

Lesson 4. Building and Implementing a Community Hazard Mitigation Plan

Introduction

With the completion of the risk assessment described in Lesson 3, a community's hazard mitigation team can make decisions about the best way to reduce the risk of future hazard damages. As you complete Lesson 4 you will see how the results of the risk assessment are used as a basis for a community hazard mitigation strategy, and will then practice developing a strategy. The lesson also covers what should be included in the hazard mitigation plan so that it meets not only the community's needs, but the FEMA criteria for approval under 44 CFR Part 201.6.

After completing this lesson, you will be able to:

- Follow a systematic process to develop a hazard mitigation strategy.
- Describe six categories of hazard mitigation actions that may be included in the strategy.
- Identify criteria used to decide what hazard mitigation actions are best for a community.
- Describe a strategy for implementing and maintaining the community hazard mitigation plan.

Steps to Developing the Mitigation Plan

The following steps outline a process for developing the community hazard mitigation plan, consistent with the FEMA hazard mitigation planning guide "Developing the Mitigation Plan: Identifying Mitigation Actions and Implementation Strategies:"

1. Establish hazard mitigation goals and objectives.
2. Identify and prioritize hazard mitigation actions.
3. Prepare the implementation strategy.
4. Document the planning process.

The Hazard Mitigation Strategy

Once complete it is important to compile the results of the entire risk assessment into a written report. The report can be presented to citizens and elected officials. The State Hazard Mitigation Officer (SHMO) also will want the results to compare with, or incorporate into, the Statewide risk assessment. The results of the risk assessment will draw attention from a wide range of local sectors, presenting a great opportunity to use the results to galvanize the community's interest in hazard mitigation and in the hazard mitigation planning process.

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The Hazard Mitigation Strategy (Continued)

Based on the risk assessment results, the hazard mitigation planning team can set mitigation goals, refine them, and begin work on the hazard mitigation strategy. A hazard mitigation strategy provides direction for the community's efforts to reduce the potential losses identified in the risk assessment. If the strategy is to be implemented, it must be based on existing local authorities, policies, programs, and resources. The approach should be flexible enough to be expanded, reduced, and/or improved if existing conditions change.

Benefit-cost review of proposed hazard mitigation actions will be helpful in establishing priorities for the strategy because such an analysis looks at the effectiveness of the actions with respect to their cost. Note that FEMA's hazard mitigation plan review criteria require each community participating in a multi-jurisdictional planning effort to identify the specific actions they will undertake.

Step 1: Establish Hazard Mitigation Goals and Objectives

First review and analyze the results of the Risk Assessment's Hazards Profiles and, if completed, the Loss Estimation. Reviewing these findings will help clarify problems, issues, and opportunities for hazard mitigation. Develop a list of problem statements that address the risk in terms of what, where, how often, and how bad.

For example:

Fire Station Number Two on Main Street floods every time a nor'easter strikes Bull Island at high tide, forcing the Fire Department to move the equipment to Fire Station Number One and leaving the eastern end of the city vulnerable in terms of fire protection. In the past 10 years this has happened 14 times.

Base your community's mitigation **goals** on the findings of the local and State risk assessments. Describe the long-term vision for hazard reduction or enhancement of mitigation capabilities. Goals are not intended to identify specific mitigation actions, but identify the overall improvements you want to achieve. Remember that goals are general guidelines that describe what you want to achieve in the long run.

Examples of goals:

- Protect and expand essential facilities.
- Improve the quality of life in the community.
- Ensure that public funds are used in the most efficient manner.

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Step 1: Establish Hazard Mitigation Goals and Objectives (Continued)

Objectives define strategies or steps to achieve the goals that have been set. They are more specific and narrower in scope than goals. It is important that the objectives be measurable so you will know when you have successfully implemented the strategy. Involve the public when developing the community's goals and objectives to ensure fair representation of all sectors in the community.

Examples of objectives:

- Move or build Fire Station Number Two in a location out of the floodplain, as close as possible to the at-risk homes in the East End.
- Include upgrades in the construction of Fire Station Number Two so that the building will withstand wind speeds up to 150 miles per hour.
- Include in the construction of Fire Station Number Two space for a community shelter that can house up to 200 shelterees.

Step 2: Identify and Prioritize Hazard Mitigation Actions

Hazard mitigation strategies to reduce specific risks can vary from very simple to complex. They are comprised of one or more hazard mitigation actions. There are so many different hazard mitigation actions that they are often classified into six categories:

- Prevention.
- Property protection.
- Public education and awareness.
- Natural resource protection.
- Critical facilities protection.
- Structural projects.

Prevention

Prevention actions are intended to keep a hazard risk problem from getting worse. They ensure that future development does not increase hazard losses. Communities can achieve significant progress toward hazard resistance through prevention actions. This is particularly true in areas that have not been developed. Types (and examples) of prevention actions are:

- Planning and zoning (floodplain regulations).
- Open space preservation (parks and recreation areas).
- Land development regulations (large lot sizes).
- Storm water management (clear ditches/larger retention basins).
- Coastal barrier protection (building behind dunes).
- Capital improvement planning (no infrastructure extended into hazard area).
- Building codes.

Step 2: Identify and Prioritize Hazard Mitigation Actions (Continued)

Property Protection

Property protection actions are used to modify buildings subject to hazard risk, or their surroundings, rather than to prevent the hazard from occurring. A community may find these to be inexpensive actions because often they are implemented or cost-shared with property owners. These actions directly protect people and property at risk. Protecting a building does not have to affect the building's appearance and is therefore a popular action for historic and cultural sites. Some examples of property protection actions are:

- Acquisition.
- Relocation.
- Rebuilding.
- Floodproofing.

Acquisition is the public procurement and management of lands that are vulnerable to damage from hazards. Following acquisition, land uses more appropriate to the degree of risk may be chosen. Public acquisition has been achieved by:

- Purchase at full market value.
- Purchase at less than full market value through methods such as foreclosure of tax delinquent property, bargain sales, and purchase and lease back.
- Donation through reserved real estate, donation by will, and donation and lease back.
- Leases and easements.

Relocation involves permanent evacuation of hazard-prone areas through movement of existing hazard-prone development and population to safer areas. Two common components of relocation are:

- Physical removal of buildings to a safer area with the future use of the vacated area limited to permanent open space.
- Substitution of existing uses for others that are less vulnerable to the hazard.

Rebuilding or modifying structures to reduce damage by future hazard events is another type of property protection action.

- Masonry structures can be retrofitted to lessen damage in earthquakes.
- Manufactured homes can be anchored to withstand hurricane wind speeds without significant damage.
- Storm shutters can be installed to protect windows and glass doors from flying debris in areas at risk from high winds.

Ideally, adoption and/or enforcement of building codes accompany rebuilding of damaged or hazard-prone structures to minimize future risk of hazard damage.

Step 2: Identify and Prioritize Hazard Mitigation Actions (Continued)

Floodproofing is protecting a flood-prone building using one or more of several different methods. Dry floodproofing means sealing a building against floodwater by making all areas below the flood protection level watertight. Wet floodproofing means allowing the floodwaters to enter the building to minimize pressure on the structure. Furniture, appliances, and valuables may be moved out of the floodable area.

Relocation Example:

The Castaic Union School District in southern California is located in an area through which the San Andreas and San Gabriel fault systems pass. The District conducted an assessment of earthquake risks that threatened their elementary and middle schools and administration building. The study led the school district to conclude that the probability of a large earthquake affecting these facilities was high. In addition to expected seismic damage, the study showed that the school buildings were located within the inundation area of the Castaic Dam, and at high risk of damage from fire and explosion if crude oil pipelines that cross the campus should fail.

Based on estimates of potential casualties, building and content damages, and lost educational services, the school district decided to condemn the structures on the high-risk site. The area selected for relocation is completely out of the dam inundation area and far removed from the oil pipelines. The new buildings were constructed to conform fully to 1995 building code provisions that make them more resistant to seismic damage than the ones they replaced.

Public Education and Awareness

Public education and awareness activities inform and remind people about hazardous areas and the actions necessary to avoid potential damage and injury. The public can be informed about hazard mitigation through several avenues. Some examples include:

- Providing hazard maps and other hazard information.
- Website.
- Outreach programs that provide hazard and mitigation information to people when they have not asked for it.
- Asking business owners to provide hazard mitigation information to employees.
- Mass mailings.
- Notices to residents and property owners in a specific, hazard-prone area.
- Displays in widely used facilities, such as public buildings and malls.
- Print media, radio/TV spots and interviews.
- Public access TV channel announcements.

Step 2: Identify and Prioritize Hazard Mitigation Actions (Continued)

Public Education and Awareness (Continued)

- Videotape/property owner handbook.
 - Presentations at meetings of neighborhood groups.
 - Tab in phone book.
 - Real estate disclosure.
 - Information in the public library or a library developed specifically for hazard mitigation information.
 - Available technical assistance.
 - School-age and adult education.
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Earthquake Outreach Example

What do Starbucks Corporation, the Boeing Company, and the Friday Harbor Flower Shop have in common? All are businesses, all are located near Seattle, and all are taking an active role in keeping their employees safe and making their businesses more disaster resistant from earthquakes and other hazards.

The Cascadia Region Earthquake Workgroup (CREW) is a non-profit action group on a mission. In 1996, the scientific community established CREW to promote awareness of seismic risk among businesses and emergency managers. The Nisqually earthquake in February 2001 provided CREW and its partners with an important opportunity to assess lessons learned and to take additional steps to mitigate against damage from future earthquakes. Since the Nisqually earthquake, CREW has sponsored conferences and held forums to showcase both successes and failures during the Nisqually earthquake, and how to apply those lessons learned to a variety of other hazards, including man-made hazards.

In April 2003, CREW released a 20-minute video directed at small- and medium-sized businesses. Using the lessons learned from Nisqually, the message of the video is “protect your people, your buildings, and your business.” The video, which highlights the work of Starbucks, Boeing, and the Friday Harbor Flower Shop, was distributed along with a tool kit developed in partnership with the Institute for Business and Home Safety (IBHS). CREW also meets with the Seattle Chamber of Commerce and other Chambers of Commerce to establish coordinating centers with businesses, and will continue to sponsor its series of business forums.

Step 2: Identify and Prioritize Hazard Mitigation Actions (Continued)

Natural Resource Protection

Natural resource protection actions are intended to reduce the intensity of hazard effects as well as to improve the quality of the environment and wildlife habitats. Parks, recreation, or conservation agencies or organizations usually implement these activities. Examples of natural resource protection include:

- Erosion and sediment control.
- Wetlands protection.
- Dune restoration.
- Reforestation.
- Terracing.
- Beach nourishment.

Natural Resource Protection Examples:

- After Hurricane Hugo, it was found that South Carolina beaches, at which white sandy clay had been deposited prior to the storm to slow erosion, exhibited much less erosion than adjacent natural beaches.
- Between 1984 and 1993 Iowa instituted farm conservation projects including no tillage of certain areas, and use of terracing, contouring, and strip cropping. Authorities estimated that damage from the 1993 floods would have been 3.5 times greater without these actions.

Critical Facilities Protection

Critical facilities protection is essential because critical facilities can have a huge effect on the scope of the damage as well as the ability of the community to respond and recover from a hazard event.

Critical facilities include:

- Essential facilities, such as police stations, fire stations, and hospitals that are vital to the response effort.
- Special facilities that house populations requiring special consideration, such as nursing homes and prisons.
- Facilities that can create secondary hazards, such as nuclear powerplants and hazardous materials production or storage facilities.

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Step 2: Identify and Prioritize Hazard Mitigation Actions (Continued)

Critical Facilities Protection Example:

The service area for Beebe Medical Center in Lewes, Delaware, is the fastest growing population center in Delaware. Because of nearby resort beaches, the population and the service requirements expand exponentially during vacation periods. From experiences during previous hurricanes, the Lewes area can expect interrupted electrical power supply, interrupted water supply and wastewater treatment, street flooding, high winds, and windborne debris. Penetration of building envelopes would allow both wind and rain to damage building interiors and contents.

Beebe Medical Center developed mitigation priorities and determined that installation of storm shutters is the number one mitigation priority. Because of the relatively high cost of permanent storm shutters, the Medical Center has signed a contract with a local contractor to install inexpensive plywood storm shutters in the event of a hurricane warning. Meanwhile, hazard mitigation grants have been used to replace the windows on the northeast side of the facility with wind resistant glass.

Structural Projects

Structural projects directly protect people and property at risk. They are called “structural” because they involve construction of manmade structures to control hazards. Some examples of structural projects are dams, reservoirs, dikes, levees, seawalls, bulkheads, revetments, high flow diversions, spillways, buttresses, debris basins, detaining walls, channel modifications, storm sewers, elevated roadways, and debris basins.

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Evaluate Alternative Hazard Mitigation Actions

One set of criteria that is used for screening planning decisions is identified by the acronym STAPLE(E).

- Social – Is the hazard mitigation strategy socially acceptable?
- Technical – Is the proposed action technically feasible, and cost effective, and does it provide the appropriate level of protection?
- Administrative – Does the community have the capability to implement the action, and is the lead agency capable of carrying out oversight of the project?
- Political – Is the hazard mitigation action politically acceptable?
- Legal – Does the community have the authority to implement the proposed action?
- Economic – Do the economic base, projected growth, and opportunity costs justify the hazard mitigation project? Benefit cost-analysis is a mathematical method for comparing costs to the benefits to the community of a hazard mitigation action. If the benefits are greater than the costs, the project is cost-effective. Comparing the ratios of benefits to costs for several hazard mitigation projects helps to identify those that offer the “greatest bang for the community’s buck.” Benefit-cost analysis gives decision makers an understandable way to explain and defend their decisions. For many grant programs, FEMA and the State will use benefit-cost analysis to determine whether a project is eligible. The community can save time and energy by limiting planning activities to projects that will be more likely to receive funding.
- Environmental – Does the proposed action meet statutory considerations and public desire for sustainable and environmentally healthy communities?

Step 3: Prepare Implementation Strategy

There will be a variety of hazard mitigation actions in the hazard mitigation strategy, and multiple ways to implement them.

- Some actions will be carried out by the public sector, and some through the private sector.
- Some actions will be accomplished pre-disaster and some will not be feasible until after a disaster when post-disaster funding sources are available.
- Some actions will be accomplished in the short term and others will require up to years to accomplish.

The implementation strategy is an essential part of the hazard mitigation plan. The implementation strategy identifies *who* is responsible for which actions, *how* the hazard mitigation actions will be funded, and *when* the actions are to be completed.

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Identify Who Will Implement the Hazard Mitigation Actions

A good first step for assigning responsibility is to organize the actions. One way to do so is to use the hazard mitigation categories discussed under Step 2:

- Prevention.
- Property protection.
- Public education and awareness.
- Natural resources protection.
- Emergency services protection.
- Structural projects.

For each category, identify an organization that can logically be assigned to lead the effort to implement a specific action. For example, a dune restoration project can logically be assigned to the natural resources department.

Identify Sources of Funding and Technical Assistance

The capability assessment conducted earlier in the planning process identified the community's current fiscal capabilities. The implementation strategy identifies how to achieve the hazard mitigation actions that the hazard mitigation planning team has selected as priorities to the community. This section will include some possible funding sources.

Local and State government:

- Year-end money.
- Post-disaster recovery.
- Capital improvement budget.
- Economic development funds.
- Staff time.

Private-sector:

- Time.
- Labor.
- Materials.
- Private grants.

Federal Government:

- FEMA Pre-Disaster Mitigation (PDM) Program.
- FEMA Flood Mitigation Assistance (FMA) Program.
- FEMA Hazard Mitigation Grant Program (HMGP), Small Business Administration (SBA) Disaster Loans, and FEMA Public Assistance, which will be addressed in Lesson 5.
- Other Federal agencies, such as Housing and Urban Development (HUD), Economic Development Agency (EDA), and the Environmental Protection Agency (EPA).

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Identify Sources of Funding and Technical Assistance (Continued)

Two sources of hazard mitigation funding made available by FEMA “pre-disaster” are described below:

The **Pre-Disaster Mitigation (PDM) Program** created by the Disaster Mitigation Act of 2000 (DMA 2000) includes competitive grants for hazard mitigation planning and projects:

- Cost-share for this grant program is 25-percent local/State match required (up to 75-percent Federal funding).
- Potential for 10-percent local/State match and 90-percent Federal share for communities meeting criteria for small and impoverished communities.
- Eligible organizations include local communities (city, county, townships, municipalities), State agencies, Indian Tribes/organizations, Alaska native villages, and certain private nonprofit groups.
- Application is made through the State office, generally through the SHMO or the PDM coordinator.
- The program requires an approved local hazard mitigation plan prior to the approval of local hazard mitigation project grants.

The **Flood Mitigation Assistance (FMA) Program** is a much smaller grant program that provides funding to assist States and communities in implementing measures to reduce or eliminate long-term risk of flood damage to NFIP-insured buildings, manufactured homes, and other insurable structures under NFIP.

The goal of FMA is to reduce repetitive loss properties in communities. Repetitive loss properties have had paid losses over \$1,000 on two or more occasions.

Cost-share requirements:

- FEMA may contribute up to 75 percent of the total eligible costs.
- At least 25 percent of the total eligible costs must be provided by non-Federal sources.
- Of this 25 percent, no more than half can be provided as in-kind contributions from third parties.

It is important to note that in the FMA program, the 25-percent match has to have at least half of the funding in cash. This requirement is different from the other program requirements.

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Identify Sources of Funding and Technical Assistance (Continued)

Eligible FMA activities include:

- Project Grants - acquisition, elevation, relocation, dry floodproofing (nonresidential structures only) of insured structures.
- Planning Grants - a FEMA-approved Flood Mitigation Plan is required in order for a State or community to receive an FMA Project Grant.
- Technical Assistance Grants - given to the States to help applicants in developing their applications.

Identify When Actions Should Be Completed

For each hazard mitigation action decide a specific timeline for starting, when interim steps will be completed, and when the action will be fully implemented.

Step 4: Document the Hazard Mitigation Planning Process

Make Decisions About the Document

There are some decisions to make before putting the plan document together: How long should the plan be? How detailed? What is the schedule? Who should write it?

Write the Plan

Writing the hazard mitigation plan involves assembling information and write-ups from previous phases of the hazard mitigation planning process.

In order to comply with the DMA 2000, FEMA has put together specific, detailed guidance for writing hazard mitigation plans. This guidance is available to all local communities in the “Multihazard Mitigation Planning Guidance under the Disaster Mitigation Act of 2000.”

Implement the Plan and Monitor Progress

When the hazard mitigation plan is complete, it is time to gain the community's support for implementing the mitigation strategy it describes. If the plan is never carried out, the risk to the community has not been reduced.

Adopt the Plan

When the plan is adopted by the governing body the authority of the plan to guide hazard mitigation initiatives in the community is achieved. In addition, adoption of the plan by the local governing body is a prerequisite that must be fulfilled before the plan can be reviewed by FEMA. Adoption demonstrates the community's commitment to fulfilling the mitigation goals and objectives outlined in the plan. It legitimizes the plan and authorizes responsible agencies to execute their responsibilities.

Implement the Plan Recommendations

Citizens and officials, particularly those who participated in creating the plan, will expect to see the results of their hard work. The planning team has the responsibility to ensure that the plan recommendations are implemented on schedule and, over time, that mitigation actions are incorporated into the day-to-day operations of government agencies. This was the purpose of developing the implementation strategy and timeline in Step 3 of Building the Plan. It should include a process for monitoring and documenting the progress of implementing the plan's recommendations

Evaluate Planning Results

It is important to determine whether the planned course of action has had the desired effect. The organizations or people with duties identified in the mitigation strategy should be asked to submit progress reports on a periodic basis. If indicators of success are established (such as milestones met, budget, or simply moving forward) it simplifies the process of keeping the community informed about the progress and success of the hazard mitigation program.

Implement the Plan and Monitor Progress (Continued)

Revise the Plan

The frequency of plan evaluation depends upon the speed and intensity at which changes are occurring in the community. Significant community growth and recent or frequent disaster events may render the risk assessment inaccurate and/or necessitate a revised hazard mitigation strategy. In any case the DMA 2000 requires that local plans be updated every five years at a minimum.

When determining the extent of the update needed, some of the factors to consider are:

- If goals and objectives are still applicable.
- If the plan's priorities still correspond with State priorities.
- If existing actions need to be reprioritized for implementation.
- If actions are appropriate for available resources.

The revised plan will again need to be reviewed for its validity, adopted by the governing body, and any new initiatives implemented.

FEMA 396-4, "Bringing the Plan to Life" contains detailed guidance on implementing the hazard mitigation plan.

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Summary

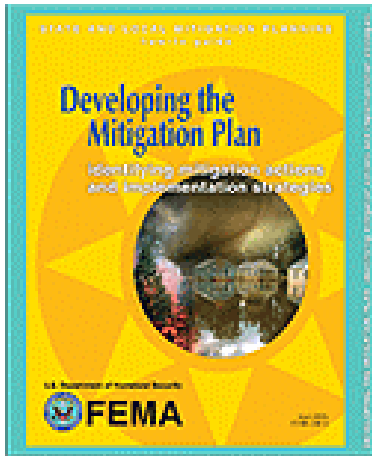


Photo: Cover of FEMA publication 386-3, “Developing the Mitigation Plan: Identifying Mitigation Actions and Implementing Strategies”

This lesson has covered the requirements and resources for developing and implementing the hazard mitigation plan.

The lesson has described methods for establishing hazard mitigation goals and objectives for the community, and evaluating and prioritizing potential hazard mitigation actions to reduce future losses. Developing a hazard mitigation plan is a multi-step process, during which it is important to keep everyone informed of the progress, solicit public input, and address all of the important hazard-related goals to end up with a plan that is consistent with the provisions of DMA 2000.

Lesson 4 covered the third phase of hazard mitigation planning: Develop a Mitigation Plan. For information on accomplishing the steps of this phase, refer to the FEMA publication 386-3, “Developing the Mitigation Plan: Identifying Mitigation Actions and Implementing Strategies.”



Photo: Cover of FEMA publication 386-4, “Bringing the Plan to Life: Implementing the Hazard Mitigation Plan”

Lesson 4 also addressed the fourth phase of planning: Implement the Plan and Monitor Progress. FEMA publication 386-4, “Bringing the Plan to Life: Implementing the Hazard Mitigation Plan,” can provide information that will help you build the implementation strategy.

In the next lesson, we will discuss community hazard mitigation in the post-disaster environment.

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Hazard Mitigation in Your Community

Select one high-priority hazard risk in your community (based on the Hazard Mitigation in Your Community activity from Lesson 3).

Identify one hazard mitigation action to reduce the risk of future damages from that hazard for each of the following hazard mitigation categories.

Prevention:

Property protection:

Public education and awareness:

Natural resource protection:

Emergency services protection:

Structural projects:

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Test Yourself

1. The _____ provides direction for the community's efforts to reduce the potential losses identified in the risk assessment.
2. _____ are general guidelines for what you want to achieve in the long run.
3. It is important that _____ be measurable so you will know when you have successfully implemented the mitigation strategy.
4. Planning, zoning, and open-space preservation (parks and recreation areas) are examples of hazard mitigation actions in the _____ category.
5. Floodproofing and acquisition are examples of hazard mitigation action in the _____ category.
6. Notices to residents of a hazard-prone area and displays of mitigation techniques are examples of hazard mitigation actions in the _____ category.
7. Wetlands protection and dune restoration are examples of hazard mitigation actions in the _____ category.
8. Dikes, levees, and seawalls are examples of _____ mitigation actions.
9. An acronym for a set of criteria used to screen planning decisions is _____.
10. FEMA's _____ Program includes competitive grants for hazard mitigation planning and projects.