

## ***Community Preparedness for Flood Resiliency***

Nina Peek, AICP  
New York Planning Federation Board of Directors  
Senior Technical Director • AKRF, Inc.

### **Focus of Today's Presentation**

- ➔** Why should communities invest in resiliency?
- ➔** What are the steps communities can take to become more resilient?
- ➔** Who offers grants and funding for resiliency planning and implementation?

## What Does it Mean to Be Resilient?

*The ability to plan for, withstand, and recover from severe events - without suffering permanent loss of functions, devastating damage, diminished productivity or decreased quality of life.*

Source: Dennis S. Mileti, 1999. *Disasters by Design: A Reassessment of Natural Hazards in the United States.*

## Why Plan Now for Future Storm Events?

- Prepare for frequent and severe flooding
- Understand risk
- Increase preparedness and efficient/coordinated emergency response
- Reduce Impacts
- Protect communities' critical resources
- Reduce the potential for injury and loss of life
- Shorten recovery time

## What Does Resiliency Look Like?

- Vulnerable to Flooding
  
  
  
  
  
  
  
  
  
  
- Resilient to Flooding

## How Does a Community Become More Resilient?

- Step 1 - Establish Baseline Conditions
- Step 2 - Identify Resources and Assets
- Step 3 - Identify Vulnerability to Flooding
- Step 4 - Characterize Flood Risk
- Step 5 - Develop Resiliency Strategies and Actions
- Step 6 – Funding Resiliency Strategies and Actions

# 1 Assemble Baseline Conditions

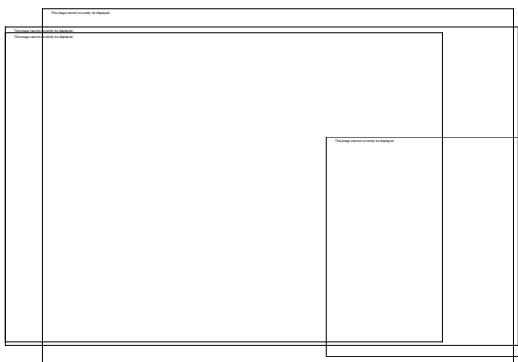
## Review Maps from Existing (Free) Data Sources

- FEMA Flood Insurance Rate Maps (FIRM):
  - <https://msc.fema.gov/portal>
- NOAA Inundation Maps:
  - [http://coast.noaa.gov/digital\\_coast/tools/slr](http://coast.noaa.gov/digital_coast/tools/slr)

# 1 Assemble Baseline Conditions

## Review Maps from Existing (Free) Data Sources

- USFWS National Wetland Inventory Maps:
  - <http://www.fws.gov/wetlands/data/mapper.HTML>
- NYSDEC Wetlands and Watercourses Maps
  - <http://www.dec.ny.gov/ismaps/ERM/viewer.htm>
- Scenic Hudson – Sea Level Rise Mapper
  - <http://www.scenichudson.org/slr/mapper>



# 1

## Assemble Baseline Conditions

- **Do you have a Hazard Mitigation Plan and/or Emergency Operations/Action Plan?**
- **Is data available for past storm events?**
  - What are the areas of vulnerability (inundation and erosion)?
- **Has flood stage/flow modeling been completed for municipal watershed(s)?**
  - Federal, state or local agencies, or private entity
- **Where are the areas of repeat flooding and flooding extent?**
  - Talk with residents, emergency service providers, municipal officials/staff
- **Do your Planning/Policy Documents address flooding and resiliency?**
  - Master Plans/Comprehensive Plans, Local Waterfront Revitalization Plans

# 2

## Identify Key Resources and Assets

**Economic** - commercial and industrial uses, town centers, central business districts, waterfront, tourism

**Health and Social Services** - schools, emergency services, municipal facilities, hospitals, day care, shelters, community centers, services to the socially vulnerable

**Housing** - single-family, multi-family, rental, housing for elderly low-income and special needs population

**Infrastructure** – roads, bridges, water supply, wastewater treatment, stormwater conveyance, waste management, utilities

**Natural and Cultural Resources** - wetlands, streams, waterbodies, open space, historic structures, parkland and recreational uses

# 3

## Identify Resources Vulnerable to Flooding

- **How vulnerable/exposed is the asset?**
- **What lies between the asset and the flood source?**
  - Coastal - beach width, shoreline protection, dunes and bluffs

Least Exposed

Most Exposed

# 3

## Identify Resources Vulnerable to Flooding

- **How vulnerable/exposed is the asset?**
- Riverine - landscaping, wetlands, stable and rocky soils, elevation of structures (freeboard), pervious surfaces

Least Exposed

Most Exposed

### **3** Identify Resources Vulnerable to Flooding

- **What was the extent of the flooding?**

### **4** Characterizing Flood Risk

Step 1 – Assemble baseline inventory



Step 2 - Identify community assets



Step 3 – Identify vulnerability and exposure



**Step 4 – Characterizing Risk**

## 4 Characterizing Flood Risk

## 4 Characterizing Flood Risk

### Review Flood Zone Maps (From Step 1)

Extreme Risk: 10 year flood  
*(Not generally mapped)*

High Risk: 100 year flood  
*(FEMA mapped)*

Moderate Risk: 500 year flood  
*(FEMA mapped)*

Other: Outside Mapped Flood  
Zone



## 5 Developing Flood Resiliency Strategies and Actions

### ***Housing and Property Protection:***

- Land acquisition, home relocation, building elevation, rebuilding barriers, flood-proofing, move mechanicals to upper floors, provision of insurance, and structural retrofits

### ***Resident and Business Owner Education and Awareness:***

- Outreach and education projects, flood/hazard information centers, technical assistance, financial assistance, programs on flood preparedness, response and recovery

### ***Natural and Cultural Resource Protection:***

- Erosion and sediment control in streams, stream corridor protection, vegetative management & stream bank buffer protection, wetland and buffer preservation, tree preservation (forests increase infiltration), shoreline protection, open space preservation, parkland as flood storage, stream channel restoration

## 5 Developing Flood Resiliency Strategies and Actions

### ***Emergency, Health and Social Services***

- Flood risk recognition, flood/hazard warning systems, emergency response & recovery plans, protection of critical facilities, health and safety maintenance, shelter facilities, training of emergency service providers, Emergency Operations Center, shelters, pumps, generators

### ***Structural/Infrastructure***

- Culvert and bridge assessment and upgrades, seawall replacement, bulkhead and retaining wall removal/repair, stormwater conveyance systems, retrofitted buildings and elevated roadways, encasing/elevating utility boxes, hardening of critical municipal facilities, utility protection,

### ***Community Planning***

- Zoning updates, LWPR updates, Master Plan updates, Emergency Operations/Action Plan, Hazard Mitigation Plan, Sustainability Plan, Conservation Easements, Deed Restrictions

## Implementation Examples

### *Buildings located in the floodplain, will flood!*

- Identify and map areas of flooding, inundation and sea level rise
- Improve relationship between development patterns and flooding by using smart growth strategies
- Locate development outside of flood zones
- Harden and floodproof existing development in flood zones
- Revise Policy Documents, Zoning and Building Codes and Regulations

## Revise your Zoning Code

- **Encourage and incentivize cluster/conservation subdivisions**
  - Benefits: preserved/conserved 100 year floodplain
  - Action: Limit or prohibit development
- **Implement stream/wetlands (and buffers), and steep slope protection**
  - Benefits: Improved stormwater detention
  - Action: Create additional room for stormwater infiltration
- **Implement tree protection ordinance**
  - Benefits: Trees create windbreaks that minimize structural damage, and forests enhance evapotranspiration/increase infiltration
  - Actions: Require removal of diseased/damaged trees, maintenance of healthy trees, and thoughtful selection of street tree species selection

### Update Building Codes

- **Require Flood Resistant Construction:** Building elevation, foundation design and anchoring system
- **Protect Heating & Electrical Systems:** Bring utility boxes, hot water heaters, etc. up from the basement or encase to protect from water

### Prepare a Hazard Mitigation Plan

- Identify and assess risk to natural and non-natural hazards (floods, fires, mudslides, bombing)
- Identify actions to reduce risk and vulnerability to disaster losses and repetitive loss
- Create disaster resistant and flood resilient communities
  - Risk-based decision making
- Consider joint HMP with adjacent municipalities and/or participate in County-wide HMP
- Communities must have an approved HMP to apply for and receive federal mitigation grant funding

## Educate Your Community

- Build understanding of local flood risks; **preparedness, response and recovery**
- Distribute flood information at meetings, newsletters, municipal websites, social media, community events, local stores, and at public buildings

<http://blogs.cornell.edu/estuaryresilience/resources/>

# 6

## Funding Resiliency Measures

- Consolidated Funding Application (CFA) - Master Plans and Comprehensive Plans
- NYS Environmental Facilities Corporation (EFC) Green Innovation Grant Program (GIGP): *Projects that "...utilize unique stormwater infrastructure design and create cutting-edge green technologies"*
- Syracuse University Environmental Finance Center: *Various Grants and Grant Guides*

## 6 Funding Resiliency Measures

### FEMA

- Hazard Mitigation Grant Program (HMGP): *after major disaster* - Implementation of long-term hazard mitigation measures
- Pre-Disaster Mitigation (PDM): *annual* - Hazard mitigation planning and projects
- Flood Mitigation Assistance (FMA): *annual* - Projects to reduce or eliminate risk of flood damage to buildings that are insured under the National Flood Insurance Program (NFIP)

## Final Thoughts

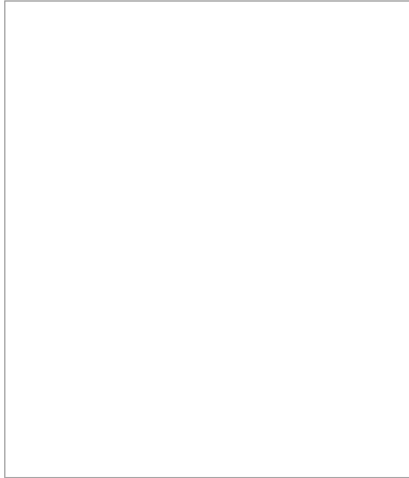
## Protect Your Community

- **Plan and Prepare**
  - Understand how and where flooding occurs
  - Educate yourself and your community about flooding and how to be ready for the next event
  - Identify and IMPLEMENT resiliency strategies, projects and actions to limit the extent of flooding
- **Develop emergency action plans to warn those in harms way and assist those who become trapped**
  - Provide adequate emergency shelter for those displaced during an event
- **Recover**
  - Assist displaced residents and owners of impacted businesses by identifying resources and funding available to help with rebuilding or relocation
  - Quickly restore critical services
  - Repair damage

## Additional Resources

- **NYSDEC Climate Smart Communities**
  - ✓ How to develop a Local Climate Action Plan: Methods and Assistance for Local Governments
  - ✓ <http://www.dec.ny.gov/energy/67493.html>
- **Mid-Hudson Regional Sustainability Plan**
  - ✓ Initiatives for direct implementation relating to land-use, energy, agriculture & open space, water
  - ✓ <http://www.co.orange.ny.us/content/124/1362/10101.aspx>
- **USGBC Technical Guidance Manual for Sustainable Neighborhoods**
  - ✓ Incorporating LEED into traditional zoning code elements, site plan regulations & neighborhood development
  - ✓ [http://www.usgbc.org/sites/default/files/Technical%20Guid.%20Man.%20for%20Sust.%20Neighborhoods\\_2012\\_Part%20A\\_1f\\_web.pdf](http://www.usgbc.org/sites/default/files/Technical%20Guid.%20Man.%20for%20Sust.%20Neighborhoods_2012_Part%20A_1f_web.pdf)
- **FEMA NFIP CRS Program**
  - ✓ <http://www.fema.gov/national-flood-insurance-program-community-rating-system>
- **Cornell University Estuary Watershed Resilience Project**
  - ✓ Flood Preparedness and response: A Guide for Municipalities
  - ✓ <http://blogs.cornell.edu/estuaryresilience/resources/>
- **Scenic Hudson, Adaptation Planning Resources**
  - ✓ <http://www.scenic Hudson.org/slr/adaptation/adaptation-resources>
- **International Economic Development Council**
  - ✓ **RestoreYourEconomy.org - A Disaster Recovery Web Portal**
  - ✓ <http://www.iedconline.org/web-pages/resources-publications/restoreyoureconomy.org/>

## Questions?



- **Contact Information:**
- **Nina Peek - [npeek@akrf.com](mailto:npeek@akrf.com)**
- **AKRF**
- **34 South Broadway**
- **Suite 401**
- **White Plains, New York 10601**
- **(914) 949-7336**