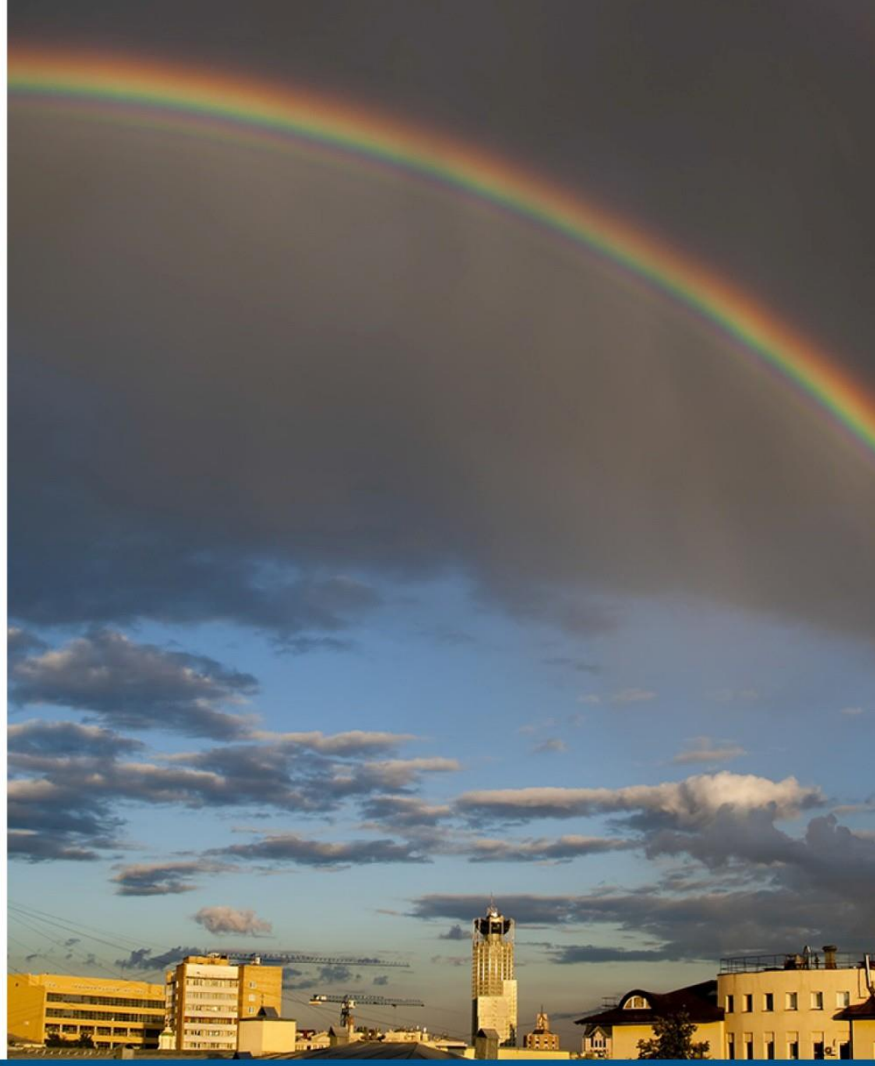


Planning for a Resilient Community

A 4-Hour Workshop for Planners

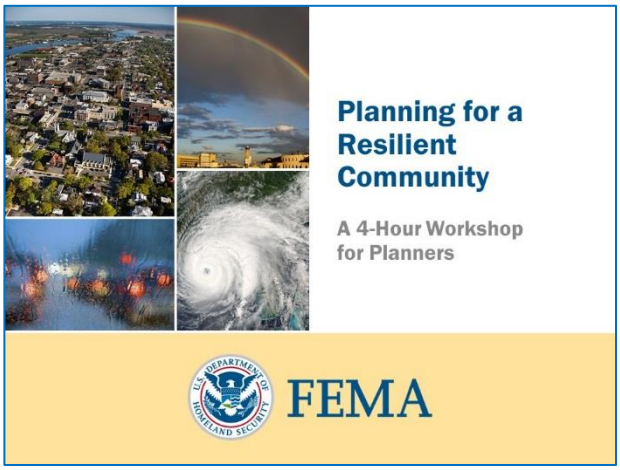
FEMA

Visual 1

Planning for a Resilient Community

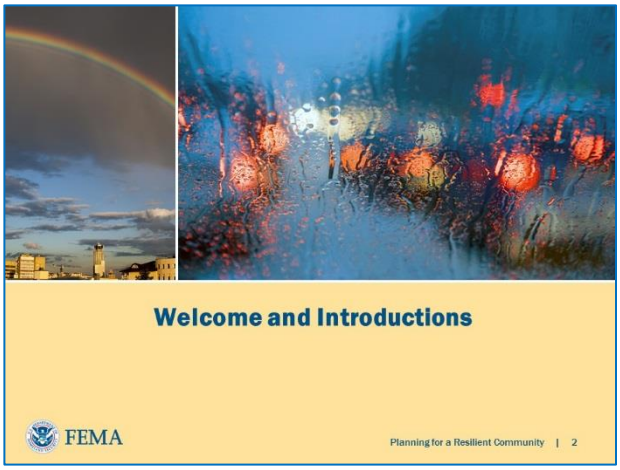
A 4-hour Workshop for Planners

FEMA



Visual 2

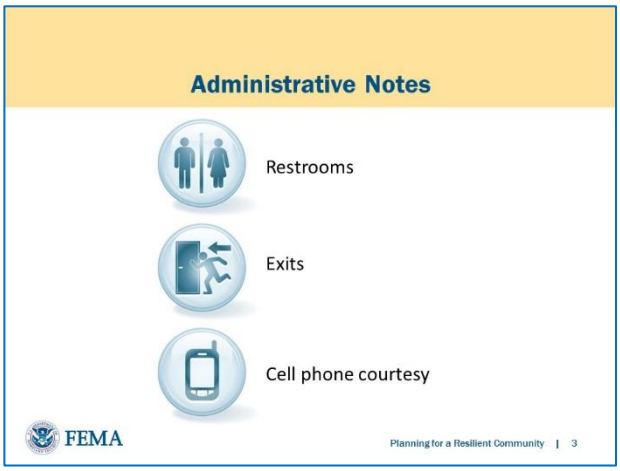
Welcome and Introductions



Visual 3

Administrative Notes

- Restrooms
- Exits
- Cell phone courtesy

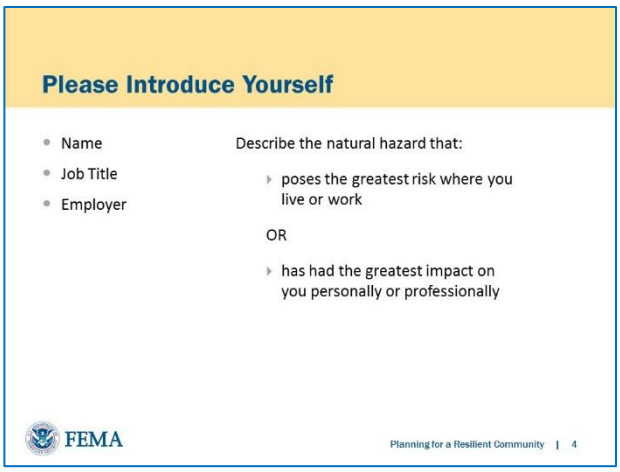


Visual 4

Please Introduce Yourself

- Name
- Job Title
- Employer
- Describe the natural hazard that:
  - Poses the greatest risk where you live/work

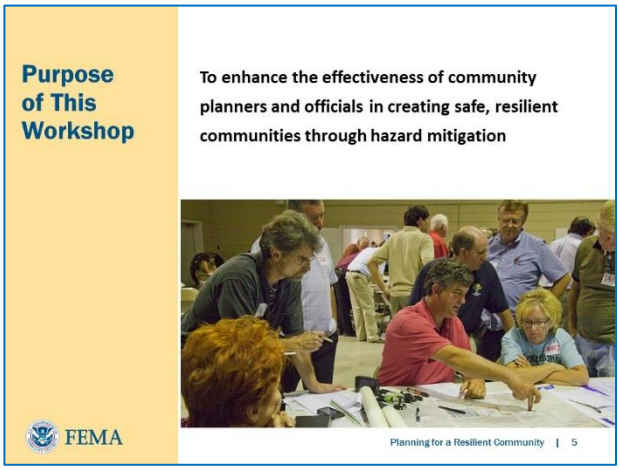
    OR
  - Has had the greatest impact on you personally or professionally



Visual 5

Purpose of this Workshop

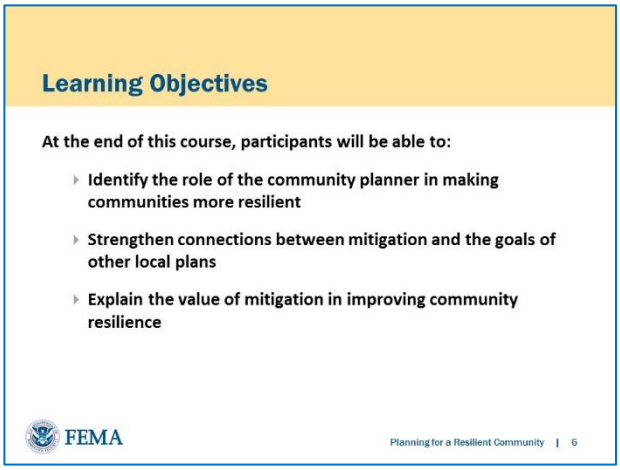
- To enhance effectiveness of community planners and officials in creating safe, resilient communities through hazard mitigation



Visual 6

Learning Objectives

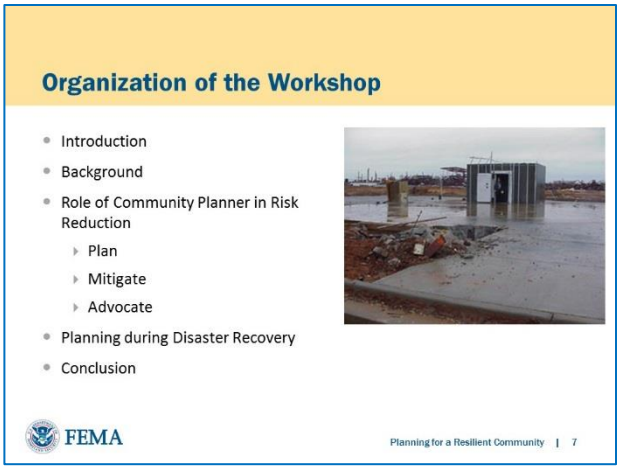
- At the end of this course, participants will be able to:
  - Identify the role of the community planner in making communities more resilient
  - Strengthen connections between mitigation and the goals of other local plans
  - Explain the value of mitigation in improving community resilience



Visual 7

Organization of the Workshop

- Introduction
- Background
- The Planner's Role in Risk Reduction
  - Plan
  - Mitigate
  - Advocate
- Planning during Disaster Recovery
- Conclusion

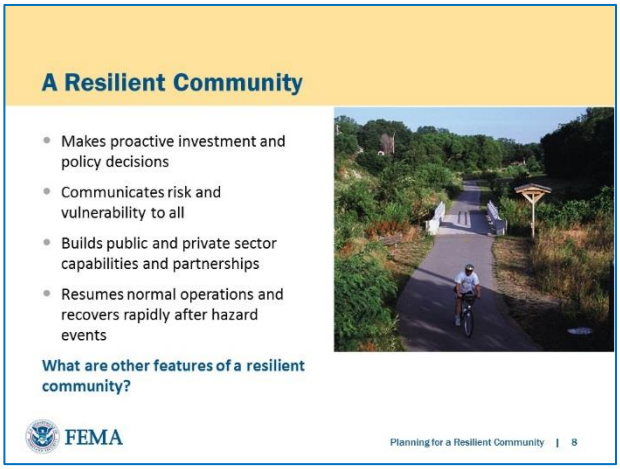


The workshop includes some activities. The workbook provides space for taking notes.

Visual 8

A Resilient Community

- Makes proactive investment and policy decisions
  - To protect community assets and provide a safe environment
- Communicates risk and vulnerability to all
  - Elected officials
  - Stakeholders
  - Members of the general public
- Builds public and private sector capabilities and partnerships
- Resumes normal operations and recovers rapidly after hazard events

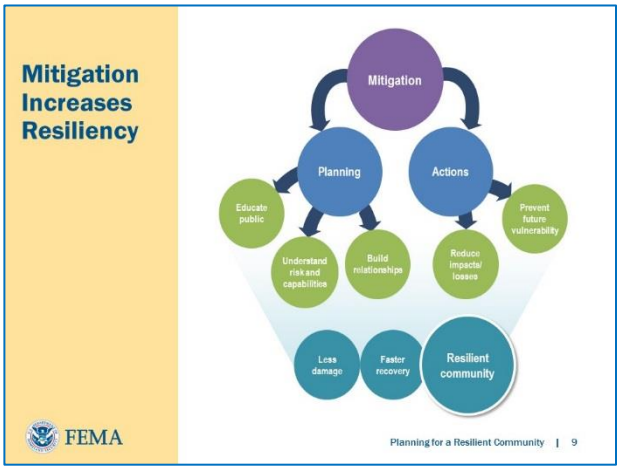


What are other features of a resilient community?

Visual 9

Mitigation Increases Resiliency

- Mitigation planning educates the public, increases understanding of risks and capabilities, and builds partnerships within a community
- Mitigation actions reduce impacts of hazards, reduce losses, and prevent future vulnerability
- With less damage, recovery time is faster, and the community is more resilient



Visual 10

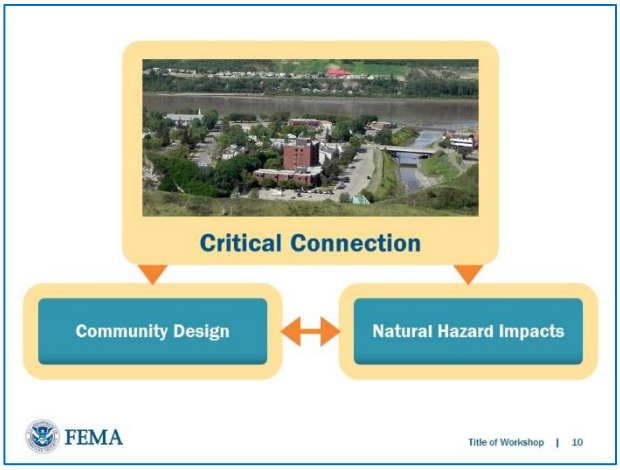
A critical connection exists between the impacts of natural hazards and the design and function of a community.

Planners can mitigate the negative effects of natural hazards and improve resilience through the use of:

- Zoning
- Building codes
- Land use planning

The ethical planner is accustomed to:

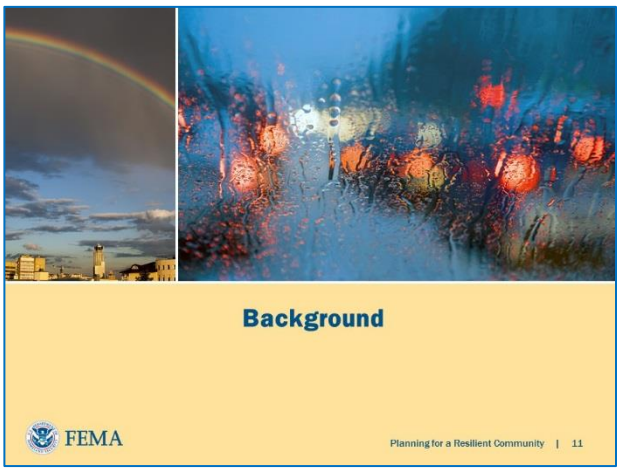
- Considering the long-range consequences of actions
- Paying special attention to the interrelatedness of decisions
- Promoting the health, safety, and welfare of a community
    - This is the primary role of government



Visual 11

Background

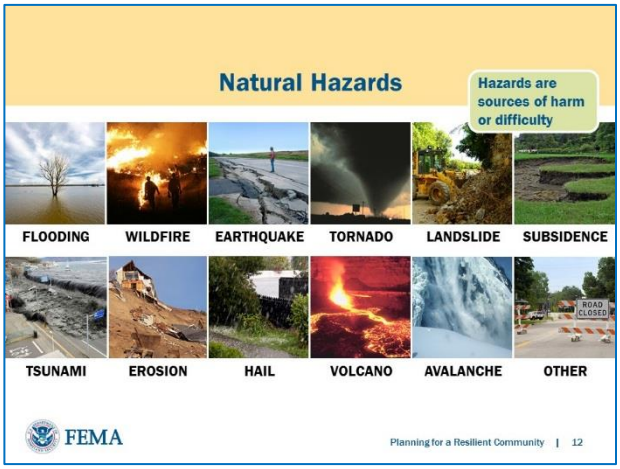
This section provides background information about hazard mitigation and related concepts and authorities.



Visual 12

Natural Hazards: Sources of harm or difficulty created by a meteorological, environmental, or geological event

- Hazards have widely divergent characteristics and affect people, structures, and infrastructure in different ways
- For some hazards, there is ample warning time; for others, there is very little
- Some hazards affect broad regions; some hazards are localized
- Climate change may impact the characteristics and future probability of many hazards
- Hazards cannot be eliminated; however, with planning, the threat of damage by a hazard can be reduced



Visual 13

Risk: The potential for damage, loss, or other impact created by the intersection of natural hazards with development

Risk is linked to development choices.

The intersection of hazards with people, development, and infrastructure creates disasters. Local decision-makers manage risk in how they choose to plan, design, and build communities.

- Location
  - In the wilderness
  - Near water
  - On a steep hillside
- Construction
  - Safe building design
  - Appropriate materials
- Site Design
  - Landscaping
  - Drainage
  - Cluster structures
- Infrastructure
  - Utilities
  - Access

A community cannot eliminate all risks, but a community can be aware of potential losses.

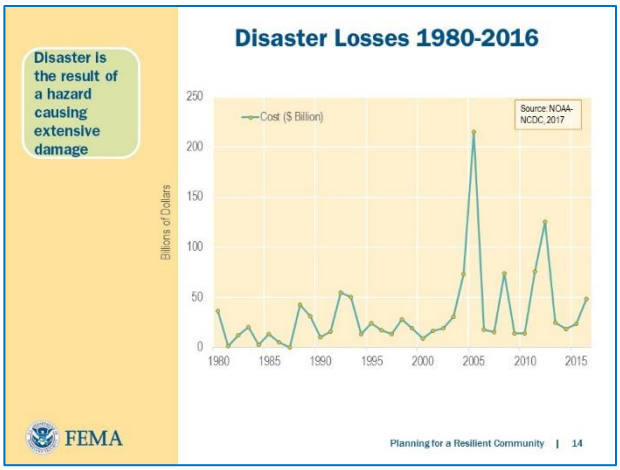
Visual 14

Disaster: The result of a hazard causing extensive damage

- Damage may include loss of life and destruction of buildings and infrastructure
- Disasters can have devastating consequences for a community's economic, social, and environmental well-being
- Relatively few hazard occurrences lead to a Presidential Disaster Declaration
- The responsibility for responding to and recovering from the majority of hazards that cause damage is borne by the state and local governments

Increasing Trend in Losses Due to Natural Hazards

- Increasing development results in increasing vulnerability to natural hazards
- Dollar values in the table below have been adjusted to the 2017 Consumer Price Index



Year	Cost ($Billion)
2017	21.7 +
2016	48.2
2015	23.2
2014	18.3
2013	24.5
2012	125.1
2011	75.4
2010	13.9
2009	13.6
2008	73.7
2007	14.8
2006	17.8
2005	214.8
2004	72.9
2003	30.3
2002	18.7
2001	16.2
2000	8.8
1999	19.2

Year	Cost ($Billion)
1998	27.5
1997	13.3
1996	17.2
1995	24.0
1994	13.0
1993	50.2
1992	54.4
1991	15.4
1990	10.1
1989	31.0
1988	42.4
1987	0
1986	5.2
1985	13.2
1984	2.6
1983	19.9
1982	12.1
1981	1.1
1980	35.8

Sources of data:

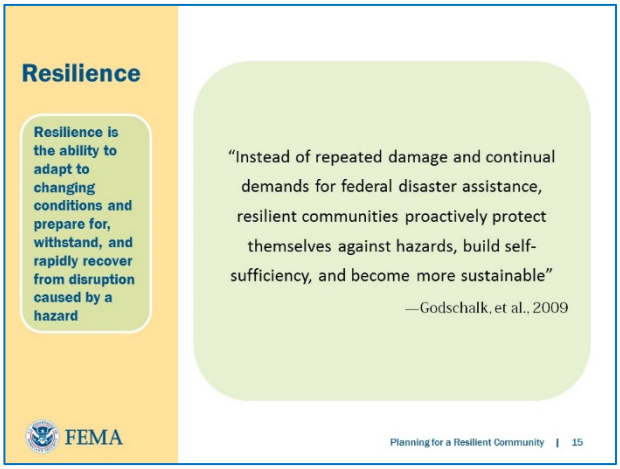
National Oceanic and Atmospheric Administration: National Climatic Data Center. Billion-Dollar Weather/Climate Disasters. Available at www.ncdc.noaa.gov/billions/events. Accessed December 18, 2017.

Visual 15

Resilience: The ability to adapt to changing conditions and prepare for, withstand, and rapidly recover from disruption caused by a hazard

"Instead of repeated damage and continual demands for federal disaster assistance, resilient communities proactively protect themselves against hazards, build self-sufficiency, and become more sustainable."

(Godschalk, David R., Adam Rose, Elliott Mittler, Keith Porter, and Carol Taylor West. 2009. "Estimating the Value of Foresight: Aggregate Analysis of Natural Hazard Mitigation Benefits and Costs." *Journal of Environmental Planning and Management* 52(5):739-56.)

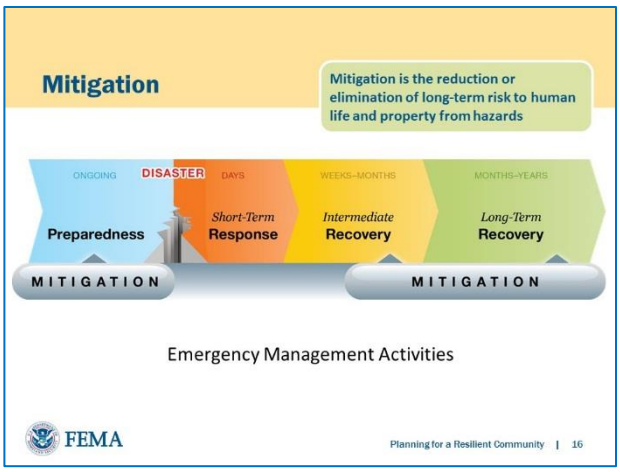


Visual 16

Mitigation: Reduction or elimination of long-term risk to human life and property from hazards

Mitigation is part of many aspects of emergency management. Emergency management includes the following primary activities:

- **Preparedness** includes plans and arrangements made to save lives and property and to facilitate response operations
- **Response** includes actions taken to provide emergency assistance, save lives, minimize property damage, and speed recovery immediately after a disaster
- **Recovery** includes actions taken to return to a normal or improved operating condition after a disaster
- **Mitigation** includes actions taken to reduce or eliminate long-term risk to life and property from hazards; mitigation can happen at any point in the cycle



Visual 17

Mitigation Provides Opportunities for Coordination

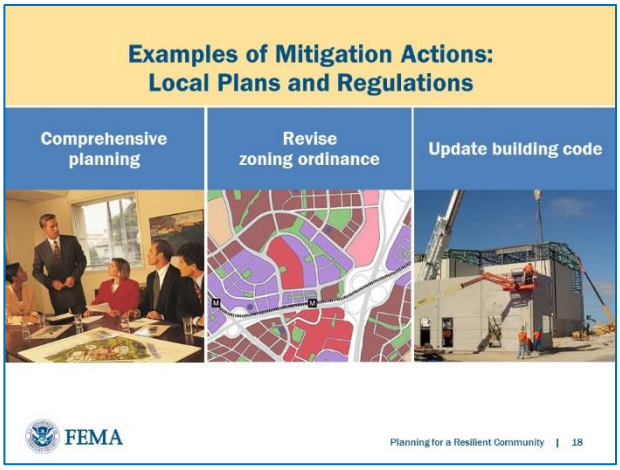
- Emergency Managers focus on:
  - Preparedness
  - Response
  - Recovery
  - MITIGATION
- Community planners focus on:
  - Land Use
  - Economic development
  - Housing
  - Transportation
  - Other issues
    - Public safety
    - Environmental protection
  - MITIGATION

Visual 18

Examples of Mitigation Actions:

Local Plans and Regulations

- Update comprehensive plan
- Revise zoning ordinance
- Enforce building code

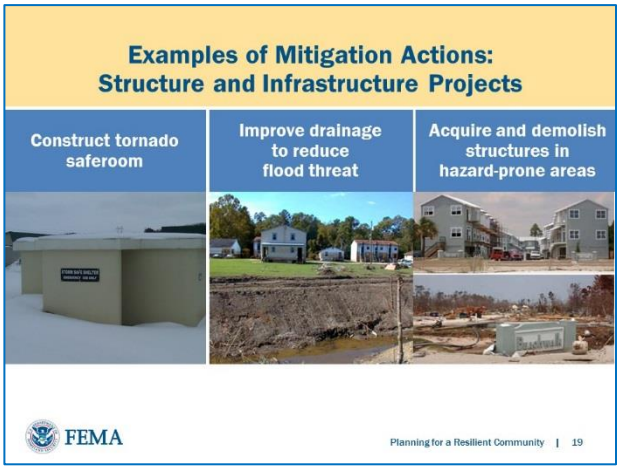


Visual 19

Examples of Mitigation Actions:

Structure and Infrastructure Projects

- Construct tornado safe room
- Improve drainage to reduce flood threat
- Acquire and demolish structures in hazard-prone areas



Visual 20

Examples of Mitigation Actions:

Natural Systems Protection

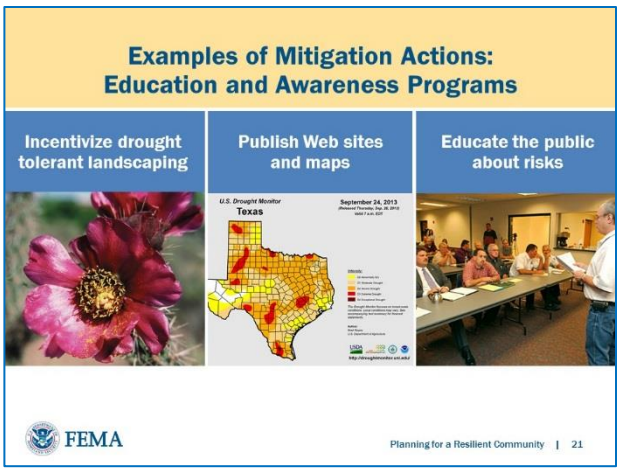
- Implement erosion control measures
- Create defensible space regulations
- Protect and preserve natural areas

Visual 21

Examples of Mitigation Actions:

Education and Awareness Programs

- Incentivize drought tolerant landscaping
- Publish Web sites and maps
- Educate the public about risks

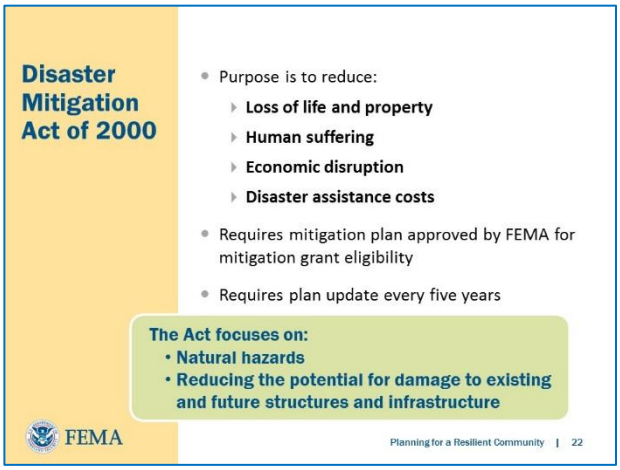


Visual 22

Disaster Mitigation Act of 2000

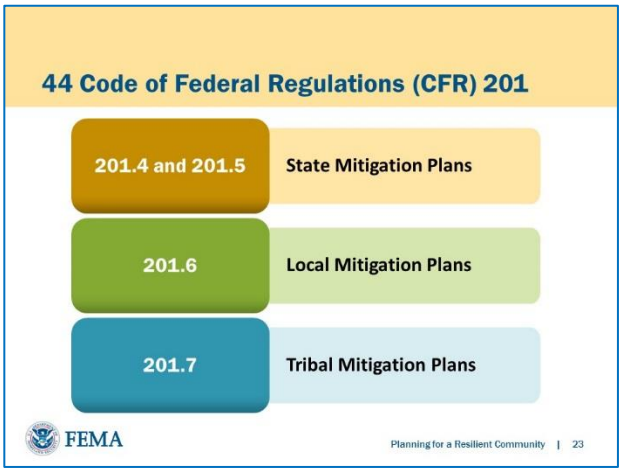
To address escalating disaster costs in the United States, Congress passed the Disaster Mitigation Act in 2000.

- Purpose is to reduce:
  - Loss of life and property
  - Human suffering
  - Economic disruption
  - Disaster assistance costs
- Requires mitigation plan approved by FEMA for mitigation grant eligibility
  - Between 2001 and 2013, FEMA approved hazard mitigation plans for approximately 28,000 local jurisdictions
- Requires plan update every five years
- The Act focuses on:
  - Natural hazards
- Reducing the potential for damage to existing and future structures and infrastructure



Visual 23

- Hazard mitigation planning regulations are housed in the Code of Federal Regulations, Title 44, Section 201.
- Planning regulations are established for:
  - State Mitigation Plans in Section 201.4 and 201.5
  - Local Mitigation Plans in Section 201.6
  - Tribal Mitigation Plans in Section 201.7
- FEMA has interpreted these regulations in the State, Local, and Tribal Mitigation Plan Review Guides. These three Guides are FEMA's official policies on and interpretation of the natural hazard planning requirements for each type of government.
- Each separate Guide is available from the FEMA Mitigation Planning Website



Visual 24

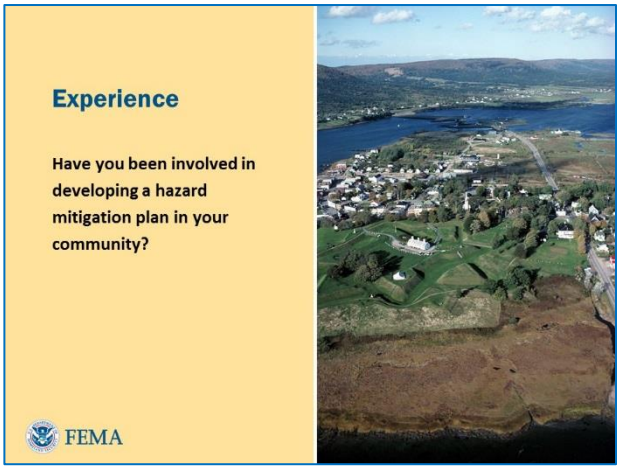
Observed Challenges for Mitigation Planning

- Lack of active participation in the process by
  - Local land use planners
  - Local leaders
- Proposed mitigation measures often
  - Focus on emergency preparedness and response
  - Not connected to other local planning efforts or ongoing programs

Visual 25

Experience

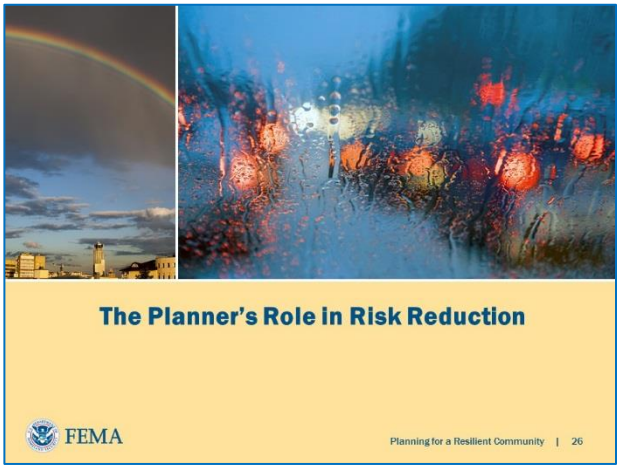
Have you been involved in developing a hazard mitigation plan in your community?



Visual 26

The Planner's Role in Risk Reduction

This section describes three major roles that a planner has in reducing risk in a community: planning to reduce risk, mitigating risk, and advocating for community resilience.

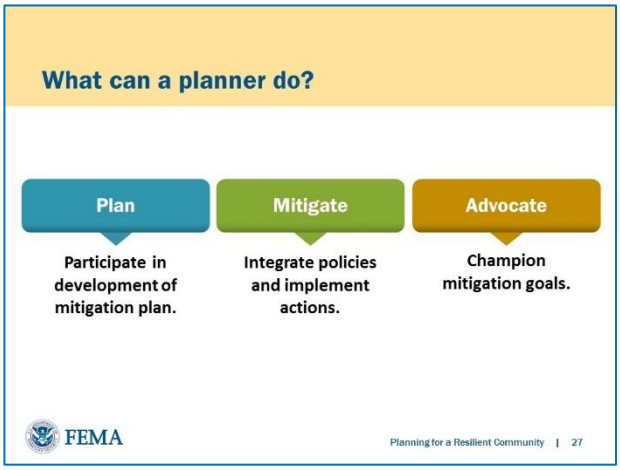


Visual 27

What Can a Planner Do?

- Plan
  - Participate in mitigation planning.
- Mitigate
  - Integrate policies and implement actions.
- Advocate
  - Champion decisions promoting resilience.

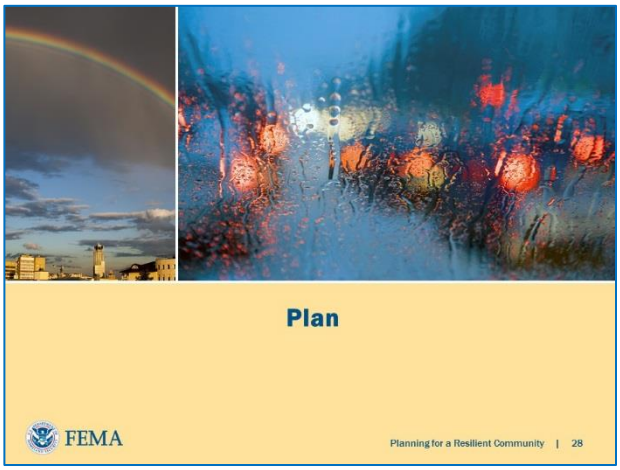
A planner can plan, mitigate, and advocate in both pre-disaster and post-disaster environments.



Visual 28

Plan

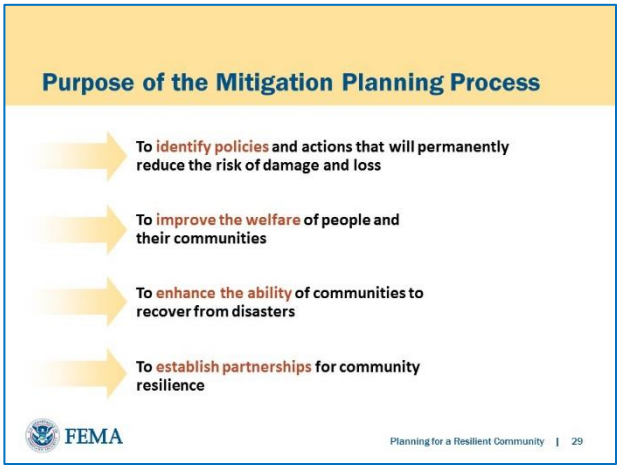
A planner can reduce risk by leading or participating in a community mitigation planning process.



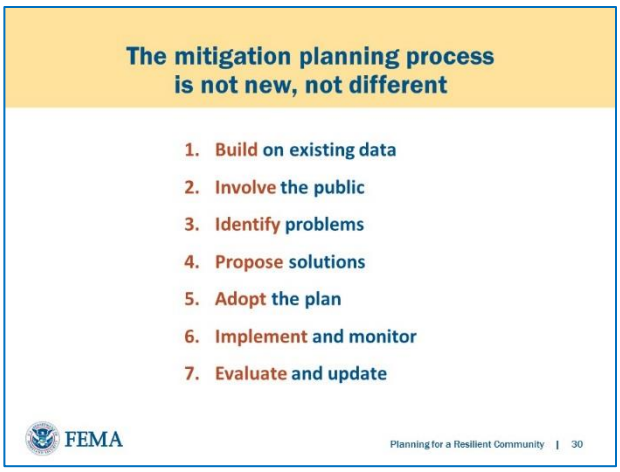
Visual 29

Purpose of the Mitigation Planning Process

- To identify policies and actions that will permanently reduce the risk of damage and loss
- To improve the welfare of people and their communities
    - Mitigation improves safety and reduces losses when a hazard affects a community
- To enhance the ability of communities to recover from disasters
- To establish partnerships for community resilience
    - Public-private and public-nonprofit partnerships can result from a planning process
    - These partnerships may be the key to a successful post-disaster recovery process



Visual 30



The mitigation planning process is not new, not different

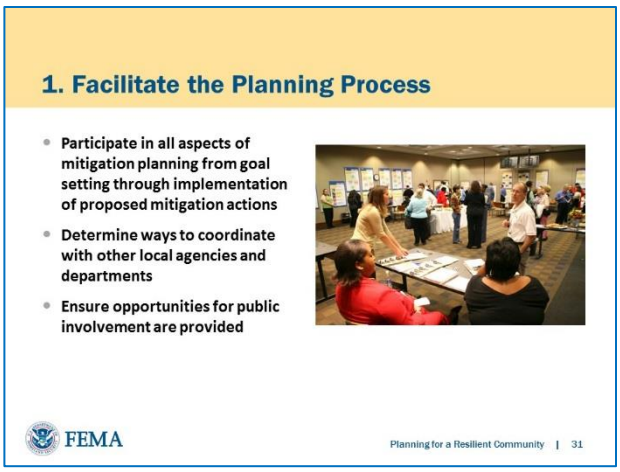
Like all planning processes, a mitigation planning process must:

- Build on existing data
  - Identify and profile hazards
- Involve the public
  - Invite key stakeholders to participate
  - Provide opportunities for public participation
  - Make an effort to involve officials, residents, and business owners in neighboring communities
- Identify problems
  - Assess risk
  - Develop problem statements to clarify the results of the risk assessment
- Propose solutions
  - Identify mitigation actions to address problems
- Adopt the plan
  - Authorize local officials to implement proposed mitigation actions
- Implement and monitor
  - Maintain the plan
- Evaluate and update
  - Update plan at least every 5 years to meet regulatory standards

Visual 31

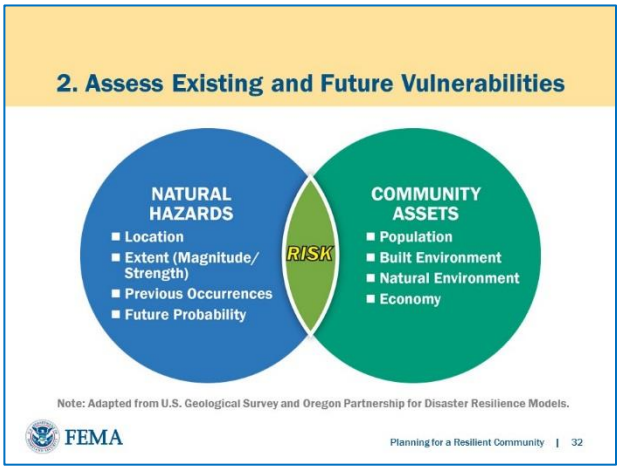
The primary tasks in the planning process are:

1. Facilitate the Planning Process
   - Participate in all aspects of mitigation planning from goal setting through implementation of proposed mitigation actions
   - Determine ways to coordinate with other local agencies and departments
   - Ensure opportunities for public involvement are provided



Visual 32

2. Assess Existing and Future Vulnerabilities
   - RISK exists at the intersection of:
     - Natural Hazards
     - Community Assets



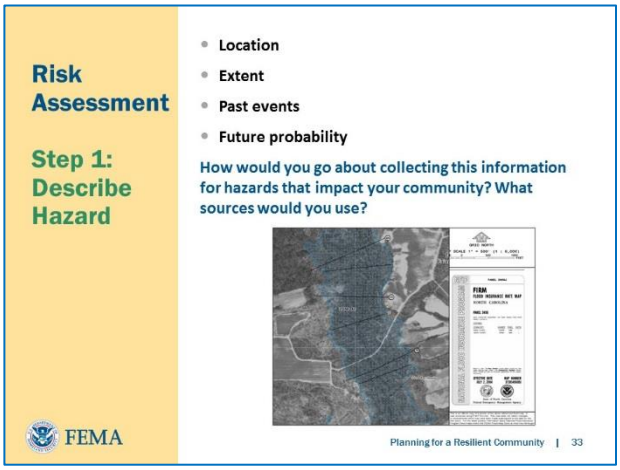
Visual 33

Risk Assessment Step 1: Describe Hazards

A risk assessment describes each of the following characteristics of each hazard that can reasonably be expected to affect the planning area:

- Location
- Extent (strength/magnitude)
- Past events
- Future probability

How would you go about collecting this information for hazards that affect your community? What sources would you use?



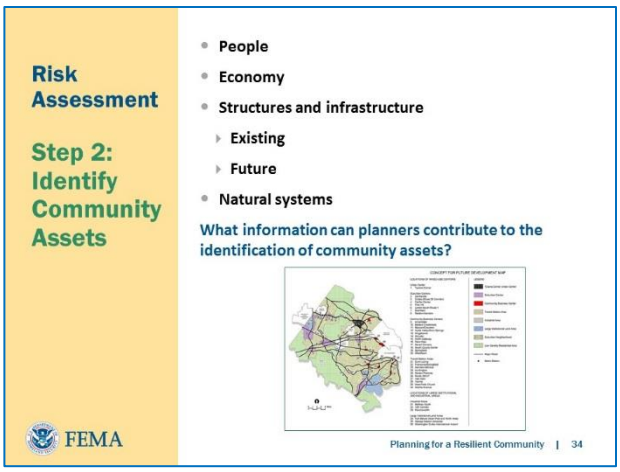
Visual 34

Risk Assessment Step 2: Identify Community Assets

- People are the key assets of a community
- Economy includes industrial, commercial, and retail businesses
- Structures and infrastructure
    - Built environment includes residential and commercial structures, as well as all components of the infrastructure, including roads, communication networks, utility lines, and critical facilities, including schools, hospitals, and government operations
- Planners consider both existing and future development
- Natural systems include forests, wetlands, riparian areas, and open spaces

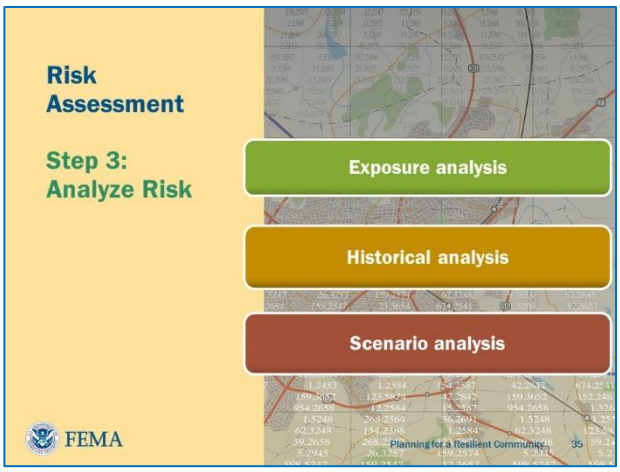
Map from Lockatong and Wickecheoke Creek (NJ) Watersheds Restoration and Protection Plan

What information can planners contribute to the identification of community assets?



Visual 35

Risk Assessment Step 3: Analyze Risk

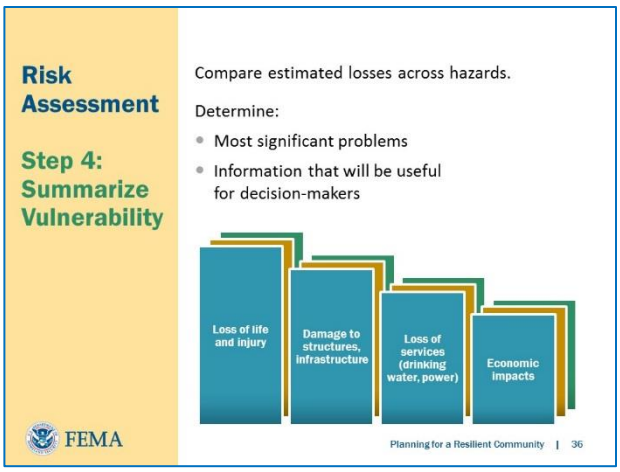


- Exposure analysis
  - Identify existing and future assets located in hazard areas
  - Consider that hazards may strike at greater magnitudes at certain locations
  - Quantify the number, type, and value of structures, critical facilities, and infrastructure in identified hazard areas
  - Estimate number, type, and value of future structures and infrastructure in hazard-prone areas based on current zoning and development plans
- Historical analysis
  - Use information on impacts and losses from previous hazard events to predict potential impacts and losses during a future event
  - This can be especially useful for weather-related hazards because of the frequency of these events
- Scenario analysis
  - Scenarios can be especially helpful for estimating the effects of low-frequency, high-consequence events, such as earthquakes, for which historical information is not available
  - Identify and estimate the potential impacts and losses in terms of monetary costs, casualties, and infrastructure downtime using modeling tools, such as FEMA's Hazus

Visual 36

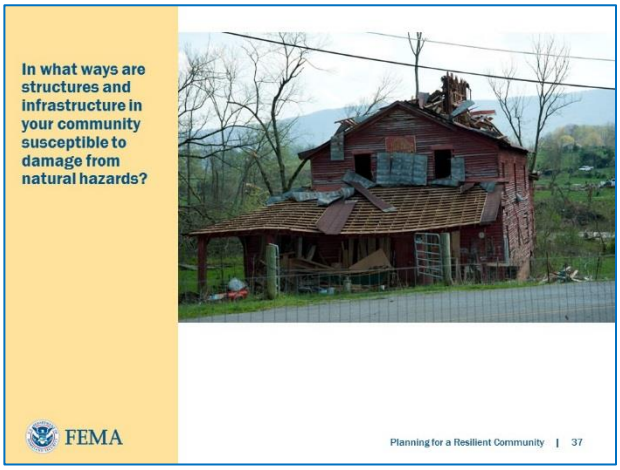
Risk Assessment Step 4: Summarize Vulnerability

- Compare estimated losses across hazards
- Determine:
  - Most significant problems
  - Information that will be useful for decision-makers
    - Loss of life and injury
    - Damage to structures, infrastructure
    - Loss of services and operability (drinking water, power)
    - Economic impacts

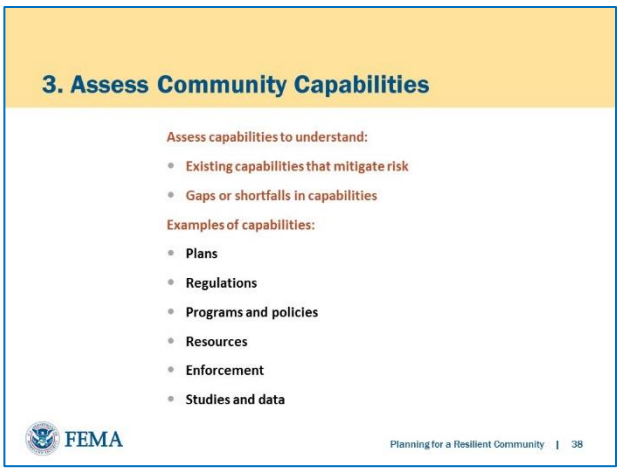


Visual 37

In what ways are structures and infrastructure in your community vulnerable to damage from natural hazards?



Visual 38



3. Assess Community Capabilities

Assess community capabilities to understand:

- Existing capabilities that mitigate risk and contribute to resiliency
- Gaps or shortfalls in capabilities

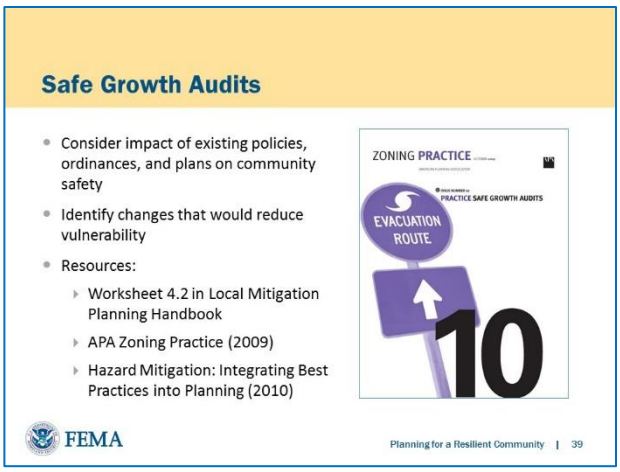
Examples of capabilities:

- Plans
  - Such as a comprehensive plan, community wildfire protection plan, or stormwater master plan that identifies policies for development in hazard-prone areas
- Regulations
  - Such as a flood damage prevention ordinance, a zoning or land use ordinance, building code, or stormwater drainage regulation
- Programs and policies
  - Such as a program for renovating public buildings regularly to meet current building codes or for water conservation and xeriscaping in arid regions
- Resources (staff, funding)
  - Such as having staff capable of GIS analysis or funding available for mitigation projects due to collection of impact fees or stormwater fees
- Enforcement
  - Such as the ability to enforce a flood damage prevention ordinance and prevent homeowners from enclosing and using an area of a house below the base flood elevation as living space
- Studies and data
  - Such as detailed study of the depth of flooding expected in particular locations, or geological information about exact locations that are prone to sinkholes

Visual 39

Safe Growth Audits

- Consider impacts of existing policies, ordinances, and plans on community safety
- Identify changes that would reduce vulnerability
- Resources
  - *Worksheet 4.2 in Local Mitigation Planning Handbook* (FEMA, 2013)
  - *APA Zoning Practice* (2009)
  - *Hazard Mitigation: Integrating Best Practices into Planning (2010)*



Visual 40

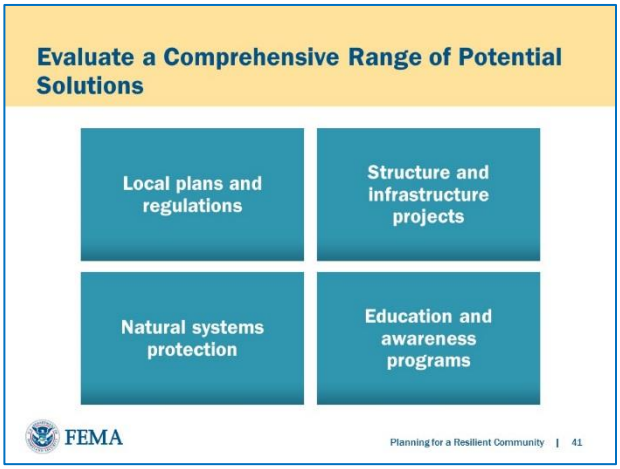
1. Identify Potential Solutions
   - First
     - Understand risk and community capabilities
   - Then
     - Propose mitigation actions to reduce risk

This is an important concept in all planning: the proposed measures or actions must be designed to solve an identified problem. Link the proposed action to risk to influence policy.

Visual 41

Evaluate a Comprehensive Range of Potential Solutions

- Local plans and regulations
- Structure and infrastructure projects
- Natural systems protection
- Education and awareness programs



Visual 42

Activity: Develop a comprehensive range of actions for an assigned problem statement

Instructions

1. Organize into small groups of four to six.
2. Read the problem statement(s) that your group has been assigned.
3. Identify a range of potential solutions for the problem.
4. Try to identify, as appropriate, the following types of solutions:
   - Local Plans and Regulations
   - Structure and Infrastructure Projects
   - Natural Systems Protection
   - Education and Awareness Programs
5. Identify a representative from your group to read the problem statement and present the potential solutions.

1. Riverine Flooding

The Alpha water treatment plant was built in 1962 and includes a sturdy, one-story office building standing 50 feet from the Beta River. On three occasions over the past 12 years, between 2 and 4 feet of water built up inside the office building. Each time, there was damage to equipment and the interior of the office building; damage was repaired and contents replaced each time. Future flooding could cause severe structural damage and loss of contents, including customer service and equipment records, and make it impossible for the water department to respond effectively to the repair and replacement needs of the community for an undetermined period of time.

2. Tornado

Gamma County has experienced a small tornado every year in the past five years. The county seat is a very compact town, with almost all development located in a 1 square mile area. Because of a high water table, none of the structures has a basement. The town is surrounded by farmland and forests. To date, tornado damage has been limited to small outbuildings in the agricultural area and to trees, which resulted in temporary loss of power. However, if a tornado were to affect the urbanized area, the damage would be significant, and loss of life and injury would be likely.

3. Wildfire

Delta County has experienced a high rate of growth over the past two decades. Multiple subdivisions have been built in the wildland-urban interface to accommodate commuters who work in the county seat. Roads leading to the subdivisions tend to be steep, winding, two-lane roads, making it difficult for emergency responders based in the county seat to reach the subdivisions rapidly. Rainfall in this traditionally arid part of the county has been relatively plentiful in the past 10 years, and trees and brush have flourished in the wildland. The State Forest Service has identified these subdivisions as high wildfire risk, yet development continues.

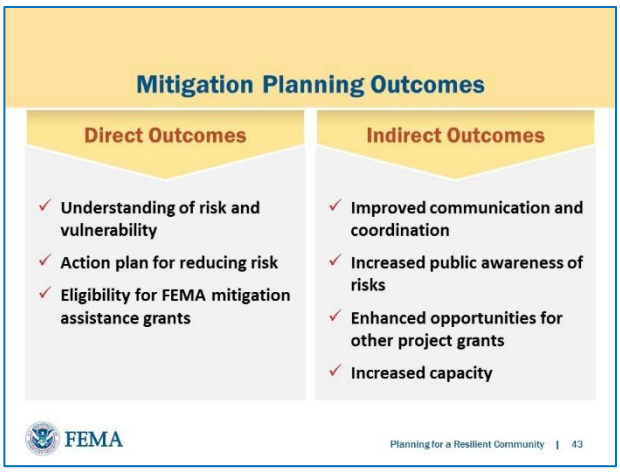
4. Storm Surge / Coastal Flooding

The coastal town of Omega has grown in popularity over the past 20 years as a tourist destination during the hot summer months. The state has replenished its beach, and commercial interests have attracted tourists with a regular schedule of summer concerts on the beach, as well as a variety of retail shops, restaurants, and boutique hotels. Omega has a mix of small, wood-frame cottages that were built before 1950 and are primarily located on side streets that are perpendicular to the coastline. Omega's newer hotels and retail businesses face the beach. Omega has not experienced a hurricane since 1965.

Visual 43

Mitigation Planning Outcomes

- Direct Outcomes
  - Understanding of risk and vulnerability
  - Action plan for reducing risk
  - Eligibility for FEMA mitigation assistance grants
- Indirect Outcomes
  - Improved communication and coordination
  - Increased public awareness of risks
  - Enhanced opportunities for other project funding
  - Increased capacity
    - For planning
    - For working through post-disaster recovery



Visual 44

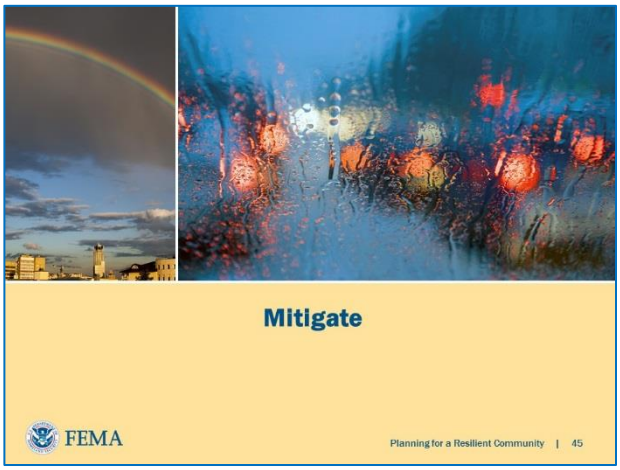
Evaluate Progress and Keep Plan Current

- Develop a coordinated process to determine:
  - How changes in development affect risk
  - If mitigation activities are being implemented as planned
  - If community priorities have changed
  - When the plan should be updated

Visual 45

Mitigate

A planner can reduce risk by integrating mitigation actions into a variety of planning mechanisms.



Visual 46

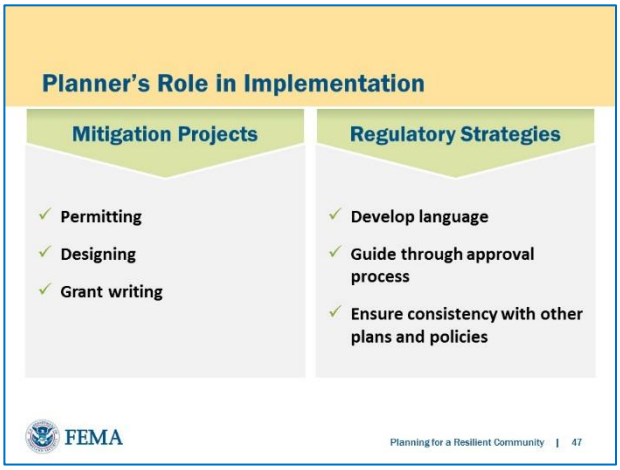
Benefits of Integrating Plans

- Leverage resources
  - Use various funding streams to implement a holistic project
- Achieve multiple objectives
- Increase political acceptance of mitigation objectives
- Send consistent message
  - Elected officials prefer that community documents provide a consistent message about policy decisions

Visual 47

Planner's Role in Implementation

- Mitigation Projects
  - Permitting
  - Designing
  - Grant writing
- Regulatory Strategies
  - Develop language
  - Guide through approval process
  - Ensure consistency with other plans and policies



Visual 48

Local Comprehensive Plan

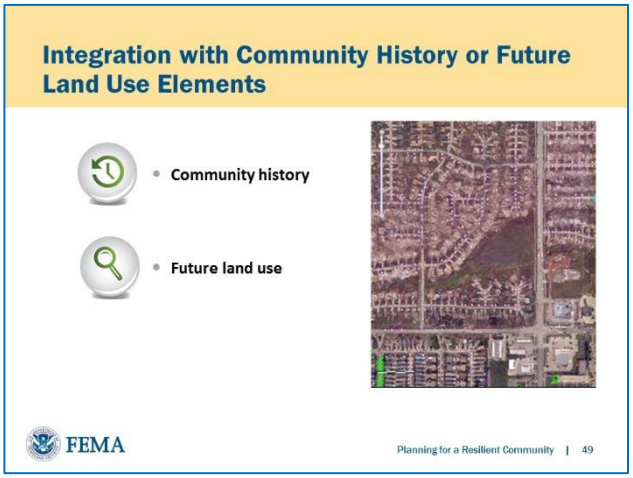
- Represents larger framework of community planning and decision-making
    - Guiding vision for community's future growth and development
    - Public policy goals for various elements
    - Implemented through ordinances, regulations, and capital improvement programs
- Opportunities for integration
- Natural hazards information and mitigation and resilience policies integrated throughout plan
    - Include background and history of past events and potential impacts.
    - Clearly identify hazard-prone areas.
    - Add relevant hazard mitigation goals, objectives, policies, and projects to the appropriate plan elements.
- Collaborative planning and implementation
    - Involve key community officials who understand the comprehensive and hazard mitigation policies, as well as their context in local government decision-making, and who have the authority to execute the policies and programs.
- Coordinated plan reviews and updates
    - Reevaluate mitigation policies whenever new information regarding a community's hazard exposure, vulnerability, or risk becomes available.
    - Develop a method to coordinate revisions and updates of the natural hazard mitigation and comprehensive plans.

In 2014, the American Planning Association updated and released "Comprehensive Plan Sustainability Standards," which lists protection of vulnerable neighborhoods from natural hazards as a best practice.

Visual 49

Integration with Community History and Future Land Use Elements

- Community history, existing conditions, and physical features
  - Include a description of past natural disasters
  - Include hazard maps to identify hazard-prone locations
- Future land use
  - Establish standards to direct development away from high-hazard areas
  - Consider the anticipated effects of climate change such as sea level rise and address this in multiple community plans

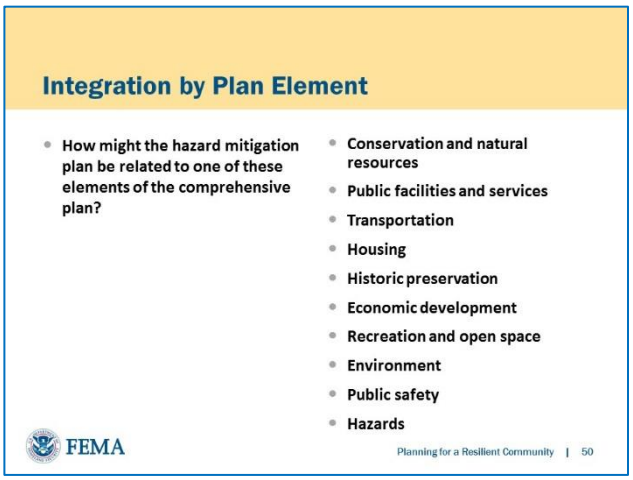


Visual 50

Integration by Plan Element

How might the hazard mitigation plan be related to one of these elements of the comprehensive plan?

- Conservation and natural resources
- Public facilities and services
- Transportation
- Housing
- Historic preservation
- Economic development
- Recreation and open space
- Environment
- Public safety
- Hazards



Adapted from *Integrating the Local Natural Hazard Mitigation Plan into a Community's Comprehensive Plan* (FEMA Region X, 2013):

Community history, existing conditions, and physical features

- Include a description of past natural disasters and their effects on the community as well as the geographical extent, severity, and probability of the occurrence of natural hazards
- Include hazard maps to identify the location of hazard-prone areas in the community

Future land use

- Analyze hazard exposure and vulnerability as part of the development of the future land use map and policies
- Identify hazard areas and include policies to establish standards to control development and reduce vulnerability
- Identify potential problems that may arise from various densities of development in hazard-prone areas, determine what densities are appropriate, and establish standards to direct development away from high-hazard areas
- Use easements and acquisition, when possible, to prevent inappropriate or unsafe uses of land

Conservation and natural resources

- Protect and restore natural protective features, such as floodplains, wetlands, marshes, and dunes
- Protect wildlife migration corridors along rivers and streams to serve as habitat and environmental protection
- Limit development in flood-prone areas
- Preserve natural vegetation and woodlands on steep slopes to reduce the likelihood of landslides
- Conserve natural woodlands without development to reduce building exposure to wildfires

Public facilities and services

- Include policies that limit public expenditure for infrastructure and public facilities in high-hazard areas
- Use capital improvement policies to steer development away from hazardous areas
- Link water treatment facilities, stormwater management, and sewerage and solid waste policies to natural hazard mitigation
- Interconnect service networks, such as roads, pipelines, and cables, and allow more than one route to any point so that they are less vulnerable to local failures
- Locate critical public facilities, such as police and fire stations or emergency operations centers, in safe locations that are not likely to be affected by hazards or rendered inaccessible by the occurrence of a hazard
- Locate other major public facilities in safe areas so that they can serve as emergency shelters

Transportation

- Determine if transportation facilities are adequate in the event of an evacuation
- Plan for contingencies if there is structural failure of bridges or other infrastructure
- Correct any known deficiencies or potential weakness in infrastructure
- Use transportation projects to influence the location and density of development
- Use transportation policies to guide growth to safe locations and limit access to hazard-prone areas

Housing

- Acquire older housing stock in floodplains or other hazard-prone areas
- Address issues of how housing demand is influenced by the desire for siting near natural amenities, which can attract people to hazardous locations
- Retrofit or replace public and publicly subsided housing to reduce damage to inhabitants during a natural disaster
- Be aware that manufactured homes pose particular problems of vulnerability, especially to high winds

Historic preservation

- Protect historic resources from hazards, especially floods and earthquakes, with appropriate retrofitting techniques

Economic development

- Develop policies to aid economic recovery after a disaster, such as burying power and other utility lines in a business district
- Provide technical assistance to support natural hazard mitigation for vulnerable small businesses
- Use the community's safety to attract potential new business investment in the area

Recreation and open space

- Convert vulnerable floodplain land, steep slopes, and areas vulnerable to wildfire or other hazards into open space or recreational areas to help avert or minimize disaster by sacrificing park land in the short term instead of allowing floods, landslides, wildfires, and other natural hazards to ruin homes or businesses
- Use natural hazard mitigation objectives to protect and provide public access to areas that are also deemed potentially hazardous for development (e.g., river fronts and beaches) and to guide land acquisition choices for open space

Environment

- Link mitigation goals, such as floodplain management, with clean air and clean water goals
- Designate critical and sensitive areas to focus planning for specific areas that have an especially high priority for protection of natural features
- Establish good floodplain management practices that protect endangered species habitat as well as help reduce and prevent flood damage
- Link the goals and objectives of watershed management (e.g., pollution runoff control) with hazard mitigation efforts
- Prevent the conflict of natural forces and hazardous materials by mitigating the potentially destructive combination of natural hazards and industrial development that could otherwise exacerbate losses, such as the contamination of floodwater
- Link wildfire safety with environmental protection strategies (e.g., improving forest ecology, protecting wildlife habitat)
- Protect and restore natural vegetation and other natural resources that provide floodplain protection, minimize erosion, stabilize slopes, or provide other ecosystem benefits

Public Safety

- Reduce the risk of public exposure to natural hazards
- Protect the community from the risk of natural hazard events
- Develop emergency response plans for natural hazard events

Hazards

- Incorporate all or most of the content and findings of the natural hazard mitigation plan by reference in a stand-alone natural hazards element
- Ensure information in the comprehensive plan and the natural hazard mitigation plan is consistent

City of Gilroy, CA, General Plan
June 2002

http://www.cityofgilroy.org/cityofgilroy/city_hall/community_development/planning/general_plan/

Policy 23.03: Drought-Resistant Landscaping. Encourage the use of drought-resistant landscaping and low-flow irrigation systems to help reduce overall demand.

Policy 25.01: Location of Future Development. Permit development only in those areas where potential danger to the health, safety, and welfare of residents can be adequately mitigated to an "acceptable level of risk" (see Policy 25.04). This applies to development in areas subject to flood damage or geological hazard due to their location and/or design. Development should be prohibited in areas where emergency services, including fire protection, cannot be provided.

Policy 25.04: "Acceptable Risk." Enact development controls to ensure "an acceptable level of risk" in those areas where life and property are subject to seismic, geologic, and flooding hazards. "Acceptable risk" in this instance describes the level of risk that the majority of citizens will accept without expecting governmental action to provide protection. This definition considers acceptable risk only from the point of view of the public agency; individual concepts of acceptable risk may vary widely.

Policy 25.07: Development in Seismic Risk Areas. Allow only low intensity, low occupancy development in areas subject to high seismic risk.

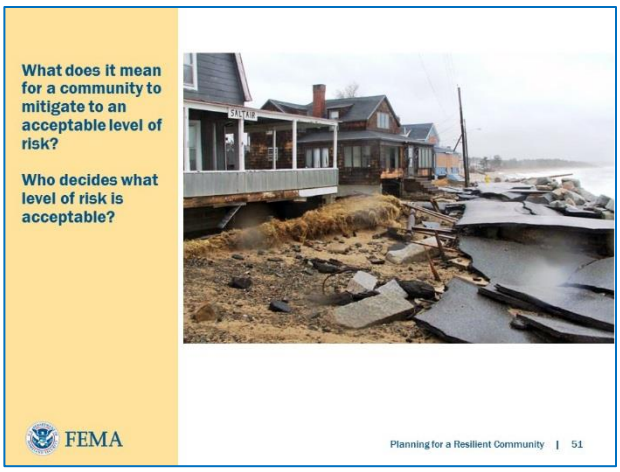
Policy 25.08: Structural Standards. Assure that structures for human occupancy are designed and constructed to retain their structural integrity when subjected to seismic activity in accordance with the Uniform Building Code of the State of California.

Policy 25.17: Flood Control Coordination. Work closely with the Santa Clara Valley Water District to alleviate flooding and drainage problems in the Planning Area, ensuring that new flood control measures are designed and implemented in accordance with Best Management Practices (BMPs) and in keeping with the goals and policies of the General Plan.

Visual 51

What does it mean for a community to mitigate to an acceptable level of risk?

Who decides what level of risk is acceptable?

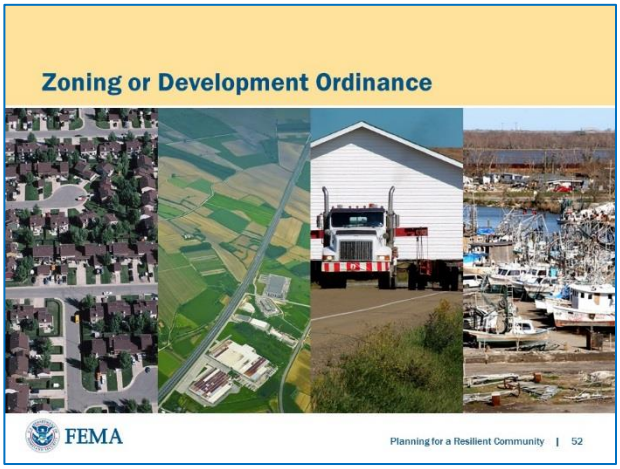


Visual 52

Zoning or Development Ordinance

- Can be used to implement mitigation measures
- May be useful in steering development away from hazardous locations
- May require stormwater management in new subdivisions
- May use hazard overlay zones to identify areas where additional safety regulations are imposed
- May identify environmentally sensitive areas that will be protected from development

Example of incorporation of hazard mitigation strategies into a unified development ordinance, shown below.

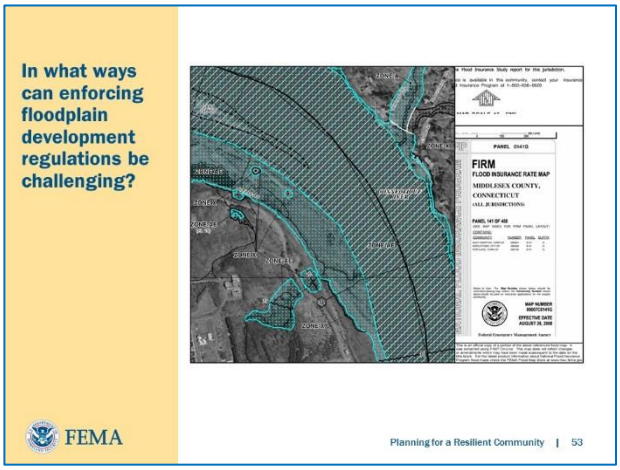


Fredericksburg, VA, Unified Development Ordinance
http://www.fredericksburgva.com/DoingBusiness/ReportsStudiesCodes/UnifiedDevelopmentOrdinance/
Floodplain Overlay District (FPO)
Allowable Uses

a. All uses in the FPO shall require a zoning permit.
b. The Zoning Administrator shall consider the impacts of the following factors:
    i. The Comprehensive Plan.
    ii. The type of proposed structures or uses.
    iii. The location of the proposed structures or uses.
    iv. Flood frequency.
    v. The nature of flooding and historical flood impacts.
    vi. Access to the site for the proposed land use.
    vii. The nature and extent of proposed fill.
    viii. The impact of the proposal on the floodplain.
    ix. The potential increase in flood damage and risk of human life.
c. No permit for new residential construction shall be granted if the lowest floor, including basement, of the proposed structure would be less than one and one-half feet above the water surface elevation of the 100-year flood.
d. No permit shall be granted for a nonresidential structure unless adequate flood proofing to the level of the 100-year flood is provided in accordance with the Virginia Uniform Statewide Building Code.

Visual 53

In what ways can enforcing floodplain development regulations be challenging?

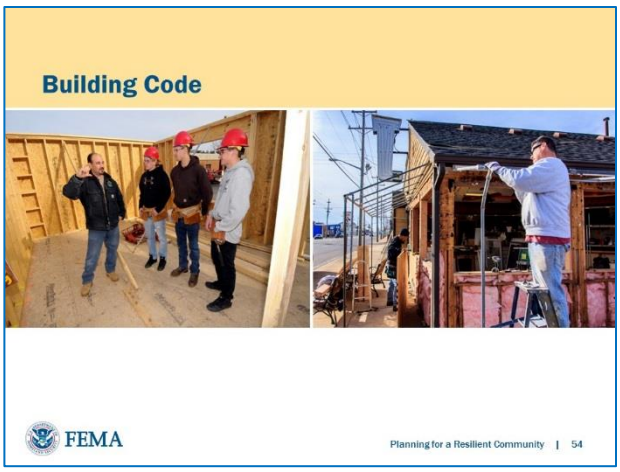


Visual 54

Building Code

- Identifies minimum design standards to reduce vulnerability to fire and damage by wind, snow, and ice
- Can require higher standards to reduce risk
- Enforcement program is important for effectiveness

Example of building code designed to mitigate the potential for damage is shown below.



Commonwealth of Virginia, 2009, Construction Code

http://www.ecodes.biz/ecodes_support/Free_Resources/Virginia2009/09Construction/09Construction_main.html

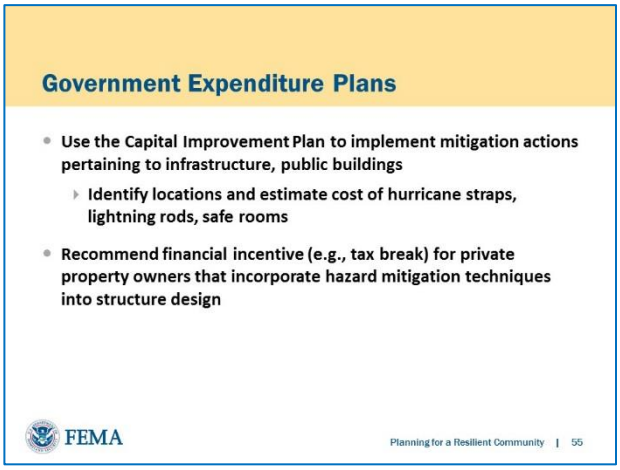
Section 1609 Wind Loads

Applications. Buildings, structures and parts thereof shall be designed to withstand the minimum wind loads prescribed herein. Decreases in wind loads shall not be made for the effect of shielding by other structures.

Visual 55

Government Expenditure Plans

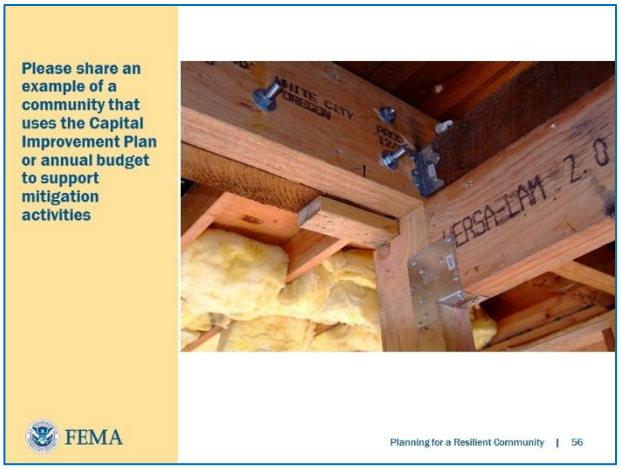
- Use the Capital Improvement Plan to implement mitigation actions pertaining to infrastructure, public buildings
  - Identify locations and estimate cost of hurricane straps, lightning rods, safe rooms
- Recommend financial incentive (e.g., tax break) for private property owners who incorporate hazard mitigation techniques into structure design



Creative uses of allowable tools, such as Transfer of Development Rights and Tax Increment Financing, can also be used to implement mitigation strategies.

Visual 56

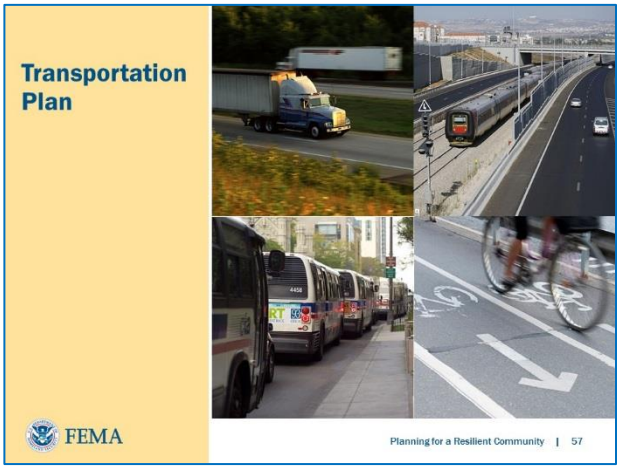
Please share an example of a community that uses the Capital Improvement Plan or annual budget to support mitigation activities



Visual 57

Transportation Plan

- Transportation plans can identify safety improvements, such as to rebuild roads and bridges so that they will not be damaged by hazards
- Plans can include mitigation measures in the long-range transportation plan to meet the Federally-required safety and security goal
    - Transportation Equity Act for the 21st Century (TEA-21) was the first federal law requiring State Departments of Transportation and Metropolitan Planning Organizations to incorporate safety and security into their respective transportation planning processes



An example of a transportation improvement plan that addresses a flood hazard is provided below.

New York Metropolitan Transportation Council Transportation Improvement Plan 2014–2018

http://www.nymtc.org/files/TIP_FFY2014_2018/Draft%20NYMTC%20FFY%202014-2018%20TIP.pdf

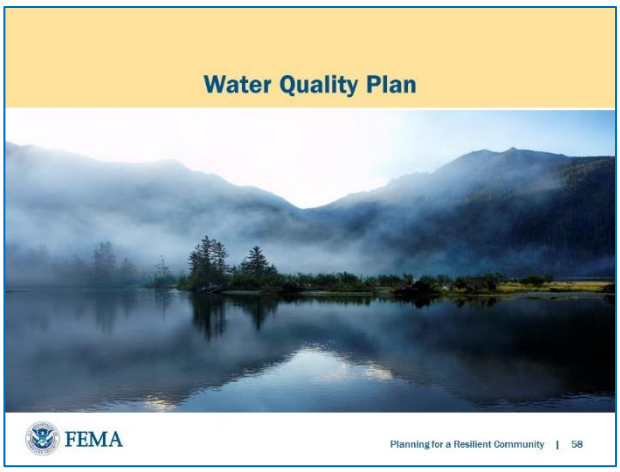
Suffolk County Project Description 080874

Improve debilitated drainage systems and isolated flooding areas; control flooding to promote safer traffic movement; improve quality of highway runoff to adjacent surface waters in the towns of E. Hampton, Riverhead, Southampton, and Southold ($7.5 – $12 M).

Suffolk County Project Description 080894

Mitigate highway flooding and provide stormwater run-off improvements on NY111 between NY454 and Townline Road in Town of Islip ($9.5 – $15.5 M).

Visual 58



Water Quality Plan

- Multiple objectives can be reached through planning
    - Plan can set aside land for protection of water quality that will also provide storage for floodwater
    - Plan can identify measures to protect water treatment plants and pumping stations against the impacts of storm surge or earthquake

Examples of strategies for protecting water quality, as well as for improving the management of storm water, are provided below.

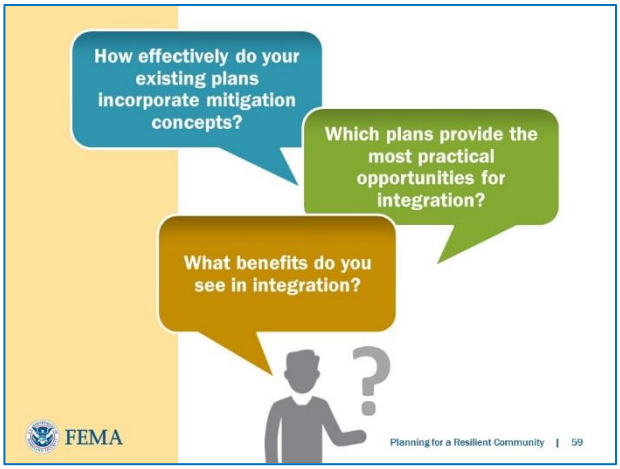
Dane County, WI, 2005, Water Quality Plan

http://www.capitalarearpc.org/WaterQuality_Plan.html

Urban Nonpoint Source Control Recommendations:

- U–2: Management agencies should promote land use patterns and practices that preserve the integrity of the natural hydrologic system, including the balance between groundwater and surface water. Require future development to implement infiltration measures, wherever practicable, as a means of controlling storm water impacts and ensuring groundwater recharge.
- U–8: Management agencies should promote open drainage systems incorporating detention and infiltration areas and natural greenways in developing areas.

Visual 59

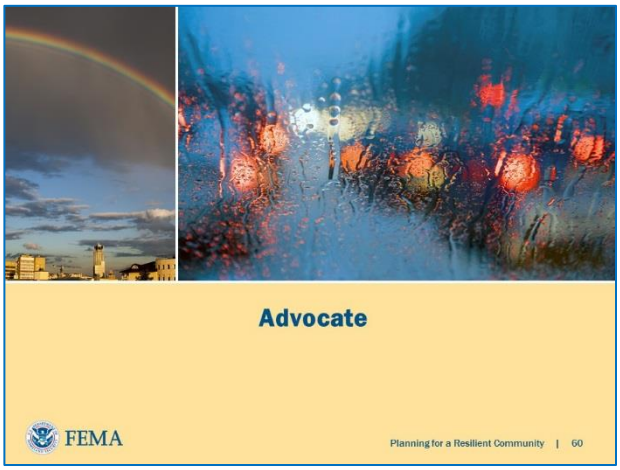


- **How effectively do your existing plans incorporate mitigation concepts?**
- **Which plans provide the most practical opportunities for integration?**
- **What benefits do you see in integration?**

Visual 60

Advocate

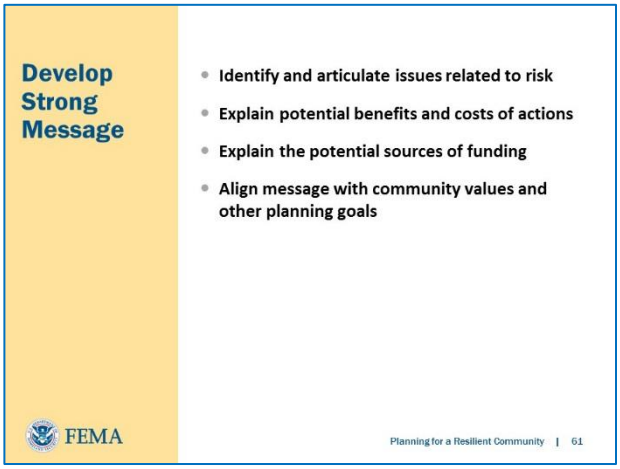
A planner can reduce risk by advocating for the implementation of appropriate mitigation strategies and conveying information about risk to a variety of stakeholders.



Visual 61

Develop Strong Message

- Identify and articulate issues related to risk
    - There are 120 homes and businesses at risk of damage and destruction in the 1-percent-annual-chance flood event.
    - The school cannot safely shelter the 400 students and 32 staff during a tornado event.
- Explain potential benefits and costs of actions
    - Without action, a major flood event could cause building damage of $250 million in downtown, in addition to closing businesses for weeks to months. Many small businesses do not survive major disasters.
    - Improved building standards and site plan review will reduce potential for wildfires that put our first responders and residents at risk, destroy homes, and threaten the water supply for years to come.
- Explain the potential sources of funding
    - FEMA grants are available for retrofitting the critical facility.
    - The State Forest Service provides matching funds to homeowners for defensible space maintenance.

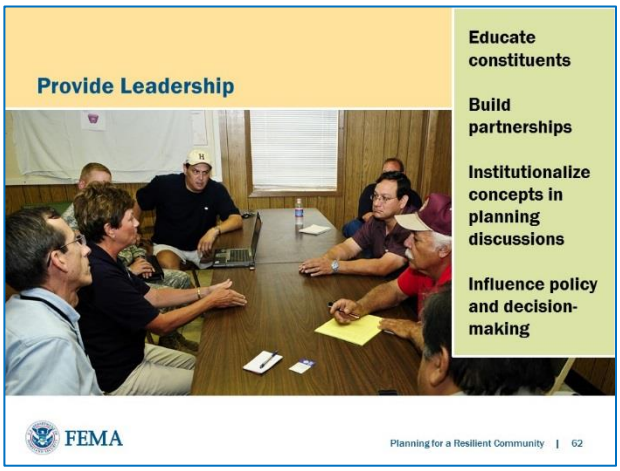


- Align message with community values and other planning goals
    - Protecting this stretch of the river from development will prevent people from being in harm's way, support fishing tourism, and provide recreational opportunities for our community.

Visual 62

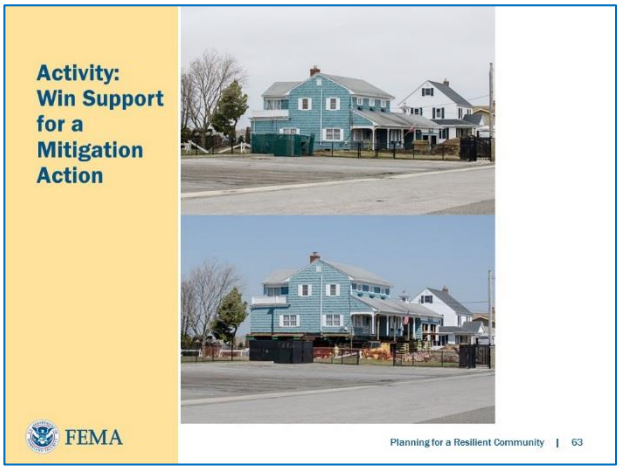
Provide Leadership

- Educate constituents
- Build partnerships
- Institutionalize concepts in planning discussions
- Influence policy and decision-making



Visual 63

Activity: Win Support for a Mitigation Action



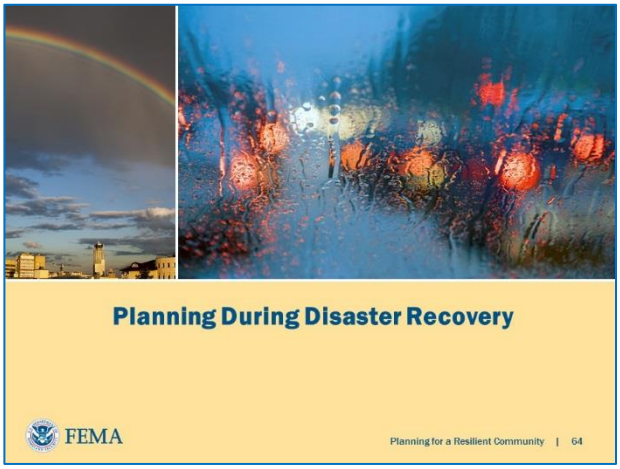
Instructions

- Organize into small groups of four to six.
- Identify a mitigation action that will be the focus of this activity for the group. It can be an action that we've talked about during the class or during the last small group activity or one that you know is needed in your community.
- Imagine that your community has a newly adopted mitigation plan. You are ready to move forward with implementing this mitigation action or project designated as a high priority in your plan.
- You have 2 minutes at a meeting of your elected officials to convince them to support the implementation and/or funding of the action.
- How will you make your case for implementation? Take approximately 5 minutes to identify the key points that you will make in your 2-minute speech.
- Volunteers read the key points developed by their groups.

Visual 64

Planning During Disaster Recovery

Disaster recovery provides the planner with additional opportunities to mitigate risk.



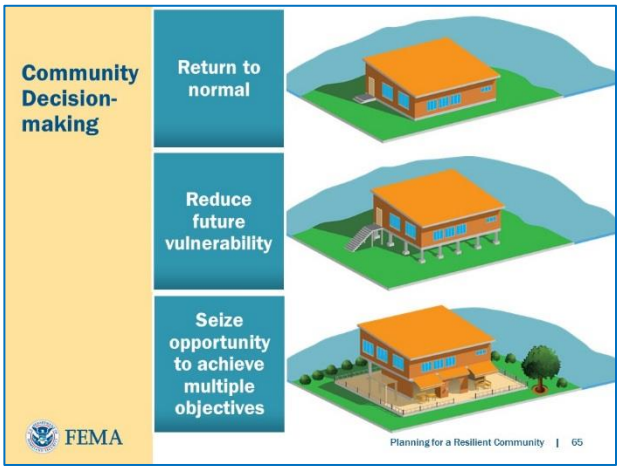
Visual 65

Community Decision-making

During disaster recovery and reconstruction, there may be a rush to rebuild as quickly as possible. Early decisions may foreclose opportunities for building long-term resiliency.

Residents, business owners, and community leaders must make difficult choices among competing priorities, such as:

- Put everything back exactly as it was pre-disaster and return to normal conditions as quickly as possible
- Reduce future vulnerabilities through mitigation, although this may add to the immediate cost of rebuilding
- Rebuild in a way that enhances community amenities, efficiency, and/or equity and achieves multiple community objectives



Visual 66

Planner's Role in Disaster Recovery

- Plan
  - Create a compelling vision that balances competing priorities and links people, plans, and values
  - A post-disaster recovery plan or policy can be established pre-disaster
- Mitigate
  - Implement actions and projects to minimize the potential for future damage while federal funds, volunteers, and project support are available
- Advocate
  - Seize opportunities and focus on investment
  - Encourage property owners to protect structures when repairing and rebuilding

Visual 67

Mitigation During Recovery Increases Future Resilience

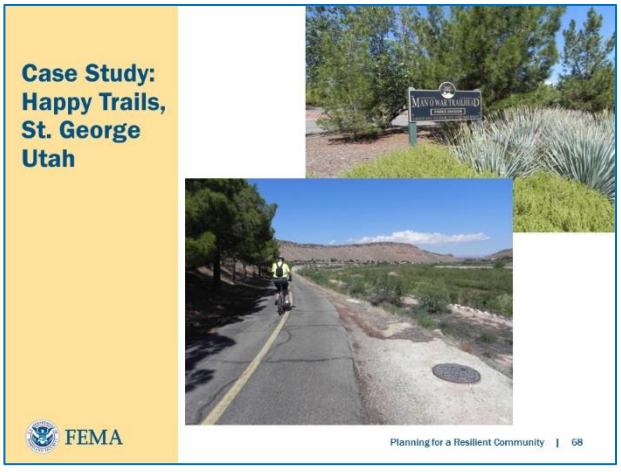
- Prevent repetitive damage
    - Examples of how mitigation has affected the rebuilding
        - Adopting more stringent building codes in South Florida after Hurricane Andrew
        - Rebuilding a school and City Hall to LEED Platinum standards after they were demolished in the 2007 tornado in Greensburg, KS
        - Adopting new building codes and requiring 100-foot brush clearance around homes after the 2003 and 2007 wildfires in the San Diego area
        - Rebuilding to new seismic standards in California after the Loma Prieta earthquake
- Each dollar spent on mitigation saves $4 in costs of repair and disruption

Source: National Institute of Building Sciences, Multihazard Mitigation Council, 2017. *Natural Hazard Mitigation Saves: 2017 Interim Report*. Accessible at http://www.nibs.org/page/mitigationsaves

Visual 68

Case Study: Happy Trails, St. George, Utah

- Potential high-risk development converted to open space
- Flood mitigation creates popular trail system
- Initial FEMA funds spur state and local investment
- Mindset of community altered by win/win solution



Planning Case Study (optional)

Case Study: Happy Trails in St. George, Utah

When the Quail Creek Dam breached on New Year's Eve 1989, it led to a disaster in southwestern Utah that not only changed the course of the Virgin River, but also the City of St. George.

The meandering river and unstable soil make development along the Virgin River very dangerous. Before the disaster, City of St. George officials understood the danger, but faced great opposition from developers and citizens who did not believe that flooding dangers existed.

After the disaster, the City's goal was to acquire land along the river and create a recreational amenity, while at the same time moving people away from the river for their own safety.

To accomplish the goal, the City Council first tried to pass an ordinance that would have prevented further development along the river; it failed in a 3-2 vote. But in 1990, a small planning group began to advocate for developing an 8-mile walking trail along the river.

Hazard Mitigation Grant Program (HMGP) funds were used to acquire property along the badly damaged banks of the Virgin River. This was the first time FEMA had ever awarded such a grant to a community.

The City of St. George now has a very popular trail system that has expanded to 43 miles. The trails provide recreational benefits and have created economic opportunities for the community. The open space along the trail provides environmental benefits, such as nesting areas for endangered species of birds and fish. The trail is also used as a service road for a city sewer line and for access to undeveloped areas for fire protection.

The initial HMGP grant was for $57,000; eventually a total of $155,000 in HMGP funds was used for the project. The City more than matched the HMGP grants by donating land valued at approximately $400,000 for the project.

The trail system is used by cyclists, equestrians, joggers, and walkers. Social organizations and volunteers provide landscaping services.

Visual 69

Post-Disaster Mitigation Opportunities and Challenges

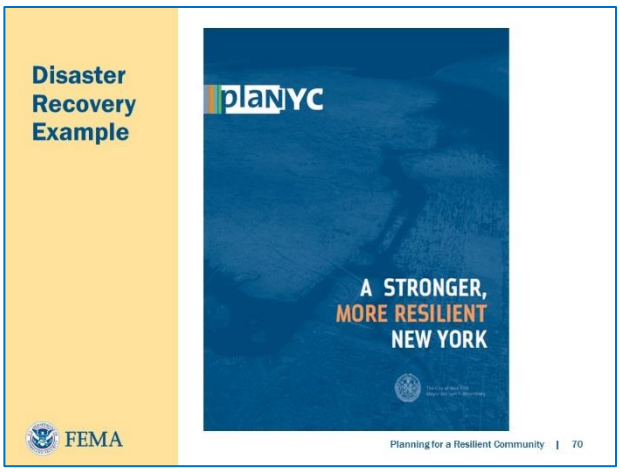
The following are examples of opportunities and challenges that planners may encounter after a major disaster:

- Housing
  - Rebuilding may provide opportunity to increase supply of affordable units
  - Temporary housing units may become permanent
- Development permits
  - Update development review procedures, such as by increasing reliance on GIS
  - Pressure to waive or expedite permitting process
  - Short-term repairs may not comply with regulations
- Critical infrastructure (e.g., roads)
  - Use available funds to rebuild to higher (safer) standards or to relocate
  - Desire to rebuild to pre-disaster conditions
- New technology
  - Opportunity to integrate energy-efficient, green building techniques as structures are rebuilt
  - May be able to combine funds available for repair with incentive programs to achieve sustainability objectives
  - Perceived or actual increase in cost of rebuilding
- Historic preservation
  - Rebuilding after a disaster may strengthen structures with historic value and preserve them well into the future
  - Reluctance to repair structures in a way that detracts from historic value

Visual 70

Disaster Recovery Example

- After Hurricane Sandy in 2012, the New York region planned to rebuild in a way that would make the area more resilient
- Excerpts of PlaNYC, showing how mitigation considerations can be incorporated into a recovery plan, are included below



The City of New York. 2013. PlaNYC: A Stronger, More Resilient New York.
http://www.nyc.gov/html/sirr/html/report/report.shtml
Goal of the plan (page 94): To minimize loss and disruption from climate hazards and enable the city to bounce back quickly if damage is sustained.

Page 14:
Though the storm surge generally devastated areas that it touched, the city's nourished beaches, dunes, and bulkheads did help to mitigate its impact, particularly where these protections were combined to form multilayered defenses.

Page 40
As the impacts of climate change accelerate over time, more damage, more flooding, and more erosion are likely in New York, with sea levels continuing to rise and more of the most intense storms expected. In response to these challenges, the City believes that it must bulk up its defenses, improving the coastline with protective measures. This will not eliminate all flooding from all conceivable storms—an impossible goal—but will mitigate the effects of sea level rise where the risk is greatest and reduce the effects of storm waves and storm flooding significantly.

Page 64:
While Sandy exposed many areas of vulnerability within the city, it also identified effective protections that should be incorporated elsewhere. Subject to available funding, the City, through the Department of Parks and Recreation (DPR), therefore will study the cost effectiveness of new waterfront and coastal asset design guidelines for open spaces and natural areas, assessing whether and how best to use these areas to protect adjacent neighborhoods, to improve landscaping to direct and store excess floodwaters, to ensure that new open space and park designs allow for maximum resiliency of parkland after an extreme weather event, and to build upon existing DPR high performance landscape guidelines.

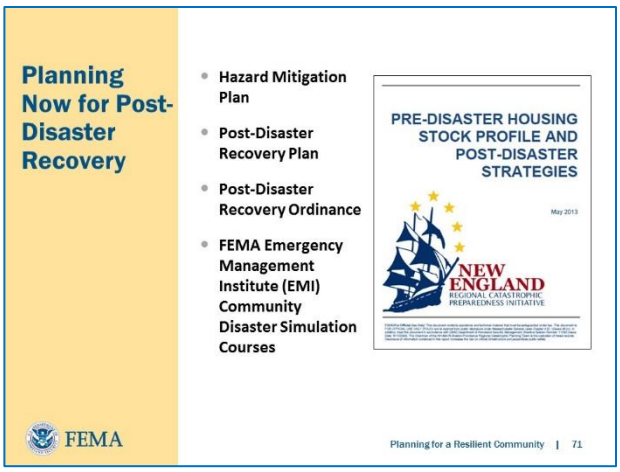
Page 101:
Investments in mitigation have many long-term benefits, including protecting lives and reducing the risk of property losses.

Visual 71

Planning Now for Post-Disaster Recovery

A community can organize in advance of a disaster to determine how it will efficiently manage short- and long-term recovery by developing the following:

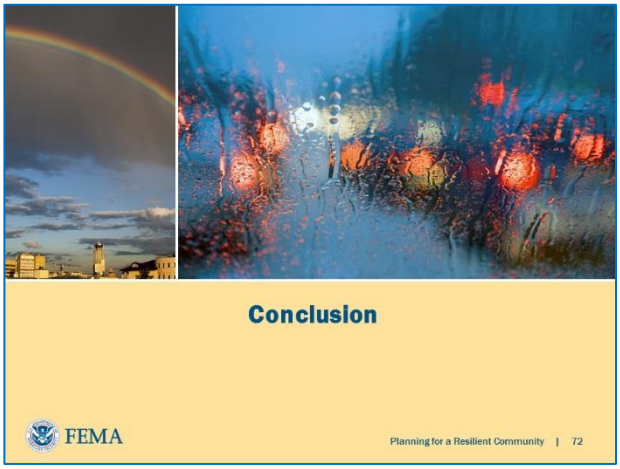
- Hazard Mitigation Plan
- Post-Disaster Recovery Plan
    - Identify methods for the local government to cooperate with other governmental entities, the private and nonprofit sectors, emergency management, community development professionals, and disaster recovery practitioners to facilitate recovery
    - Specify resilient/mitigation-oriented policies for business resumption, damage assessment, demolition, debris removal, permitting for repairs, preservation of historic buildings, restoration of nonconforming buildings and uses, and provision of temporary and replacement housing
- Post-Disaster Recovery Ordinance
    - Establish powers or authorities to be implemented upon declaration of a local emergency so that local officials can take extraordinary action to reasonably ensure safe and healthy post-disaster recovery (e.g., declaration of a building moratorium)
    - Identify responsibilities for expeditious and orderly post-disaster recovery and rebuilding
    - APA Model Pre-Event Recovery Ordinance



- FEMA Emergency Management Institute (EMI) Community Disaster Simulation Courses
    - Two courses back-to-back: “All Hazards Preparedness and Response” and “All Hazards Recovery and Mitigation”
    - Can be attended by a specific audience of participants all from one community
    - Places public officials and other key community leaders in a disaster simulation; helps to identify roles and responsibilities
    - Travel expenses to EMI by a group from your community may be eligible for reimbursement

Visual 72

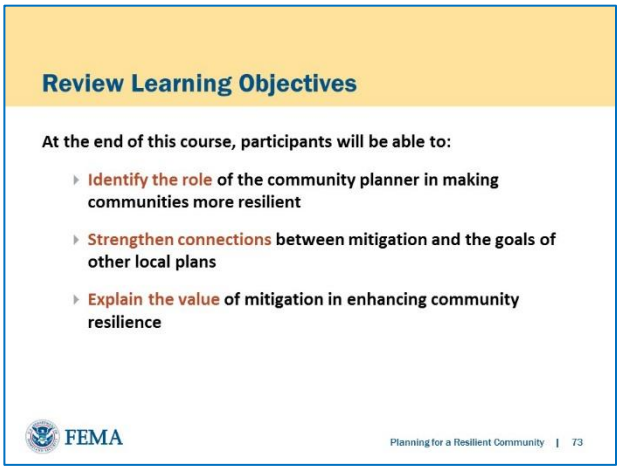
Conclusion



Visual 73

Review Learning Objectives

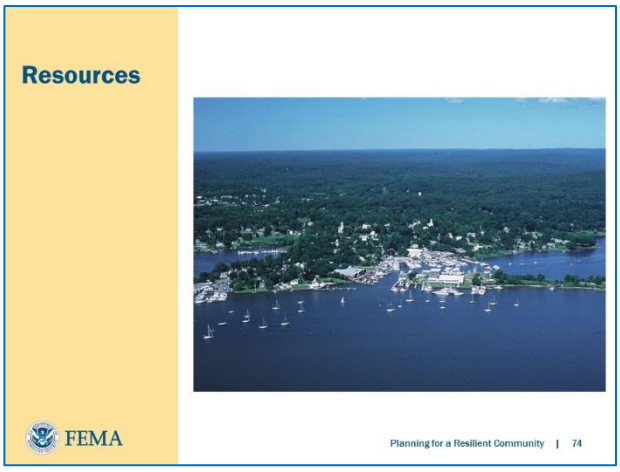
- At the end of this course, participants will be able to
  - Identify the role of the community planner in making communities more resilient
  - Strengthen connections between mitigation and the goals and content of other local plans
  - Explain the value of mitigation in enhancing community resilience



Visual 74

Resources

- Many resources are available to help planners create more disaster-resilient communities. Some of these resources are listed below.



Resources for Planners

Training courses

American Institute of Certified Planners (AICP). 2011. Mitigating Hazards Through Planning. Media Presentation. Typically scheduled for delivery by a state chapter of the American Planning Association (APA).

Emergency Management Institute. E-900 – Integrated Emergency Management Course: All-Hazards Preparedness and Response. Information available at http://training.fema.gov/emicourses/crsdetail.asp?cid=E900&ctype=R

Emergency Management Institute. E-901 – Integrated Emergency Management Course: All Hazards Recovery and Mitigation. Information available at http://training.fema.gov/emicourses/crsdetail.asp?cid=E901&ctype=R

FEMA. 2011. Mitigation Planning for Local and Tribal Communities (IS 318). Available through the Emergency Management Institute at http://training.fema.gov/EMIWeb/IS/courseOverview.aspx?code=is-318

FEMA. Updated 2013. Local Mitigation Planning Workshop (G-318). Typically scheduled for delivery by a State Office of Emergency Management Training Office.

Guidance documents

APA. 2013. Comprehensive Sustainability Standards. Available at http://www.planning.org/sustainingplaces/compplanstandards/pdf/compplansustainabilitystandards.pdf

APA. 2005. Planning for Wildfires. Planning Advisory Service Report Number 529/530. Information available at http://www.planning.org/research/wildfires/

APA. 2005. Landslide Hazards and Planning. Information available at http://www.planning.org/nationalcenters/hazards/wildfiresfloods.htm

APA. 1998. Planning for Post-Disaster Recovery and Reconstruction. Planning Advisory Service Report Number 483/484. Partially available at http://www.fema.gov/media-library/assets/documents/2147

APA. 2010. Hazard Mitigation: Integrating Best Practices into Planning. Available at http://www.fema.gov/media-library/assets/documents/19261?id=4267

APA. 2011. Policy Guide on Climate Change. Available at www.planning.org/policy/guides/

APA. 2013. Model Pre-Event Recovery Ordinance. Available at http://www.planning.org/research/postdisaster/pdf/modelrecoveryordinance.pdf

FEMA. 2013. Integrating Hazard Mitigation into Local Planning. Available at http://www.fema.gov/media-library/assets/documents/31372?id=7130

FEMA. 2013. Local Mitigation Planning Handbook. Available at http://www.fema.gov/media-library/assets/documents/31598?id=7209

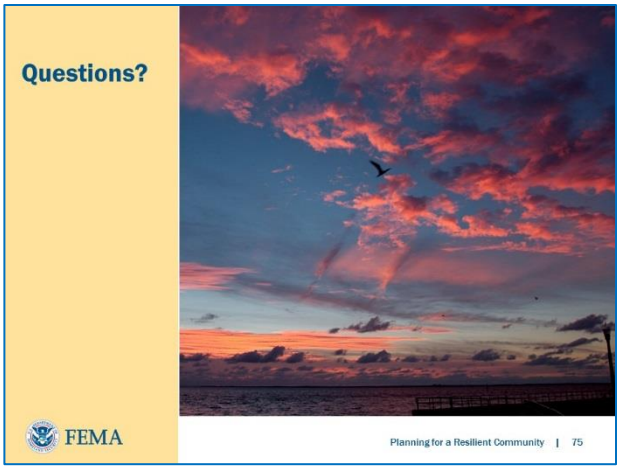
FEMA. 2013. Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards. Available at http://www.fema.gov/media-library/assets/documents/30627?id=6938

FEMA Region X. 2013. Integrating the Local Natural Hazard Mitigation Plan into a Community's Comprehensive Plan. Available at http://www.fema.gov/media-library-data/1388432170894-6f744a8afa8929171dc62d96da067b9a/FEMA-X-IntegratingLocalMitigation.pdf

National Fire Protection Association (NFPA). 2013. Community Wildfire Safety Through Regulation: A Best Practices Guide for Planners and Regulators. Available at https://www.nfpa.org/~/media/Files/Wildland/WildfireBestPracticesGuide.pdf

Visual 75

Questions?



Visual 76

Course Evaluation