Hazard Mitigation and You: What You Need to Know

BRUCE R. NATALE, P.E., GABRIEL HOLBROW AND MICHELE WUNDERLICH

Planning and the Resilience Cycle

Resilience: the ability of social units (e.g., organizations, communities) to mitigate hazards, contain the effects of disasters when they occur, and carry out recovery activities in ways that minimize social disruption and mitigate the effects of future disasters.

Resilience is the ability to adapt to changing conditions and prepare for, withstand, and rapidly recover from disruption.

“If and when disaster occurs how well will we bounce back?”

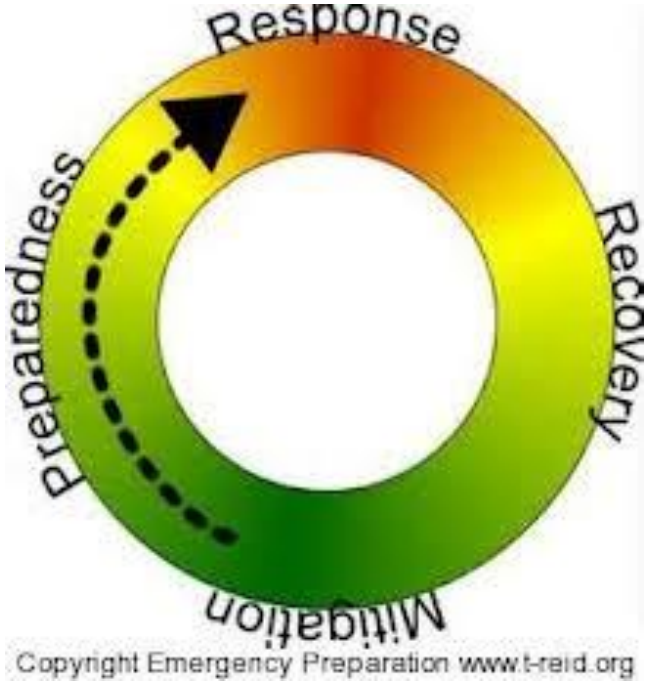
Planning and the Resilience Cycle

Mitigation. Sustained actions taken to reduce or eliminate long-term risk to life and property from hazards.

Preparedness. Actions taken to plan, organize, equip, train, and exercise to build and sustain the capabilities necessary to prevent, protect against, mitigate the effects of, respond to, and recover from those threats that pose the greatest risk.

Response. Actions necessary to save lives, protect property and the environment, and meet basic human needs after an incident has occurred.

Recovery. Actions necessary to assist communities affected by an incident to recover effectively.



Planning and the Resilience Cycle

Four Interventions

- Education and Awareness Programs
- Local Plans and Regulations
- Structure and Infrastructure Projects
- Natural System Protection

Hazard Mitigation

- Hazard mitigation is sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards.
- Reduces the potential impacts of, and costs associated with, emergency and disaster related events.
- Mitigation actions can include activities such as revisions to land-use planning, training and education, and structural and non-structural safety measures.

Cayuga County Multi-Jurisdictional All-Hazard Mitigation Plan

- FEMA defines a hazard mitigation plan as documentation of a state or local government evaluation of natural hazards and the strategies to mitigate such hazards.
- Cayuga County's plan is an all-hazard mitigation plan that looks other hazards besides natural hazards, such as transportation hazards.
- Started in early 2012 with 75% funding from NYS and FEMA.
- Approved by FEMA on April 15, 2014 and will be updated every five years.

Cayuga County Multi-Jurisdictional All-Hazard Mitigation Plan

- All towns and villages in Cayuga County participated in the planning process except for the Town of Cato.
- All towns and villages as well as the City of Auburn and Cayuga County have adopted the plan except for the Town of Summerhill and the Village of Port Byron.
  - If a municipality does not adopt the plan, they are not eligible for FEMA hazard mitigation funding.

Top Hazards in Cayuga County

- Flooding
- Severe Storms
- Winter Storms
- Transportation Hazards
- Ground Failure

Flooding

Five federal declarations between 1970-2013

- June 20-25, 1972: Remnants Tropical Storm Agnes
  - $3.7 million property damage and $4.46 million in crop damage.
  - Two major dams damaged.
- March 17-19, 1973
- September 25-27, 1975: Remnants of Tropical Storm Eloise
  - $6.25 million in property damage
- January 19-20, 1996: Snowmelt/flash flood
  - $1.4 million in property damage, one death
- April 2-4, 2005
  - Mill Street Bridge lost in Port Byron
  - Flash flooding

Severe Storm

Three federal declarations between 1970-2013

- January 19-20, 1996
  - Severe storm and flooding
  - $1.4 million in property damage and one death.
- September 7, 1998 aka Labor Day Storm
  - Severe storm, thunderstorms and wind
  - Property damage estimates close to $25 million and $1 million in crop damage.
- April 2-4, 2005
  - Severe storm and flooding
  - Flash flooding, lost Mill Street Bridge in Port Byron

Severe Winter Storm

Two Federal Declarations between 1970 and 2013

- April 3-5, 2003
  - Ice storm, winter weather
  - $4.3 million in property damage and ~$150,000 in crop damage
  - Three deaths in Cayuga County
- January 28-31, 2004
  - Snow Emergency
  - ~$450,000 in property damage

March 13, 1993 “Storm of the Century”

- Cayuga County was not in the federal declaration, but had $5 million in damage.

Transportation Hazards

- Steamship Frontenac Fire, 9 deaths
- Gasoline tanker accident 1975 in Town of Locke: destroyed 11 buildings
- Vehicular accidents
- HazMat in Transit
- Roadway flooding
- At-grade railroad crossings
  - FLR has 20 at-grade and 5 driveway crossings
  - CSX has 4 at-grade and 2 driveway crossings.
  - July 8, 2004 train derailment at Route 38 crossing in City of Auburn

'reck of Steamer Frontenac, Cayuga Lake, Burned July 27, 1907.

Ground Failure

- Seneca River Landslide in 2003
  - 1000 feet of Seneca Riverbank failed. Two houses condemned. Up to 12 property owners had damage.
- Lake Ontario Coastal Erosion
  - Moon Beach area, Sterling
- Spring Lake Road, Conquest
- Harnett Road, Sempronius
- Central Cayuga County: Karst

Past Mitigation Projects

January 1996 Disaster (Severe Storm and Flooding)

- FEMA Hazard Mitigation Grants
  - Town of Genoa: Berm to protect water supply
  - SWCD: Removed railroad pier in Port Byron
  - SWCD: Riprap in Locke and Moravia and drainage improvements
  - Town of Moravia: Stormwater pond #2

Past Mitigation Projects

January 1996 Disaster (Severe Storm and Flooding)

- FEMA 406 Grants
  - Town of Genoa: Third culvert added to Weeks Road
  - Town of Genoa: Floodproofed fire department
  - Town of Summerhill: Fillmore Gulf Road
  - Village of Moravia: Stormwater pond #1

Past Mitigation Projects:
Town of Genoa, Fire Department

Past Mitigation Projects

September 1998 Disaster (aka Labor Day Storm)

- HUD DRI Grant
  - County: Town of Moravia Stormwater Retention Pond #2
  - County: Green Street Bridge in Port Byron

Past Mitigation Projects: Green Street Bridge

Past Mitigation Projects: Green Street Bridge

Past Mitigation Projects: Green Street Bridge

Green Street Bridge handling a 100 to 500 year flood flow.

Past Mitigation Projects

April 2003 Disaster (Ice storm, winter weather)

- FEMA Hazard Mitigation Grant
  - City of Auburn: Washington Street Channel Improvements
- FEMA 406 Grant Funding
  - Town of Mentz: Sperry Road Riprap

Past Mitigation Projects

April 2005 Disaster (Severe storm and flooding)

- FEMA 406 grant funds
  - Town of Mentz: Mill Street Bridge replacement

Past Mitigation Projects

- Frazil Ice control to prevent ice jams in Port Byron
- Asbestos and tank removals at CCIDA site 2002
- County petroleum spill clean-ups and tank removals Twelve tanks removed 2008-2011.
- Brownfield cleanup in Meridian
- Household hazardous waste collections

Best Practices For Mitigating Hazards

- Education and Awareness Programs
- Local plans and Regulations
- Structure and Infrastructure Projects
- Natural System Protection

Education and Awareness Programs

Inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them.

- County Hazard Mitigation Website
- StormReady program (County participates)
- Other Examples:
  - Radio or television spots
  - Websites with maps and information
  - Real estate disclosure
  - Presentations to school groups or neighborhood organizations
  - Mailings to residents in hazard-prone areas.
  - Firewise Communities

Local Plans and Regulations

These actions include government authorities, policies, or codes that influence the way land and buildings are developed and built.

Basic Actions

- Include hazard mitigation when updating municipal ordinances.
- Review the hazard mitigation plan prior to land use or zoning changes and permitting or development decisions.

Local Plans and Regulations

Comprehensive Planning

- Include hazard identification, risk assessment information, and hazard mitigation goals in comprehensive plans.
- Future land use map can be used to guide development away from high hazard areas.
- High hazard areas can be identified as opportunities for acquisition or preservation within the recreation, open space, or environmental plan elements or maps.

Land Use Ordinance

Subdivision Regulations

- Restrict the subdivision of land within or adjacent to natural hazard areas.
- Provide for conservation subdivisions or cluster subdivisions to conserve environmental resources.

Building Codes and Enforcement

Local Plans and Regulations

Zoning Ordinances and Municipal Codes

- Overlay zones can be used to guide development away from hazard areas.
  - Examples: Prohibit development in a landslide hazard area
- Limit specific uses, such as prohibiting the placement of fire departments or other essential community facilities in a floodplain.
- Prohibit development within or filling of floodways, floodplains and wetlands.
- Subdivision, site development, and critical areas ordinances can affect the location of development as well, either through development restrictions, or through flexible permitting provisions such as planned unit developments, cluster subdivisions, or density transfer that allow for intensive use of suitable land in exchange for the preservation of land more at risk from hazards.

Local Plans and Regulations

Site Plan (Project) Review

- Site plan or project permit review and approval criteria may include specific standards for evaluating risks and requiring safe growth best practices. Such criteria can be codified using zoning and municipal code controls. The effectiveness of such criteria can be reinforced by providing guidance to project applicants, such as checklists or handouts.
- Subdivision or site plan reviews provide excellent opportunities to proactively address hazard mitigation in new construction.

Local Plans and Regulations

National Flood Insurance Program (NFIP)

- The NFIP is a federal program enabling property owners in participating communities to purchase insurance protection against losses from flooding.
- For a community to be eligible in NFIP, it must adopt and enforce a floodplain management ordinance to regulate proposed development in floodplains and officially designate a local floodplain coordinator/ administrator.
- Participation in the NFIP is based on an agreement between communities and FEMA.
- All Cayuga County Towns and Villages participate and each has their own floodplain administrator.

Local Plans and Regulations

The NFIP has three basic components:

- **Floodplain mapping**. NFIP participation requires community adoption of flood hazard maps to provide the data needed to administer floodplain management programs and to actuarially rate new construction for flood insurance.

- **Floodplain management**. The NFIP requires communities to adopt and enforce minimum Federal floodplain management regulations that help mitigate the effects of flooding on new and improved structures. States and communities may have more restrictive elements in their floodplain ordinances to provide additional safety measures.

- **Flood insurance**. Community participation in the NFIP enables property owners to purchase insurance as a protection against flood losses in exchange for community floodplain management regulations that reduce future flood damages.

Local Plans and Regulations

NFIP: Special flood hazard area

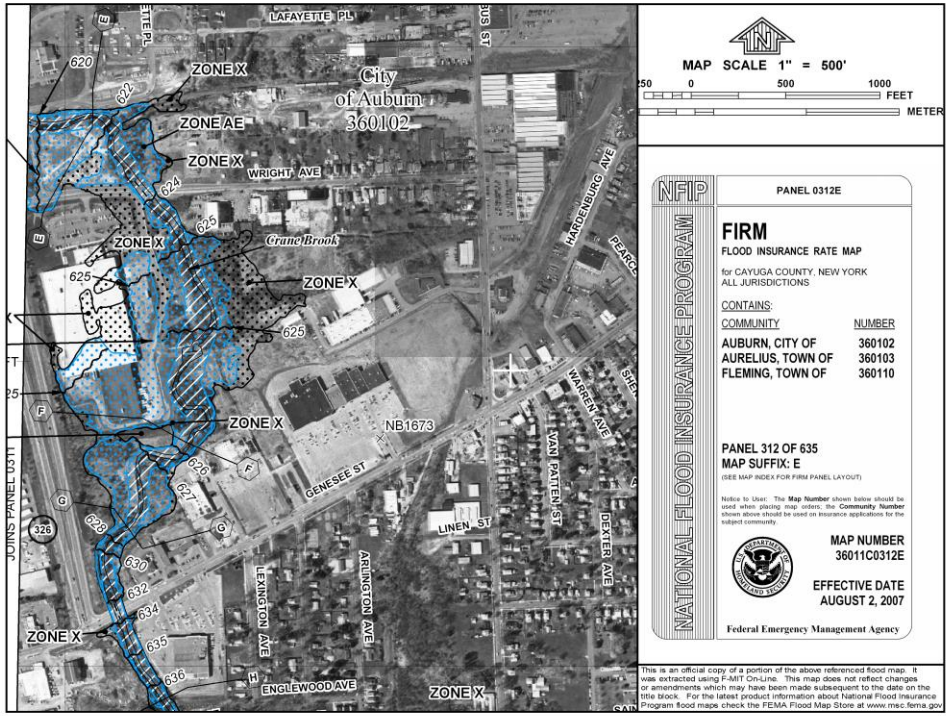
- The area that would be inundated by the 100-year flood, better thought of as an area that has a one percent or greater chance of experiencing a flood in any single year. Special Flood Hazard Areas are shown on federal flood maps, known as Flood Insurance Rate Maps, as shaded areas labeled with the letter "A" or "V" sometimes followed by a number or letter.
- Area where the NFIP's floodplain management regulations must be enforced and the area where the mandatory purchase of flood insurance applies.

Local Plans and Regulations

FEMA Floodplain mapping

- Map service center: http://msc.fema.gov

Local Plans and Regulations



FEMA Floodplain Map

Cayuga County was only the second county in New York State to get county-wide floodmaps generated from LiDAR with a digital elevation model. The new set of maps became official in 2007.

Local Plans and Regulations

Comparing Your Building's Elevation to a Potential Flood Level

- Your insurance agent will use the Elevation Certificate to compare your building's elevation to the Base Flood Elevation (BFE).
- The base flood is a flood with a 1 percent chance of occurring in any given year. The BFE identifies how high the water is likely to rise (also called water surface elevation) in a base flood. The land area of the base flood is called the Special Flood Hazard Area, floodplain, or high-risk zone.
- Flood insurance rates in a high-risk zone (a zone beginning with the letter A or V) are based on a building's elevation above, at, or below the BFE.

Local Plans and Regulations

Elevation and Flood Insurance Rates

- Generally, in high-risk zones, the higher above the BFE a building is located, the lower the insurance premium will be for that property. The Elevation Certificate provides the documentation necessary to make that determination.
- In moderate- to low-risk zones (zones beginning with letters B, C, or X), rates are not based on elevation, so an Elevation Certificate may not be necessary to determine the premium.

Local Plans and Regulations

How to get an Elevation Certificate

- Ask your local floodplain manager if your property's elevation information is on file. If so, the community floodplain manager is authorized to complete the Elevation Certificate for you.
- If your information is not on file, you might need to hire a State-licensed surveyor to obtain an Elevation Certificate.
- When you receive your Elevation Certificate:
  - Provide one copy to your insurance agent.
  - Keep a copy for your records.

Local Plans and Regulations

FEMA Community Rating System (CRS)

- CRS recognizes and encourages community floodplain management activities that exceed the minimum NFIP standards.
- Depending upon the level of participation, flood insurance premium rates for policyholders can be reduced up to 45%.
- Other benefits include enhanced public safety, reduced damages to property and public infrastructure, avoided economic disruption and losses, reduced human suffering, and protection of the environment.

Local Plans and Regulations

FEMA Community Rating System (CRS)

- Technical assistance on designing and implementing some activities is available at no charge.
- Participating in the CRS provides an incentive to maintaining and improving a community's floodplain management program over the years. Implementing some CRS activities can help projects qualify for certain other Federal assistance programs.
- Village of Moravia participates. Class 8 with a 10% reduction in insurance rates.

Local Plans and Regulations

Budgeting

- Fund hazard mitigation projects or actions in operating budgets to the extent possible.
- Look at mitigation actions when allocating funding for the municipal budget.
- Capital Improvement and Infrastructure Programs
  - Have a capital improvement plan (CIP).
  - Ensure that major structural mitigation projects that are identified in your hazard mitigation plan become part of your CIP.
  - Communities should be strategic about such improvements and consider whether public investments may encourage growth in high risk areas.
  - Incorporate retrofitting/replacement of critical systems.

Local Plans and Regulations

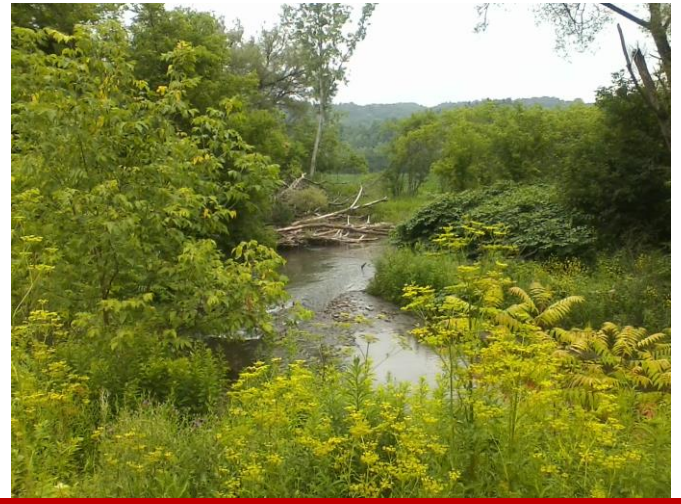
Other

- Avoid locating emergency facilities in flood plains
- Ensure local planning board or economic development groups identify hazard areas when assisting new businesses in finding locations.
- Open space preservation
- Stormwater management regulations and master plans.
- Evaluate all construction projects to see if they meet the Hazard Mitigation goals and objectives.
- Code enforcement: building code provision for 2 feet above base flood level.

Local Plans and Regulations

Other

- Safe growth audit.
- Comprehensive beaver management plans
- Debris control plan for protected and unprotected streams



Structure and Infrastructure Projects

These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as critical facilities and infrastructure.

This type of action also involves projects to construct manmade structures to reduce the impact of hazards.

Many of these types of actions are projects eligible for funding through the FEMA Hazard Mitigation Assistance program

Structure and Infrastructure Projects

- Acquisitions and elevations of structures in flood prone areas
- Structural retrofits
- Floodwalls and retaining walls
- Detention and retention structures
- Culverts
- Safe rooms
- Communication systems

Structure and Infrastructure Projects

Utilities

- Utility undergrounding
- Proper tree maintenance
- Tree trimming law
- Selectively manage problem areas by removal of hazardous trees, tree replacement.
- Backup power at critical facilities.

Structure and Infrastructure Projects

Structure and Infrastructure Projects

- Relocate critical infrastructure outside of hazard area
- Provide redundancy for critical functions and infrastructure
- Road stabilization in shale and muck areas.
- Monitor and upgrade bridges as needed to mitigate ice jams, flooding and other ice damage.
- Incorporate hazard mitigation actions in daily operations and on all projects.

Structure and Infrastructure Projects

Natural Systems Protection

These are actions that minimize damage and losses and also preserve or restore the functions of natural systems.

- Stream bank stabilization and clearing/snagging of debris jams
  - SWCD can assist
- Lake shore stabilization
- Sediment and erosion control
  - Promote and maintain drainage system maintenance and upkeep.

Natural Systems Protection

Natural Systems Protection

- Buffers
- Forest management
- Conservation easements
- Wetland restoration and preservation

Natural Systems Protection

Future project opportunities

- Bridge redesigns: New York Central Railroad
- Channel improvements
- Back-up generators
- Raising structures
- Stream brush clearing

Funding opportunities

Federal Hazard Mitigation Funding Opportunities

- Hazard Mitigation Grant Program (HMGP) (404 Mitigation)
  - Post disaster mitigation program made available to states by FEMA after a federal disaster declaration. Do not have to be in declared county.
  - Can provide up to 75% funding for hazard mitigation measures.
  - Funds cost-effective projects that will protect public or private property or that will reduce the likely damage in future disasters.
  - Local governments must apply on the behalf of individuals.
  - Requires adoption of County's plan.

Funding opportunities

Federal Funding Opportunities

- Flood Mitigation Assistance Program (FMA)
  - Funding to implement measures to reduce or eliminate the long term risk of flood damage to buildings, manufactured homes, and other structures insurable under the National Flood Insurance Program (NFIP).
  - Annual funding.
  - Only NFIP homes and businesses.
  - 75% federal funds, 25% in-kind.
  - Local governments must apply on the behalf of individuals.
  - Requires adoption of County's plan.

Funding Opportunities

- Pre-Disaster Mitigation Program (PDM)
  - Grant program funds hazard mitigation planning and projects on an annual basis.
  - The PDM program was set in place to reduce overall risk to people and structures, while at the same time, also reducing reliance on federal funding if an actual disaster were to occur.
  - The FY 2014 Flood Mitigation Assistance grants focus on reducing or eliminating claims under the NFIP with a focus on mitigation planning and the mitigation of severe repetitive loss properties.
  - Local governments must apply on the behalf of individuals.
  - Requires adoption of County's plan.

Funding Opportunities

- Public Assistance Program (406 Mitigation)
  - Only following a federally declared disaster, only in a declared county at a damaged site.
  - Funds mitigation measures in conjunction with the repair of the disaster-damaged facilities.
  - Mitigation measures must be related to eligible disaster-related damages and must directly reduce the potential for future, similar disaster damages to the eligible facility

Funding Opportunities

Document everything.