

identify and prioritize mitigation actions

Overview

In Step 2, you will identify, evaluate, and prioritize mitigation actions that address the goals and objectives developed by the planning team in Step 1. These actions form the core of your mitigation plan, and will be the most outward representation of the planning process to the general public and political leadership in your community. As such, it may be tempting at this point in the planning process to quickly finalize a list of projects that would simply get the job done. However, it is important to take time to evaluate the relative merits of the alternative mitigation actions and the local conditions in which these activities would be pursued. In doing so, you can be confident that the actions you end up with will have public, government, and political support, and will be the appropriate technical response to the hazard issues in your community.

Some actions you identify may be “bricks and mortar” projects, such as constructing tornado shelters or safe rooms, and retrofit-



Mitigation actions can be grouped into six broad categories:

- 1. Prevention.** Government administrative or regulatory actions or processes that influence the way land and buildings are developed and built. These actions also include public activities to reduce hazard losses. Examples include planning and zoning, building codes, capital improvement programs, open space preservation, and storm water management regulations.
- 2. Property Protection.** Actions that involve the modification of existing buildings or structures to protect them from a hazard, or removal from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, storm shutters, and shatter-resistant glass.
- 3. Public Education and Awareness.** Actions to inform and educate citizens, elected officials, and property owners about the hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and school-age and adult education programs.
- 4. Natural Resource Protection.** Actions that, in addition to minimizing hazard losses, also preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.
- 5. Emergency Services.** Actions that protect people and property during and immediately after a disaster or hazard event. Services include warning systems, emergency response services, and protection of critical facilities.
- 6. Structural Projects.** Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include dams, levees, floodwalls, seawalls, retaining walls, and safe rooms.



ting or rehabilitating existing structures to resist flood, wind, or seismic forces. Others may be non-construction related projects, such as acquisition and relocation of threatened structures and implementation of educational awareness programs. Regulatory actions are also non-construction alternatives that often take the form of new legislation or amendments to existing laws, building codes, or land development ordinances.

The evaluation and prioritization of the alternative mitigation actions will produce a list of recommended mitigation actions to incorporate into the mitigation plan. The process outlined in this step includes a comparative evaluation of the pluses and minuses for each potential action. During this effort, the planning team will address a number of important questions, including:

- Which actions can help us meet our mitigation objectives?
- What capabilities do we have to implement these actions?
- What impacts (if any) will these actions have on our community?

Document the process you used and the sources you sought to help identify possible mitigation actions. You will need this information in Step 4 to write your mitigation plan in accordance with relevant FEMA program requirements.



Procedures & Techniques

Task A. Identify alternative mitigation actions.

The purpose of this task is to identify a variety of possible actions to address the mitigation objectives you developed in Step 1. You will use **Worksheet #1: Identify Alternative Mitigation Actions** to record these actions for use in subsequent tasks. Start by filling in your community's goal and corresponding objective. Then consult a variety of sources, some of which follow, to identify potential alternative mitigation actions appropriate for your area. List these alternative actions and the sources used on your worksheet.

1. Review existing literature and resources.

Using your list of mitigation objectives as the foundation, identify alternative actions that may achieve these objectives. Existing literature can help identify alternative mitigation actions and shed light on specific issues to consider when you evaluate the alternatives later. A number of publications, Web sites, and other resources provide information on the structural integrity, specific design features, and approximate cost ranges of actions.

While there is no single source of information for all possible mitigation actions, the library in Appendix B provides many resources as a starting point for the planning team. Additionally, **Worksheet**



Examples of alternative mitigation actions include:

- Adopting land use planning policies based on known hazards
- Developing an outreach program to encourage homeowners to buy hazard insurance to protect belongings
- Relocating structures away from hazard-prone areas
- Developing an outreach program to encourage homeowners to secure furnishings, storage cabinets, and utilities to prevent injuries and damages during an earthquake
- Retrofitting structures to strengthen resistance to damage
- Developing, adopting, and enforcing effective building codes and standards
- Engineering or retrofitting roads and bridges to withstand hazards
- Requiring the use of fire-retardant materials in new construction
- Requiring disclosure of hazards as part of real estate transactions
- Adopting ordinances to reduce risks to existing hazard-prone buildings
- Imposing freeboard requirements in special flood hazard areas
- Implementing V Zone construction requirements for new development located in coastal A Zones

Job Aid #1: Alternative Mitigation Actions by Hazard (Appendix D) may help you identify potential mitigation actions. The matrix lists alternative mitigation actions that may be applicable across a range of seven major natural hazards. This job aid is organized according to the six broad categories of mitigation actions presented earlier. This listing is not exhaustive; therefore, the planning team should also ask the “expert” partners identified in Phase 1 (see *Getting Started*, FEMA 386-1) to suggest other possible mitigation actions.

Scientists and hazard experts (e.g., geologists, seismologists, hydrologists, etc.), as well as floodplain managers, emergency managers, fire marshals, public works engineers, transportation engineers, and civil engineers who are expert in applying mitigation and emergency management principles all have valuable experience in knowing what works to mitigate hazards. These experts can help you evaluate whether the mitigation alternative will fulfill your objective, if the action provides a long-term solution to the problem, and possibly what some of the social, administrative, environmental, and economic implications are for your planning area. Furthermore, some potential alternative actions involve complex engineering and may require additional study before a solution or alternative mitigation action can be identified. For example, if your objective is to reduce flood damage in a particular location, but you are not sure if the flooding is caused by undersized culverts, inadequate storm drainage, or debris, you will have to ask an engi-



When identifying alternative mitigation actions, be sure to evaluate needs for both existing and future buildings and infrastructure.



States have prepared technical guides to assist local communities. The following two guides available

through the Web include descriptions of various mitigation actions to address hazards:

- North Carolina Division of Emergency Management, *Tools and Techniques for Mitigating the Effects of Natural Hazards* at http://www.dem.dcc.state.nc.us/mitigation/Library/Full_Tools_and_Tech.pdf
- Oregon Department of Land Conservation and Development (DLCD), *Planning for Natural Hazards—Oregon Technical Resource Guide* at <http://www.lcd.state.or.us/hazhtml/Guidehome.htm>



Fill in the goal and its corresponding objective developed in Step 1. Use a separate worksheet for each objective. Make sure you note the sources of information. Use Worksheet Job Aid #1 in Appendix D as a starting point for identifying potential mitigation actions. The examples in this worksheet and the remaining worksheets refer to Hazardville and are for illustrative purposes. Blank worksheets can be found in Appendix C.

Goal: Minimize losses to existing and future structures within hazard areas.

Objective: Reduce potential damages to the manufactured home park in the floodplain.

Alternative Actions	Sources of Information (Include sources you consulted for future reference and documentation.)	Comments (Note any initial issues you may want to discuss or research further.)
1. Acquire flood-prone structures	State Hazard Mitigation Officer	Effective for existing development. Some floodplain residents are just unwilling to sell. A number of elderly renters may be disproportionately affected because there are few affordable rental units in the community.
2. Construct a berm around the park	Hazardville Dept. of Public Works	This option would only work in areas where flooding is less than 2 feet deep, according to our risk assessment. Many of the sites at risk will get more than 4 feet of flooding during a 100-year flood.
3. Elevate structures	Hazardville Dept. of Public Works	Suitable for structures in good condition. Cost of elevation may outweigh expected losses to the home. Elevated structures can be more vulnerable to earthquakes unless additional bracing is used.

Have you considered alternative mitigation actions from other mitigation action categories?
Check off ones that apply to this objective.

Prevention

Public Education and Awareness

Emergency Services

Property Protection

Natural Resource Protection

Structural Projects



neer to evaluate the flooding condition, or recommend that an engineering analysis be conducted to identify potential solutions.

2. Review “success stories.”

Other communities or states may have already addressed your same problem and developed a solution that may also work for your community. Ask your State Hazard Mitigation Officer (SHMO) to help identify success stories from other communities or states. In addition, FEMA has “success stories” and “best practices” guides that can help identify what other communities have done.

3. Solicit public opinion and input.

Surveys or questionnaires are very effective tools for gathering information on potential alternative mitigation actions that would be acceptable or preferred by community residents. With surveys, not only can you collect valuable information, but you can also establish rapport and foster involvement among citizens. Best of all, you reach people who don’t show up for meetings. A survey or questionnaire can be included in a utility bill mailing, conducted door-to-door, or posted on a community Web site.

The survey should ask for information such as:

- The residents’ understanding of what is currently being done to address hazards;
- What residents think is lacking in current efforts and what could be improved upon;
- Suggestions and preferences of proposed mitigation actions (see survey excerpt); and
- Which of your mitigation goals and objectives do residents feel are most important to pursue.

Surveys, however, can be costly for a community, tribe, or state to undertake. Volunteers can help to reduce costs. For some communities, however, a survey may be too expensive and alternative ways to obtain information must be pursued.



FEMA’s Mitigation Resources for Success CD (FEMA 372)

features a variety of technical, case study, and federal program information that will help build support and provide resources for undertaking hazard mitigation activities and programs. The CD includes useful information, publications, technical fact sheets, photographs, case studies, and federal and state mitigation program information and contacts. The documents and photographs can be exported to other documents, Web sites, and publications, and can be used in educational and training presentations. To obtain a copy, call the FEMA publications warehouse at 1-800-480-2520. FEMA’s Web site also includes a Web page with information on success stories: <http://www.fema.gov/fima/success.shtm>.



Acknowledge current policies and practices

that have been successful in your community, tribe, or state. Publicizing these successes fosters support for continuing or increasing mitigation efforts.



University and college students

are a useful and low-cost resource for developing surveys. Sociology, environmental sciences, or urban planning departments are good places to start. Workshops or public gatherings are another good way to involve the public in identifying a range of alternative mitigation actions. Survey questions can be handed out and collected from the group as part of the meeting to ensure that the planning team has provided an opportunity for public input to the plan. The survey excerpt shown here was developed and implemented with assistance from students in the University of Oregon Department of Community and Regional Planning.





Excerpt from the Oregon Household Natural Hazards Preparedness Questionnaire, January 2003. The complete survey can be found in Appendix E.

18. A number of activities can reduce your community's risk from natural hazards. These activities can be both regulatory and non-regulatory. An example of a regulatory activity would be a policy that limits or prohibits development in a known hazard area such as a floodplain. An example of a non-regulatory activity would be to develop a public education program to demonstrate steps citizens can take to make their homes safer from natural hazards. Please check the box that best represents your opinion of the following strategies to reduce the risk and loss associated with natural disasters.

Community-Wide Strategies		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Not Sure
A.	I support a regulatory approach to reducing risk.						
B.	I support a non-regulatory approach to reducing risk.						
C.	I support a mix of both regulatory and non-regulatory approaches to reducing risk.						
D.	I support policies to prohibit development in areas subject to natural hazards.						
E.	I support the use of tax dollars (federal and/or local) to compensate land owners for not developing in areas subject to natural hazards.						

Capability Assessment

A capability assessment has two components: an inventory of an agency's mission, programs, and policies; and an analysis of its capacity to carry them out. A capability assessment is an integral part of the planning process in which you identify, review, and analyze what your state and community are currently doing to reduce losses and identify the framework that is in place or should be in place for the implementation of new mitigation actions. Depending on how your community or state is developing the mitigation plan, capability assessments can be conducted effectively at different points in the planning process. The capability assessment has been included here in this guide because the inventory will generate information that will help the community and state evaluate alternative mitigation actions. Similarly, analyzing what your community and state has the capacity to do, and understanding what needs to be changed or enhanced to facilitate loss reduction, enables you to address such shortfalls in your mitigation plan.



4. Summarize your findings.

The planning team will use the results of Task A to evaluate the alternative mitigation actions in Task C. The planning team can use Worksheet #1 as the summary or, if a team member has time, he or she can summarize the research and present it in a more detailed manner. Any background information the planning team discovers along the way regarding the implications of various alternatives (e.g., relative costs, potential environmental impacts, regulatory requirements, etc.) should be available to the whole planning team for consideration in the next task.

Task B. Identify and analyze state and local mitigation capabilities.

In this task, you will review and analyze state and local programs, policies, regulations, funding, and practices currently in place that either facilitate or hinder mitigation in general, including how the construction of buildings and infrastructure in hazard-prone areas is regulated. You will also learn how your local, tribal, and state governments are structured in terms of professional staff that would be available to directly carry out mitigation actions, or to provide technical assistance. This inventory and analysis is often called a capability assessment. By completing this assessment, you will learn how

or whether your community will be able to implement certain mitigation activities by determining:

- Types of mitigation actions that may be prohibited by law;
- Limitations that may exist on undertaking actions; and
- The range of local and/or state administrative, programmatic, regulatory, financial, and technical resources available to assist in implementing your mitigation strategy.

This information will feed directly into the analysis of the specific mitigation actions you will undertake in Task C.

1. Review the state capability assessment.

The state capability assessment provides local jurisdictions with valuable information to determine the viability of certain mitigation actions. Review the information provided in the state capability assessment with regard to the following:

- Will the state be able to provide sufficient resources to assist you (financially, technically, administratively, or with respect to regulations) in implementing specific alternative mitigation actions (e.g., is technical staff or funding available to assist in evaluating your critical facilities for natural hazard vulnerability)?
- Will certain mitigation actions not be available to you (e.g., does the state prohibit the use of public funds to purchase private property)?
- Are there state regulations, initiatives, or policies that operate at the local level that have negative implications for improving loss reduction efforts? (For example, does the state require that all incorporated jurisdictions use a specific building code? This would be considered somewhat supportive because everyone in the building industry would use the same code throughout the state; however, it may hinder a coastal community’s ability, for example, to enact stricter requirements regarding wind loads.)

If the state capability assessment has not been completed, you may wish to work with your State Hazard Mitigation Officer to obtain the information to complete **Worksheet #2: State Mitigation Capability Assessment**. You will need this information to determine local capabilities.



Inventory and analyze your capabilities for implementing mitigation actions at the state and local levels.

DMA 2000 requires states, as part of their mitigation strategy, to discuss their “pre- and post-disaster hazard management policies, programs, and capabilities to mitigate the hazards in the area, including: an evaluation of state laws, regulations, policies and programs related to hazard mitigation as well as to development in hazard-prone areas; a discussion of state funding capabilities for hazard mitigation projects; and a general description and analysis of local mitigation policies, programs and capabilities” [44 CFR §201.4 (c)(3)(ii)]. The capability assessment provides an opportunity for the state to identify the resources and tools (programs, laws, policies, practices, and staffing) that pertain to loss reduction, and to evaluate these tools based on whether they support, facilitate, or hinder loss reduction at the state and local levels.

The state’s mitigation capabilities will have significant implications for the local planning effort. For example, the state may require that all local floodplain management ordinances contain the provision that new construction must be elevated to one foot above the base flood elevation. This is an example of a policy that supports mitigation. The state may have established a fund to assist local governments in acquiring property for various public benefits (including loss reduction). This is an effort that can facilitate local mitigation efforts. Alternatively, in an effort to stimulate tourism, the state may have an economic development program that provides incentives to businesses that locate along coastal waterfronts. This is an example of a program that may hinder mitigation efforts.

The state capability assessment serves as the backdrop or prelude to the identification of specific mitigation efforts targeted for state-level planning, as well as for local planning. Similarly, by evaluating the effectiveness of their existing activities with respect to capabilities of local jurisdictions, states can determine the need for any additional programs to assist communities in their mitigation efforts, and include those additional action items in the state mitigation plan.

States should coordinate the results of their capability assessment with tribal and local governments within their jurisdictional area.

Worksheet #2: State Mitigation Capability Assessment provides a suggested template for states to complete a capability assessment.

List the name of the agency and its mission and function in the first column. By identifying the missions and functions, as well as programs, plans, policies, regulations, funding, and other practices administered by agencies, states create an inventory of resources that can be brought to bear on mitigation efforts within the state.

List any programs, plans, policies, etc., this agency has in the second column. It is important to include within this column any legal authorities (which will be found within state regulations) that govern how land would be developed within hazard areas. Typically, these types of regulations are found in state codes under emergency management or public safety codes, building and construction codes, or planning codes. You should also take the opportunity to include any resources that this organization has developed for either state or local use as part of each respective program. Include any appropriate legal citations or source references for programs, regulations, policies, etc.

If you know a point of contact, list it in the third column.

Check off what type of effect the programs, plans, policies, etc., have on loss reduction. States should now evaluate the effects or implications of these activities on efforts to reduce losses within the state (fourth column). This evaluation should address the implications for both the state and local levels. The essential questions to be answered are: Does/would this program/plan/policy etc., support or facilitate mitigation efforts, or does/would it hinder these efforts? How or why? Put these reasons in the Comments column. At this point, you will not yet try to resolve any issues (such as if a particular program or policy could negatively affect proposed mitigation efforts). However, the planning team will carry forward this information as input into the evaluation of specific actions in Task C.

Finally, add any other comments you may have about the agency or its activities in the last column.

Agency Name (Mission/Function)	Programs, Plans, Policies, Regulations, Funding, or Practices	Point of Contact Name, Address, Phone, Email	Effect on Loss Reduction* (✓)			Comments
			Support	Facilitate	Hinder	
Department of Economic Development (To enhance the economic well-being of the citizens of the State of Emergency through public investment.)	1. Infrastructure Development Fund	Goldie Graham 586 Ventura Blvd. Capitalia, EM (555) 555-2345		✓		Provides grants and loans to fund local infrastructure improvements, including stormwater management projects, for new or expanding businesses.
	2. Development Tax Credits for Priority Growth Communities	Buck Doughman 200 Greenback Dr. Capitalia, EM (555) 555-2346			✓	Provides tax credits to private investors who develop land in Priority Growth Communities. Because Hazardville is one of the state's Priority Growth Communities, the state could be subsidizing developers to build in the floodplain.

***Definitions:**

Support: Programs, plans, policies, regulations, funding, or practices that help the implementation of mitigation actions.

Facilitate: Programs, plans, policies, etc., that make implementing mitigation actions easier.

Hinder: Programs, plans, policies, etc., that pose obstacles to implementation of mitigation actions.



After you have obtained state level information on programs, plans, policies, regulations, funding, and practices, review the results to gain a greater understanding of how these state resources will affect mitigation in your specific community. Since you have already done some research into potential mitigation actions (Task A), and you know your goals and objectives (Step 1), you can address in at least a minimal way whether these policies, regulations, etc., will have an impact on the type of mitigation actions you are beginning to explore.

2. Complete a local capability assessment.

The planning team can use **Worksheet #3: Local Mitigation Capability Assessment** and **Worksheet Job Aid #2: Local Hazard Mitigation Capabilities** to complete this subtask. The planning team can use Job Aid #2 to identify specific regulatory tools, staff, and financial resources that exist in your jurisdiction. The team can then transfer this information to Worksheet #3.

Your proposed mitigation actions will be evaluated against the backdrop of what is feasible in terms of your government’s legal, administrative, fiscal, and technical capacities. Additionally, there are many types of mitigation activities, some of which will require funding, construction-related actions, and procedural and policy changes. As such, local jurisdictions should examine these capabilities in light of the type of activities they are interested in pursuing.

As shown in Worksheet #2, your state’s capability assessment should include a description of a range of agencies and their resources, responsibilities, and limitations related to implementing mitigation initiatives. It is now time to create your own local capability assessment using Worksheet #3. Make a list of state agencies, regional organizations, and local government agencies mentioned in the state assessment. The state capability assessment will not focus on your specific jurisdiction; therefore, you should expand your list to include local agencies with policies, programs, and skills in multiple departments that can have an effect on mitigation activities. You may have identified some of these agencies when you prepared the hazard profile and loss estimate in Phase 2. At a minimum, you should list local government agencies, departments, and offices with responsibility for planning, building code enforcement, mapping, building, and/or managing physical assets, as well as for emergency management functions (see tip box above).

It may be helpful to list these organizations, as well as other departments or agencies that do not appear to have a direct impact on



The following agencies or departments can contribute to an understanding of the local tools and resources available for loss reduction:

- Building, Zoning, and Code Enforcement
- Councils of Government
- Economic Development
- Emergency Management
- Environmental
- Housing
- Planning
- Police and Fire
- Public Works
- Parks and Recreation
- Regional Planning Organizations
- Transportation



If the planning team feels that there are significant political problems in the community, a consultant may be the

best way to ensure an objective evaluation of the effects of programs, plans, policies, regulations, funding, and practices on loss reduction. An outside consultant should have the ability to look at a situation without attachment, emotion, or bias. You may decide to ask the consultant to perform the entire capability assessment, as some of the results of this assessment may be perceived as an attack on the responsible agency in your state or community.



While a formal discussion on community capabilities is not required

DMA

by the DMA 2000 requirements for *local* plans, *state* plans must provide some detail about local capabilities. To assist the state in meeting this requirement and to develop a more comprehensive understanding of mitigation's role in your community, performing a local capability assessment is *highly recommended*. Rules implementing DMA 2000 state that the local mitigation strategy must be "based on existing authorities, policies, programs, and resources, and [the community's] ability to expand on and improve these existing tools" [44CFR§201.6 (c)(3)].

The Institute for Local Self Government



(Institute) is a non-profit organization that provides research, information, and support for the development of public policy for California communities and cities. One of its more notable programs, the Community Land Use Project, assists public agencies with decision-making and the defense of their practices in environmental preservation land use decisions. The Institute has a wealth of information on its Web site, including an easy to understand section on takings, government finance, and fiscal analyses, and tips for public participation and effective citizen involvement. Although targeted to a California audience, there is still a lot of useful information on the Web site that can be used by anyone. More information about the Institute can be found at <http://www.ilsg.org/>.

mitigation but could have an indirect effect on your mitigation program. The list should also include businesses and non-governmental or nonprofit organizations—charities, churches, and the American Red Cross, as well as operators of critical facilities, colleges, and universities—since they play important roles in pre- and post-disaster environments.

Planning team members will need to interview department or division heads in your local government to obtain information on all relevant programs, policies, regulations, funding, and practices. However, before talking with officials it is advisable to review reports, plans, and other community documents that are readily available to get a basic understanding of what exists in your jurisdiction. In this way, you can target or better tailor your questions when you interview them. By interviewing local officials, the planning team will gain a better understanding of the functions of relevant government agencies to determine whether their missions can, or already do, facilitate mitigation goals and objectives.

When completing the worksheet, be sure to note the sources and types of data that these agencies or organizations possess, and the databases, analytical tools (e.g., GIS, HAZUS, etc.), and software they use to analyze the information.



An excellent Web site for help in evaluating building codes and local general plans is <http://www.ibhs.org>. The Institute for Business and Home Safety has developed the *Community Land Use Evaluation for Natural Hazards Questionnaire* (http://www.ibhs.org/land_use_planning). It has also produced *Summary of State Land Use Planning Laws* (2002) (http://www.ibhs.org/research_library/view.asp?id=302) and *Summary of State Mandated Codes* (1999) (http://www.ibhs.org/dg.lts/id.112/research_library.view.htm).

Compiling this inventory will help the planning team identify what is currently being done and begin to assess what is working well. The second part of a capability assessment is the analysis of how effective the existing actions and capacities are and what gaps exist that hinder implementation. This evaluation allows the planning team to identify what may need to change to enhance what is working, or what to put into place to undertake new actions or implement existing ones. However, the more extensive analysis will occur when the planning team evaluates specific alternative mitigation actions by objective, as described in the next task.



Worksheet #3 Local Mitigation Capability Assessment

step 2

List the name of the agency and its mission in the first column. By identifying the missions and functions, as well as programs, plans, policies, regulations, funding, and other practices administered by that agency, local and tribal jurisdictions create an inventory of resources that can be brought to bear on mitigation efforts within the community or tribe. Use Worksheet #2: State Mitigation Capability Assessment and Worksheet Job Aid #2 in Appendix D to complete this worksheet.

List any programs, plans, policies, etc., this agency has in the second column. It is important to include within this column any legal authorities (which can be found by reviewing the state capability assessment) that govern how land would be developed within hazard areas. Typically, these types of regulations are found in local zoning, building, subdivision, and other special land development codes (such as floodplain management ordinances, hillside ordinances, etc.). You should also take the opportunity to include any resources that this organization has developed for local use as part of each respective program. Include any appropriate legal citations or source references for programs, regulations, policies, etc.

If you know a point of contact, list it in the third column.

Check off whether the programs, plans, policies, etc., have an effect on loss reduction. Communities and tribes should now evaluate the effects or implications of these activities on efforts to reduce losses within the jurisdiction (fourth column). The essential questions to be answered are: Does/would this program/plan/policy etc., support or facilitate mitigation efforts, or does/would it hinder these efforts? How or why? Put these reasons in the Comments column. At this point, you will not try to resolve any issues (such as if a particular program or policy could negatively affect proposed mitigation efforts), but the planning team will carry this information forward as input into the evaluation of specific actions in Task C.

Finally, add any other comments you may have about the agency or its activities in the last column.

Agency Name (Mission/Function)	Programs, Plans, Policies, Regulations, Funding, or Practices	Point of Contact Name, Address, Phone, Email	Effect on Loss Reduction* (✓)			Comments
			Support	Facilitate	Hinder	
Department of Public Works (To ensure the proper functioning of public infrastructure.)	1. Sanitation Division	M. T. Trashmore 800 Dumptruck Ave. Hazardville, EM (555) 555-1234		✓		Responsible for cleaning storm drains, gutters, roadside ditches, etc.
	2. Stream maintenance policy	M. T. Trashmore			✓	Streams and culverts are only scheduled to be cleaned/maintained every 3 years.
	3. Transportation Division	Potsy McAsphalt 495 Mixing Bowl Lane Hazardville, EM (555) 555-1235	✓			State DOT maintains funds to renovate state highways and bridges. Priority given to elevating structures vulnerable to flooding.

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Hinder: Programs, plans, policies, etc., that pose obstacles to implementation of mitigation actions.

Task C. Evaluate, select, and prioritize mitigation actions.

In this task, the planning team will select mitigation actions suitable to your community and then decide in what sequence or order these actions should be pursued. Task C includes *suggested* methods for evaluating and prioritizing the alternative mitigation actions identified in Task A. There are other ways to evaluate and prioritize mitigation actions. However, the methods suggested here will help the planning team fulfill DMA 2000 requirements that require state, tribal, and local governments to show how mitigation actions were evaluated and prioritized.

Remember, your evaluation should determine whether the action would work for the *specific* mitigation objectives you formulated in Step 1. Your evaluation is not a judgment of the general merits of the action, but an assessment of the effect the action will have on the specified mitigation objective in a particular location within your jurisdiction.

The planning team should agree on the evaluation criteria and the process for prioritizing mitigation actions. See *Getting Started* (FEMA 386-1) for ideas on gaining consensus.

1. Evaluate alternative mitigation actions.

Now that the planning team has completed Worksheet #1 and the capability assessment (Worksheet #3) in Task B, it must evaluate whether existing and potential alternative mitigation actions fulfill your objectives and if they are appropriate for the planning area. There are many ways to develop and apply evaluation criteria. One method enables the planning team to consider in a systematic way the **S**ocial, **T**echnical, **A**dministrative, **P**olitical, **L**egal, **E**conomic, and **E**nvironmental (STAPLEE) opportunities and constraints of implementing a particular mitigation action in your jurisdiction. The planning team can use **Worksheet #4: Evaluate Alternative Mitigation Actions** to record the team's discussions.

The box that follows provides a list of the types of questions you can ask as part of the evaluation process to help you sort through which alternative actions may be best for your community. All of this information is intended to help the planning team weigh the pros and cons of different alternative actions for each of the identified objectives. However, this decision-making is not necessarily a straightforward process; it is highly specific to each jurisdiction. This process would be difficult to describe in a step-by-step procedure that would reliably lead all communities to the "right" solu-



tion, as the possible results or end products of the process are quite varied and do not necessarily follow a straight path.

EVALUATION CRITERIA FOR MITIGATION ACTIONS

The following discussion explains each of the STAPLEE evaluation criteria. It includes examples of questions the planning team should consider, as well as who may be the appropriate person or agency to answer these questions as the team works through the list of alternative mitigation actions.

SOCIAL. The public must support the overall implementation strategy and specific mitigation actions. Therefore, the projects will have to be evaluated in terms of *community acceptance* by asking questions such as:

- Will the proposed action adversely affect one segment of the population?
- Will the action disrupt established neighborhoods, break up voting districts, or cause the relocation of lower income people?
- Is the action compatible with present and future community values?
- If the community is a tribal entity, will the actions adversely affect cultural values or resources?

Your local elected officials, community development staff, and planning board are key team members who can help answer these questions.

TECHNICAL. It is important to determine if the proposed action is *technically feasible*, will help to reduce losses in the *long term*, and has minimal *secondary impacts*. Here, you will determine whether the alternative action is a whole or partial solution, or not a solution at all, by considering the following types of issues:

- How effective is the action in avoiding or reducing future losses? If the proposed action involves upgrading culverts and storm drains to handle a 10-year storm event, and the objective is to reduce the potential impacts of a catastrophic flood, the proposed mitigation cannot be considered effective. Conversely, if the objective were to reduce the adverse impacts of frequent flooding events, the same action would certainly meet the technical feasibility criterion.
- Will it create more problems than it solves?
- Does it solve the problem or only a symptom?

Key team members who can help answer these questions include the town engineer, public works staff, and building department staff.

ADMINISTRATIVE. Under this part of the evaluation criteria, you will examine the anticipated *staffing*, *funding*, and *maintenance* requirements for the mitigation action to determine if the jurisdiction has the personnel and administrative capabilities necessary to implement the action or whether outside help will be necessary.

- Does the jurisdiction have the capability (staff, technical experts, and/or funding) to implement the action, or can it be readily obtained?
- Can the community provide the necessary maintenance?
- Can it be accomplished in a timely manner?

(continued on page 2-14)

The U.S. State and Local Gateway

is an invaluable resource for understanding a range of community governmental capabilities. The Web site was developed to give state, local, and tribal government officials and employees access to a variety of federal, state, local, tribal, and organizational information and links. The site includes links to funding, best practices, tools, training, laws and regulations, current issues, partners, and other information by topic. The site can be accessed at http://www.firstgov.gov/Government/State_Local.shtml.

Funding

Spending is a fundamental power of local government. Spending decisions made at all levels of government can include consideration of hazard mitigation goals and objectives. Annual budgets and capital improvement plans offer an opportunity to include the costs of mitigation activities as part of routine state, community, or tribal outlays, rather than considering mitigation projects as separate special initiatives. Just as communities have the power to spend, they also have the power to withhold spending for the public good. Does your state

or community have the authority to withhold spending in hazard areas? For example, Florida Rule 9J5 discourages the extension of public infrastructure into coastal high-hazard zones by local communities.



Current elected officials often have very different priorities than their predecessors, and every elected official is likely to have his or her own agenda driving these priorities. However, elected officials are voted into their position to represent their constituents, and if your team has done a good job of getting the public to buy into and support your plan, elected officials are more likely to lend their support. This may be particularly important if your plan proposes to use a significant amount of tax revenue or other public funds to finance mitigation projects.

State and local level government

politics and processes can sometimes be difficult to fully understand. An online study guide, which was designed to accompany *State and Local Politics*, Tenth Edition, by Burns, Peltason, and Magleby, provides an objective overview of the institutions and political forces that can shape policies and outcomes in state and local jurisdictions. The study guide is available at <http://cwx.prenhall.com/bookbind/pubbooks/burns6/>.



An excellent resource

to assist in quickly determining your state's legal authorities with respect to planning to reduce natural hazard losses is available in an online report titled *A Survey of State Land-Use and Natural Hazards Planning Laws*. This report can be found at http://www.ibhs.org/land_use_planning/. The Web site also provides information on state-level technical assistance that is available through statutory requirements.



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POLITICAL. Understanding how your current community and state political leadership feels about issues related to the environment, economic development, safety, and emergency management will provide valuable insight into the level of political support you will have for mitigation activities and programs. Proposed mitigation objectives sometimes fail because of a lack of political acceptability. This can be avoided by determining:

- Is there *political support* to implement and maintain this action?
- Have political leaders participated in the planning process so far?
- Is there a *local champion* willing to help see the action to completion?
- Who are the stakeholders in this proposed action?
- Is there enough *public support* to ensure the success of the action?
- Have all of the stakeholders been offered an opportunity to participate in the planning process?
- How can the mitigation objectives be accomplished at the lowest “cost” to the public?

Ensure that a designated member of the planning team consults with the board of supervisors, mayor, city council, administrator, or manager.

LEGAL. Without the appropriate legal authority, the action cannot lawfully be undertaken. When considering this criterion, you will determine whether your jurisdiction has the legal authority at the state, tribal, or local level to implement the action, or whether the jurisdiction must pass new laws or regulations. Each level of government operates under a specific source of delegated authority. As a general rule, most local governments operate under enabling legislation that gives them the power to engage in different activities.

You should identify the unit of government undertaking the mitigation action, and include an analysis of the interrelationships between local, regional, state, and federal governments. Legal authority is likely to have a significant role later in the process when your state, tribe, or community will have to determine how mitigation activities can best be carried out, and to what extent mitigation policies and programs can be enforced.

- Does the *state, tribe, or community* have the *authority* to implement the proposed action?
- Is there a technical, scientific, or legal basis for the mitigation action (i.e., does the mitigation action “fit” the hazard setting)?
- Are the proper laws, ordinances, and resolutions in place to implement the action?
- Are there any potential legal consequences?
- Will the community be liable for the actions or support of actions, or lack of action?
- Is the action likely to be *challenged* by stakeholders who may be negatively affected?

Your community's legal counsel is a key team member to include in this discussion.

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State, Local, and Tribal Authorities

State governments possess an inherent power (also called “police power”) to enact reasonable legislation and protect the health, safety, and welfare of the public. The Tenth Amendment of the U.S. Constitution delegates this power to states, which in turn, through their state constitutions, delegate some of these powers to local governments.

Laws, legislation, and related topics for **tribal** governments can be found at <http://www.findlaw.com/01topics/21indian/index.html>. The Web page includes links to law documents, briefs, articles, databases, government agencies, political information, and other related Web sites.

Most local governments are given a fair amount of autonomy to enforce their police power, particularly as it pertains to emergency management functions. State legislation, however, controls what local governments can legally do. While certain federal laws may have bearing on local government activities, the local government must have the proper delegation from the state in order to act. States grant local governments the authority to exercise powers in two ways:

Dillon’s Rule. Local governments in states with this type of legislative structure are only able to exercise powers that have been expressly granted to them in their state constitution or state laws.

Home Rule. Local governments in states with this type of legislative structure have much greater flexibility in their organizational structure, fiscal control, and governmental autonomy, as long as an activity is not prohibited by state legislation or in conflict with any state statute or the state constitution.

For more information, see <http://www.naco.org/pubs/research/briefs/dillon.cfm>.



Examples of Local Police Powers

Regulation. Most states have granted local jurisdictions broad regulatory powers to enable the enactment and enforcement of ordinances that deal with public health, safety, and welfare. These include building codes, building inspections, zoning, floodplain and subdivision ordinances, and growth management initiatives.

Acquisition. Removing at-risk property from the private market is a useful mitigation tool. Legislation typically empowers governments to acquire property for public purposes by gift, grant, bequest, exchange, purchase, lease, or eminent domain. Land acquired for these purposes, however, must be given just compensation in return, or it is considered a taking. All of FEMA’s buyout programs operate on the basis of the *voluntary cooperation* of property owners.

Taxation. Taxes and special assessments can be an important source of revenue for governments to help pay for mitigation activities. In addition, the power of taxation can have a profound impact on the pattern of development in local communities. Special tax districts, for example, can be used to discourage intensive development in hazard-prone areas.



eminent domain *n.* the right of a government to appropriate private property for public use, usually with compensation to the owner.



Takings

Regulating development on private property can be contentious and even litigious, particularly if the regulations are so restrictive that they constitute a “taking,” or if they are arbitrarily applied or enforced. The Fifth Amendment of the U.S. Constitution has a Takings Clause requiring that owners of private property taken for public use be given “just compensation.” A regulatory “taking” is a regulation or action that causes a private landowner to lose *all* economically beneficial use of his or her land. Care must be taken in drafting legislation that may reduce the fair market value of land. Any required changes in the use of private property must be clearly related to public health and safety concerns.

Benefit-Cost Analysis



All projects using federal funds must be justified as being cost-effective. This can be determined through the use of various benefit-cost analysis methodologies, addressed in *Using Benefit-Cost Analysis in Mitigation Planning* (FEMA 386-5).

Grants and services



from foundations, environmental organizations, volunteer groups, and other nonprofit organizations may be worth considering, as such organizations are often willing to contribute financial or other resources if they feel there is a significant need. Private industry, investors, and the business community should also be considered for potential sources of funding and in-kind services. As you review your state or community's fiscal capacity, continue to add new information to your list of potential funding sources identified earlier in the planning process. How to research and obtain funding for mitigation is discussed in more detail in *Securing Resources for Mitigation Planning* (FEMA 386-9).

Local foundations often play leadership roles in communities and can provide financial resources, technical assistance, and support. A complete list of community nonprofit, tax-exempt, publicly supported grant making organizations by state is available at <http://www.tgci.com/resources/foundations/community/index.html> or <http://www.tgci.com/resources/foundations/SearchGeoloc.asp>.

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ECONOMIC. Every local, state, and tribal government experiences budget constraints at one time or another. Cost-effective mitigation actions that can be funded in current or upcoming budget cycles are much more likely to be implemented than mitigation actions requiring general obligation bonds or other instruments that would incur long-term debt to a community. States and local communities with tight budgets or budget shortfalls may be more willing to undertake a mitigation initiative if it can be funded, at least in part, by outside sources. "Big ticket" mitigation actions, such as large-scale acquisition and relocation, are often considered for implementation in a post-disaster scenario when additional federal and state funding for mitigation is available.

Economic considerations must include the present economic base and projected growth and should be based on answers to questions such as:

- Are there currently sources of funds that can be used to implement the action?
- What *benefits* will the action provide?
- Does the *cost* seem reasonable for the size of the problem and likely benefits?
- What burden will be placed on the tax base or local economy to implement this action?
- Does the action *contribute to other community economic goals*, such as capital improvements or economic development?
- What proposed actions should be considered but be "tabled" for implementation until *outside sources of funding* are available?

Key team members for this discussion include community managers, economic development staff, and the assessor's office.

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The Catalog of Federal Domestic Assistance Programs

(CFDA) is a collection of federal programs, projects, services, and activities that provide assistance or benefits to the American public. Available federal assistance includes grants, loans, loan guarantees, services, and other types of support. The online document is available at <http://aspe.os.dhhs.gov/cfda>.



Economic Analysis Tool Box

Local Economic Analysis Tools. The National Association of Counties (NACo) collects, maintains, researches, and publishes economic and other information about counties. Reports are available online at <http://www.naco.org/pubs/research/special/index.cfm>. NACo also is currently developing a database of county policies, ordinances, and model programs that could be used as case studies for other communities.

Thirty-five of America's largest cities and 40 of America's largest counties were graded on their financial, human resources, and information technology management, and managing for results performance by the Maxwell Campbell Public Affairs Institute. The annual report for these cities and counties is available online at <http://www.governing.com/gpp/2000/gp0intro.htm> and <http://www.governing.com/gpp/2002/gp2intro.htm>, respectively.

Nationwide county data, including demographic and economic data and other statistics, can be found at <http://www.Capitolimpact.com>.

The National League of Cities researches and reports on programs and issues affecting cities and towns nationwide. The latest annual report focuses on recent trends in municipal finance and fiscal policy actions. According to the report, the methodology used should provide good generalized information about cities with populations of 10,000 or more. The report is available online at http://www.nlc.org/nlc_org/site/programs/research_reports/index.cfm.

Tribal Economic Analysis Tools. The U.S. Department of Commerce, Economic Development Administration funded a report entitled *Job Creation and Job Skills Development in Indian Country*. It evaluated current literature on job creation and job skills in tribal communities and assessed tribal economic development-related issues. The report can be accessed at the following Web site: http://www.osec.doc.gov/eda/html/1g3_researchrpts.htm.

Native economic Development Guidance and Empowerment (eDGE) is an interagency initiative of the federal government to promote economic development within tribal and Alaska Native communities. Native eDGE provides links to federal and non-federal grants, loans, and technical assistance for tribal and Alaska Native organizations and individuals. The Web site is located at <http://nativeedge.hud.gov/>.

Regional Economic Analysis Tools. The National Association of Regional Councils (NARC) has compiled demographic information for regional councils within each state. NARC also has several publications that contain information on gathering baseline data, economic development strategies, and a directory of regional councils. This information can be helpful in determining current trends in government and can give you data that will be useful if you are undertaking a multi-jurisdictional plan. The association's Web site is located at <http://www.narc.org/>.

HAZUS

HAZUS, FEMA's natural hazard loss estimation tool, has an extensive inventory of data that communities can use and build upon. HAZUS-MH, the new multi-hazard version of HAZUS, includes data from the 2000 U.S. Census. See FEMA's Web site for more details: <http://www.fema.gov/hazus/index.shtm>.

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ENVIRONMENTAL. Impact on the environment is an important consideration because of public desire for sustainable and environmentally healthy communities and the many statutory considerations, such as the National Environmental Policy Act (NEPA), to keep in mind when using federal funds.

You will need to evaluate whether, when implementing mitigation actions, there would be negative consequences to environmental assets such as threatened and endangered species, wetlands, and other protected natural resources.

- How will this action affect the environment (*land, water, endangered species*)?
- Will this action comply with local, state, and *federal environmental laws or regulations*?
- Is the action *consistent with community environmental goals*?

Numerous mitigation actions may well have beneficial impacts on the environment. For instance, acquisition and relocation of structures out of the floodplain, sediment and erosion control actions, and stream corridor and wetland restoration projects all help restore the natural function of the floodplain. Also, vegetation management in areas susceptible to wildfires can greatly reduce the potential for large wildfires that would be damaging to the community and the environment. Such mitigation actions benefit the environment while creating sustainable communities that are more resilient to disasters.

Key team members include the local health department, conservation commissions, environmental or water resources agency, building officials, environmental groups, fish and game commissions, etc.

SUMMARY. In many cases, it will not be possible to simply attend a planning meeting and answer these questions. In those cases, designated team members will need to investigate the issues further and report back to the team. See Table 2-1 for considerations and sources of information for each mitigation evaluation criterion.



Table 2-1 suggests some considerations and sources of information for each STAPLEE criterion to use when completing Worksheet #4.

Table 2-1: Researching STAPLEE Criteria

Evaluation Category	Considerations	Sources of Information
Social	Community Acceptance	<ul style="list-style-type: none"> ■ Questionnaire (see Appendix E) ■ Interviews with government staff, non-profit organizations, and neighborhood advocacy organizations ■ Community plans ■ Newspaper articles
	Adversely Affects Segment of Population	<ul style="list-style-type: none"> ■ Maps showing demographics (race, age, income, voting districts, etc.) with locations of proposed mitigation actions
Technical	Technical Feasibility	<ul style="list-style-type: none"> ■ Judgment of mitigation experts, scientists, and engineers ■ Existing literature/studies on the action
	Long-term Solution	<ul style="list-style-type: none"> ■ Judgment of mitigation experts ■ Existing literature/studies on the action
	Secondary Impacts	<ul style="list-style-type: none"> ■ Judgment of mitigation experts ■ Existing literature ■ Maps showing environmentally sensitive resources with locations of proposed mitigation actions ■ Scientific and/or engineering evaluations
Administrative	Staffing (sufficient number of staff and training)	<ul style="list-style-type: none"> ■ Capability assessment (see Worksheets #2 and #3) ■ Jurisdiction organizational chart ■ Availability of technical assistance from regional or state agencies ■ Interviews with department heads and relevant staff
	Funding Allocated	<ul style="list-style-type: none"> ■ Capability assessment (see Worksheets #2 and #3) ■ Annual operating budget ■ Capital improvement budget ■ Interviews with department heads and relevant staff
	Maintenance/Operations	<ul style="list-style-type: none"> ■ Capability assessment (see Worksheets #2 and #3) ■ Existing literature on maintenance costs ■ Interviews with department heads and relevant staff
Political	Political Support	<ul style="list-style-type: none"> ■ Questionnaire (see Appendix E) ■ Interviews with elected officials ■ Newspaper articles
	Local Champion or Plan Proponent (respected community member)	<ul style="list-style-type: none"> ■ Questionnaire (see Appendix E) ■ Interviews with elected officials, community leaders, and private sector participants in planning process
	Public Support (Stakeholders)	<ul style="list-style-type: none"> ■ Questionnaire (see Appendix E) ■ Interviews with government staff, non-profit organizations, and neighborhood advocacy organizations ■ Newspaper articles ■ Public meetings

Table 2-1: Researching STAPLEE Criteria (continued)

Evaluation Category	Considerations	Sources of Information
Legal	State Authority	<ul style="list-style-type: none"> ■ Research of state codes ■ Contact with state attorney general's office
	Existing Local Authority	<ul style="list-style-type: none"> ■ Research of local codes and ordinances ■ Local legal counsel
	Action Potentially Subject to Legal Challenge by Opponents (stakeholders who would be negatively affected)	<ul style="list-style-type: none"> ■ Research by local legal counsel ■ Maps, census, plans
Economic	Benefit of Mitigation Action	<ul style="list-style-type: none"> ■ Benefit-cost analysis software/methodology ■ Judgment of experts ■ Existing literature ■ Case studies of similar implemented actions ■ Economic impact assessment
	Cost of Mitigation Action	<ul style="list-style-type: none"> ■ Order of magnitude cost estimate (e.g., Action A costs five times more than Action B) ■ Judgment of experts ■ Local contractors ■ Case studies
	Contributes to Economic Goals	<ul style="list-style-type: none"> ■ Judgment of experts ■ Evaluation of community's comprehensive plan, economic development plan, and other community plans and policies
	Outside Funding Required	<ul style="list-style-type: none"> ■ Order of magnitude cost estimate ■ Evaluation of state and federal funding programs
Environmental	Affects Land/Water Bodies	<ul style="list-style-type: none"> ■ Maps, studies, plans ■ Coordination with state and federal resource agencies, including compliance with all relevant statutes and regulations
	Affects Endangered Species	<ul style="list-style-type: none"> ■ Maps, studies, plans ■ Coordination with state and federal resource agencies, including compliance with all relevant statutes and regulations
	Affects Hazardous Materials and Waste Sites	<ul style="list-style-type: none"> ■ Maps, studies, plans ■ Hazardous waste site databases ■ Coordination with state and federal resource agencies, including compliance with all relevant statutes and regulations
	Consistent with Community's Environmental Goals	<ul style="list-style-type: none"> ■ Maps of land use, zoning, sensitive areas, projected growth ■ Interviews with government staff ■ Review of local plans and policies
	Consistent with Federal Laws	<ul style="list-style-type: none"> ■ Contact with federal agencies



Worksheet #4

Evaluate Alternative Mitigation Actions

step 2

1. Fill in the goal and its corresponding objective. Use a separate worksheet for each objective. The considerations under each criterion are suggested ones to use; you can revise these to reflect your own considerations (see Table 2-1).

2. Fill in the alternative actions that address the specific objectives the planning team identified in Worksheet #1.

3. **Scoring:** For each consideration, indicate a plus (+) for favorable, and a negative (-) for less favorable.

When you complete the scoring, negatives will indicate gaps or shortcomings in the particular action, which can be noted in the Comments section. For considerations that do not apply, fill in N/A for not applicable. Only leave a blank if you do not know an answer. In this case, make a note in the Comments section of the “expert” or source to consult to help you evaluate the criterion.

Goal: Minimize losses to existing and future structures within hazard areas.

Objective: Reduce potential damages to the manufactured home park in the floodplain.

STAPLEE Criteria Considerations → for Alternative Actions ↓	S (Social)		T (Technical)			A (Administrative)			P (Political)			L (Legal)			E (Economic)				E (Environmental)				
	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Community Environmental Goals	Consistent with Federal Laws
1. Acquire flood-prone structures	-	-	+	+	+	-	-	-	-	+	+	+	+	+	-	-	-	+	+	+	+	+	+
2. Construct a berm around park	+	+	-	-	-	-	-	-	+	+	-	+	+	+	-	+	+	-	-	+	+	+	+
3. Elevate structures	+	+	-	+	-	-	-	+	+	+	+	+	+	+	-	+	-	+	+	+	+	+	+

Alternative Actions	Comments
1. Acquire flood-prone structures	Will need to seek outside funding.
2. Construct a berm around park	Will not provide 100-year flood protection to most homes. May be best for units that have not been purchased or elevated.
3. Elevate structures	Don't know what effect the action will have on older, less sturdy structures. Would need to determine structural integrity of older homes. Further study may be necessary.



As you start the prioritization process,

look for ways to eliminate from consideration those actions that, from a **technical** standpoint, will not meet your objective, even though they may have been indicated as generally applicable to your situation. For example, if an alternative mitigation action is to relocate a building out of the floodplain, the building may be structurally unsound and may not survive a move. Such an action can now be eliminated from your list and there is no need to undertake a detailed evaluation of the remaining criteria, thereby saving you time. You should provide comments—a short summary of your reasoning—in Worksheet #4 indicating why you believe your actions will not work. If you cannot judge the action on its technical merits because of a lack of data, document that fact in the “Comments” section. Items in the “Comments” section can then lead to developing a list of necessary implementation steps, such as conducting additional studies.



A community can go through a process of identifying and evaluating alternative mitigation actions and discover that everything is in place to undertake a certain type of action that would be very effective and easily affordable. However, the community simply may not like some of the social or environmental implications of that action. The Town of Hazardville faces this type of issue with its historic lighthouse. One solution would be to move the lighthouse inland to remove it from the danger it faces from the eroding cliffs. But, the community would then lose the historic and cultural value of its long-standing position at the main entrance to town overlooking the sea. As such, the planning team may decide to undertake a more expensive or difficult action that it is not necessarily as equipped for but feels strongly should be the preferred alternative. Table 2-2 presents five possible situations the planning team could encounter.



At times, you may feel that your community does not have enough information

about a specific situation to recommend a particular mitigation action. In these cases, your mitigation action can be to recommend further study. For example, if your community has 20 critical facilities that should be addressed in the plan, how do you decide which ones should be dealt with first, and what type of action should be used for mitigation? In a situation like this, your recommendation could be to “Conduct an investigation of the 20 critical facilities over the next three years to determine the most appropriate mitigation actions to protect them from flooding, high winds, and seismic hazards.”

HAZUS

HAZUS can provide information to help evaluate different mitigation approaches for a given problem.

Sophisticated HAZUS users interested in developing more detailed damage and loss estimates for individual or groups of buildings can use HAZUS-MH, which comes with two useful tools: AEBM (Advanced Engineering Building Module) and InCast (Inventory Collection and Survey Tool). For earthquake mitigation purposes, using the AEBM creates building-specific damage and loss functions that could be used to assess losses for an individual building (or group of similar buildings) both in their existing condition and after some amount of seismic rehabilitation. Building-specific damage and loss functions are based on the properties of a particular building. The particular building of interest could be either an individual building or a typical building representing a group of buildings. The procedures are highly technical, and users should be qualified seismic/structural engineers who, for example, might be advising a local jurisdiction regarding the merits of adopting an ordinance to require cripple-wall strengthening of older wood-frame residences. The AEBM concept will be expanded to other hazards in future HAZUS models.

For better characterization of damages to individual structures or groups of buildings, the multi-hazard InCast tool allows users to input building-specific characteristics such as location, occupancy type, and structural information. The InCast data integrates seamlessly within HAZUS-MH and can provide enhanced and more complete building inventories, thus improving the reliability of risk assessment results.



Table 2-2: Potential Results of the Evaluation of Alternative Mitigation Actions

This table illustrates the type of situations that may arise when evaluating mitigation actions. The intent is to help the planning team understand that the decision-making process can lead to a variety of different types of recommendations—from clear-cut actions to seeking more information to combinations of different actions. The point is that the planning team is highly unlikely to face a situation that has no prospects for any type of meaningful mitigation.

Situation	Example	Recommendation (What would you do?)
<p>1. A single preferred alternative action can be identified to meet an objective.</p> <p>In this situation, the community has sufficient data to provide a clear understanding of the nature of the problem, and an alternative action can be identified for which funding is readily available and all the necessary capabilities are in place. In addition, the alternative action is generally consistent with the needs and values of the community.</p> <p><i>Note: A desirable result, but the least common to occur.</i></p>	<p>For a hypothetical objective to "reduce flood losses" in a particular part of a community, an alternative might be to "acquire properties subject to repetitive flood loss and relocate structures to city-owned land."</p> <p>The ideal situation would include the availability of federal grant monies and local matching funds to acquire properties and relocate the subject structures to city-owned land. If this land is outside of the floodplain, is properly zoned, and can be deeded to landowners without the objections of the adjacent property owners, there should be no hesitation on the part of the community to select and implement this alternative.</p>	<p>Select the alternative.</p>
<p>2. Two or more alternative actions seem technically feasible and acceptable, but more data is needed to determine which is most appropriate.</p> <p><i>Note: A very common result.</i></p>	<p>Again for a generic objective to "reduce potential damage to critical facilities located in the floodplain," alternative mitigation actions could include:</p> <p>Alternative A: Relocate critical facilities in the floodplain to less hazard-prone areas.</p> <p>Alternative B: Retrofit critical facilities in the floodplain.</p> <p>In this situation, if the planning team does not have enough details about the condition of a particular facility to determine if it is a good candidate for relocation or would benefit more from retrofitting, they will be hard pressed to make the choice.</p> <p>The planning team could elect to recommend a study to assess the condition of the facility and then determine which action is most appropriate.</p>	<p>Identify a study to determine which alternative is most appropriate as an action item in the implementation strategy.</p> <p><i>Note: The time frame required for studies can vary widely. If the results of the study become available within the "planning horizon," then it would be appropriate for the planning team to take up the consideration of these alternatives as part of a process of periodic updates and refinements of the plan (see FEMA 386-4).</i></p>
<p>3. A low-cost alternative action is identified that is possible to accomplish immediately, but is not as effective and/or desirable as another alternative action that requires the acquisition of significant resources.</p> <p><i>Note: Another very common result.</i></p>	<p>For an objective to "protect structures in the urban/wildland interface," alternatives could very well include:</p> <p>Alternative A: Begin a public education campaign to raise awareness of the dangers of wildfires.</p> <p>Alternative B: Establish a fuel reduction program to assist property owners in the wildland/urban interface.</p>	<p>Select both alternatives.</p>



Table 2-2: Potential Results of the Evaluation of Alternative Mitigation Actions (continued)

Situation	Example	Recommendation (What would you do?)
	<p>While Alternative A is less effective, it builds support for Alternative B and has relatively small "hard costs."</p> <p>The planning team can choose to implement the public education campaign, while simultaneously taking steps (such as identifying funding, recruiting staff, preparing a best management practice guide, etc.) toward establishing a fuels reduction program.</p>	
<p>4. An alternative action is identified that is possible to accomplish, but is not desirable from the viewpoint of a portion of the community, while another less objectionable alternative action requires the acquisition of significant resources.</p> <p><i>Note: A common result that is the most difficult to resolve. These situations are the ones that test both the process and the participants.</i></p>	<p>For a specific objective to "preserve historic structures threatened by coastal erosion" (such as a historic lighthouse that has great cultural value to members of the community), alternative mitigation actions can include:</p> <p>Alternative A: Remove historic structures from the coast to safer ground.</p> <p><i>Note: This action would afford predictable protection but would permanently alter the historic character of the community. There are also concerns regarding funding and the ability to secure the technical expertise necessary for this option.</i></p> <p>Alternative B: Retrofit historic structures to avoid storm surge damage, thereby maintaining the historic character of the community.</p> <p><i>Note: This action will require the identification of other sources of funding (grants, donated materials, and in-kind labor); development of staff capabilities; and/or hiring a consultant with expertise in historic preservation. It may not be as effective in the long term in reducing potential damages to the lighthouse.</i></p> <p>In this case, the choice is not clear-cut. If properly designed, the planning team will represent a reasonable cross section of the community, and with adequate public input, will make the decision they feel is in the best interest of the community.</p>	<p>Select the alternative that best reflects the "will" of the community.</p>
<p>5. An alternative action is identified that is desirable in terms of the long-term sustainability of the community, but is opposed by the affected population and requires substantial funds to implement.</p> <p><i>Note: A common result.</i></p>	<p>An objective to "substantially reduce or eliminate flood losses" can result in the identification of an alternative to "acquire repetitive loss properties in high-hazard areas."</p> <p><i>Note: acquisition programs are voluntary and residents often resist this potential disruption of historic and family ties to their property.</i></p>	<p>Select the alternative and list it as both a pre- and post-disaster action.</p>



Table 2-2: Potential Results of the Evaluation of Alternative Mitigation Actions (continued)

Situation	Example	Recommendation (What would you do?)
	<p>This type of action is optimally initiated using pre-disaster funds, with the understanding that complete implementation may not occur until after a disaster. Homeowners may be opposed to moving or may want to prevent a patchwork of open lands and existing homes, but may be more willing to sell if their home is substantially damaged by a hazard event or if several people on the block are willing to sell. Often, the largest amount of funds a community, tribe, or state may receive for mitigation is after a disaster.</p> <p>The committee should still put the acquisition forward as a priority item for mitigation, with the understanding that they may not be able to complete the action until after a disaster.</p>	

2. Summarize and document recommended mitigation actions.

After you have evaluated the potential alternative mitigation actions, pull out from Worksheet #4 those actions that the planning team has determined to be appropriate for your community. Clean up the comment notes or expand them to explain any special circumstances that must be kept in mind in the next step. For example, if you found that one action is more effective when undertaken in conjunction with another, then note this fact.

3. Prioritize selected mitigation actions.

Now that the planning team has a list of acceptable and doable actions for your community, it's time to prioritize them. You may have identified a dozen actions for each of the hazards affecting your community and are now faced with deciding where to start when you may have more than 50 possible actions. You may want to review your goals and objectives to see if you decided from the onset to address a particular hazard first (e.g., flooding or earthquakes) if the risk assessment and loss estimate found that these occurred more frequently and caused major losses. You should also review and take into account the results of your efforts earlier in Task C, in which you evaluated the alternative mitigation actions appropriate to your particular hazards. You now know, given state and local capabilities, what it would take to implement the alternative actions you ultimately select. Some common ways to rank actions follow. Use **Worksheet #5: Prioritized Alternative Mitigation Actions** to complete this step.



You may want to refer to your composite vulnerability map

completed during your risk assessment to review the areas that are highly vulnerable to multiple hazards. One option is to move to the top of the list those actions that address these problem areas.



During this final step, the following considerations should be kept in mind when prioritizing your mitigation actions:

- **Ease of implementation.** To initiate and/or maintain interest in the planning process, particularly if support is tentative, you may want to select those actions that are easily implemented first. Initiatives such as media attention to hazards and risks cost little and reach a large number of citizens.
- **Multi-objective actions.** Some mitigation actions may work toward achieving multiple community goals. For example, an acquisition and demolition project can lead to new open space that provides additional natural storage for floodwaters. This solves the problem of repetitively flooded structures, which are now removed, and provides opportunities for recreational use such as hiking/biking paths.
- **Time.** To demonstrate more immediate progress, you may choose to initiate mitigation actions that are quickly accomplished over those that would take a long time to obtain the necessary approvals or funding to carry out the project. For example, if you decide to implement both riverine and coastal flooding mitigation actions, you may decide to address the riverine flooding first in areas where homeowners and businesses have already expressed an interest in reducing flood damage. After initiating riverine mitigation actions, you may then focus on mitigating coastal flooding in areas where the property owners are perhaps not as aware of the potential benefits of hazard mitigation, and therefore getting their cooperation may take time.
- **Post-disaster mitigation.** A number of potential mitigation actions being evaluated by the planning team may not be able to be implemented in the near term due to funding availability or political and social considerations. In a post-disaster scenario, however, the extent of damages, political will, and access to state and federal mitigation funds can dramatically alter the feasibility of implementation. The acquisition/demolition of flood-prone structures and relocation of residents outside of the floodplain is a prime example. In many cases, this mitigation action becomes more feasible after a disaster. Consider targeting specific mitigation actions for implementation following a major disaster.

A common way to rank actions is to have the planning team vote on the actions; this approach is termed “multi-voting.” All of the



mitigation actions under consideration must be listed so that the entire planning team can see them. Each team member is then given half the total number of potential actions to use as individual votes. See the following table as an example. Assume the planning team consists of nine people; because there are four actions, each member is given two votes to apply to the mitigation actions he or she feels are most important, resulting in a total of 18 votes. The action that receives the most votes is the highest priority; the item with the second most votes is the second priority, etc.

Multi-Voting Ranking

Mitigation Action	Number of Votes	Priority
Elevate structures.	3	3
Build a berm around park.	2	4
Acquire flood-prone structures.	8	1
Establish public education and outreach projects.	5	2
TOTAL NUMBER OF VOTES	18	

Numerical ranking is another way to prioritize mitigation actions. Again, all of the mitigation actions are listed and the planning team reviews the entire list. After careful evaluation, the members assign a numerical ranking to each action. You then add the ranks given to the action and the one with the lowest number is the highest priority. If there are a large number of actions and many people voting, you can average the rankings instead of counting each one. See the following table as an example of averaging the rankings. Assume that the planning team consists of four people and each person ranks all four actions from 1-4. The rankings for each action are added and then divided by the number of votes.

For example, in the following table, acquire flood-prone structures received three “1” votes and one “2” vote. These add up to five, which is then divided by four to equal 1.25. Since it is closest to the “1” rank, it becomes the first priority.



Numerical Ranking

Mitigation Action	Rank Given to the Measure	Sum of the Rankings	Average of Rankings	Priority
Elevate structures.	1,3,4,3	11	2.75	3
Build a berm around park.	4,3,4,4	15	3.75	4
Acquire flood-prone structures.	1,1,2,1	5	1.25	1
Establish public education and outreach projects.	2,3,2,2	9	2.25	2



Los Alamos County, New Mexico, experienced a major wildfire in 2000,

which led to the burning of approximately 48,000 acres. When developing its hazard mitigation plan, the county identified a number of objectives, including reducing direct exposure of individual structures to wildfires. For this objective, the

planning team examined several wildfire alternative mitigation actions and narrowed them down to two main alternatives. Several hundred houses were located in the high fire-hazard area. Due to the architectural style of the area, many houses had wood shake shingles as roofing material. The alternative considered was to replace all the wood roofs with fire-retardant shingles. The second alternative was to create defensible space around the houses by strategically managing vegetation to decrease the fuel available for fires adjacent to the structures. The planning committee weighed the cost, the necessary time frame, and the longer-term effects of both alternatives. The cost of the roof replacements was an order of magnitude higher than the vegetation management action, would take longer to implement, and still result in fuel close to the houses. The defensible space action was relatively inexpensive, could be accomplished quickly, and would be effective as long as the vegetation was managed. The defensible space action was determined to be the best solution for the county.



Worksheet #5 Prioritized Alternative Mitigation Actions

step 2

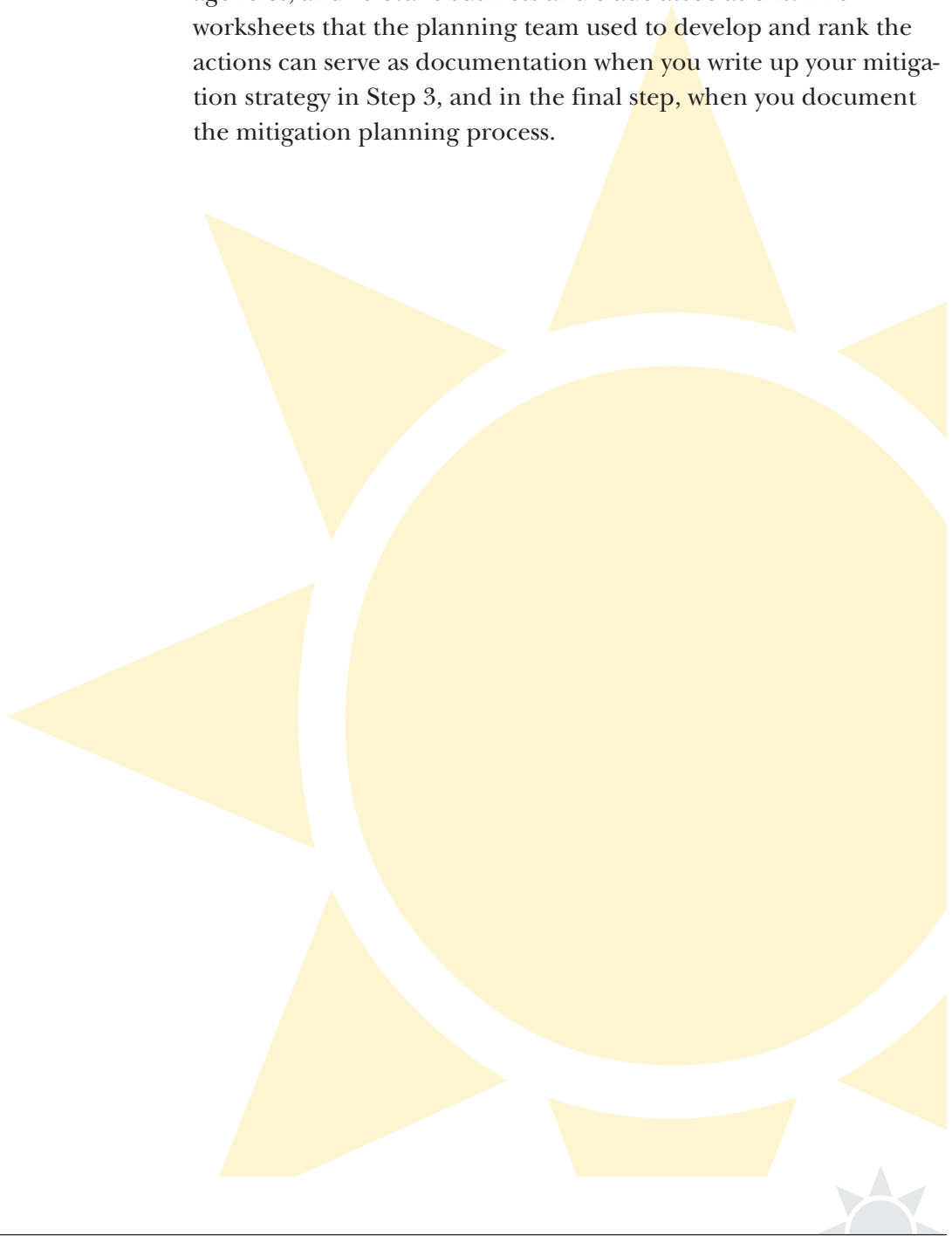
List the Alternative Mitigation Actions, in order of priority. Identify the goal(s) and corresponding objective(s) each action addresses, and note the sources of information for easy reference and any comments or issues to keep in mind when implementing the action. Note that the prioritized actions in this example cover more than one goal.

Alternative Actions (In Order of Priority)	Goal(s) and Objective(s) (From Worksheet #1)	Source(s) of Information (From Worksheet #1)	Comments (From Worksheets #1 and #4)
1. Acquire flood-prone structures	Goal: Minimize losses to existing and future structures within hazard areas. Objective: Reduce damages to the manufactured home park in the floodplain.	State Hazard Mitigation Officer	Effective for units with deepest potential flooding (4 feet). Some floodplain residents are just unwilling to sell. A number of elderly renters may be disproportionately affected because there are few affordable rental units in the community. Will need to seek outside funding.
2. Establish public education and outreach projects	Goal: Prevent destruction of forests and structures in the Urban Wildland Interface. Objective: Protect structures in the Urban Wildland Interface.	State of Emergency Dept. of Forestry	Educate homeowners on benefits of creating defensible space. Many defensible space tips are generally low-cost and easy to implement, and many homeowners have expressed a willingness to implement them. Benefits will not necessarily be widespread because it depends on homeowner's initiative to implement.
3. Elevate structures	Goal: Minimize losses to existing and future structures within hazard areas. Objective: Reduce damages to the manufactured home park in the floodplain.	Hazardville Dept. of Public Works	Suitable for structures in good condition. Cost of elevation may outweigh the expected losses to the home. Elevated structures can be more vulnerable to earthquakes, unless more bracing is used. Don't know what effect the action will have on older, less sturdy structures. Would need to determine structural integrity of older homes. Further study may be necessary.
4. Build a berm around park	Goal: Minimize losses to existing and future structures within hazard areas. Objective: Reduce damages to the manufactured home park in the floodplain.	Hazardville Dept. of Public Works	This option would only work in areas where flooding is less than 2 feet deep, according to our risk assessment. Best used for units that have not been purchased or elevated.



Summary

Once you have finished with this step, you will have a list of socially acceptable, prioritized actions that address the problems identified in your community or state. They will be technically and administratively feasible, politically acceptable, legal, economically sound, and not harmful to the environment. You will have consulted a variety of sources, and obtained input from the public, community planners, subject matter experts from appropriate government agencies, and relevant business and trade associations. The worksheets that the planning team used to develop and rank the actions can serve as documentation when you write up your mitigation strategy in Step 3, and in the final step, when you document the mitigation planning process.



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THORR Identifies Mitigation Actions

(Part 2 of a 4-Part Series on the Mitigation Strategy Process)

[Hazardville, EM] The Town of Hazardville Organization for Risk Reduction (THORR) has identified several mitigation actions to get Hazardville on the road to being disaster resistant. The mitigation actions were developed by five different workgroups consisting of a diverse group of citizens from all sections of town. Each workgroup was given one of the goals developed on February 4, 2002, and the accompanying objectives to help them develop mitigation strategies. The workgroups then researched each problem over the course of one month and developed a list of alternatives to solve the problem. In order to come up with viable alternative mitigation actions, each group gathered to discuss the goals and associated objectives, brainstorming to create a list of all possible mitigation actions to address the problems. Each idea was thoroughly discussed and debated within the group.

In the end, all of the alternative mitigation actions were evaluated based on the following criteria, known as STAPLEE:

1. **Social:** Is the action socially acceptable (is it compatible with present and future community values)?
2. **Technical:** Is the measure technically feasible?
3. **Administrative:** Does the community have the capability to implement and maintain the action?
4. **Political:** Is there public support both to implement and maintain the action?
5. **Legal:** Does the community have the authority to implement the proposed action?
6. **Economic:** Is the action cost-effective?
7. **Environmental:** Does this action affect the environment (land/water/endangered species)?

Based on concerns expressed by community members and a vote taken by THORR, it was decided that projects that would help solve the biggest and most recurring problems in the town should be addressed first. For example, since Hazardville is most likely to be affected by flooding, the first objective identified was to reduce damages to the manufactured home park in the

floodplain. The town has now made it a priority to buy houses that repetitively flood and to demolish them, leaving the land as open space. Mayor McDonald has proposed turning this open space into a greenway that the entire community can use, and would include a bike path and jogging trail running along the Raging River.

Some of the other actions discussed are, by order of priority:

- Establish a wildfire public education and outreach project;
- Elevate structures in the manufactured home park that are not purchased;
- Construct a berm around the manufactured home park to protect units subject to shallowest flooding;
- Reinforce the boardwalk to withstand storm surge damage;
- Eliminate potential fuels for wildfires;
- Retrofit older masonry buildings to withstand earthquakes; and
- Build retaining walls to limit landslides.

These actions are still important, but they have a lower priority than the floodplain property buyouts.



1 develop mitigation goals and objectives

2 identify and prioritize mitigation actions

3 prepare an implementation strategy

4 document the mitigation planning process

step

