | | | | |
| 1. Maintain water control structures (reservoirs, retention/detention ponds) in new or existing property to lessen the effects of flash and storm sewer back up flooding. | | | | | |
| 4 | Property Protection | Village Administrator | 05-22-2020 | 05-21-2025 | LOC; PDM; HGMP |
| 2. Utilize acquisition, demolition, and relocation for properties that suffer repetitive flood loss and/or experience repeated damage to structures from all types of flooding. | | | | | |
| 5 | Prevention | Village Administrator | 05-22-2020 | 05-21-2025 | PDM; HMGP |
| 3. Clear debris, fallen trees, excess sediment, etc. from waterways to improve flow. | | | | | |
| 6 | Property Protection | Village Administrator | 05-22-2020 | 05-21-2025 | LOC |
| 4. Manage stream flow through channelization, sedimentation removal, debris and obstruction removal, and stream ecology management practices. | | | | | |
| 7 | Structurally Engineered Projects | Village Administrator | 05-22-2020 | 05-21-2025 | PDM; HMGP |
| 5. Collaborate with watershed and conservancy districts and other counties that share an interest in common waterways to facilitate cleaning, maintaining, and correcting watershed problems | | | | | |
| 8 | Natural Resource Protection | Village Administrator | 05-22-2020 | 05-21-2025 | LOC; ICC |
| 6. Enforce floodplain, zoning, and building regulations to manage development in areas without regulations or standards; and take part in revision of flood maps, monitoring the need for local construction regulation and maintaining adequate efforts to reduce vulnerability through management of development. | | | | | |
| 9 | Prevention | Village Administrator | 05-22-2020 | 05-21-2025 | LOC |
| 7. Maintain membership, join, or resolve sanctions with NFIP; establish CRS participation; engage in federal floodplain activities to support flood prevention. | | | | | |
| 10 | Prevention | Village Administrator | 05-22-2020 | 05-21-2025 | LOC |
| 8. Identify and implement means to collect debris in runoff water and manage it before it clogs ditches, streams, culverts, and other waterways. | | | | | |
| 11 | Property Protection | Village Administrator | 05-22-2020 | 05-21-2025 | LOC; ICC |
| INFRASTRUCTURE: Centerburg will act to harden, improve, and replace various forms of infrastructure to reduce damages and consequences from storms and disasters. | | | | | |
| 14. Maintain, repair, upgrade, and/or replace storm sewers and wastewater management systems; add street curbs or replace deteriorating ones; repair or replace stormwater basins. | | | | | |
| 1 | Structurally Engineered Projects | Village Administrator | 05-22-2020 | 05-21-2025 | PDM; CDBG; HMGP |
| 15. Advocate and support improvements to utility systems (distribution lines, generating plants, pumps, filters, and other system components) that result in more dependable, resilient infrastructure for the purpose of maintaining lifelines during disaster response and recovery. | | | | | |
| 2 | Structurally Engineered Projects | Village Administrator | 05-22-2020 | 05-21-2025 | PDM; CDBG; HMGP |
| 16. Replace, improve, or create sanitary sewer systems for neighborhoods, subdivisions or jurisdictions to replace septic systems or outdated sewer systems. | | | | | |
| 3 | Structurally Engineered Projects | Village Administrator | 05-22-2020 | 05-21-2025 | CDBG; PDM |

| Priority | Action Type | Lead | Start Date | End Date | Funding |
|---|----------------------------------|-----------------------|------------|------------|-----------------|
| SEVERE STORMS (THUNDERSTORM, TORNADO, WIND): Centerburg will take action to reduce the consequences and damages from severe thunderstorms, windstorms, and other severe weather. | | | | | |
| 9. Support the construction of safe rooms for single- and multi-family homes and areas such as mobile home parks, campgrounds, apartment complexes, condominium neighborhoods, etc. | | | | | |
| 12 | Property Protection | Village Administrator | 05-22-2020 | 05-21-2025 | PDM; HMGP |
| 10. Maintain trees and vegetation on public property, and remove dead or diseased trees that are vulnerable to wind damage. | | | | | |
| 13 | Property Protection | Village Administrator | 05-22-2020 | 05-21-2025 | LOC; PDM |
| 11. Improve and/or maintain warning and notification systems to warn the public about impending dangers and threats. | | | | | |
| 14 | Public Information | Village Administrator | 05-22-2020 | 05-21-2025 | PDM; EMPG; HSGP |
| 12. Enhance warning and notification systems through improvements to digital technology and other hardware and software used in the operation of warning and notification systems. | | | | | |
| 15 | Public Information | Village Administrator | 05-22-2020 | 05-21-2025 | PDM; EMPG; HSGP |
| 13. Educate the community about warnings and notifications and the actions they should take when a one is issued | | | | | |
| 16 | Public Information | Village Administrator | 05-22-2020 | 05-21-2025 | EMPG |
| WATER QUALITY: Centerburg will take action to protect the sources of water so that a safe potable water supply is available for county residents. | | | | | |
| 17. Advocate for improvements to water treatment plants to include enhanced testing and monitoring, and to improve treatment capabilities | | | | | |
| 17 | Structurally Engineered Projects | Village Administrator | 05-22-2020 | 05-21-2025 | CDBG |

3.3.3 Danville

Table 3-4: Danville Mitigation Strategies

| Priority | Action Type | Lead | Start Date | End Date | Funding |
|---|----------------------------------|-----------------------|------------|------------|-----------|
| FLOOD: Danville will take action to reduce the effects of all types of flooding. | | | | | |
| 1. Construct or maintain water control structures (reservoirs, retention/detention ponds, dams, levees, dikes, floodwalls, etc.) in new or existing property to lessen the effects of flash and storm sewer back up. | | | | | |
| 9 | Structurally Engineered Projects | Village Administrator | 05-22-2020 | 05-21-2025 | PDM; CDBG |
| 2. Elevate structures (buildings, roadways, bridges, culverts etc.) to remove them from flood-prone areas. | | | | | |
| 10 | Property Protection | Village Administrator | 05-22-2020 | 05-21-2025 | PDM; HMGP |
| 3. Utilize acquisition, demolition, and relocation for properties that suffer repetitive flood loss and/or experience repeated damage to structures from all types of flooding. | | | | | |
| 11 | Prevention | Village Administrator | 05-22-2020 | 05-21-2025 | PDM; HMGP |
| 4. Collaborate with watershed and conservancy districts and other counties that share an interest in common waterways to facilitate cleaning, maintaining, and correcting watershed problems. | | | | | |
| 12 | Natural Resource Protection | Village Administrator | 05-22-2020 | 05-21-2025 | LOC: ICC |
| 5. Adopt and/or enforce floodplain and zoning regulations to manage development; and take part in revision of flood maps, monitoring the need for local construction regulation and maintaining adequate efforts to reduce vulnerability through management of development. | | | | | |
| 13 | Property Protection | Village Administrator | 05-22-2020 | 05-21-2025 | LOC; ICC |
| 6. Maintain membership, join, or resolve sanctions with NFIP; establish CRS participation; engage in federal floodplain activities to support flood prevention. | | | | | |
| 14 | Prevention | Village Administrator | 05-22-2020 | 05-21-2025 | LOC |
| 7. Add rapidly deployable signs to mark flooded roadways quickly. | | | | | |
| 15 | Property Protection | Village Administrator | 05-22-2020 | 05-21-2025 | LOC |
| 8. Protect waterway banks and land near waterways from deterioration due to rapid or excessive flow by planting vegetation, installing dormant woody stakes and posts, planting trees, shrubs and grasses along banks and berms, or using deflectors to prevent deterioration, or other methods to accomplish the same. | | | | | |
| 16 | Natural Resource Protection | Village Administrator | 05-22-2020 | 05-21-2025 | PDM; HMGP |
| 9. Utilize biotechnical methods (placement of willow posts, hardwood tree plantings, fascines, brush layering, evergreen revetments, log revetments, tree kickers, lunker structures, or placed rocks as examples) to minimize the deterioration or destruction of stream banks due to excessive flow. | | | | | |
| 17 | Natural Resource Protection | Village Administrator | 05-22-2020 | 05-21-2025 | PDM; HMGP |
| 10. Maintain and improve soil quality through crop rotation, crop residue management, contour buffer strips, contour farming and strip-cropping, use of cover crops, installation of field borders, rotation grazing, pasture planting, establishment of grassy waterways, grade stabilization structures, water and sediment control basins, critical area planting, diversion, terracing, manure storage and runoff control, nutrient management, pest management, well abandonment, riparian buffers, wetland restoration, windbreaks, woodlot management, tree planting, and creation of upland wildlife habitat. | | | | | |
| 18 | Natural Resource Protection | Village Administrator | 05-22-2020 | 05-21-2025 | PDM; HMGP |
| 11. Adopt, support, and enforce zoning and building codes that prevent construction in flood zones, and that support construction practices that mitigate damage due to flood for structures built in vulnerable areas | | | | | |

| Priority | Action Type | Lead | Start Date | End Date | Funding |
|--|----------------------------------|-----------------------|------------|------------|------------------------|
| 19 | Property Protection | Village Administrator | 05-22-2020 | 05-21-2025 | LOC; ICC |
| HAZARDOUS MATERIALS: Danville will take action to prevent, manage, and reduce the consequences from spills and leaks of hazardous materials. | | | | | |
| 22. Ensure that signage on highways and roadways is clear and easy to follow to decrease the likelihood of vehicle accidents due to unsure routes of travel. | | | | | |
| 29 | Property Protection | Village Administrator | 05-22-2020 | 05-21-2025 | LOC |
| 23. Advocate for funding and conducting additional first responder training to cover not only highway hazardous materials incidents but also pipeline and intermodal systems. | | | | | |
| 30 | Property Protection | Village Administrator | 05-22-2020 | 05-21-2025 | LOC; HSGP; EMPG; Other |
| INFRASTRUCTURE: Danville will act to harden, improve, and replace various forms of infrastructure to reduce damages and consequences from storms and disasters. | | | | | |
| 24. Maintain, repair, upgrade, and/or replace storm sewers and wastewater management systems; add street curbs or replace deteriorating ones; repair or replace stormwater basins. | | | | | |
| 1 | Structurally Engineered Projects | Village Administrator | 05-22-2020 | 05-21-2025 | PDM; CDBG; HMGP |
| 25. Improve and repair roadways that are damaged by rapid runoff and heavy precipitation. | | | | | |
| 2 | Property Protection | Village Administrator | 05-22-2020 | 05-21-2025 | LOC; ICC |
| 26. Advocate and support improvements to utility systems (distribution lines, generating plants, pumps, filters, and other system components) that result in more dependable, resilient infrastructure for the purpose of maintaining lifelines during disaster response and recovery. | | | | | |
| 3 | Property Protection | Village Administrator | 05-22-2020 | 05-21-2025 | PDM; HMGP |
| 27. Identify alternate/back-up utility resources for use when a primary energy source is compromised (generators, redundant suppliers, etc.). | | | | | |
| 4 | Property Protection | Village Administrator | 05-22-2020 | 05-21-2025 | EMPG; PDM |
| 28. Conduct hydrology and hydraulics, storm water and sewer, inundation, and other studies to determine the root cause of flooding and water management problems as well as vulnerable populations and property. | | | | | |
| 5 | Property Protection | Village Administrator | 05-22-2020 | 05-21-2025 | PDM; HMGP |
| 29. Maintain, repair, upgrade and/or replace water treatment and distribution systems. | | | | | |
| 6 | Structurally Engineered Projects | Village Administrator | 05-22-2020 | 05-21-2025 | PDM: HMGP |
| 30. Replace, improve, or create sanitary sewer systems for neighborhoods, subdivisions or jurisdictions to replace septic systems or outdated sewer systems. | | | | | |
| 7 | Structurally Engineered Projects | Village Administrator | 05-22-2020 | 05-21-2025 | PDM; CDBG; HMGP |
| 31. Replace roadways and streets with deteriorating pavement due to heavy drainage; replace worn bridges and culverts and increase size and span as appropriate. | | | | | |
| 8 | Property Protection | Village Administrator | 05-22-2020 | 05-21-2025 | ICC: LOC; PDM |
| LAND SUBSIDENCE: Danville will reduce the effects of various forms of land subsidence, including but not limited to, erosion, water damage, the effects of karst formations, and land that washes away due to water movement. | | | | | |
| 21. Support and implement slope protection actions along waterways and other vulnerable areas where natural occurrences endanger property, structures, or where other geological vulnerabilities exist. | | | | | |
| 34 | Natural Resource Protection | Village Administrator | 05-22-2020 | 05-21-2025 | ICC; PDM |

| Priority | Action Type | Lead | Start Date | End Date | Funding |
|--|----------------------------------|-----------------------|------------|------------|----------------------|
| SEVERE STORMS (THUNDERSTORM, TORNADO, WIND): Danville will take action to reduce the consequences and damages from severe thunderstorms, windstorms, and other severe weather. | | | | | |
| 12. Support the construction of safe rooms for single- and multi-family homes and areas such as mobile home parks, campgrounds, apartment complexes, condominium neighborhoods, etc. | | | | | |
| 20 | Property Protection | Village Administrator | 05-22-2020 | 05-21-2025 | PDM; HMGP |
| 13. Maintain trees and vegetation on public property, and remove dead or diseased trees that are vulnerable to wind damage. | | | | | |
| 21 | Property Protection | Village Administrator | 05-22-2020 | 05-21-2025 | LOC |
| 14. Develop agreements for safety shelters to be used for a variety of disaster-related purposes during severe storms and/or evacuations, including areas like stadiums and parks used for recreation, public gatherings, or other assemblies. | | | | | |
| 22 | Property Protection | Village Administrator | 05-22-2020 | 05-21-2025 | LOC; PDM |
| 15. Improve and/or maintain warning and notification systems to warn the public about impending dangers and threats. | | | | | |
| 23 | Public Information | Village Administrator | 05-22-2020 | 05-21-2025 | LOC; PDM; HSGP; CDBG |
| 16. Enhance warning and notification systems through improvements to digital technology and other hardware and software used in the operation of warning and notification systems. | | | | | |
| 24 | Public Information | Village Administrator | 05-22-2020 | 05-21-2025 | HSGP; PDM; AFG |
| 17. Educate the community about warnings and notifications and the actions they should take when issued. | | | | | |
| 25 | Public Information | Village Administrator | 05-22-2020 | 05-21-2025 | LOC; EMPG |
| 18. Educate the community about protective actions they should take when an emergency notice is issued. | | | | | |
| 26 | Public Information | Village Administrator | 05-22-2020 | 05-21-2025 | LOC; EMPG |
| 19. Educate the public about shelter locations and the routes that should be used to access these shelters in an emergency situation. | | | | | |
| 27 | Public Information | Village Administrator | 05-22-2020 | 05-21-2025 | LOC; EMPG |
| 20. Work to develop affordable and functional county-wide public safety communication system with the capability for multi-discipline and multi-jurisdictional communication. | | | | | |
| 28 | Property Protection | Village Administrator | 05-22-2020 | 05-21-2025 | LOC; HSGP; EMPG; PDM |
| WATER QUALITY: Danville will take action to protect the sources of water so that a safe potable water supply is available for residents. | | | | | |
| 32. Advocate for improvements to water treatment plants to include enhanced testing and monitoring, and to improve treatment capabilities. | | | | | |
| 31 | Structurally Engineered Projects | Village Administrator | 05-22-2020 | 05-21-2025 | PDM |
| 33. Advocate and support continuing research into all causes of water quality issues, including analysis of practices by industrial, personal, manufacturing, and agricultural communities. | | | | | |
| 32 | Natural Resource Protection | Village Administrator | 05-22-2020 | 05-21-2025 | LOC; Other |
| 34. Develop inter-connected and redundant water systems that are able to switch over when one is contaminated to provide a safe water supply for the population. | | | | | |
| 33 | Structurally Engineered Projects | Village Administrator | 05-22-2020 | 05-21-2025 | PDM; HMGP |

3.3.4 Fredericktown

Table 3-5: Fredericktown Mitigation Strategies

| Priority | Action Type | Lead | Start Date | End Date | Funding |
|--|----------------------------------|-----------------------|------------|------------|------------|
| EARTHQUAKE: Fredericktown will take action to assess and mitigate the effects of potential earthquakes. | | | | | |
| 12. Identify the structures and infrastructure in the county that would likely be damaged or destroyed in an earthquake of moderate to severe magnitude. | | | | | |
| 25 | Property Protection | Village Administrator | 05-22-2020 | 05-21-2025 | LOC |
| FLOOD: Fredericktown will take action to reduce the effects of all types of flooding. | | | | | |
| 1. Construct or maintain water control structures (reservoirs, retention/detention ponds, dams, levees, dikes, floodwalls, etc.) in new or existing property to lessen the effects of flash and storm sewer back up. | | | | | |
| 12 | Structurally Engineered Projects | Village Administrator | 05-22-2020 | 05-21-2025 | PDM; HMGP |
| 2. Utilize acquisition, demolition, and relocation for properties that suffer repetitive flood loss and/or experience repeated damage to structures from all types of flooding. | | | | | |
| 13 | Prevention | Village Administrator | 05-22-2020 | 05-21-2025 | PDM; HMGP |
| 3 Utilize channel diversion or channel modification (deepening or widening) to re-route water or increase capacity and reduce flooding. | | | | | |
| 14 | Structurally Engineered Projects | Village Administrator | 05-22-2020 | 05-21-2025 | PDM; HMGP |
| 4. Collaborate with watershed and conservancy districts and other counties that share an interest in common waterways to facilitate cleaning, maintaining, and correcting watershed problems. | | | | | |
| 15 | Natural Resource Protection | Village Administrator | 05-22-2020 | 05-21-2025 | LOC; ICC |
| 5. Maintain membership, join, or resolve sanctions with NFIP; establish CRS participation; engage in federal floodplain activities to support flood prevention. | | | | | |
| 16 | Prevention | Village Administrator | 05-22-2020 | 05-21-2025 | LOC |
| 6. Identify repetitive loss and severe repetitive loss structures in the jurisdiction, and will advocate for mitigation actions regarding these properties. | | | | | |
| 17 | Prevention | Village Administrator | 05-22-2020 | 05-21-2025 | LOC |
| 7. Add rapidly deployable signs to mark flooded roadways quickly. | | | | | |
| 18 | Property Protection | Village Administrator | 05-22-2020 | 05-21-2025 | LOC; CDBG |
| 8. Utilize natural habitats and/or vegetative buffers inside waterways to slow the rapid flow of floodwater and/or hold excess storm water. | | | | | |
| 19 | Natural Resource Protection | Village Administrator | 05-22-2020 | 05-21-2025 | PDM; FMA |
| HAZARDOUS MATERIALS: Fredericktown will take action to prevent, manage, and reduce the consequences from spills and leaks of hazardous materials. | | | | | |
| 13. Advocate for funding and conducting additional first responder training to cover not only highway hazardous materials incidents but also pipeline and intermodal systems. | | | | | |
| 22 | Property Protection | Village Administrator | 05-22-2020 | 05-21-2025 | EMPG; HSGP |
| INFRASTRUCTURE: Fredericktown will act to harden, improve, and replace various forms of infrastructure to reduce damages and consequences from storms and disasters. | | | | | |
| 14. Maintain, repair, upgrade, and/or replace storm sewers and wastewater management systems; add street curbs or replace deteriorating ones; repair or replace stormwater basins. | | | | | |

| Priority | Action Type | Lead | Start Date | End Date | Funding |
|--|----------------------------------|-----------------------|------------|------------|-----------------|
| 1 | Structurally Engineered Projects | Village Administrator | 05-22-2020 | 05-21-2025 | PDM; CDBG |
| 15. Ensure that high hazard and classified dams have current emergency plans that identify inundation areas and facilitate emergency actions in the event of a failure. | | | | | |
| 2 | Structurally Engineered Projects | Village Administrator | 05-22-2020 | 05-21-2025 | PDM; CDBG; HMGP |
| 16. Maintain, repair, and replace dams and upground reservoirs that are structurally compromised or that place the public in danger during a structural failure. | | | | | |
| 3 | Structurally Engineered Projects | Village Administrator | 05-22-2020 | 05-21-2025 | PDM;HMGP; CDBG |
| 17. Improve and repair roadways that are damaged by rapid runoff and heavy precipitation. | | | | | |
| 4 | Property Protection | Village Administrator | 05-22-2020 | 05-21-2025 | CDBG |
| 18. Advocate and support improvements to utility systems (distribution lines, generating plants, pumps, filters, and other system components) that result in more dependable, resilient infrastructure for the purpose of maintaining lifelines during disaster response and recovery. | | | | | |
| 5 | Structurally Engineered Projects | Village Administrator | 05-22-2020 | 05-21-2025 | PDM; HMGP |
| 19. Identify alternate/back-up utility resources for use when a primary energy source is compromised (generators, redundant suppliers, etc.). | | | | | |
| 6 | Property Protection | Village Administrator | 05-22-2020 | 05-21-2025 | PDM; EMPG; HMGP |
| 20. Conduct hydrology and hydraulics, storm water and sewer, inundation, and other studies to determine the root cause of flooding and water management problems as well as vulnerable populations and property. | | | | | |
| 7 | Structurally Engineered Projects | Village Administrator | 05-22-2020 | 05-21-2025 | PDM; HMGP |
| 21. Maintain, repair, upgrade and or replace water treatment and distribution systems. | | | | | |
| 8 | Structurally Engineered Projects | Village Administrator | 05-22-2020 | 05-21-2025 | PDM;HMGP; CDBG |
| 22. Replace, improve, or create sanitary sewer systems for neighborhoods, subdivisions or jurisdictions to replace septic systems or outdated sewer systems. | | | | | |
| 9 | Structurally Engineered Projects | Village Administrator | 05-22-2020 | 05-21-2025 | PDM; CDBG |
| 23. Replace roadways and streets with deteriorating pavement due to heavy drainage; replace worn bridges and culverts and increase size and span as appropriate. | | | | | |
| 10 | Structurally Engineered Projects | Village Administrator | 05-22-2020 | 05-21-2025 | PDM |
| 24. Develop infrastructure redundancy through the addition of generators, development of alternate power, water, and fuel supplies; and addition of alternate vendors for service and products like portable generators, fuel supplies, bottled water, etc. | | | | | |
| 11 | Property Protection | Village Administrator | 05-22-2020 | 05-21-2025 | PDM: HMGP |
| LAND SUBSIDENCE: Fredericktown will reduce the effects of various forms of land subsidence, including but not limited to, erosion, water damage, karst formations, and land that washes away due to water movement. | | | | | |
| 11. Provide programs that reduce erosion and sedimentation along shorelines, riverbanks, ditch banks, road berms, and areas that wash away. | | | | | |

| Priority | Action Type | Lead | Start Date | End Date | Funding |
|--|----------------------------------|-----------------------|------------|------------|-----------------|
| 24 | Natural Resource Protection | Village Administrator | 05-22-2020 | 05-21-2025 | PDM; FMA |
| SEVERE STORMS (THUNDERSTORM, TORNADO, WIND): Fredericktown will take action to reduce the consequences and damages from severe thunderstorms, windstorms, and other severe weather. | | | | | |
| 9. Support the construction of safe rooms for single- and multi-family homes and areas such as mobile home parks, campgrounds, apartment complexes, condominium neighborhoods, etc. | | | | | |
| 20 | Property Protection | Village Administrator | 05-22-2020 | 05-21-2025 | PDM |
| 10. Enhance warning and notification systems through improvements to digital technology and other hardware and software used in the operation of warning and notification systems. | | | | | |
| 21 | Public Information | Village Administrator | 05-22-2020 | 05-21-2025 | PDM; EMPG; HSGP |
| WATER QUALITY: Fredericktown will take action to protect the sources of water so that a safe potable water supply is available for county residents. | | | | | |
| 25. Develop inter-connected and redundant water systems that are able to switch over when one is contaminated to provide a safe water supply for the population. | | | | | |
| 23 | Structurally Engineered Projects | Village Administrator | 05-22-2020 | 05-21-2025 | CDBG; PDM |

3.3.5 Gambier

Table 3-6: Gambier Mitigation Strategies

| Priority | Action Type | Lead | Start Date | End Date | Funding |
|---|----------------------------------|---|------------|------------|----------------|
| FLOOD: Gambier will take action to reduce the effects of all types of flooding. | | | | | |
| 1. Construct or maintain water control structures (reservoirs, retention/detention ponds, dams, levees, dikes, floodwalls, etc.) in new or existing property to lessen the effects of flash and storm sewer back up flooding. | | | | | |
| 8 | Structurally Engineered Projects | Village Administrator | 05-22-2020 | 05-21-2025 | PDM;HMGP: CDBG |
| 2. Utilize acquisition, demolition, and relocation for properties that suffer repetitive flood loss and/or experience repeated damage to structures from all types of flooding. | | | | | |
| 9 | Prevention | Village Administrator | 05-22-2020 | 05-21-2025 | PDM: HMGP |
| 3. Utilize channel diversion or channel modification (deepening or widening) to re-route water or increase capacity and reduce flooding. | | | | | |
| 10 | Structurally Engineered Projects | Village Administrator | 05-22-2020 | 05-21-2025 | PDM; HMGP; FMA |
| 4. Clear debris, fallen trees, excess sediment, etc. from waterways to improve flow. | | | | | |
| 11 | Property Protection | Village Administrator | 05-22-2020 | 05-21-2025 | LOC; ICC |
| 5. Manage stream flow through channelization, sedimentation removal, debris and obstruction removal, and stream ecology management practices. | | | | | |
| 12 | Property Protection | Village Administrator | 05-22-2020 | 05-21-2025 | PDM; Other |
| 6. Develop, implement, and maintain the capability to prevent flood damages to property through use of sandbags and other wind and water proofing techniques. | | | | | |
| 13 | Property Protection | Kenyon College Safety Director | 05-22-2020 | 05-21-2025 | ICC |
| 7. Add rapidly deployable signs to mark flooded campus roadways and common-use areas quickly. | | | | | |
| 14 | Property Protection | Kenyon College Safety Director | 05-22-2020 | 05-21-2025 | ICC |
| 8. Advocate the use of green materials and practices in new college development, such as green parking policies, green roof materials, and alternate paving materials that promote absorption instead of runoff. | | | | | |
| 15 | Property Protection | Kenyon College Safety Director | 05-22-2020 | 05-21-2025 | ICC |
| INFRASTRUCTURE: Gambier will act to harden, improve, and replace various forms of infrastructure to reduce damages and consequences from storms and disasters. | | | | | |
| 17. Maintain, repair, upgrade, and/or replace storm sewers and wastewater management systems; add street curbs or replace deteriorating ones; repair or replace stormwater basins. | | | | | |
| 1 | Property Protection | Village Administrator Kenyon College Safety Director | 05-22-2020 | 05-21-2025 | PDM: HMGP |
| 18. Identify alternate/back-up utility resources for use when a primary energy source is compromised (generators, redundant suppliers, etc.). | | | | | |
| 2 | Property Protection | Village Administrator | 05-22-2020 | 05-21-2025 | PDM;HMGP: EMPG |
| 19. Replace, improve, or create sanitary sewer systems for neighborhoods, subdivisions or jurisdictions to replace septic systems or outdated sewer systems. | | | | | |

| Priority | Action Type | Lead | Start Date | End Date | Funding |
|--|----------------------------------|---|------------|------------|-----------------|
| 3 | Structurally Engineered Projects | Village Administrator | 05-22-2020 | 05-21-2025 | PDM;HMGP; CDBG |
| 20. Replace roadways and streets with deteriorating pavement due to heavy drainage; replace worn bridges and culverts and increase size and span as appropriate. | | | | | |
| 4 | Structurally Engineered Projects | Village Administrator | 05-22-2020 | 05-21-2025 | PDM; CDBG |
| 21. Upgrade or replace communications equipment to provide adequate and timely emergency notifications to students and staff. | | | | | |
| 5 | Public Information | Kenyon College Safety Director | 05-22-2020 | 05-21-2025 | ICC |
| 22. Acquire generators for alternate power during an extended outage and identify alternate vendors for fuel supplies, bottled water, and other critical supplies. | | | | | |
| 6 | Property Protection | Kenyon College Safety Director | 05-22-2020 | 05-21-2025 | ICC |
| 23. Develop facilities to be utilized for comfort centers when utility outages occur during periods of extreme heat. | | | | | |
| 7 | Property Protection | Kenyon College Safety Director | 05-22-2020 | 05-21-2025 | ICC |
| SEVERE STORMS (THUNDERSTORM, TORNADO, WIND): Gambier will take action to reduce the consequences and damages from severe thunderstorms, windstorms, and other severe weather. | | | | | |
| 9. Support the construction of safe rooms for single- and multi-family homes and areas such as college residence halls, mobile home parks, campgrounds, apartment complexes, condominium neighborhoods, etc. | | | | | |
| 16 | Property Protection | Village Administrator Kenyon College Safety Director | 05-22-2020 | 05-21-2025 | PDM: HMGP |
| 10. Repair or retrofit public and college properties with wind-resistant materials (i.e. metal roofing, siding, wind-resistant glass, etc.) to decrease damage due to wind or other storms. | | | | | |
| 17 | Property Protection | Village Administrator Kenyon College Safety Director | 05-22-2020 | 05-21-2025 | PDM; LOC |
| 11. Maintain trees and vegetation on public and college property, and remove dead or diseased trees that are vulnerable to wind damage. | | | | | |
| 18 | Property Protection | Village Administrator Kenyon College Safety Director | 05-22-2020 | 05-21-2025 | LOC |
| 12. Develop agreements for safety shelters to be used for a variety of disaster-related purposes during severe storms and/or evacuations, including areas like stadiums and parks used for recreation, public gatherings, or other assemblies. | | | | | |
| 19 | Property Protection | Village Administrator | 05-22-2020 | 05-21-2025 | LOC; EMPG |
| 13. Improve and maintain warning and notification systems to warn the public and college community about imminent threats and hazards. | | | | | |
| 20 | Public Information | Village Administrator Kenyon College Safety Director | 05-22-2020 | 05-21-2025 | EMPG; PDM; HSGP |
| 14. Enhance warning and notification systems through improvements to digital technology and other hardware and software used in the operation of warning and notification systems. | | | | | |

| Priority | Action Type | Lead | Start Date | End Date | Funding |
|--|----------------------------------|--------------------------------|------------|------------|------------|
| 21 | Public Information | Village Administrator | 05-22-2020 | 05-21-2025 | EMPG; HSGP |
| 15. Educate college students and staff about warnings and the actions they should take when a one is issued. | | | | | |
| 22 | Public Information | Kenyon College Safety Director | 05-22-2020 | 05-21-2025 | ICC |
| 16. Work to provide necessary services to populations with functional needs during disasters. | | | | | |
| 23 | Property Protection | Kenyon College Safety Director | 05-22-2020 | 05-21-2025 | ICC |
| WATER QUALITY: Gambier will take action to protect the sources of water so that a safe potable water supply is available for residents. | | | | | |
| 24. Work for early and pro-active collaboration between jurisdictions regarding spills or leaks into the water supply that will eventually affect water quality in the county. | | | | | |
| 26 | Natural Resource Protection | Village Administrator | 05-22-2020 | 05-21-2025 | LOC |
| 25. Develop inter-connected and redundant water systems that are able to switch over when one is contaminated to provide a safe water supply for the population. | | | | | |
| 27 | Structurally Engineered Projects | Village Administrator | 05-22-2020 | 05-21-2025 | PDM; CDBG |
| WINTER STORMS: Gambier will take action to protect the community from the effects of severe winter storm incidents. | | | | | |
| 26. Establish procedures to notify students and staff of extreme cold and the dangers of exposure. | | | | | |
| 24 | Public Information | Kenyon College Safety Director | 05-22-2020 | 05-21-2025 | ICC |
| 27. Establish locations to be used as warming centers during periods of extreme cold, utility outages, or other interruptions of heat. | | | | | |
| 25 | Public Information | Kenyon College Safety Director | 05-22-2020 | 05-21-2025 | ICC |

3.3.6 Gann/Brinkhaven

Table 3-7: Gann/Brinkhaven Mitigation Strategies

| Priority | Action Type | Lead | Start Date | End Date | Funding |
|--|----------------------------------|-------|------------|------------|-----------|
| FLOOD: Gann will take action to reduce the effects of all types of flooding. | | | | | |
| 1. Construct or maintain water control structures (reservoirs, retention/detention ponds, dams, levees, dikes, floodwalls, etc.) in new or existing property to lessen the effects of flash and storm sewer back up flooding. | | | | | |
| 7 | Structurally Engineered Project | Mayor | 05-22-2020 | 05-21-2025 | LOC: ICC |
| 2. Elevate structures (buildings, roadways, bridges, culverts etc.) to remove them from flood-prone areas. | | | | | |
| 8 | Property Protection | | 05-22-2020 | 05-21-2025 | PDM |
| 3. Utilize acquisition, demolition, and relocation for properties that suffer repetitive flood loss and/or experience repeated damage to structures from all types of flooding. | | | | | |
| 9 | Prevention | Mayor | 05-22-2020 | 05-21-2025 | PDM; HMGP |
| 4. Clear debris, fallen trees, excess sediment, etc. from waterways to improve flow. | | | | | |
| 10 | Property Protection | Mayor | 05-22-2020 | 05-21-2025 | LOC |
| 5. Manage stream flow through channelization, sedimentation removal, debris and obstruction removal, and stream ecology management practices. | | | | | |
| 11 | Structurally Engineered Project | Mayor | 05-22-2020 | 05-21-2025 | PDM: LOC |
| 6. Collaborate with watershed and conservancy districts and other counties that share an interest in common waterways to facilitate cleaning, maintaining, and correcting watershed problems. | | | | | |
| 12 | Natural Resource Protection | Mayor | 05-22-2020 | 05-21-2025 | Other |
| 7. Adopt and/or enforce floodplain, zoning, and building regulations to manage development in areas without regulations or standards; and take part in revision of flood maps, monitoring the need for local construction regulation and maintaining adequate efforts to reduce vulnerability through management of development. | | | | | |
| 13 | Prevention | Mayor | 05-22-2020 | 05-21-2025 | LOC |
| 8. Maintain membership, join, or resolve sanctions with NFIP; establish CRS participation; engage in federal floodplain activities to support flood prevention. | | | | | |
| 14 | Prevention | Mayor | 05-22-2020 | 05-21-2025 | LOC |
| INFRASTRUCTURE: Gann will act to harden, improve, and replace various forms of infrastructure to reduce damages and consequences from storms and disasters. | | | | | |
| 12. Maintain, repair, upgrade, and/or replace storm sewers and wastewater management systems; add street curbs or replace deteriorating ones; repair or replace stormwater basins. | | | | | |
| 1 | Structurally Engineered Projects | Mayor | 05-22-2020 | 05-21-2025 | CDBG; PDM |
| 13. Improve and repair roadways that are damaged by rapid runoff and heavy precipitation. | | | | | |
| 2 | Property Protection | Mayor | 05-22-2020 | 05-21-2025 | CDBG: PDM |
| 14. Advocate and support improvements to utility systems (distribution lines, generating plants, pumps, filters, and other system components) that result in more dependable, resilient infrastructure for the purpose of maintaining lifelines during disaster response and recovery. | | | | | |
| 3 | Property Protection | Mayor | 05-22-2020 | 05-21-2025 | CDBG: PDM |
| 15. Identify alternate/back-up utility resources for use when a primary energy source is compromised (generators, redundant suppliers, etc.) | | | | | |
| 4 | Property Protection | Mayor | 05-22-2020 | 05-21-2025 | PDM; HMGP |

| Priority | Action Type | Lead | Start Date | End Date | Funding |
|--|---------------------|-------|------------|------------|-----------------|
| 16. Repair, replace, retrofit, or upgrade communications equipment including towers, transmission lines, distribution lines, receivers and transmitters to provide improved or redundant capabilities to communicate at all times. | | | | | |
| 5 | Property Protection | Mayor | 05-22-2020 | 05-21-2025 | CDBG; HSGP; AFG |
| 17. Replace roadways and streets with deteriorating pavement due to heavy drainage; replace worn bridges and culverts and increase size and span as appropriate. | | | | | |
| 6 | Property Protection | Mayor | 05-22-2020 | 05-21-2025 | CDBG; PDM |
| SEVERE STORMS (THUNDERSTORM, TORNADO, WIND): Gann will take action to reduce the consequences and damages from severe thunderstorms, windstorms, and other severe weather. | | | | | |
| 9. Support the construction of safe rooms for single- and multi-family homes and areas such as mobile home parks, campgrounds, apartment complexes, condominium neighborhoods, etc. | | | | | |
| 15 | Property Protection | Mayor | 05-22-2020 | 05-21-2025 | PDM |
| 10. Maintain trees and vegetation on public property, and remove dead or diseased trees that are vulnerable to wind damage. | | | | | |
| 16 | Property Protection | Mayor | 05-22-2020 | 05-21-2025 | LOC |
| 11. Develop agreements for safety shelters to be used for a variety of disaster-related purposes during severe storms and/or evacuations, including areas like stadiums and parks used for recreation, public gatherings, or other assemblies. | | | | | |
| 17 | Property Protection | Mayor | 05-22-2020 | 05-21-2025 | LOC |

3.3.7 Martinsburg

Table 3-8: Martinsburg Mitigation Strategies

| Priority | Action Type | Lead | Start Date | End Date | Funding |
|--|----------------------------------|-------|------------|------------|------------|
| FLOOD: Martinsburg will take action to reduce the effects of all types of flooding. | | | | | |
| 1. Construct or maintain water control structures (reservoirs, retention/detention ponds, dams, levees, dikes, floodwalls, etc.) in new or existing property to lessen the effects of flash and storm sewer back up flooding. | | | | | |
| 9 | Structurally Engineered Projects | Mayor | 05-22-2020 | 05-21-2025 | PDM; CDBG |
| 2. Utilize acquisition, demolition, and relocation for properties that suffer repetitive flood loss and/or experience repeated damage to structures from all types of flooding. | | | | | |
| 10 | Prevention | Mayor | 05-22-2020 | 05-21-2025 | PDM; HMGP |
| 3. Clear debris, fallen trees, excess sediment, etc. from waterways to improve flow. | | | | | |
| 11 | Property Protection | Mayor | 05-22-2020 | 05-21-2025 | LOC |
| 4. Collaborate with watershed and conservancy districts and other counties that share an interest in common waterways to facilitate cleaning, maintaining, and correcting watershed problems. | | | | | |
| 12 | Natural Resource Protection | Mayor | 05-22-2020 | 05-21-2025 | ICC; LOC |
| 5. Maintain membership, join, or resolve sanctions with NFIP; establish CRS participation; engage in federal floodplain activities to support flood prevention. | | | | | |
| 13 | Prevention | Mayor | 05-22-2020 | 05-21-2025 | LOC |
| 6. Identify and implement means to collect crop debris in runoff water and manage it before it clogs ditches, streams, culverts, and other waterways. | | | | | |
| 14 | Property Protection | Mayor | 05-22-2020 | 05-21-2025 | LOC |
| INFRASTRUCTURE: Gann will act to harden, improve, and replace various forms of infrastructure to reduce damages and consequences from storms and disasters. | | | | | |
| 15. Maintain, repair, upgrade, and/or replace storm sewers and wastewater management systems; add street curbs or replace deteriorating ones; and repair or replace stormwater basins. | | | | | |
| 1 | Property Protection | Mayor | 05-22-2020 | 05-21-2025 | PDM; CDBG |
| 16. Improve and repair roadways that are damaged by rapid runoff and heavy precipitation. | | | | | |
| 2 | Property Protection | Mayor | 05-22-2020 | 05-21-2025 | PDM; Other |
| 17. Advocate and support improvements to utility systems (distribution lines, generating plants, pumps, filters, and other system components) that result in more dependable, resilient infrastructure for the purpose of maintaining lifelines during disaster response and recovery. | | | | | |
| 3 | Prevention | Mayor | 05-22-2020 | 05-21-2025 | LOC; ICC |
| 18. Identify alternate/back-up utility resources for use when a primary energy source is compromised (generators, redundant suppliers, etc.). | | | | | |
| 4 | Property Protection | Mayor | 05-22-2020 | 05-21-2025 | PDM; HMGP |
| 19. Conduct hydrology and hydraulics, storm water and sewer, inundation, and other studies to determine the root cause of flooding and water management problems as well as the vulnerable populations and property. | | | | | |
| 5 | Property Protection | Mayor | 05-22-2020 | 05-21-2025 | PDM; CDBG |
| 20. Maintain, repair, upgrade and or replace water treatment and distribution systems. | | | | | |
| 6 | Structurally Engineered Projects | Mayor | 05-22-2020 | 05-21-2025 | PDM; CDBG |

| Priority | Action Type | Lead | Start Date | End Date | Funding |
|---|-----------------------------|-------|------------|------------|-----------------------|
| 21. Replace, improve, or create sanitary sewer systems for neighborhoods, subdivisions or jurisdictions to replace septic systems or outdated sewer systems. | | | | | |
| 7 | Property Protection | Mayor | 05-22-2020 | 05-21-2025 | PDM; CDBG |
| 22. Repair, replace, retrofit, or upgrade communications equipment including towers, transmission lines, distribution lines, receivers and transmitters to provide improved or redundant capabilities to communicate at all times. | | | | | |
| 8 | Public Information | Mayor | 05-22-2020 | 05-21-2025 | HSGP; AFG |
| SEVERE STORMS (THUNDERSTORM, TORNADO, WIND): Martinsburg will take action to reduce the consequences and damages from severe thunderstorms, windstorms, and other severe weather. | | | | | |
| 7. Support the construction of safe rooms for single- and multi-family homes and areas such as mobile home parks, campgrounds, apartment complexes, condominium neighborhoods, etc. | | | | | |
| 15 | Property Protection | Mayor | 05-22-2020 | 05-21-2025 | PDM; HMGP |
| 8. Maintain trees and vegetation on public property, and remove dead or diseased trees that are vulnerable to wind damage. | | | | | |
| 16 | Property Protection | Mayor | 05-22-2020 | 05-21-2025 | LOC |
| 9. Develop agreements for safety shelters to be used for a variety of disaster-related purposes during severe storms and/or evacuations, including areas like stadiums and parks used for recreation, public gatherings, or other assemblies. | | | | | |
| 17 | Property Protection | Mayor | 05-22-2020 | 05-21-2025 | LOC |
| 10. Improve and/or maintain warning and notification systems to warn the public about impending dangers and threats. | | | | | |
| 18 | Public Information | Mayor | 05-22-2020 | 05-21-2025 | LOC; HMGP; PDM; HSGP |
| 11. Enhance warning and notification systems through improvements to digital technology and other hardware and software used in the operation of warning and notification systems. | | | | | |
| 19 | Public Information | Mayor | 05-22-2020 | 05-21-2025 | LOC; PDM; HSGP; Other |
| 12. Educate the community about warnings and notifications and the actions they should take when one is issued. | | | | | |
| 20 | Public Information | Mayor | 05-22-2020 | 05-21-2025 | LOC; EMPG |
| 13. Educate the public about what to do in emergency situations such as tornado/severe thunderstorm/wind storm/earthquake/flood/flash flood/blizzard. | | | | | |
| 21 | Public Information | Mayor | 05-22-2020 | 05-21-2025 | LOC; EMPG |
| 14. Work to develop affordable and functional county-wide public safety communication system with the capability for multi-discipline and multi-jurisdictional communication. | | | | | |
| 22 | Property Protection | Mayor | 05-22-2020 | 05-21-2025 | PDM; HSGP; AFG; Other |
| WATER QUALITY: Martinsburg will take action to protect the sources of water so that a safe potable water supply is available for residents. | | | | | |
| 23. Advocate for improvements to water treatment plants to include enhanced testing and monitoring, and to improve treatment capabilities. | | | | | |
| 23 | Natural Resource Protection | Mayor | 05-22-2020 | 05-21-2025 | ICC |

3.3.8 Mount Vernon

Table 3-9: Mount Vernon Mitigation Strategies

| Priority | Action Type | Lead | Start Date | End Date | Funding |
|---|---------------------------------|-------------------------|------------|------------|-----------|
| EARTHQUAKE: Mount Vernon will take action to assess and mitigate the effects of potential earthquakes. | | | | | |
| 31. Identify the structures and infrastructure in the county that would likely be damaged or destroyed in an earthquake of moderate to severe magnitude. | | | | | |
| 46 | Property Protection | Safety Service Director | 05-22-2020 | 05-21-2025 | LOC |
| FLOOD: Mount Vernon will take action to reduce the effects of all types of flooding. | | | | | |
| 1. Construct or maintain water control structures (reservoirs, retention/detention ponds, dams, levees, dikes, floodwalls, etc.) in new or existing property to lessen the effects of flash and storm sewer back up. | | | | | |
| 13 | Structurally Engineered Project | Safety Service Director | 05-22-2020 | 05-21-2025 | PDM; HMGP |
| 2. Elevate structures (buildings, roadways, bridges, culverts etc.) to remove them from flood-prone areas. | | | | | |
| 14 | Structurally Engineered Project | Safety Service Director | 05-22-2020 | 05-21-2025 | PDM; HMGP |
| 3. Utilize acquisition, demolition, and relocation for properties that suffer repetitive flood loss and/or experience repeated damage to structures from all types of flooding. | | | | | |
| 15 | Prevention | Safety Service Director | 05-22-2020 | 05-21-2025 | PDM; HMGP |
| 4. Utilize channel diversion or channel modification (deepening or widening) to re-route water or increase capacity and reduce flooding. | | | | | |
| 16 | Structurally Engineered Project | Safety Service Director | 05-22-2020 | 05-21-2025 | PDM; HMGP |
| 5. Clear debris, fallen trees, excess sediment, etc. from waterways to improve flow. | | | | | |
| 17 | Prevention | Safety Service Director | 05-22-2020 | 05-21-2025 | LOC |
| 6. Manage stream flow through channelization, sedimentation removal, debris and obstruction removal, and stream ecology management practices. | | | | | |
| 18 | Structurally Engineered Project | Safety Service Director | 05-22-2020 | 05-21-2025 | PDM; LOC |
| 7. Collaborate with watershed and conservancy districts and other counties that share an interest in common waterways to facilitate cleaning, maintaining, and correcting watershed problems. | | | | | |
| 19 | Natural Resource Protection | Safety Service Director | 05-22-2020 | 05-21-2025 | LOC; ICC |
| 8. Enforce floodplain, zoning, and building regulations to manage development in areas without regulations or standards; and take part in revision of flood maps, monitoring the need for local construction regulation and maintaining adequate efforts to reduce vulnerability through management of development. | | | | | |
| 20 | Prevention | Safety Service Director | 05-22-2020 | 05-21-2025 | LOC |
| 9. Maintain participation in NFIP; establish CRS participation; engage in federal floodplain activities to support flood prevention. | | | | | |
| 21 | Prevention | Safety Service Director | 05-22-2020 | 05-21-2025 | LOC |
| 10. Identify and implement means to collect crop debris in runoff water and manage it before it clogs ditches, streams, culverts, and other waterways. | | | | | |
| 22 | Property Protection | Safety Service Director | 05-22-2020 | 05-21-2025 | LOC |
| 11. Protect waterway banks and land near waterways from deterioration due to rapid or excessive flow by planting vegetation, installing dormant woody stakes and posts, planting trees, shrubs and grasses along banks and berms, or using deflectors to prevent deterioration, or other similar methods. | | | | | |

| Priority | Action Type | Lead | Start Date | End Date | Funding |
|---|---------------------------------|-------------------------|------------|------------|-----------|
| 23 | Natural Resource Protection | Safety Service Director | 05-22-2020 | 05-21-2025 | PDM; HMGP |
| 12. Utilize biotechnical methods (placement of willow posts, hardwood tree plantings, fascines, brush layering, evergreen revetments, log revetments, tree kickers, lunger structures, or placed rocks as examples) to minimize the deterioration or destruction of stream banks due to excessive flow. | | | | | |
| 24 | Natural Resource Protection | Safety Service Director | 05-22-2020 | 05-21-2025 | PDM; HMGP |
| 13. Utilize natural habitats and/or vegetative buffers inside waterways to slow the rapid flow of floodwater and/or hold excess storm water. | | | | | |
| 25 | Natural Resource Protection | Safety Service Director | 05-22-2020 | 05-21-2025 | PDM; HMGP |
| 14. Utilize stream bank protection measures such as gabion revetments, riprap revetments, and crib walls, and other structural methods to protect the banks and berms as well as current use of the areas. | | | | | |
| 26 | Natural Resource Protection | Safety Service Director | 05-22-2020 | 05-21-2025 | PDM; HMGP |
| 15. Require developers and/or construction crews in urban development zones to use tools such as chemical stabilization, compost blankets, geotextiles to control soil deterioration, mulching of new plantings, seeding and sodding of areas highly vulnerable to rapid surface runoff, installation of grass lined channels, slope diversion for surface runoff, and other methods to reduce the damages to land and property due to heavy and rapid surface runoff or drainage from rainfall or other precipitation or draining water. | | | | | |
| 27 | Natural Resource Protection | Safety Service Director | 05-22-2020 | 05-21-2025 | LOC |
| 16. Advocate the use of green materials and practices in development, such as green parking policies, green roof materials, and alternate paving materials that promote absorption instead of runoff. | | | | | |
| 28 | Structurally Engineered Project | Safety Service Director | 05-22-2020 | 05-21-2025 | PDM; HMGP |
| INFRASTRUCTURE: Mount Vernon will act to harden, improve, and replace various forms of infrastructure to reduce damages and consequences from storms and disasters. | | | | | |
| 32. Maintain, repair, upgrade, and/or replace storm sewers and wastewater management systems; add street curbs or replace deteriorating ones; repair or replace stormwater basins. | | | | | |
| 1 | Structurally Engineered Project | Safety Service Director | 05-22-2020 | 05-21-2025 | PDM: HMGP |
| 33. Ensure that high hazard and classified dams have current emergency plans that identify inundation areas and facilitate emergency actions in the event of a failure. | | | | | |
| 2 | Structurally Engineered Project | Safety Service Director | 05-22-2020 | 05-21-2025 | LOC |
| 34. Maintain, repair, and replace dams and upground reservoirs that are structurally compromised or that place the public in danger during a structural failure. | | | | | |
| 3 | Structurally Engineered Project | Safety Service Director | 05-22-2020 | 05-21-2025 | PDM: HMGP |
| 35. Improve and repair roadways that are damaged by rapid runoff and heavy precipitation. | | | | | |
| 4 | Property Protection | Safety Service Director | 05-22-2020 | 05-21-2025 | LOC |
| 36. Advocate and support improvements to utility systems (distribution lines, generating plants, pumps, filters, and other system components) that result in more dependable, resilient infrastructure for the purpose of maintaining lifelines during disaster response and recovery. | | | | | |

| Priority | Action Type | Lead | Start Date | End Date | Funding |
|---|---------------------------------|-------------------------|------------|------------|-----------|
| 5 | Structurally Engineered Project | Safety Service Director | 05-22-2020 | 05-21-2025 | PDM: HMGP |
| 37. Conduct hydrology and hydraulics, storm water and sewer, inundation, and other studies to determine the root cause of flooding and water management problems as well as the vulnerable populations and property. | | | | | |
| 6 | Structurally Engineered Project | Safety Service Director | 05-22-2020 | 05-21-2025 | PDM: HMGP |
| 38. Maintain, repair, upgrade and or replace water treatment and distribution systems. | | | | | |
| 7 | Structurally Engineered Project | Safety Service Director | 05-22-2020 | 05-21-2025 | PDM: HMGP |
| 39. Replace, improve, or create sanitary sewer systems for neighborhoods, subdivisions or jurisdictions to replace septic systems or outdated sewer systems. | | | | | |
| 8 | Structurally Engineered Project | Safety Service Director | 05-22-2020 | 05-21-2025 | PDM: HMGP |
| 40. Repair, replace, retrofit, or upgrade communications equipment including towers, transmission lines, telephone lines, distribution lines, receivers and transmitters to provide improved or redundant capabilities to communicate at all times. | | | | | |
| 9 | Structurally Engineered Project | Safety Service Director | 05-22-2020 | 05-21-2025 | PDM: HMGP |
| 41. Replace roadways and streets with deteriorating pavement due to heavy drainage; replace worn bridges and culverts and increase size and span as appropriate. | | | | | |
| 10 | Structurally Engineered Project | Safety Service Director | 05-22-2020 | 05-21-2025 | PDM: HMGP |
| 42. Develop infrastructure redundancy through the addition of generators, development of alternate power, water, and fuel supplies; and addition of alternate vendors for service and products like portable generators, fuel supplies, bottled water, etc. | | | | | |
| 11 | Property Protection | Safety Service Director | 05-22-2020 | 05-21-2025 | PDM: HMGP |
| 43. Develop infrastructure system redundancy for operating contingencies and individual response plans for all facilities serving critical users and perform an annual review of these critical user facilities and coordination efforts. | | | | | |
| 12 | Property Protection | City Engineer | 05-22-2020 | 05-21-2025 | LOC |
| LAND SUBSIDENCE: Mount Vernon will reduce the effects of various forms of land subsidence, including but not limited to, erosion, water damage, the effects of karst formations, and land that washes away due to water movement. | | | | | |
| 29. Provide programs that reduce erosion and sedimentation along shorelines, riverbanks, ditch banks, road berms, and areas that wash away | | | | | |
| 44 | Natural Resource Protection | Safety Service Director | 05-22-2020 | 05-21-2025 | ICC; LOC |
| 30. Develop collaborative efforts with environmental advocates to prevent contamination of groundwater. | | | | | |
| 45 | Prevention | Safety Service Director | 05-22-2020 | 05-21-2025 | LOC |
| SEVERE STORMS (THUNDERSTORM, TORNADO, WIND): Mount Vernon will take action to reduce the consequences and damages from severe thunderstorms, windstorms, and other severe weather. | | | | | |
| 17. Support the construction of safe rooms for single- and multi-family homes and areas such as mobile home parks, campgrounds, apartment complexes, condominium neighborhoods, etc. | | | | | |
| 29 | Property Protection | Safety Service Director | 05-22-2020 | 05-21-2025 | PDM; HMGP |

| Priority | Action Type | Lead | Start Date | End Date | Funding |
|--|---------------------------------|-------------------------|------------|------------|----------------|
| 18. Repair or retrofit public properties with wind-resistant materials (i.e. metal roofing, siding, wind-resistant glass, etc.) to decrease damage due to wind or other storms. | | | | | |
| 30 | Structurally Engineered Project | Safety Service Director | 05-22-2020 | 05-21-2025 | PDM: HMGP |
| 19. Maintain trees and vegetation on public property, and remove dead or diseased trees that are vulnerable to wind damage. | | | | | |
| 31 | Property Protection | Safety Service Director | 05-22-2020 | 05-21-2025 | LOC |
| 20. Support implementation of construction standards that require wind resistant building materials and roofing types for structures. | | | | | |
| 32 | Prevention | Safety Service Director | 05-22-2020 | 05-21-2025 | LOC |
| 21. Promote warning and notification systems to warn the public about impending dangers and threats. | | | | | |
| 33 | Public Information | Safety Service Director | 05-22-2020 | 05-21-2025 | PDM;HMGP; EMPG |
| 22. Enhance warning and notification systems through improvements to digital technology and other hardware and software used in the operation of warning and notification systems. | | | | | |
| 34 | Public Information | Safety Service Director | 05-22-2020 | 05-21-2025 | PDM;HMGP; EMPG |
| 23. Educate the community about warnings and notifications and the actions they should take when issued. | | | | | |
| 35 | Public Information | Safety Service Director | 05-22-2020 | 05-21-2025 | LOC |
| 24. Educate the community about the protective actions they should take when an emergency occurs. | | | | | |
| 36 | Public Information | Safety Service Director | 05-22-2020 | 05-21-2025 | LOC |
| 25. Teach school aged children about 9-1-1 and emergency warning and notification systems, including what to do when a warning is issued. | | | | | |
| 37 | Public Information | Safety Service Director | 05-22-2020 | 05-21-2025 | LOC |
| 26. Educate the public about what to do in emergency situations such as tornado/severe thunderstorm/wind storm/earthquake/flood/flash flood/blizzard. | | | | | |
| 38 | Public Information | Safety Service Director | 05-22-2020 | 05-21-2025 | LOC |
| 27. Advocate for residents to carry adequate and appropriate insurances to protect them from loss. | | | | | |
| 39 | Property Protection | Safety Service Director | 05-22-2020 | 05-21-2025 | LOC |
| 28. Work to develop affordable and functional city communication system with the capability for multi-discipline and multi-jurisdictional communication. | | | | | |
| 40 | Property Protection | Safety Service Director | 05-22-2020 | 05-21-2025 | HSGP; EMPG |
| WATER QUALITY: Mount Vernon will take action to protect the sources of water so that a safe potable water supply is available for residents. | | | | | |
| 44. Advocate for improvements to water treatment plants to include enhanced testing and monitoring, and to improve treatment capabilities. | | | | | |
| 41 | Structurally Engineered Project | Safety Service Director | 05-22-2020 | 05-21-2025 | PDM: HMGP |
| 45. Advocate and support continuing research into all causes of water quality issues, including analysis of old industrial sites that are now abandoned or not being used. | | | | | |
| 42 | Prevention | Safety Service Director | 05-22-2020 | 05-21-2025 | PDM: HMGP |
| 46. Develop inter-connected and redundant water systems that are able to switch over when one is contaminated to provide a safe water supply for the population. | | | | | |
| 43 | Structurally Engineered Project | Safety Service Director | 05-22-2020 | 05-21-2025 | PDM: HMGP |

3.4 IMPLEMENTATION

These mitigation strategies are general actions that could reduce the negative impact of disasters. For a strategy to become an actionable item, it must be converted to a project with a funding source, action steps, timelines, and project goals. For example, a project to acquire and demolish a repetitive loss property begins by identifying the property to be acquired and a funding source. The property owner must agree to accept the buy-out and use the money to purchase another home and the jurisdiction must accept its share of cost, planning responsibility, and project management roles. Only then can the actual project be executed. A similar process must be followed for any of the strategies identified here to become projects.

The Knox County EMA will monitor the implementation of these strategies through ongoing communication with jurisdiction officials and stakeholders. When mitigation grants or other funding sources become available, reasonable efforts will be made to secure funding. For strategies funded through local budgets, jurisdictions will work diligently to identify local funding sources that can be used to address disaster vulnerability. When funding is secured, a detailed project timeline will be developed and action steps taken to complete the project. Upon completion, the jurisdiction will evaluate project effectiveness and share that information with the EMA and planning team for consideration in developing future projects.

In some instances, a potential mitigation project may be most efficiently administered by a property owner, special district, or nonprofit organization. Examples might include a property owners' association, college or university, school district, utility district, or other service district. In such cases, the jurisdiction having authority may delegate grant application and administration directly to that entity. This delegation might be done in consideration of staffing and oversight capabilities, timeliness of work performance, or logistics. The authority having jurisdiction will require that all building codes, floodplain regulations, and other development and land use regulations be followed and will verify compliance. Non-governmental and external entities performing this work will be required to comply with all rules, procedures, and grant terms and conditions. All permits will be reviewed and issued by the appropriate local authority and all inspections and final occupancy approvals will be given by the designated local or state. This delegation will not compromise or reduce the collaborative efforts of mitigation planning, land use planning, or development regulations in Knox County.

Developing this plan required stakeholders to evaluate hazards and risks in their community through extensive collaboration and conversation; this collaboration was the most valuable part of the mitigation planning process. Stakeholders were required to examine the local community, predict where and under what conditions damages would occur, and identify opportunities to reduce or eliminate those damages. The identified solutions were developed to maximize benefit while minimizing cost. This process required whole community involvement so that all sectors of the community were represented in the planning process. Ultimately, this work resulted in comprehensive, relevant, and effective solutions to Knox County's unique risks and vulnerabilities. Given the availability of funding, personnel, and support, Knox County and its jurisdictions are positioned to move forward and implement these strategies and accomplish their goal of making the county more disaster resilient.