

# OHIO NATURAL HAZARD MITIGATION PLANNING GUIDEBOOK

A step-by-step guide to help communities prepare natural hazard mitigation plans and minimize future losses



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July 2, 2002

**DRAFT**

## PREFACE

The purpose of this document is to provide counties, cities, villages, watershed groups, and other local entities with a model process to plan for natural hazards and mitigate the effects of those hazards. The strong home-rule form of government in Ohio means that local governments in the state are the primary decision-makers for land use management, building codes, zoning, and other regulatory tools. Therefore, development of a natural hazards mitigation plan at the community level is vital if the community is to effectively address natural hazards.

The primary purpose of any locally developed plan is to meet specific community needs. Use of this guidebook will help counties, cities, and villages think through their own hazard mitigation needs and opportunities and allow them to identify activities that can be implemented regardless of whether a disaster has occurred.

This model was developed with statutory requirements for various mitigation programs in mind. For example, plans developed using this model will be compliant with the Disaster Mitigation Act of 2000, qualify for credits in the Community Rating System, assist communities preparing Hazard Mitigation Grant Program project proposals, and comply with many requirements of the Flood Mitigation Assistance Program.

Current Ohio law contains little regarding statutory land-use planning requirements. As a result, there is great flexibility in the planning model that can be used. It is important to note; however, that land use policies, regulations and programs that are a result of an adopted plan have much more credibility to both the public and legal system.

This document was prepared out of the need for planning guidance that has relevance to Ohio communities. We were fortunate to have many wonderful planning guides at our disposal when preparing this guidebook. Specifically the authors of *Flood Hazard Mitigation Planning: A Community Guide* from Massachusetts, the *National Flood Insurance Program Community Rating System Example Plans* document from FEMA, *Understanding Your Risks: Identifying Hazards and Estimating Losses* document from FEMA, *National Flood Programs in Review – 2000* from the Association of Floodplain Managers, and FEMA Region V mitigation planning training materials are recognized.

Finally, we would like to acknowledge the leadership of the Ohio Department of Natural Resources and the Ohio Emergency Management Agency for making this collaborative effort possible.

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## LIST OF COMMONLY USED ACRONYMS

CRS	Community Rating System
DMA2K	Disaster Mitigation Act of 2000
FEMA	Federal Emergency Management Agency
FMA	Flood Mitigation Assistance Program
HMGP	Hazard Mitigation Grant Program
NFIP	National Flood Insurance Program
ODNR	Ohio Department of Natural Resources
Ohio EMA	Ohio Emergency Management Agency

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## INTRODUCTION

### DAMAGES CONTINUE TO RISE

Consider the following selection of federally declared disasters and the resources made available to address the damages that occurred:

DATE DECLARED	INCIDENT TYPE	COUNTIES DECLARED	FUNDS PROVIDED
March 4, 1997	Flash flooding on inland rivers/streams and Ohio River flooding	Adams, Athens, Brown, Clermont, Gallia, Hamilton, Highland, Hocking, Jackson, Lawrence, Meigs, Monroe, Pike, Ross, Scioto, Vinton, Washington and Morgan	\$ 38,334,310 (P)
			\$ 9,476,264 (I)
			\$ 9,821,524 (M)
			\$ 9,821,524 (SM)
June 30, 1998	Flash flooding, flooding, high winds and tornadoes.	Athens, Belmont, Coshocton, Guernsey, Harrison, Jackson, Jefferson, Knox, Meigs, Monroe, Morgan, Morrow, Muskingum, Noble, Ottawa, Perry, Pickaway, Richland, Tuscarawas, Washington; Franklin, Sandusky Holmes	\$ 30,251,278 (P)
			\$ 4,700,000 (I)
			\$ 5,866,126 (M)
			\$ 5,866,126 (SM)
March 7, 2000	Flash flooding, flooding	Adams, Gallia, Jackson, Lawrence, Meigs, Pike, and Scioto	\$ 504,532 (I)
			\$ 297,310 (M)
			\$ 297,310 (SM)
August 25, 2000	Flooding	Lucas	\$ 2,446,497 (I)
			\$ 873,931 (M)
			\$ 873,931 (SM)
September 26, 2000	High winds and tornadoes	Greene	\$ 75,859 (I)
			\$ 2,216,008 (P)
			\$ 558,025 (M)
			\$ 558,025 (SM)

- (I) – Individual and Family Grant
- (M) – Hazard Mitigation Grant
- (P) – Public Assistance
- (SM) – State Mitigation funds

Annual losses from natural hazards continue to rise in Ohio and nationally. Average annual losses from flooding in the United States averaged \$2.2 billion (in current dollars) in the 1910’s and increased to \$5.6 billion in the 1990’s<sup>1</sup>. Flooding is Ohio’s primary natural hazard.

### SUSTAINABILITY, DISASTER RESILIENCE, AND MITIGATION

*“We should exercise foresight now, as the ordinarily prudent man exercises foresight in conserving and wisely using the property which contains the assurance of well-being for himself and his children. . . We want to see him exercise forethought for the next generation. We need to exercise it in some fashion ourselves as a nation for the next generation.”*

*-- President Theodore Roosevelt, 1908*

Although these words were spoken nearly one hundred years ago, concerns about planning and conservation, or wise use, of our resources are still very valid concerns.

Today, this idea has evolved into a concept called *sustainability*<sup>2</sup>. Sustainable development, broadly defined, means development that meets the needs of the present

<sup>1</sup> NAI: *A Common Sense Strategy to Protect Your Property*, 2001

<sup>2</sup> The description of sustainability, disaster resistance, and comprehensive planning presented here was excerpted from *The Association of State Floodplain Managers National Flood Programs in Review*, 2000.

generation without compromising the ability of future generations to meet their own needs. The major principles of sustainability include the recognition of the interconnectedness of environmental, economic, and social actions; a balance of present needs with future needs; recognition of natural and geographic boundaries rather than artificial or political boundaries within which to make decisions; and a locally based, participatory planning and decision making process. More and more *disaster resiliency* is being included as another component of community sustainability. As used in relation to natural disasters, resiliency or resistance means being able to “bounce back” fairly quickly from an extreme natural event (such as an earthquake, tornado, hurricane, or flood) without permanent, intolerable damage or disruption of natural, economic, social, or structural systems and without massive amounts of outside assistance.

Ideally, if it has given proper attention to the principles of sustainable development and disaster resilience, a community should be able to withstand natural extremes such as floods without experiencing them as “catastrophic” or “disastrous” events. A community that has undertaken a comprehensive set of natural hazard mitigation activities along with its measures for sustainability gains multiple benefits. Not only is the community safer and more resistant to disaster, it is also more economically and environmentally durable and more efficient. Lives are saved, injuries are minimized. Essential services can reach people in need. Devastating property damage and community disruption are minimized. Business can resume more quickly or continue as usual in the face of hazardous events. Homes and schools can avoid costly repairs. Local governments can meet their mandate to ensure the health, safety, and welfare of their citizens, even in the face of natural disasters. In addition, the residents of such a community enjoy a stronger economy and a better quality of life on a day-to-day basis.

Sustainability emphasizes planning as a primary approach to involve local citizens, obtain broad input, and develop real goals and action plans. It is holistic, broad-based, sensitive to the natural environment and demands local control and responsibility. So how do natural hazard mitigation planning and sustainability fit? Every community in Ohio faces natural hazards, whether it is flooding, tornadoes, subsidence or some other disaster. In turn, every community is responsible for making decisions on how to *mitigate* against damage caused from these hazards.

FEMA defines hazard mitigation as “any action taken to reduce or eliminate the long-term risk to human life and property from hazards.” Mitigation activities have been implemented for many years in Ohio. In many areas of Ohio, the NFIP makes flood insurance available and Ohio Mine Subsidence Insurance Fund makes mine subsidence insurance available. The Ohio’s Dam Safety Program inspects high hazard dams to ensure that they will function properly during times of flooding while the Hazard Mitigation Grant Program provides funds for community projects that purchase, elevate, relocate, or retrofit structures in floodplain areas. Structural measures such as dams, dikes, and levees are important to mitigate the impacts of flooding, as are several non-structural alternatives. The Chagrin River Watershed Partners, for instance, has developed a whole host of tools to ensure that development in the watershed results in

little or no impact to adjacent properties and preserves the natural and ecological functions of the floodplain.

Whatever the hazard, there are actions that can be taken to address those hazards – no matter how small -- that can support disaster resilience and sustainability.

A natural hazards mitigation plan is a collection of analyses, policies, and actions on how the community will grow and change in the future, and should also be a blueprint for how it can achieve and maintain sustainability and disaster resiliency. The plan is the result of a process that involves many local departments, business people, landowners, developers, and citizens. Out of the process emerge policies that reflect local values and concerns.

Land-use planning (like comprehensive planning and/or natural hazards mitigation planning), zoning, and subdivision control are a community's primary land use tools. They serve as a foundation for the community to address development concerns in high risk areas, such as floodplains. For example, if the community policy is to avoid development in the floodplain, the plan should indicate that major investments in new roads and utilities will not be made into those areas. If, through the planning process, the community has decided to convert portions of the floodplain to recreational use or open space, that too, should be stipulated in the natural hazards mitigation plan and/or comprehensive plan.

The Stafford Act as amended (which authorized DMA2K) requires that a natural hazards mitigation plan, meeting program criteria, be developed in order that communities will be eligible for future pre-disaster and post-disaster mitigation program funds (i.e. HMGP, FMA, etc.). The purpose of the plan is to ensure that the community has established goals and objectives, in addition to a well thought out process for mitigating future damages before approving projects. A political jurisdiction may develop their own plan or be part of a multi-jurisdictional plan, which includes several communities with similar hazards. **It is important to note that in the future, a community or jurisdiction without a natural hazard mitigation plan will not be eligible for most sources of mitigation funding.**

## OHIO’S MODEL NATURAL HAZARD MITIGATION PLANNING PROCESS – AN OVERVIEW

Many planning models have been created to plan for natural hazards and mitigation. Regardless of the actual process used by the community, the plan should be created by a diverse committee representing all facets of a community, have ample public input, analyze a broad range of problems and actions, and be officially recognized by the community. Finally, don’t have the mindset that once the plan has been developed, it cannot be adjusted from time to time! Almost any plan that is actually being carried out will have to be adjusted to reflect the realities of plan implementation and development.

The purpose and goal of this guidebook is to provide a step-by-step process to assist local officials, planners, emergency managers, zoning administrators and consultants in developing and implementing successful local natural hazard mitigation plans. In the next several sections, detailed descriptions of the eleven planning steps below are provided. While using this process is not mandatory, we encourage your community to use these chapters as a template to help in developing your plan.

<b>Section One</b> .....	Organize resources and prepare to plan
<b>Section Two</b> .....	Identify hazard(s) /conduct hazard analysis
<b>Section Three</b> .....	Identify the problem(s)
<b>Section Four</b> .....	Set goals
<b>Section Five</b> .....	Identify possible activities
<b>Section Six</b> .....	Select best activities and develop action plans
<b>Section Seven</b> .....	Prepare your draft plan
<b>Section Eight</b> .....	Seek public input, state, and federal review
<b>Section Nine</b> .....	Prepare the final plan
<b>Section Ten</b> .....	Adopt the plan
<b>Section Eleven</b> .....	Implementation, monitoring and adjusting the plan



## SECTION ONE: ORGANIZE RESOURCES AND PREPARE TO PLAN

Although it sounds strange, the first section is really all about planning to plan! Some thought and organization before the planning process actually begins will go a long way toward ensuring successful planning.

This section has six steps:

1. Get community’s governmental leadership to support the planning effort
2. Form a core (planning) group
3. Identify expertise to help with the planning process and provide input into the plan
4. Involve other agencies
5. Choose a planning model to follow
6. Decide how the public will be informed

### Step 1: Get Community’s Governmental Leadership Support

Obtaining the support of the community’s governmental leaders (both elected officials and appointed agency directors) is the best foundation for a planning effort. Whether a board of county commissioners passes a resolution of support, or a letter of support is obtained from a community’s planning commission, a particular jurisdiction’s leadership and support of the planning effort is critical. This support will give the core group the confidence and motivation that their efforts will make a difference. Since it will be up to the community’s leaders to provide resources to implement the plan, they must support what is recommended by the plan.

### Step 2: Form a Core Group

Secondly, a core group must be formed. Whether this group is a committee, task force, or some other entity, the core group will lead the planning process. Who should be members of this core group? The core group should be no more than ten to fifteen members and should represent a cross-section of people in the community including local government staff, the public, local businesses, local interest groups, etc. This core group will be a forum to review the needs and concerns of all interested groups, and a means for participants to keep their community up to date on the plan’s progress. Also, the group will be responsible for doing some or most of the work in preparing the plan.

It may be necessary at this point to educate the core group about mitigation concepts, disaster mitigation planning, and it’s importance to the local community.

**TIP:**

Members of the core group may include:

- ? Local elected officials
- ? Local agency staff (planning, emergency management, planning commission, zoning commission)
- ? Residents
- ? Representatives of homeowner or neighborhood associations
- ? Business owners
- ? Representative of local Chamber of Commerce
- ? Farmers
- ? People involved in community development (land developers, real estate agents, lenders)
- ? Civic and non-profit organization representatives

### Step 3: Identify People to Assist in Plan Preparation and Development

The third step of organizing resources to plan is identifying expertise to help with the planning process. This will vary from community to community. Generally a person is needed to facilitate group meetings. A facilitator is a neutral person who focuses on guiding the committee using tools and techniques to allow the committee to reach consensus on problems and solutions. Also, a person is needed to actually write the plan and take notes during planning meetings. Having an assigned scribe that takes detailed notes will make writing the plan much easier. A person or group is also needed to produce maps, diagrams, and other technical documents. The person writing the plan can be the same as the facilitator, or could be a member of the core group that has good grammar and can write with clarity. The person or group that is responsible for producing maps and other technical information should have a little more technical knowledge about the

subject and could include a person or person(s) from a community planning department, engineering department, local university, or some other governmental agency.

#### TIP:

What if a community doesn't have the financial resources to hire a consultant to do all of the things described above? With a little extra work, many of these activities can be completed by the community at little or no cost. For example, a community may receive a small grant to produce a mitigation plan. The core group may find that it can get the county planning department, a local watershed coordinator, extension agent, or volunteers to assist with meeting facilitation, producing the needed maps and technical documents for the plan, and writing the plan itself.

The Ohio Department of Natural Resources and Emergency Management Agency can offer technical assistance on an as-needed basis.

In this third step, the cost of producing the plan should be considered. Often a community will use a grant or other funding to hire a consultant who is responsible for facilitating the meetings, producing maps and other technical data, performing research, and writing the plan. A good consultant will work hard to ensure that the core group is participating in the plan development and has ample input into the plan.

### Step 4: Involve Other Agencies

This step requires notification of other local, state, and federal agencies, as applicable, of the community's intent to begin planning and soliciting their involvement. A telephone contact, letter, or e-mail should be sent to agencies that: could be of assistance to the community, have regulatory jurisdiction in the community, or have an interest in the planning process. In addition to notifying the agency of the community's intent to plan, the letter should request any plans (construction, long-range use, etc.) pertaining to the community so they can be incorporated into the community's natural hazards mitigation plan. For example, does the local water district have a long term plan to extend water lines in identified floodplain areas? Or does a county have a plan for future bicycle paths that may impact steep slopes or floodplain areas?

### Step 5: Choose Planning Model

The fifth step in organizing to plan is to choose an overall planning model. What planning model is the core group going to use? How long will the planning process

take? How often should the core group meet? All of these questions should be tackled as early as possible.

Having a clear planning model can help when planning meetings stray from the task at hand. It can be very easy for a core group to get bogged down in very minute details of an issue that may not be relevant to producing the plan. A core group must keep its overall planning goals in mind. Sometimes, a plan will identify problems and actions that another committee or group will need to address.

The DMA2K requires documentation of the planning process used to develop the plan, including how it was prepared, who was involved, and how the public was involved. Following a planning model, and documenting the results of the planning process, will make writing the draft plan much easier.

### **Step 6: Decide on Public Outreach Activities**

One phrase that is repeated throughout this document is “public outreach.” Any good planning process will have ample public outreach; in fact, Section 8 of this handbook requires public input. Public outreach is necessary to obtain input into the plan early in the process and to get “buy-in” from the community.

At this point, a list should be made of the core group’s public outreach efforts: This may include:

- public service announcements
- posting meeting agendas and minutes in public areas (library, community building)
- school programs
- presentations at meetings held by government, civic or other interest groups
- open house
- posters, flyers, and brochures
- media coverage
- news release; public notice
- newsletters
- demonstration projects (i.e. Ohio EMA’s model mitigation house)
- web site

If the core group spends time on public outreach activities, chances are the “surprise factor” will be minimized when the draft plan is completed and public support will be stronger. The DMA2K requires that there is adequate public participation in the creation of a natural hazard mitigation plan.

### **Multi-Jurisdictional Plans**

Ohio communities may decide to participate in a multi-jurisdictional planning effort. This may be most likely where: nearby communities face similar problems, communities may be in the same watershed, a county or regional planning commission exists, or a county and its communities have similar characteristics (i.e., very rural, agricultural

counties). If communities decide to participate in a multi-jurisdictional planning effort, the DMA2K requires representatives from each community must be members of the core group or be participating in the planning process, problems and activities should be developed that apply to each community represented, and the plan should be adopted by each community represented.

### **SECTION ONE CHECK LIST**

- 1. Has local governmental support been obtained?
- 2. Has a diverse core group been formed?
- 3. Have people that will be involved in plan preparation been identified?
- 4. Have other agencies been involved?
- 5. Has a planning model been chosen?
- 6. Has a strategy for public outreach been developed?

## SECTION TWO: CONDUCT HAZARD ASSESSMENT

In beginning the planning process, the community must identify the risks from hazards through a comprehensive hazard analysis.

Hazard analysis is the foundation upon which all emergency planning efforts in the community are built. Hazard analysis provides an understanding of the potential threats facing the community. By pinpointing the exact location, extent and magnitude of past disasters, and by examining new or emerging risks, it is possible to determine the probability of such events occurring and the vulnerability of people and property. By reviewing this information along with relevant land use, geographic, economic, and demographic information, local officials can make assumptions about which segments of the community might be impacted by various types of hazards. This in turn allows them to set priorities and goals for mitigation, prior to an incident occurring.

Hazard analysis can be broken down into four basic steps:

1. Identify the hazards.
2. Profile each hazard.
3. Develop a community profile.
4. Conduct a vulnerability analysis and estimate losses.

### Step One - Identification of hazards

The first step in hazard analysis involves the identification of those natural hazards to which the community is susceptible. The community should consider all types of hazards including, but not limited to:

- Tornados
- Floods
- Thunderstorms and lightning
- Severe winter storms
- Wildfires
- Landslides
- Land subsidence

The following sources will assist with the hazard identification process:

#### Historical records

The community should research local historical data (such as newspaper accounts) to determine the types of hazards the community either has experienced or is susceptible to. Interviewing long-term community residents is another good source of information. Another excellent resource might be your local historical society. Utilizing local information sources is important because they often provide information on those events that may not have been widespread or severe enough to receive national attention, but nonetheless had a significant impact on the community.

#### Existing plans and reports

The community should review existing reports and plans such as state mitigation plans, hazard identification reports, studies, local emergency response plans, and local comprehensive plans, etc. These plans may list the hazards that can occur or have occurred in the past.

#### Experts in your community, state or region

The community should contact local, regional, state, and federal sources such as floodplain managers, emergency management staff, police and fire departments, planning departments, state agencies, universities, etc. for existing hazard identification information.

#### Internet Websites

Information on hazards may also be obtained through the search of Internet websites through the use of keywords such as the name of the community, the type of the hazard, etc.

After you have completed the initial hazard identification in your community, you will then need to focus on the most prevalent hazards. You may be able to eliminate some hazards from further analysis that not likely to occur in your community (you still want to mention them in your plan). If you are not sure of the chance of a particular hazard occurring, you must attempt to analyze it further.

Further detail of the Hazard Analysis Process is contained in Appendix A, the FEMA State and Local Mitigation Planning how-to guide “Understanding Your Risks”, FEMA 386-2. At the completion of this portion of the hazard analysis you should complete the applicable worksheet(s) in Appendix A.

## **SECTION TWO – STEP ONE CHECK LIST**

- 9 1. Have newspapers and other historical records been searched?
- 9 2. Have existing plans and reports been searched?
- 9 3. Have you talked to experts in your community, state or region?
- 9 4. Have you gathered information from Internet Websites?
- 9 5. Have you prepared a list of the most prevalent hazards in your community?
- 9 6. Have you completed the worksheet(s) in Appendix A?

### **Step 2 - Complete A Profile of Hazard Events**

For each potential hazard identified in Step 1 you will need to develop hazard event profiles, which answers the question: *How bad can it get?*

To begin this step you will need to obtain or create a base map to show the areas subject to hazards. The map should be of a scale to show sufficient detail. The base map can be a road map, USGS Topographic Map, USGS Digital Orthophoto Quarter Quad, Aerial Topographic and/or Planimetric Maps, Geographical Information System maps, etc.

After selecting your base map, you will need to gather information for each hazard event profile. For example:

- Obtain flood hazard information from the Flood Insurance Rate Map (FIRM) for your community. Transfer the boundaries of the FIRM onto your base map.
- Obtain earthquake hazard information from the <http://geohazards.cr.usgs.gov/eq/pubmaps/US.pga.050.map.gif> website. Determine and record your Peak Ground Acceleration (PGA) and transfer the boundary of the PGA zones onto your base map.
- Obtain tornado hazard information from the <http://www.fema.gov/mit/tsfsm01.gif> website and transfer the boundary of your Design Wind Speed zones onto your base map.
- Obtain landslide hazard information from known, existing or old landslides. Mark the areas susceptible to landslides on your base map.
- Obtain wildfire hazard information from the [http://www.fs.fed.us/land/wfas/nfdr\\_map.htm](http://www.fs.fed.us/land/wfas/nfdr_map.htm) website. Determine your critical fire weather frequency and fire hazard severity and draw the boundaries of your wildfire hazards onto your base map.
- Obtain any other hazard information as applicable.

Further detail of this step of the Hazard Analysis Process is contained in Appendix A. At the completion of this portion of the hazard analysis, you should complete the applicable worksheet(s) in Appendix A.

## SECTION TWO – STEP TWO CHECK LIST

- 9 1. Have you obtained or created a base map to show areas subject to hazards?
- 9 2. Have you obtained flood hazard event profile information?
- 9 3. Have you obtained earthquake hazard event profile information?
- 9 4. Have you obtained tornado hazard event profile information?
- 9 5. Have you obtained landslide hazard event profile information?
- 9 6. Have you obtained any other hazard profile information as applicable?

- 9 7. Have you transferred the hazard profile event information onto your base map?
- 9 8. Have you completed the worksheet(s) in Appendix A?

**Step 3 – Develop a community profile.**

To develop a community profile, you must identify and map key areas in the community such as historical resources, industries, critical facilities, active organizations, present and future land uses and development. Information regarding geography, climate, and demographics should also be included in this profile.

During this step you will need to determine how much property and what segment of the population are located in hazard areas. To complete this step you will need to:

- Determine the total number of buildings in your community. This information can be obtained from tax assessment maps, Geographical Information System (GIS), aerial photographs or local planning documents.
- Determine the total estimated value of buildings in your community. This information can be obtained from tax assessments of individual buildings or estimating whole areas.
- Determine the total number of people in your community. This information can be obtained from census data or local data. Note any large seasonal or daily population changes.
- Determine the total number of buildings inside the hazard areas. This information can be obtained from tax assessment maps, GIS, or aerial photographs.
- Determine the total estimated value of buildings inside the hazard areas. This information can be obtained from tax assessment values or estimating whole areas.
- Determine the total number of people inside the hazard areas. This information can be obtained from Census data or local data. Note any large seasonal or daily population changes.
- Calculate the proportion of assets located in hazard areas. To determine the proportion of structures, building value or people in your hazard area, divide the number in the hazard area by the total number or values in your community.
- Determine the location of expected growth in your community by referencing local comprehensive plans or by consulting local officials.

Further detail of this step of the Hazard Analysis Process is contained in Appendix A. At the completion of this portion of the hazard analysis, you should complete the applicable worksheet(s) in Appendix A.

**SECTION TWO – STEP THREE CHECK LIST**

- 9 1. Have you obtained the total number of buildings in your community?



- 9 2. Have you obtained the total value of buildings in your community?
- 9 3. Have you obtained the total number of people in your community?
- 9 4. Have you obtained the total number of buildings inside the hazard areas?
- 9 5. Have you obtained the total value of buildings inside the hazard areas?
- 9 6. Have you obtained the total number of people inside the hazard areas?
- 9 7. Have you calculated the proportion of assets inside the hazard areas?
- 9 8. Have you obtained expected community growth information?
- 9 9. Have you completed the worksheet(s) in Appendix A?

#### Step 4 – Complete a Vulnerability Analysis and Estimate Losses

To complete the hazard analysis you must determine the vulnerability of the community to the various hazards identified and assessed in the previous steps. Keep in mind that a hazard is only a problem when it can cause harm to people or damage property.

Determining a community's vulnerability is accomplished by:

- Identifying and mapping community hazard areas.
- Developing and applying hazard-specific disaster scenarios to determine critical issues that must be addressed pertaining to specific community sectors, safety, loss of critical functions or facilities, public health impacts, economic impacts, and short and long-term recovery.
- Determining who has the emergency response authority for each identified vulnerability.
- Determining planning and resource allocation needs and considerations for implementing priority activities identified in the previous steps.

The final step in the hazard analysis process is estimating losses that would occur during a hazard event and creating a composite map of the loss areas. To develop loss estimate information you will need to obtain the structures replacement value and multiply it by the expected percent damage from each hazard event. The expected percentage of damage to structures will vary greatly, based upon the age of the building, construction materials used and severity of the hazard. In this step you will need to:

- Determine the extent of damages from floods. The percent of losses will vary depending upon the depth of flooding, whether the structure has a basement and if it is a manufactured home.
- Determine the extent of damages from earthquakes. The percent of losses will vary based upon the type of structure, construction materials and PGA values.
- Determine the extent of damages from tornadoes. The percent of losses will be based on past occurrences of tornadoes and your design wind speed.
- Determine the extent of damages from landslides. The percent of losses will be based upon the location of a structure within the hazard area and past occurrences of landslides.
- Determine the extent of damages from wildfires. Contact your local fire department to estimate these damages. Structures located near the urban-wildland area are most vulnerable.
- Determine the extent of damages from other hazards you identified in your community.

Further detail of this step of the Hazard Analysis Process is contained in Appendix A. At the completion of this portion of the hazard analysis, you should complete the applicable worksheet(s) in Appendix A.

#### SECTION TWO – STEP FOUR CHECK LIST

- 9 1. Have you completed a vulnerability analysis for your community?

- 9 2. Have you created a map of vulnerable areas in your community?
- 9 3. Have you determined the extent of damages from a flood in your community?
- 9 4. Have you determined the extent of damages from an earthquake in your community (if applicable)?
- 9 5. Have you determined the extent of damages from a tornado in your community (if applicable)?
- 9 6. Have you determined the extent of damages from a landslide in your community (if applicable)?
- 9 7. Have you determined the extent of damages from a wildfire in your community (if applicable)?
- 9 8. Have you determined the extent of damages from other hazards you identified in your community?
- 9 9. Have you completed the worksheet(s) in Appendix A?

## SECTION THREE: IDENTIFY THE PROBLEM(S)

Do you know what problems are caused by natural hazards? If there are several problems, what are the most important problems? Are some problems really just results of a different, root problem? By identifying and confronting the problems that hazards cause, residents are more likely to understand the threat of future hazards and their impacts on the community. The public must be involved in identifying problems up front, as well as throughout the mitigation planning process.

Problem identification may not be as easy as it sounds. Sometimes, problems may just be symptoms of a deeper, root problem. For instance, flooding by itself is not necessarily a problem (it is a natural process that has been occurring for millions of years) - flooding becomes a problem when it affects people, buildings, or other development.

In this section, the core group will use the worksheets that were developed in the previous two sections to draft problem statements for each identified hazard. There are five steps in this section:

1. Review the hazard analysis and estimated loss worksheets.
2. Determine the “as-is” and “desired state” of your community’s hazard vulnerability.
3. Brainstorm potential problem statements that are preventing your community from reaching its “desired state”.
4. Research and/or develop data that supports your problem statements.
5. Select and rank the problem statements.

Hazard specialists, elected officials, and residents may not agree on what constitutes a hazard problem, its severity, or its sources. Getting the core group to agree on a problem statement or multiple problem statements is the first step in getting agreement on goals and solutions.

When developing problem statements, the core group should be careful to avoid the common pitfalls listed below:

- Making the problem match pre-conceived solutions
- Deciding on a problem statement before effectively analyzing every aspect of the perceived problem
- Failing to gather critical data to support the problem statement
- Tackling problems that are beyond the control or influence of the core group
- Working on problems that are too general, too large, or poorly defined

**Step 1:** Review the hazard analysis and estimated loss worksheets.

**Step 2:** Determine the “as-is” and “desired state” of your community’s hazard vulnerability. The “as-is” state of your community is a description of the vulnerability

that existing hazards present. The “desired state” of your community is a description of the level of vulnerability that the community is willing to accept. The purpose of defining the “as-is” and “desired state” is to clarify and quantify the difference between the community’s current hazard vulnerability and the level of vulnerability that the community would like to have. The data needed to determine the “as-is” state should already be complete for your community. The data can be found in the hazard analysis and estimate loss worksheets developed in Section 2.

The “desired state”, or level of vulnerability that the community would like to have, should be zero! Achieving zero vulnerability for some hazards is impossible and the core group should not confuse the “desired state” with the community goals that will be developed in Section 4. Your community’s “desired state” of hazard vulnerability should be a lofty expectation.

The “as-is” and “desired state” should be developed for each hazard identified by the core group. The two can be stated in terms of structures affected, total dollars lost, or any other value that represents vulnerability and makes sense to the core group. The core group will analyze the gap between the “as-is” and “desired state” to help the core group identify the problems that are preventing the community from reaching its “desired state.”

**Step 3:** Brainstorm potential problems that are preventing your community from reaching its “desired state”. At this point in the planning process, every perceived problem should be considered and there are no dumb suggestions. Chances are if you are thinking it, someone else is too. Refer to Appendix B for a description of different brainstorming methods.

After brainstorming possible ideas, the core group will want to clarify the problem statements. During this step you must continually ask “why, why, why?” This will allow the core group to “peel back the layers” to find the root cause(s) of the identified problems. Problem statements will describe the reasons why your community has not achieved its “desired state.” During this step try not to give opinions on whether or not a proposed problem statement “truly is the problem.” Step 4 will require the group to obtain data to support or refute proposed problem statements.

**Step 4:** Research and/or develop data that supports or refutes your problem statements. Start with the research and data that was developed in Section 2. If there are potential problem statements being considered that cannot be supported by data from Section 2, the group will have to do additional research. The core group might decide that the bridge on Main Street is the problem that causes flooding in town. Some citizens might swear, “It never flooded until that bridge was put in!” This may or may not be true. In this example, the core group could compare historical records of rain events with building and damage records before and after the bridge was built. Maybe there was not a big enough storm to cause flooding in the historical records until after the bridge was built. Perhaps it always flooded in a particular area, but there were no buildings there until after the bridge was built. Or maybe the data supports this

argument. The purpose of this step is to gather data that either supports or refutes the proposed problem statements and either restate or develop new problem statements based on facts. Be sure to document all of the facts that are presented to the core group.

**Step 5:** In the final step, the core group should select and rank the problem statements that are supported by the data gathered in the previous step. Problem statements that cannot be supported with facts must be discarded. The core group should determine what criteria will be used to rank problem statements and reach consensus on the most important problem statements.

There are several tools that can be used to help the core group determine problem statements. Appendix B details some of the tools that can be used.

### SECTION THREE CHECK LIST

- 1. Has the core group developed “as-is” and “desired states” for each identified hazard?
- 2. Has the core group compiled a list of possible problem statements?
- 3. Has the community gathered data that supports or refutes proposed problem statements?
- 4. Has the community selected and ranked problem statements that were supported by facts?

## SECTION FOUR: SET GOALS

Now that you have a clear understanding of the problems that your community’s hazards cause, the next step is to identify what goals can minimize or eliminate them. Many existing sources can help you in the process of developing your ideas, some of which may be in conflict with your mitigation focus. Perhaps your community has an economic development plan calling for increased development in a location with high flood or other natural hazard exposures.

If possible, start with the following table that lists plans common to a variety of communities, which may provide some insight for your goals or raise concerns you need to address.

Source	Existing Goal Statements	Effective Goal for Mitigation? (If not, what needs changed)
Comprehensive Plan		
Capital Plan		
Economic Development Plan		
Transportation Plan		

Source	Existing Goal Statements	Effective Goal for Mitigation? (If not, what needs changed)
Emergency Management Plan		
Stormwater Management Plan		
Parks and Open Space		
Others		



So what exactly are goals and activities:

**Goals** are general guidelines that explain what you want to achieve. They are usually long-term and represent global visions, such as “Mitigate all structures between Elm Street and the river.”

**Activities** define strategies or implementation steps to attain the identified goals. Unlike goals, activities are specific, measurable, and have a defined completion date. Activities are more specific, such as “Identify and mitigate all repetitive loss structures between Elm Street and the river.”

Establishing mitigation goals and activities becomes simple with a little forethought. For example, your hazard analysis may have identified dwellings or businesses with flooding problems. Let’s assume our community of Smallville has a 100-year flood plain identified with 10 homes within its boundaries:

**Goal 1: Mitigate (acquire / elevate / retrofit / relocate) all structures located within known 100-year flood plains in the Village of Smallville.**

Smallville also has a history of tornadoes.

**Goal 1: Adopt the International Building Code standards for all new construction in Smallville.**

**Goal 2: Require that all new residences in Smallville include a saferoom.**

Keep in mind when developing your goals and activities they should be achievable. For example, setting a goal to eliminate any potential for tornado damage in a high-risk area is unrealistic. Establish realistic goals, like those listed above, to alter building codes to improve building performance during events or requiring saferooms in all future construction.

## SECTION FOUR CHECK LIST

1. Have you reviewed all existing planning documents and looked for possible impacts on your mitigation goals?
  - Comprehensive Plan
  - Capital Plan
  - Economic Development Plan
  - Transportation Plan
  - Emergency Management Plan
  - Stormwater Management Plan
  - Parks and Open Space

Others \_\_\_\_\_

2. Do your goal statements and activities meet the basic requirements?

**Achievable** ~ Can the goal be met by using mitigation strategies?

**Measurable** ~ Is there a clear method of showing progress and achievement of the goal?

**Effective** ~ Will completing the goal reduce or eliminate the hazard?

3. How well do your goals focus your planning efforts on known natural hazards?

Each goal has a unique target

All of the natural hazards in your area are addressed by at least one of your goals

## SECTION FIVE: IDENTIFY POSSIBLE ACTIVITIES

Now that the community's mitigation goals have been identified, what activities can be taken to achieve them? Will these activities address the problems created by the hazard? Are they activities that are supported in the community? What are the community's alternatives? This section of the handbook will help you identify activities that address the problems that hazards create in your community. Your proposed actions should clearly help achieve the goals to reduce risk and vulnerability established in the previous section.

Before discussing many of the possible activities that a community can undertake, at this point it is important to emphasize that possible activities do not have to be extremely costly or large in scope. For example, in a southeastern Ohio community, one of the flooding problems identified was storage of materials on the property owned by the railroad that bordered the creek channel. These materials potentially could be a debris hazard during a flood. The village chose to mitigate some of their flooding problem by contacting the railroad and requesting that the materials be stored outside of the flood hazard area.

Mitigation activities costing significant amounts of money are usually funded from combined sources. For example, the HMGP (post-disaster source) can fund property protection activities (i.e., acquisition or elevation of structures) but will not fund the purchase of flood insurance or the construction of levees. As it selects mitigation activities, the core group should investigate a variety of funding sources. Do not let current funding sources (pre or post-disaster) limit your goals or activities.

There are six categories of hazard mitigation activities<sup>3</sup>:

**Preventative** activities keep problems from getting worse. The use and development of hazard areas are limited through planning or regulations. These activities are usually administered by building, zoning, planning, and/or code enforcement officials.

**Property protection** is usually undertaken by property owners on a building-by-building or parcel basis.

**Emergency service measures** are taken during disaster events to minimize their impact. These measures are usually the responsibilities of city or county emergency management staff.

**Structural projects** keep hazards away from an area. Structural projects include dams, dikes and levees. These are usually long-term actions and have on-going maintenance costs.

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<sup>3</sup> These classifications adapted from the *Natural Hazards Informer*, July 1999

**Natural resource protection** preserves or restores natural areas or the natural functions of hazard areas. An example of this is a floodplain or wetland area maintained in its natural state.

**Public information** programs advise property owners, potential property owners, and visitors to hazard areas, as well as protect people and property from them. Public information can also increase people's awareness to their vulnerability and property risk.

Appendix C contains tables, broken down by hazard type, of many possible mitigation activities. At this point, the core group should refer to the mitigation activity tables and consider each activity for hazards that are significant in the community. To better understand a particular activity in terms of costs, benefits, and drawbacks, the core group should request that people having expertise in that activity speak to the group. Again, contact the Ohio Department of Natural Resources or Ohio Emergency Management Agency for assistance.

## **SECTION FIVE CHECKLIST**

- 1. Possible activities have been reviewed for each hazard
- 2. Potentially feasible activities have been identified
- 3. Information has been gathered and/or experts consulted for each potentially feasible activity for further analysis

## SECTION SIX: SELECT THE BEST ACTIVITIES AND DEVELOP ACTION PLANS

Now that the core group has identified all of the possible activities that will reduce hazard damage in your community, it is time to select the activities to include in the plan. Section six has five steps:

1. Identify evaluation criteria grouped by hazard
2. Determine the rating scale to be used
3. Complete matrix
4. Total scores
5. Select activities, create action plans

There are several tools that the core group can use to rank and select the proposed activities. The most common tool used is a “matrix”. Each proposed activity should be evaluated using an appropriate set of criteria. A matrix will allow the core group to rank possible activities based on the same set of criteria using a simple rating scale. Please keep in mind that the group should not use the matrix to make their final decision on the proposed actions that the plan will recommend. Rather, the matrix should be used to stimulate conversation about the pros and cons of each activity, and help narrow the list of activities that the core group will have to consider in its final decision.

It may be helpful to list the pros and cons on a “balance sheet” as the group discusses how to rate each proposed action (refer to Appendix D). A balance sheet will help organize the information and facilitate discussion among the group. The core group should reach consensus on the final decision about which proposed activities will be included in the draft plan. The group should also invite the public to this meeting. It is important for the public to be able to have input on the direction of their community’s hazard mitigation plan. Active public participation in this meeting could prevent having to repeat this step if the draft plan meets strong public opposition.

**Step 1:** The core group should identify the criteria that it will use to evaluate each set of activities based on grouping by hazard. The group should select the criteria based on the values, policies, and environmental/economic realities of the community. The following is the minimum criteria that the core group should consider, the group can always add more:

1. Cost effective
2. Technically feasible
3. Environmentally sound
4. Social impacts
5. Activity addresses the problem
6. Meets federal, state, and local regulations
7. Politically acceptable
8. Activity reduces the risk

One factor to consider when discussing proposed activities is the cost of each activity. Most activities that the core group is considering have been done somewhere, so the group should be able to obtain rough cost estimates for each activity. Cost is an important factor when considering what activities to select. But unless the costs are extreme, it should not be the deciding factor. For example, building Hoover Dam Jr. may help alleviate the community's flooding problems, but the costs may be prohibitive. Some proposed activities may cost very little, but might not be the best alternative to achieve the community's goals. If there is concern over the cost of a project, assign a core group member to research the cost, or invite an expert to evaluate the situation. The group will want to document how and why they decided to include or not include all activities, especially if they are controversial.

The core group can conduct a benefit cost analysis to compare possible mitigation activities. If the benefits of an action are less than the costs, the core group could assign the activity a lower ranking, re-design the activity, or abandon that activity all together. These decisions should be documented because the rationale will need to be included in the plan. FEMA has developed training courses, instructional guides, and computer software to assist communities in preparing benefit cost analysis calculations. The FEMA benefit cost analysis hotline can also provide technical assistance (1-800-424-2142 or 1-301-670-3399 extension 710).

It may not make sense to perform a benefit cost analysis for some proposed mitigation activities. For example, it is not practical to evaluate the costs and benefits of an elementary school poster contest to raise awareness of hazards associated with tornadoes. It would also be difficult to quantify the benefits of a community adopting stricter building codes to prevent tornado damage. However, large mitigation projects that require federal or state funding will require a benefit cost analysis as part of the application for funding. The core group should decide what proposed activities can be effectively evaluated by a cost benefit analysis and include the rationale in the plan document.

**Step 2:** Determine the rating scale that will be used. An example scale might be:

- 5 = Excellent
- 4 = Good
- 3 = Fair
- 2 = Bad
- 1 = Unacceptable

The core group might choose to use 1-3 instead and use high, medium, and low as descriptors. Whatever rating scale is chosen, the descriptors should be relevant to the criteria and proposed actions.

**Step 3:** The matrix can now be sketched out on a flip chart. It is important to note that agreement should be reached before any values are recorded on the chart. If the core group has difficulty deciding how to rate a particular activity using the selected criteria,

they should consider inviting an expert on the particular subject to give a presentation to the group at the next meeting. You can always hold off on rating an activity until the group gathers the data and/or expertise needed to make an informed decision.

CRITERIA	PROPOSED ACTIVITIES			
	Activity 1	Activity 2	Activity 3	Activity 4
Cost Effective	5	3	2	4
Technically Feasible	3	3	4	2
Environmentally Sound	2	3	5	4
Social Impacts	3	3	4	1
<b>Total</b>	13	12	15	11

5 = Excellent  
 4 = Good  
 3 = Fair  
 2 = Bad  
 1 = Unacceptable

**Step 4:** After completing the matrix, the core group can decide whether to total the scores. Scoring can be adjusted by giving a particular *weighting* to certain criteria. For instance, scores in the “economically justifiable” criteria might be worth twice the amount of scores in the “technically feasible” criteria. Again, the matrix should not be used to make the final decision. Use the matrix to prioritize and help the core group reach consensus on which proposed activities will be included in the draft plan.

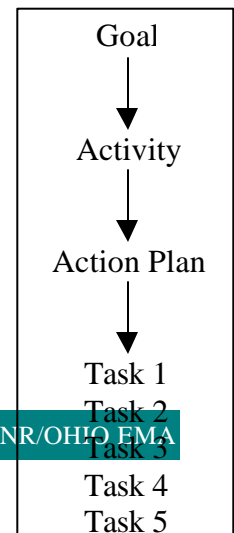
**Consensus** does not mean majority rules, or everyone has to agree. **Consensus** is a decision that everyone can live with. Consensus has been reached when all the members of a group can say:

- ✓ I believe that you understand my point of view.
- ✓ I believe that I understand your point of view.
- ✓ Whether or not I prefer this decision, I will support it because it was reached open and fairly.

The core group should select proposed activities that:

- ✓ Address the problems identified in SECTION THREE
- ✓ Meet the goals established in SECTION FOUR.
- ✓ Have some chance of getting funded.

**Step 5:** The core group will now need to develop action plans for each activity the group is proposing. The “action plan” is the strategy that the community will use to implement the proposed activities.



First, identify a “lead person”, by title in the plan. This person has the responsibility to ensure that the action plan is successfully carried out. The lead person should be someone with administrative authority since he or she will be responsible for seeing that the action plan is implemented. This person should be identified in the plan by his or her title.

Next, the core group must identify all of the tasks that will be needed to implement each action plan. The following is an example of one community’s action plan and its associated tasks (some of the tasks may have been completed in previous sections):

### **ACTION PLAN EXAMPLE**

**Goal:**           **Mitigate structures, with willing owners, in the 100-year floodplain of Shady Creek by April 2005**

**Activity:**       **Buy-out a repeatedly flooded subdivision**

**Lead:**           **Village Administrator**

**Start Date:**   **June 2004**

**Finish Date:** **June 2006**

**Task 1:** Identify the structures subject to flood damage

**Task 2:** Establish damage and frequency relationship for floods

**Task 3:** Perform a cost/benefit analysis for each structure

**Task 4:** Identify the interest in buy-outs

**Task 5:** Identify funding sources

**Task 6:** Make offers on the structures

**Task 7:** Close on the structures

**Task 8:** Demolish the structures

**Task 9:** Clean up and maintain the property

It is easy to see how one action plan can become eight detailed tasks. The action plans should not list all of the work that will go into completing each task. However, the group should try to identify all the major tasks required to implement the action plan. If a major task is left out, the plan can always be revised. The lead person for each action plan should also be responsible for assigning individuals to certain tasks and offering assistance to be sure they are completed successfully.

The core group should consider the scheduling needs and order of implementation for the tasks. Some tasks are dependent on another task being completed, and some can be completed simultaneously. The core group should determine start and completion dates for each task. These dates are not set in stone, but it is important to have a completion date to strive for. Without a deadline to strive for, the tasks may be set



aside and forgotten about, or worse yet, never started! Establishing milestones for multi-year tasks are an effective way to track progress. Issuing progress reports to affected stakeholders can help ensure that tasks are completed correctly and in a timely manner. In addition, the progress reports can be used to obtain support for other mitigation activities.

The group will need to determine what resources are needed to implement each action plan. The core group may need technical experts or legal advice to complete a certain task. Maybe the action plan requires a large piece of earth-moving equipment. Try to identify as many of these resources early on to prevent delays during plan implementation. Always remember to secure the proper permits or approvals needed for any work.

Finally the group will need to consider possible sources of funding. The core group should begin by brainstorming a list of government, private, business, citizen, and non-profit organizations that award grants or donate money. Start with local resources and expand your list to include state and federal sources. Core group members could then divide the organizations up and contact them to inquire about future funding opportunities. Funding for activities that address multiple objectives will be easier to locate and secure. Without adequate funding, some activities may not be executed. Having a natural hazard mitigation plan that is DMA2K compliant will improve your community's chance of securing federal and state funding for mitigation activities.

## SECTION SIX CHECK LIST

- 1. Has the core group listed the criteria it will use to evaluate each proposed activity?
- 2. Has the core group completed a matrix that rates proposed activities based on selected criteria?
- 3. Has the core group reached consensus on the activities that will be proposed in the draft plan?
- 4. Has the core group identified action plans and associated lead person, tasks, and timetable for each activity?
- 5. Has the core group documented how the action plans will be prioritized, implemented, and administered by the local community?

## SECTION SEVEN: PREPARE YOUR DRAFT PLAN

This section is based on a FEMA guidance document that explains the minimum requirements for a DMA2K compliant natural hazards mitigation plan, since it is likely that most communities are preparing plans as a result of this new law. Appendix E contains an excerpt from the FEMA guidance document which illustrates examples of acceptable and unacceptable plan language.

Most of the data needed to prepare the draft plan should have already been developed in previous sections of this guidebook. This section requires the development of one additional item: Appendix F contains an example natural hazards mitigation plan.

Major sections of a DMA2K compliant natural hazards mitigation plan are identified below in bold and subsections are underlined: Plans submitted for state and federal review for DMA2K compliance will be rejected if the major sections in bold (below) are not included.

### **Documentation of the Planning Process (Developed in Section 1)**

A description of the planning process should include how the plan was prepared, who was involved in the planning process, and the timeframe for preparing the plan. The plan should document how the core group was formed the number of meetings held, their outcomes, etc. (meeting minutes and or progress reports should be included in the plan).

In addition to the core team preparing the plan, it is also important to indicate how the public participated, including what means (e.g., WebPages, storefronts, toll free phone lines, etc.) were made available to those who could not attend public forums to voice concerns or provide input during the planning process.

A multi-jurisdictional plan (optional), as prepared by regional planning and development authorities (e.g. watershed/river basin commission), is acceptable as a Local Mitigation Plan under DMA2K. However, the plan will be rejected if all of the jurisdictions encompassed in the plan do not participate in its development. Therefore, the plan must document how each jurisdiction participated in the planning process.

### **Hazard Identification and Risk Assessment (Developed in Section 2)**

Local risk assessments must include detailed descriptions of all the hazards that could affect the jurisdiction along with an analysis of the jurisdiction's vulnerability to those hazards. Specific information about numbers and types of structures, potential dollar losses, and an overall description of land use trends in the jurisdiction must be included in this analysis. For multi-jurisdictional plans, any risks that affect only certain sections of the planning areas must be assessed separately in the context of the affected area.

#### Profiling Hazard Events

The plan should provide a discussion of past occurrences of hazard events in or near the community in terms of their severity and resulting effects. The plan should also describe the analysis used to determine the probability of occurrence and magnitude of

future hazard events. It should also characterize each hazard and include the following information:

- The probability or likelihood that the hazard event would affect an area
- The magnitude or severity of the hazard events
- The geographical extent or areas in the community that would be affected
- The conditions, such as topography, soil characteristics, meteorological conditions, etc., in the area that make it prone to hazards

The analysis should be detailed enough to allow identification of the areas of the jurisdiction that are most severely affected by each hazard.

A composite map should be provided for hazards with a recognizable geographic extent (i.e., hazards that are known to occur in particular areas of the jurisdiction, such as floods, coastal storms, wildfires, and landslides). For those hazards not geographically determined, the plan should indicate their applicable intensity. For example, in areas where tornadoes occur, plans should indicate their maximum wind speed.

#### Assessing Vulnerability: Identifying Assets and Estimating Potential Losses

This information list should be based on an inventory of existing and proposed structures within the community and/or an estimate of those located within identified hazard boundaries. The information should include critical facilities, such as shelters and hospitals, and infrastructure, such as roadways, water, utilities, and communication systems. The community should determine how best to indicate structures that are vulnerable to more than one hazard.

The plan should include an estimate of losses in terms of dollar amounts for the identified vulnerable assets. An estimate should be provided for each hazard, and should include, when resources permit, structure, contents, and function losses to present a full picture of the total loss for each asset.

#### Assessing Vulnerability: Analyzing Development Trends

The plan should provide a general overview of land uses and types of development occurring within the community. This can include existing and proposed land uses as well as development densities in the identified hazard areas and any anticipated future changes.

The multi-jurisdictional plan can present information for the general planning area as a whole as described in the previous paragraphs. However, where hazards and associated losses occur in only part of the planning area, this information should be attributed to the particular jurisdiction in which they occur.

### **Mitigation Strategy (Developed in Sections 4-6)**

Natural hazard mitigation plans must include a mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment,

based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools. This entails the development of goals from which specific mitigation actions and projects will be derived. All mitigation actions must be prioritized based on factors developed by the core group with an emphasis on the action's benefit vs. cost (when possible). For multi-jurisdictional plans, each jurisdiction must show the specific actions they will undertake.

#### Local Hazard Mitigation Goals (Developed in Section 4)

The community's hazard reduction goals guide the development and implementation of mitigation activities. This section should describe what these goals are and how they were developed. They should also be compatible with the goals of the community as expressed in other community planning documents.

#### Identification, Analysis, and Prioritization of Mitigation Activities (Developed in Sections 5-6)

The plan should list potential mitigation activities it has identified in its planning process and describe its approach to evaluating these activities to select those that achieve the community's goals. Not all of the mitigation measures identified may ultimately be included in the community's plan due to prohibitive costs, scale, low benefit/cost analysis ratios, or other concerns. The process by which the core group decides on particular mitigation measures must be described in the plan.

After outlining the mitigation activities to be included in the strategy, the plan should describe the method used to prioritize the order in which they intend to implement them. One evaluation factor that must be included when prioritizing mitigation actions is a benefit cost analysis (when possible).

#### Action Plans for Mitigation Activities (Developed in Section 6)

The action plan should also identify those policies, programs, or resources that can be used to implement the strategy. Action plans should include an overview of the activity, tasks needed to complete the activity, the implementation timeline, possible funding sources, and the agency or personnel responsible for carrying out the actions.

The multi-jurisdictional plan should contain a section that links the proposed mitigation actions to the applicable jurisdictions. Any jurisdiction within the planning area requesting approval or credit for the Mitigation Plan must be able to point to specific actions to be pursued.

#### **Implementation, Monitoring, and Updating Policies for the Plan (Partially Described in Section 11)**

The plan should indicate how mitigation recommendations will be integrated into comprehensive plans, capital improvement plans, zoning and building codes, site reviews, permitting, and other planning tools, where such tools are the appropriate vehicles for implementation. In communities that do not have a comprehensive plan, or other similar planning mechanisms, the plan should explain how the mitigation recommendations will be implemented.

The plan should describe the community’s process to monitor the plan (this process may require periodic reports by agencies involved in implementing projects or activities; site visits, meetings, the preparation of an annual report, etc.).

The plan should also include a description of how, when, and by whom the plan will be evaluated, and should include the criteria used to evaluate the plan. The evaluation should assess, among other things, whether:

- The goals and objectives address current and expected conditions
- The nature or magnitude of risks has changed
- The current resources are appropriate for implementing the plan
- There are implementation problems, such as technical, political, legal or coordination issues with other agencies
- The outcomes have occurred as expected

Ideally, the plan should be evaluated on an annual basis. If plans are not updated annually, the plan should describe the schedule chosen by the community and provide an explanation for that schedule. Finally, the plan should describe what opportunities the broader public would have during the plan’s evaluation to comment on the progress made to date and the proposed plan revisions. Plans should describe the how the broader public will be kept involved (e.g., holding strategic meetings, posting the proposed changes to the plan on the web, etc.)

## SECTION SEVEN CHECK LIST

Have you addressed all the major points in the plan development process:

- 1. Document the planning process and public participation
- 2. Hazard identification and risk assessment
  - Hazard profiling
  - Identify vulnerable assets
  - Estimate potential losses for vulnerable assets
  - Analyze development trends
  - Multi-jurisdictional hazard identification and risk assessment (if applicable)
- 3. Mitigation strategy
  - Mitigation goals
  - Identify, analyze, and prioritize mitigation actions
  - Creation of action plans for selected mitigation activities
  - Multi-jurisdictional mitigation strategy (if applicable)
- 4. Implementation, monitoring, and updating policies for plan

- ❑ Description on implementation policies
- ❑ Description of processes and procedures for monitoring plan implementation
- ❑ Description of frequency and process of plan evaluation

## SECTION EIGHT: SEEK PUBLIC INPUT; STATE AND FEDERAL REVIEW

Following this planning process involves a certain level of public outreach (including dissemination of information and public input). If public input (or feedback) has been obtained throughout the planning process, the draft plan should reflect the values and goals of many people in the community. However, it is important to gauge the opinion of the public and build support for the plan. The best way to do that is to have a formal public input step in the process.

Methods of obtaining public input include town meetings, public hearings and open houses. Questionnaires distributed in utility bills or published in the local newspaper would also provide valuable public input. The technique(s) used to elicit public input should be decided upon by the core group. Also, it is recommended that the core group be actively involved in public input activities.

Although there are several different methods to elicit public comment on the draft plan, one of the most effective is an open house. The open house provides the opportunity to provide reactions, express concerns and offer suggestions to the draft plan. Since the open house is an informal setting, there is more opportunity for one-on-one communication with the persons responsible for developing the plan. The public has the time to familiarize themselves with the plan and any displays the core group has developed.

Tips for holding a successful open house include:

- Hold the meeting in a public building.
- Hold the open house during hours when people are off work.
- Advertise the meeting through various medias.
- Display the process that was used in developing the plan.
- Have core members present that can answer technical questions.
- Have easily understandable displays and handouts.
- Ask that the public provide written commentary and suggestions before leaving the open house.
- Design the open house so that two-way communication is encouraged, such as providing refreshments.

### State and Federal Review

In order to be eligible for project funding from FEMA the final plan must be compliant with the DMA2K. Draft plans must be submitted to the Ohio EMA for initial review and coordination. This can be done at the same time the core group is planning its public participation event. Ohio EMA will submit the draft plan to FEMA for review and comment as well.

To begin a DMA2K compliance review, please send the plan with a request for review to:

Ohio Emergency Management Agency  
Mitigation Branch  
2855 West Dublin Granville Road  
Columbus, Ohio 43235-2206

## **SECTION EIGHT CHECK LIST**

- 1. Has date been scheduled for public participation event?
- 2. Has facility to hold public participation event been reserved?
- 3. Agenda created and speakers confirmed?
- 4. Has public notice been provided?
- 5. Has the plan been forwarded to the Ohio Emergency Management Agency for review?



## SECTION NINE: PREPARE THE FINAL PLAN

Now it is time to finalize your plan. Because the public has had many opportunities for input throughout the planning process, your public meeting to unveil the draft plan should have gone smoothly. However, the public, Ohio EMA, and FEMA might have identified a few items that were overlooked by the core group.

The core group must establish how the feedback from these groups will be evaluated. The method that the group uses should compare the feedback with the plans goals and activities. Should the feedback be incorporated into the plan (some of the feedback from Ohio EMA and FEMA may be required to be incorporated)? Does the feedback invalidate any of the group's goals or activities? If so, does the goal have to be discarded, or can it be reworked to incorporate the new information? Does the core group have to consider a new goal or possible activity?

When the core group reaches consensus on the draft plan corrections, the corrections should be incorporated into the final plan. If the core group has to make significant changes to the draft plan, it may warrant another public meeting. The core group should decide whether the changes are significant enough to warrant a second public meeting. Even if a second public meeting is not necessary, the core group may want to publicize its process for incorporating feedback using a Questions and Answers fact sheet or some other document.

The group must also plan the production of the final document. Who will write the final document? How many plan documents must be printed, and at what cost? Who should get copies of the document? Will the group charge a fee for extra copies? Will the plan be offered in a digital format? Are there any areas that the law requires the plan be on file, such as the county recorder's office?

In order to be eligible for mitigation funding from FEMA, the final plan must be compliant with the DMA2K. Final, adopted plans must be submitted to the Ohio EMA. After formal adoption by the local community, Ohio EMA will then send the plan and supporting documentation to the FEMA regional office for formal review and approval.

### SECTION NINE CHECK LIST

- 1. Has the core group evaluated and addressed the public input?
- 2. Has the core group included the relevant public input in the final plan?
- 3. Has the group developed a plan for the final document production?
- 4. Have Ohio EMA and FEMA certified that the plan is DMA2K compliant?

## SECTION TEN: ADOPT THE PLAN

Once the final plan is complete it is necessary for all the governing bodies covered by the plan to adopt it formally. This must be a signed agreement to implement the strategies and processes detailed in the plan.

### **Adoption by the Local Governing Body**

Adoption by the local governing body demonstrates the jurisdiction's commitment to fulfilling the mitigation goals and objectives outlined in the plan. Adoption legitimizes the plan and authorizes responsible agencies to execute their responsibilities. The plan must include a copy of the resolution adopting the plan.

### **Multi-Jurisdictional Plan Adoption**

In order for multi-jurisdictional plans to be approved, each jurisdiction that is included in the plan must have its governing body adopt the plan before submission to the state and FEMA, even when a regional agency has the authority to prepare such plans in the name of the respective jurisdictions.

## SECTION TEN CHECK LIST

- 1. The plan is adopted by all jurisdictions involved
- 2. Copies of the adoption document(s) are included with your plan
- 3. All affected jurisdictions actively participated in the process
- 4. Has a certified copy of the adopted plan been sent to Ohio EMA for DMA2K final approval?

## SECTION ELEVEN: IMPLEMENT, MONITOR AND ADJUST THE PLAN

Once the plan is approved and in place, it is time to implement it! Efforts to complete the mitigation activities identified in action plans that have been developed should be monitored. It is easy to get sidetracked by other important issues and not implement the mitigation activities. Having a monitoring system is one way to ensure that work is being done on the activities. For instance, if a report on the implementation of mitigation activities to the village council is required on a monthly basis, it is likely that somebody will be working on the activities.

Implementing an activity or project identified in the plan, may identify new problems, and/or opportunities that require changes to the plan. The plan should be revised at least on the timetable established within the plan, and adjusted on an as-needed basis in the interim.

### Implementation suggestions

Suggestion # 1: Implement some inexpensive, highly visible demonstration projects. To get the mitigation effort moving, you may want to select a few easy, inexpensive, highly visible projects to implement quickly. Such tangible results will demonstrate to the community that the plan is being taken seriously by community leaders. By doing so, public skepticism may be overcome and new interest in the project created. For your plan to be successful, it is imperative that the local people support your mitigation efforts.

Although quickly implementing some inexpensive and visible projects makes good political sense in helping the mitigation effort progress, make sure that you do not lose sight of more complex projects. These may be more important in reducing the community's overall risk and vulnerability.

Suggestion # 2: Developing a newsletter or a periodic news release plan to inform residents of the mitigation program as projects are implemented or completed, has also been very effective in keeping the lines of communication open between the local government and affected and interested public. The implementation process goes much more smoothly when people are aware of what's happening.

Suggestion # 3: Hire a project coordinator. As a final suggestion, you may want to consider hiring a project manager or hazard mitigation coordinator to manage and oversee workflow. Duties of the coordinator include: working with contractors, acting as a liaison between the property owner and local government, writing newsletters, conducting other public information duties, and performing other duties related to project development and implementation. It is important that the person hired for this position understand the goals and objectives of the project because he or she will have to personally communicate this information to members of the community.

Planning doesn't stop once you have initiated your plan. Communities are dynamic entities. They grow and change over time. To avoid becoming obsolete and void, plans must also grow and evolve over time to be effective. If a hazard mitigation plan is to succeed, it is important to update the plan periodically. Developing a monitoring system can be a useful tool to aid you in this process.

Utilizing a monitoring system also serves another purpose. It helps keep your plan running on schedule even when there are other jobs and duties to perform. Local officials wear many different hats and are responsible for multiple assignments. Few have the luxury of focusing on only one task or project at a time. Therefore, the community should adopt a monitoring system to keep people and the plan, on task and on time. This section suggests how to develop a monitoring system to update your community's hazard mitigation plan and keep your plan running on schedule.

Adjustments or revisions are a necessary part of any plan. There are always some contingencies that cannot be foreseen, or events, which could not be predicted. Revisions incorporate those changes necessary to better fit the plan into real-life situations. Revision of mitigation plans also ensures that as the community's needs change, so does the plan, employing the latest and most effective mitigation techniques. Your community's plan should be updated and revised at least once each year.

As with any project you will want to evaluate your project's effectiveness. A brief annual report helps chart progress in meeting your community's goals and objectives. Additionally, a periodic update newsletter can be produced.