

IS 2 Emergency Preparedness, USA

This independent study course contains information about natural and technological hazards. Participants are led through the development of personal emergency preparedness plans and are encouraged to become involved in the local emergency preparedness network. The text is accompanied by illustrations, maps, charts, and diagrams.

If you plan to use the course materials which are available on-line, you do not need to enroll at this time. You will enroll when you take the final exam.

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Unit 2: Part A of "EMERGENCY PREPAREDNESS U.S.A"	7.7 MB	6 printed pages with maps
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Final Exam for "EMERGENCY PREPAREDNESS U.S.A"	45 KB	7 printed pages

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FOOTER: FEDERAL EMERGENCY MANAGEMENT AGENCY



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Foreword

The Federal Emergency Management Agency (FEMA) is the central point of contact within the Federal government for a wide range of emergency management activities both in peace and in war. The agency has numerous roles, including assisting victims of major disaster events, coordinating government activities, providing planning assistance, guiding and advising various agencies, and delivering training.

FEMA's training program is delivered through the Emergency Management Institute and the National Fire Academy. These schools are located on a campus at Emmitsburg, Maryland. NFA is the national focal point for Federal efforts to advance the professional development of fire service personnel engaged in fire prevention and control activities. EMI provides emergency management training to enhance emergency management practices throughout the United States for the full range of potential emergencies.

Both the Emergency Management Institute and the National Fire Academy offer courses, workshops, and seminars on the campus at Emmitsburg, and nationwide through the Emergency Management Training program and State fire service training programs. Although most training activities are directed at State and local government officials with emergency management or fire protection responsibilities, some also are provided to private sector and volunteer audiences, as well as to the general public.

HOME STUDY COURSES

FEMA's home study program is one of the delivery channels the Emergency Management Institute uses to deploy emergency management training to the general public and to emergency management audiences. The Emergency Management Institute's home study program currently consists of thirteen courses.

These home study courses are geared toward both the general public and persons who have responsibilities for emergency management. All courses are suitable for either individual or group enrollment, and are available at no charge. Courses include a final examination, and persons who score 75 percent or better on the examination are issued a certificate of completion by EMI.

For additional information about these courses, contact your local or State Office of Emergency Management or write to:

FEMA Home Study Program
Administrative Office
Emergency Management Institute
16825 South Seton Avenue
Emmitsburg, MD 21727

In addition to the courses available through the Emergency Management Institute's home study program, the National Fire Academy offers a home study course titled *Wildland/Urban Interface Fire Protection*. The course is designed to provide individuals with the skills needed to assess local wildland/urban interface fire problems, recognize proven protection strategies, and put solutions to work protecting community and wildlands. This course may be purchased through the National Audio-Visual Center, 8700 Edgeworth Drive, Capitol Heights, MD 20743-3701, (301) 763-1896.



Introduction

THE PURPOSE OF THIS COURSE

What would you do if you found yourself in one or all of these situations?



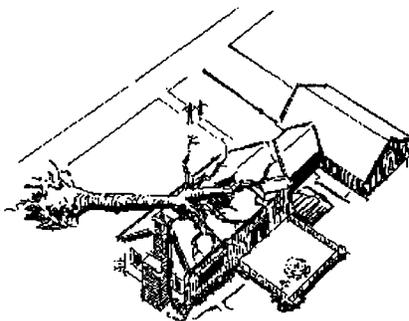
You are enjoying a quiet evening at home when you sense a vibration in the building. Your dog begins to whine. Suddenly your lamp starts to sway and books fall out of your bookshelves. Cracks appear in your ceiling. You realize that you are in an earthquake.

Would you know how to protect yourself and your family?



A freight train carrying hazardous chemicals derailed in your town and bursts into flames. News reports say that people are being evacuated from homes near the accident because deadly chlorine gas is leaking from a tank car. You feel safe since the accident is several blocks away, but late that night an emergency official comes to your door and you are told that the chlorine leak is endangering homes in your area and you must leave.

Would you know where to go and what to take with you?



A tornado has just struck your town. Your home is in shambles. All of your personal possessions have been destroyed. Your family and friends are scattered at different places in town. You need a place to go for shelter and food. You need to find your family.

Where would you go? What would you do?



You are buying a home, and have finally found the perfect house. It has everything that you want at a price you can afford. The house even has a beautiful view of a lovely river. Before you sign the contract, it occurs to you that if the river should flood, the house might be in the floodplain.

Should you buy it anyway? Is there anything you can do to protect the house? What would you do?



A nuclear power plant has begun to operate in your area. Opinions are divided about the benefits and dangers from the plant. Some people are strongly in favor of the plant. They argue that it provides clean power and cuts the high cost of electricity. Others object to the plant and insist that nuclear power is dangerous. They point to the accident at Three Mile Island as an example of our inability to handle nuclear power and radioactive materials.

Where would you turn for information? What are the dangers of such a plant? What safety measures are being taken for your benefit? If an accident did happen at the plant, would you know what to do?

This course is about dangers that threaten us in the United States. It is about emergencies caused by *natural events* such as earthquakes and floods, as well as those resulting from the *technologies* that provide us with comfortable homes, comfortable lives, foods, medicines, cars, and recreation.

The course is for people who are concerned. It is for people who:

- Want better answers to the questions that arise in the situations such as those just presented;
- Live in cities or places that flood or have earthquakes, hurricanes, tornados, blizzards, volcanoes, forest fires, extreme heat, or drought;
- Live near places where hazardous materials are manufactured, stored, or transported; or
- Are concerned about chemical spills, radioactive material dumps, nuclear power plant accidents, and national security threats.



This course is about emergencies that have the potential to occur in the United States, and how emergency management can help to prevent unnecessary loss of life and property.

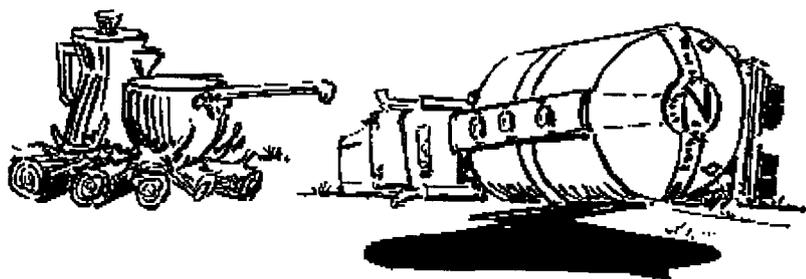
The course is about protection. It is about something called *emergency management*, which provides a *system* or *network* of protection from all kinds of emergencies. The course is about preventing the loss of life and property from emergencies. It is about what the government is doing to protect people, and what you should do to protect yourself.

The world we live in is dangerous. Earthquakes, tornados, fires, floods, hazardous chemicals, and nuclear wastes threaten us. But the world has always had dangers. Natural hazards have existed since the beginning of time, but humans have lived and prospered in spite of them. People have lived with technological dangers since fire was first used to keep people warm and to cook food. As our technologies have increased, however, so have the related dangers. Today we are as much concerned about chemicals and radioactive materials as we are about earthquakes and floods—perhaps more so.

You can choose how you wish to live with these dangers. One choice is to ignore them and to take chances with your security by leaving your safety completely in the hands of others. Another choice is to take steps to protect yourself. If you want to take steps to better protect yourself from hazards, this course can help.



Total protection from hazards cannot be provided by any government. Nor can individuals acting alone achieve complete security. The very word *disaster* is frightening. Government agencies at the Federal, State, and local levels have emergency management plans and procedures that can save lives and reduce damages. Your level of protection is affected by the emergency plans developed by your State and community. If you are prepared, you will be aware of features of those plans that affect you—such as the warning system your community would use—and will also have personal emergency plans to further ensure your safety.



Most technologies have associated hazards. Today's new technologies carry new hazards that we must be prepared to control through emergency management.

The purpose of this course is to help you prepare and protect yourself from the risk of major emergencies and disasters by teaching you how to recognize dangers, how you can help yourself, and how government agencies can assist you and your community.

Course Overview

The course has seven units.

Unit One—The Four Phases of Emergency Management introduces the activities of preparedness, response, recovery, and mitigation and addresses government and individual responsibilities for carrying out these activities.

Unit Two—Analyzing the Risks describes the major natural and technological hazards and provides information on how to analyze the risks from these hazards.

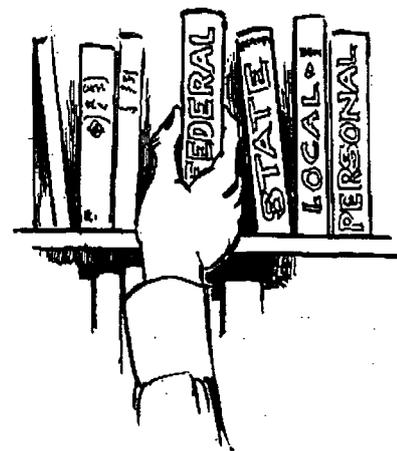
Unit Three—Natural Hazards: Applying the Four Phases discusses the types of actions that can be taken to protect against natural hazards.

Unit Four—Technological Hazards: Applying the Four Phases discusses the types of actions that can be taken to protect against natural hazards.

Unit Five—Preparing a Family Disaster Plan identifies the essential elements of a family disaster plan and provides exercises for developing such a plan.

Unit Six—Personal Action Plans: Where to Go Next provides information on available emergency services and how to access them, and discusses activities that the individual can do to share emergency preparedness knowledge.

Unit Seven—Emergency Management Review presents a review of the material covered in this course.



Planning is a key component of emergency management. Planning to deal with emergencies occurs at each government level—and should take place at the personal or family level as well.



How to Complete the Course

You will remember the material best if you do not rush through it. Take a break at the end of each unit and give yourself time to think about the material. Then take the quiz at the end of the unit, reviewing the relevant material if you missed any questions.

The course contains a *pretest*, seven units, a resource section to help you continue learning, and a final examination. You should take the pretest to evaluate your knowledge before you begin the course. You can score the pretest yourself, using the pretest answer key, to determine how much you know before you begin studying the course.

A *resource section* is included to help you continue learning after you have completed the course. This section features listings of recommended readings to assist you in obtaining additional information relevant to the course objectives.

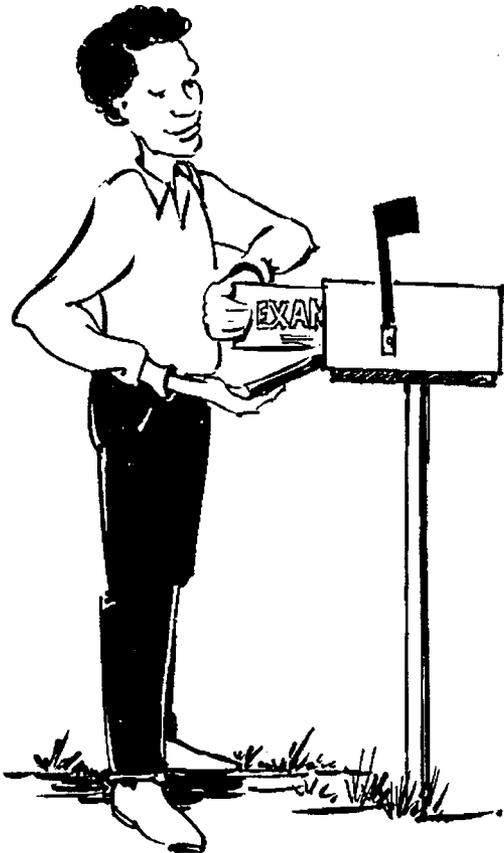
The *final examination*, located at the end of the course booklet, will test the knowledge you have gained from the course. An answer sheet is supplied with the course materials. Mail the completed answer sheet to the address on the form; your test will be evaluated and results will be mailed to you within a few weeks. If your score is 75 percent or above, a certificate of completion will be mailed to you. Interested students successfully completing the course may apply for one semester hour of college credit through the FEMA Home Study Program Office.

How to Take the Pretest

The following pretest is designed to evaluate your current knowledge of emergency preparedness. Read each question and all of the possible answers carefully before you mark your answer. There is only one correct answer for each test item. Mark the answers by circling the correct response or by following the directions in specific questions.

There are 22 questions on the pretest. The test should take you approximately fifteen minutes. Find a quiet spot where you will not be interrupted during this time.

After you have checked all of your answers with the key on page A-1, begin reading Unit One.





PRETEST: EMERGENCY PREPAREDNESS U.S.A.

(Answers on page A-1)

- 1 - 4. What phase of emergency management does each of the following illustrate? Write the letter of the correct answer to the left.
- a. Preparedness b. Response c. Recovery d. Mitigation
- ___ Making an evacuation plan
 - ___ Getting financial assistance to make repairs after a disaster
 - ___ Seeking shelter from a tornado
 - ___ Buying flood insurance if you live in a flood-prone area
5. Which of the following is an example of a technological hazard?
- a. Drought c. Forest fire e. Flood
b. Chemical spill d. Blizzard
6. Where in the United States can tornados occur?
- a. In any State
b. Only in the midwest
c. Only in the "dust bowl"
d. Only in open, relatively unpopulated areas
7. Communities with new development may experience an increased potential from what hazard?
- a. Earthquakes from disturbed fault lines
b. Tornados resulting from atmospheric changes
c. Floods caused by urban drainage problems
d. Drought as a consequence of vegetation removal
8. A difference between natural and technological hazards is that natural hazards
- a. Are more likely to affect urban areas.
b. Often can be predicted.
c. Are more likely to affect rural areas.
d. Are more likely to result in property damage.
9. A symptom of heat exhaustion is
- a. Cold, pale, clammy skin.
b. High body temperature.
c. Painful spasms in the muscles.
d. Redness and pain.
10. What measure should a community take to reduce the dangers from flood waters?
- a. Encourage development of in-house shelters.
b. Require provision of soil analysis in real estate transactions.
c. Establish a mutual-aid agreement with the fire department of neighboring communities.
d. Enact and enforce local zoning laws and ordinances requiring wise construction practices for new buildings in special flood hazard areas.
11. Which of the following might an individual do to mitigate against the effects of a severe thunderstorm?
- a. Stockpile food and water.
b. Stay inside your house away from windows.
c. Move to the basement.
d. Build a storm shelter in the basement.
e. Install lightning rods.



12. Which of the following agencies issues a warning for a probable volcanic eruption?
 - a. Environmental Protection Agency
 - b. U.S. Geological Survey
 - c. Federal Emergency Management Agency
 - d. National Weather Service
 - e. National Oceanic and Atmospheric Administration
13. What hazard stemming from an accident at a nuclear power generating plant might threaten a community?
 - a. Flooding
 - b. Chemical spill
 - c. Earth tremors
 - d. Release of radioactive gases
14. Which of the following is a difference between technological and natural hazards?
 - a. Warning signs for technological hazards may be evident only to trained personnel.
 - b. There is less time to respond to technological hazards.
 - c. Technological hazards are more life-threatening.
 - d. Technological hazards generally do less damage.
15. Legislation passed by Congress in 1986—Title III of the Superfund Amendments and Reauthorization Act—includes which of the following provisions?
 - a. Hazardous materials cannot be stored in communities without permission.
 - b. Each community must establish a Local Emergency Planning Committee under a statewide system.
 - c. Extremely hazardous substances are banned from rural areas.
 - d. Transportation of certain dangerous substances is banned anywhere in the U.S.
16. If you are caught in a hazardous materials accident and the wind is coming *from* the accident, you should move
 - a. Toward the wind.
 - b. Away from the wind.
 - c. Sideways to the wind.
17. Your home is located in an area where flash flooding frequently occurs. Which of the following is the most important element of your family disaster plan?
 - a. Plans for evacuation
 - b. Plans for safely staying at home
 - c. Stocking supplies
 - d. Conducting damage assessment
 - e. Fire insurance
18. Which of the following should be included in your family disaster planning?
 - a. Regular family fire drills
 - b. Plans for evacuation
 - c. Determining where to meet other family members after a disaster
 - d. Teaching children to summon help in an emergency
 - e. All of the above



19. Which of the following is the goal of emergency management?
 - a. Provide protection for citizens, property, and government from all hazards.
 - b. Develop preparedness plans for dealing only with natural hazards since these represent the greatest risk.
 - c. Support the adoption of legislation that would authorize the Federal government to assume all responsibility for emergency management.
 - d. Encourage communities to develop preparedness plans after disaster strikes and the real need for planning exists.

20. A hurricane comes inland, flooding several counties of a coastal State and destroying many homes. If Federal funds are required, who declares the area a disaster and releases Federal assistance funds to help the needy families?
 - a. Local emergency manager
 - b. State emergency manager
 - c. President of the United States
 - d. Federal Emergency Management Agency Director
 - e. Governor

21. A severe thunderstorm appears to be approaching your area. You hear that tornados struck other parts of the State earlier that afternoon. How can you keep informed of possible dangers to your community?
 - a. Contact the Civil Air Patrol.
 - b. Call the sheriff's department.
 - c. Call the fire department.
 - d. Listen to local news reports on your radio or television.

22. One way your local fire department can assist you in an emergency is by fighting fires. Another service provided by nearly all fire departments is
 - a. Providing fire prevention information.
 - b. Controlling crowds in time of disaster.
 - c. Issuing emergency weather warnings.
 - d. Conducting environmental impact studies.
 - e. Planning evacuation routes.

END OF PRETEST

1

The Four Phases of Emergency Management

In this unit, you will learn

- The four phases of emergency management,
- General activities that should happen in each phase of a disaster,
- Government responsibilities for emergency management, and
- Different types of emergency management activities performed by government officials.

WHAT ARE THE FOUR PHASES?

Typical emergencies that can occur in your home can illustrate the four phases.

- First, you prepare to protect yourself or others if an emergency occurs.
- If an accident does happen, you administer first aid or get medical attention if necessary.
- Later, you clean up or repair any damage.
- Finally, you ask yourself how the accident happened and how it can be prevented from happening again. You take steps you believe would lessen the problems you experienced handling the accident.

Let's illustrate these four phases with a common example.

Your young son falls down the stairs and is injured. You check his injuries and find that they are serious. You make the child comfortable and safe, but you know you should not move him. You remove any broken toys from the stairs to prevent other accidents. You immediately call the emergency number posted by your telephone. Your child receives medical attention and treatment for his injuries. You clean up the mess on the stairs. You later find out that the accident happened because your other child left toys on the stairs. Now you make sure that everyone in your family is told not to leave objects on the stairs. You also are careful to check the stairway more often, especially after your children have been playing.

When you respond to emergency situations or dangers in this manner, you are practicing emergency management.

- You had *prepared* yourself to handle emergencies (by learning basic first aid and posting the emergency number) and you knew what to do (check the extent of the child's injuries and get medical aid).
- When the emergency occurred, you



(Left) When an emergency occurs, appropriate actions must be taken to protect people and property from harm. In the case of this household injury, such action would include summoning help. (Right) By teaching his child not to leave toys on the stairs, this parent is seeking to avoid future emergencies.

reacted responsibly (observing the seriousness of the injury, making your child comfortable and safe, and removing broken toys from stairs and calling emergency medical service).

- Once the immediate emergency was over, you *repaired any damage* (cleaning up the mess and broken toys).
- Then you looked for ways to *avoid future emergencies of this type* (teaching family members to pick up things from stairs, and checking stairs often).

Emergency management includes each of these four activities. Emergency management is preparing to handle an emergency appropriately, acting in a responsible and helpful way, repairing the damage, and taking steps to prevent or lessen the harmful effects of future emergencies.

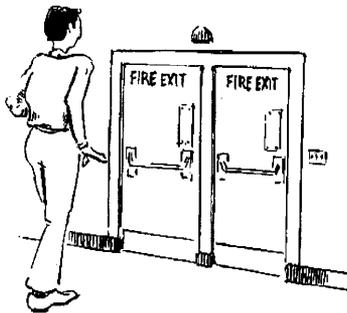
<h2 style="margin: 0;">The Four Phases of Emergency Management</h2>	PREPAREDNESS	Preparing to handle an emergency
	RESPONSE	Responding safely to an emergency
	RECOVERY	Recovering from an emergency
	MITIGATION	Preventing future emergencies or minimizing their effects



Preparedness is knowing the warning signs and what to do during an emergency. A fire drill is an example of preparedness.

Let us examine each of the four phases in more detail.

One way to protect yourself is to *be prepared* for emergencies before they happen. You can prepare yourself by learning what to do for the specific type of emergency that may occur. Another way to protect yourself is by learning the danger signals, so that you will be able to identify trouble when it happens. Having plans for what to do, where to go, or who to call for help before an event occurs will improve your chances of acting responsibly during an emergency. For instance, posting your community's emergency telephone numbers, holding fire or tornado drills, and installing smoke detectors are all preparedness measures.

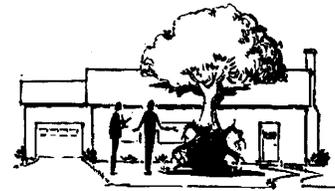


Response is taking the actions necessary to protect yourself from harm during an emergency. Leaving a building through a designated exit during a fire is an example of response.

Your safety and well-being in an emergency depend not only on how prepared you are by knowing what to do, but also on how you *respond or act* in a crisis. Emergencies can create fear and panic in people if they do not know how to respond. If you are prepared with a planned set of steps to take, you will know what to do and where to go for safety and help, even if you are frightened. By being able to act responsibly, you will be able to protect yourself, your family, and others around you. Taking cover in an earthquake and escaping a burning building are both examples of safe response.

After an emergency has happened and the immediate danger is over, your continued safety and well-being will depend on your ability to *recover*. After an illness you have a recovery period when your body repairs itself and returns to normal. During this recovery period, you must take care of yourself to prevent further illness. There is also a recovery period following an emergency when your family or home must be brought back to normal. If your home has been damaged, you will want to make repairs and return to normal as quickly as possible.

Although some emergencies can be prevented, some cannot. *Mitigation* includes preventing those emergencies that can be prevented, and reducing the damage and danger to life caused by those emergencies that cannot be prevented. For example, to mitigate fire in your home, you would follow safety standards in selecting building materials, wiring, and appliances. But no matter how much care you take, you know that an accident involving fire could happen. To protect yourself from the costly burden of rebuilding after a fire, you should obtain fire insurance. These actions are examples of mitigation because they reduce the danger and damaging effects from fire.



Recovery is what you do after an emergency to return to your normal life and to make yourself safer. Undertaking home repairs is an example of recovery.

Ideally, mitigation should take place before an emergency happens in order to prevent or lessen the damage. Frequently, however, steps to prevent or mitigate the affects of emergencies are not taken until an emergency has already occurred, when repairs are being considered. Thus mitigation is related to both recovery and preparedness.

Before you continue, let's review the four phases of emergency management. These terms will be used throughout the rest of the course.

Preparedness

includes *plans or preparations* made to save lives and to help response-and-rescue operations. Evacuation plans and stocking food and water are both examples of preparedness. Preparedness activities take place **BEFORE** an emergency occurs.



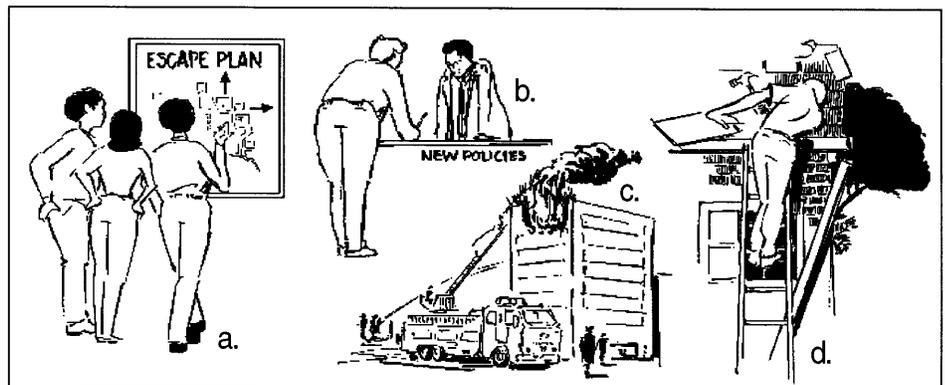
Mitigation is preventing emergencies or taking actions to lessen the harmful effects of unavoidable emergencies. Purchasing insurance is an example of mitigation.

Response

includes *actions taken* to save lives and prevent further property damage in a disaster or emergency situation. Response is putting your preparedness plans into action. Seeking shelter from a tornado or turning off gas valves in an earthquake are both response activities. Response activities take place **DURING** an emergency.

Recovery

includes actions taken to *return to a normal or even safer situation* following an emergency. Recovery includes getting financial assistance to help pay for the repairs. Recovery activities take place **AFTER** an emergency.



Mitigation

includes any activities that *prevent* an emergency, *reduce the chance* of an emergency happening, or *reduce the damaging effects* of unavoidable emergencies. Buying flood and fire insurance for your home is a mitigation activity. Mitigation activities take place **BEFORE** and **AFTER** emergencies.

Which of the four phases of emergency management is illustrated by each of the above drawings? Answer: (a) preparedness, (b) mitigation, (c) response, (d) recovery

CHALLENGE EXERCISE: The Phases of Emergency Management

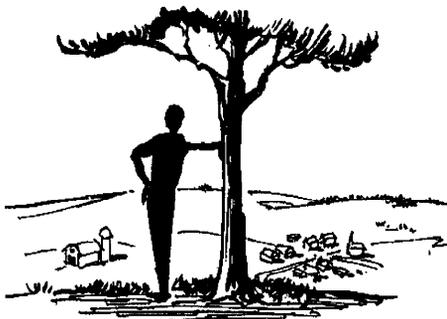
To help you review the four phases of emergency management, complete each statement by filling in the blank with the correct answer from the four choices given below. (Answers on page A-1)

MITIGATION PREPAREDNESS RESPONSE RECOVERY

1. Planning what to do in an emergency is called _____ .
2. Action taken to protect yourself and others during an emergency is called _____ .
3. Repairing damages caused during an emergency and returning to normal life is called _____ .
4. Preventing emergencies is called _____ .
5. Taking steps beforehand to reduce the amount of danger and damage from potential emergencies is called _____ .
6. The phases of emergency management that should take place *before* a disaster are called _____ and _____ .
7. The phases of emergency management that should take place *during* or *immediately after* an emergency are called _____ and _____ .

EMERGENCY MANAGEMENT AND GOVERNMENT

The four phases of emergency management can be applied to all emergencies, whether they are minor accidents or major events. In your home, you have yourself, your family, and your personal property to protect. In your community, your local government must see that the lives and property within the community are protected when an emergency strikes. In addition, the industry, agriculture, commerce, and other elements of your community's economy must be preserved. In other words, everything that makes your community function must be protected from harm. Government activities are designed to provide such protection.



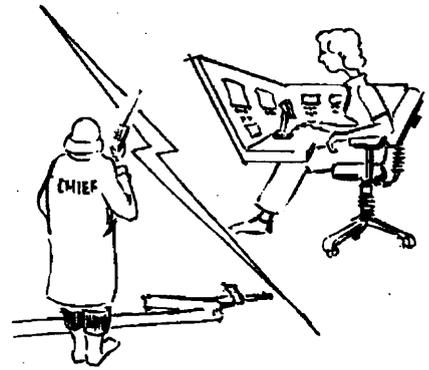
While you alone cannot prevent or lessen the impact of major disasters that may occur in your community, you can take appropriate actions at the household level to protect family and property.

Emergency Management

You can identify and remove potential hazards or mitigate against other hazards in your home by establishing safety measures. But, acting alone, you cannot prevent or lessen the impact of major emergencies that may happen in your community.

Major emergencies can cover several jurisdictions and may require large-scale government and voluntary agency response. Coordinated plans must be made to prevent or mitigate the effects of emergencies, and to save lives and property in an emergency. When an emergency threatens, hundreds of people

need to be warned and protected. Emergency services must be ready to care for the injured and to give shelter to those who cannot remain in their homes. Communications systems must be in place, and someone must direct the response activities. There must be ways to assess the damage caused by the emergency, to return people safely to their homes after the danger has passed, and to help people and businesses return to normal as soon as possible. Efforts must be made to increase safety in the face of future emergencies. This nationwide protection process, which encompasses all four phases of activities—mitigation, preparedness, response, recovery—is called *emergency management*.



Local jurisdictions must have effective communication systems in place for both minor and major emergencies.

Achieving a comprehensive network of emergency management involves systematic planning on the part of local, State, and Federal governments and voluntary agencies to identify the potential hazards that could threaten each community, and apply the four phases of emergency management to develop sound emergency plans for each potential hazard. Each community should be prepared to use local resources appropriately to prepare for and deal with each emergency. When local resources are not adequate, communities should be prepared to coordinate with other local and State governments to share resources needed to protect citizens, property, and government in the event of any large-scale emergency.



Training programs for emergency management personnel are extremely important in ensuring preparedness.

Achieving Emergency Management

This course is about emergency management and how to achieve it. As you complete each unit you will be applying emergency management strategies to analyze your hazard risks, identify the unique aspects of each potential hazard, and develop a family disaster plan to help you respond to the hazards that threaten your community. Your plans will include mitigation activities, ways to receive warning, means of communication with both your family and local officials in time of emergency, response actions based on the unique characteristics of the hazards, and typical recovery activities. Your plans will be flexible enough to help you respond safely to the unique characteristics of particular hazards and emergencies. When you finish the course, you will also know what you need to do to improve your preparedness and where to go for help.

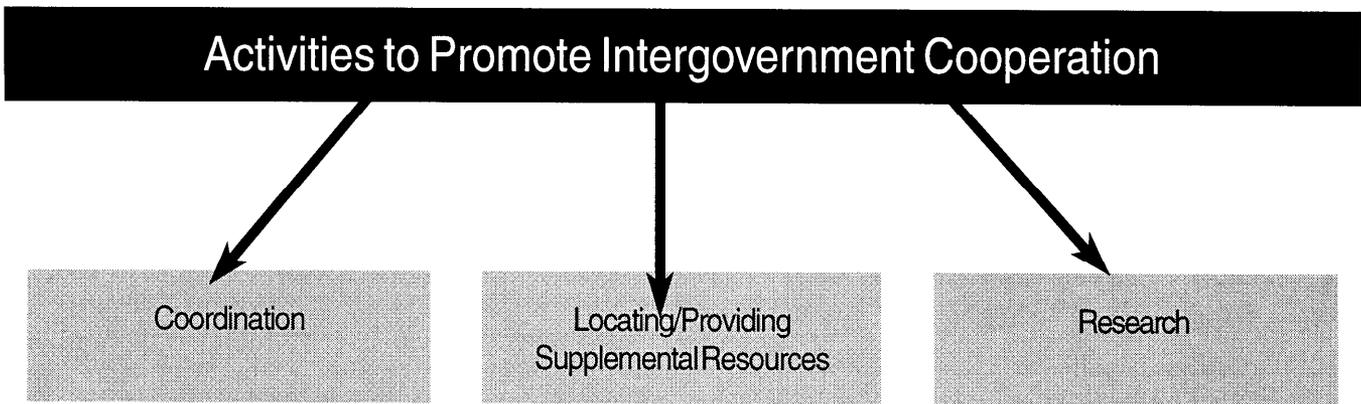
On a larger scale, these same principles are applied to attain the goal of national emergency management. The difference is that local, State, and Federal officials are working together to provide protection for millions of citizens. They also are working within local and State governments, which differ in their needs, resources, laws, and policies regarding emergency management. Each person who takes this course will have plans that are similar, but each plan will be unique to the person and to the community and State in which that person lives. In the same way, each community and each State has both common emergency management requirements and unique needs based on potential hazards and the resources available to protect people, property, and government.

You need to know how emergency management works at government levels so that you can coordinate your personal preparedness plans with local plans. This coordination is a basic emergency management principle, and as you proceed with the course you will understand why it is so important.

Government Activities

In order to better understand the importance of your role in emergency management and how you as an individual are part of the national emergency management system, you should know the steps each level of government takes to ensure your safety and protection. Emergency management at all government levels involves many activities. Some of these activities are designed to promote efficient cooperation among the various government levels. Activities in this category include coordination, locating and providing supplemental resources, and research.

- *Coordination of plans and preparedness activities* are necessary to avoid conflict and inefficient use of people and resources. State plans must be coordinated so that various activities do not interfere with one another. Community and county plans cannot be in conflict with State plans. The coordination of all emergency services and resources is essential in working toward the common goal of effective emergency management. Each State has a State emergency management office constituted by Federal and State laws with responsibility to assist in this coordination effort.
- *Supplemental resources* such as money, equipment, or personnel help to close the gap between the capability needed by a community and its actual capability to protect citizens in an emergency. Supplemental resources can benefit States, communities, and individuals, and they can be provided in several ways. One example of supplemental resources is Federal disaster assistance grants and loans. Another example is mutual aid agreements made between fire departments in neighboring communities to help each other in a fire emergency too large for one department to handle alone.
- *Research* provides up-to-date information on mitigation, preparedness, response, and recovery activities. This research is usually funded at the Federal level. States, local communities, and individuals all benefit as new information is made public. One example is research that produces new designs and proper construction for dams, which leads to fewer dam failures.

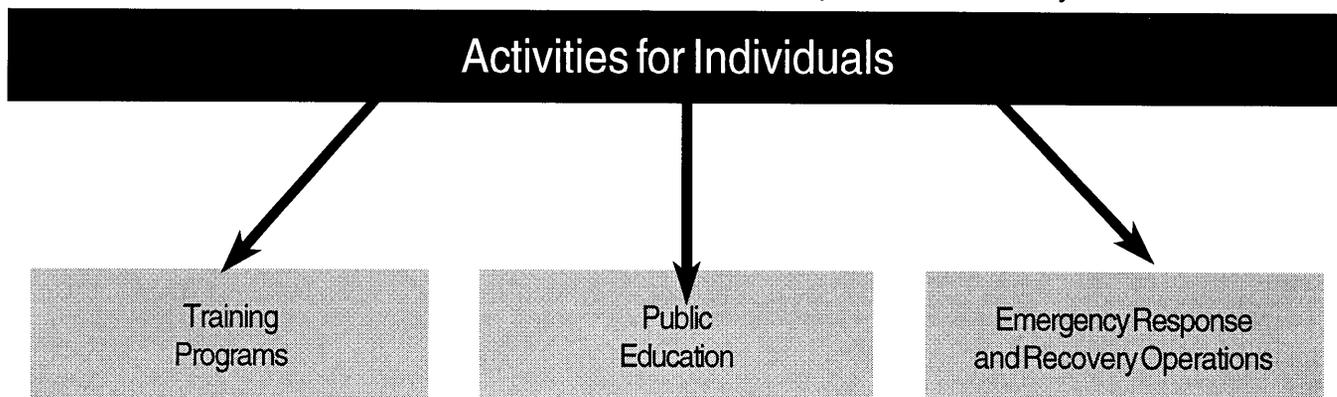


Government Activities and You

The three activities just described involve cooperation among levels of government. The following emergency management activities relate more directly to individuals and to their participation in government-sponsored emergency management activities.

- *Public education* includes publication of printed materials and news articles, broadcasts, public service announcements, meetings, and courses such as this one. These activities are organized at all government levels. Education can help prepare the public to protect itself from hazards by encouraging active participation in emergency management.

- *Training programs* are developed to provide emergency personnel and volunteers with information and skills needed to protect the public. Many training programs involve exercises to give emergency management personnel a chance to practice their skills. These programs help keep the emergency management work force, from full-time paid personnel to part-time volunteers, aware of the latest research and procedures.
- *Disaster response and recovery operations* include warnings, evacuation, sheltering, search and rescue, and cleanup activities. A prepared public and trained emergency management personnel should work together during disaster operations for safe and effective response and recovery.



These activities take place at all government levels. Let's look more closely at the specific emergency management responsibilities of the local, State, and Federal governments.

Government Responsibilities

Local governments make plans and provide resources to protect their citizens from the hazards that threaten their communities. Local government serves as the link between you and the State and Federal agencies in the emergency management network. Local government has the responsibility to protect citizens from any emergency that strikes the community. This is done through mitigation activities, preparedness plans, response to emergencies, and recovery operations. Although communities differ widely, the responsibility for protecting the citizens and property of any community remains with local government. Wherever you live within the United States, a county or municipal agency has been designated as your local emergency management agency.

In emergency management, this saying applies: "Responsibility begins at home." You are responsible for protecting yourself, your family, and your property to the best of your ability. This means using your own resources to mitigate against, prepare for, respond to, and recover from personal emergencies.

However, since individuals cannot be expected to have sufficient resources to adequately protect themselves from major emergencies, the community assumes responsibility for protecting its citizens. Your local government helps to protect you through the following activities:

- Identifying hazards and assessing their potential risk to the community;
- Determining the community's capability to mitigate against, prepare for, respond to, and recover from major emergencies;
- Identifying and employing methods to improve the community's capability through efficient use of resources, improved coordination, and cooperation with other communities and with the State and Federal governments;
- Establishing mitigation measures such as building codes, zoning ordinances, or land-use management programs;
- Developing and coordinating preparedness plans;

1 Emergency Preparedness U.S.A.

- Establishing warning systems;
- Stocking emergency supplies and equipment;
- Educating the public and training emergency personnel;
- Activating response plans and rescue operations;
- Ensuring that shelter and medical assistance is provided;
- Assessing damage caused by the emergency; and
- Recovering from the emergency and helping citizens return to normal life as soon as possible.

If a community or group of communities does not have sufficient resources to provide adequate protection for its citizens, the local government can ask for assistance from the State or Federal government. Many Federal programs have been set up to give additional help, especially to communities with major and continuing problems such as floods and earthquakes. In addition, communities and States are encouraged to develop cooperative agreements to share resources and to make more efficient use of the resources they do have.

At the *State level* of government, a State emergency management office is involved in protecting communities and citizens within the State. The State office carries out statewide emergency management activities and helps coordinate emergency management activities involving more than one community. In addition, the State may assist individual communities when they need help. If any community lacks the resources needed to protect itself or to recover from a disaster, the State may help with money, personnel, or other resources.

Such financial assistance is made available on a supplemental basis through a process of application and review. If community resources are insufficient, the local government may apply to the State for State assistance. The governor reviews the application, studies the damage estimates and, if appropriate, declares the area a State disaster. This official declaration makes State resources available. However, if damages are so extensive that the combined local and State resources are not sufficient, the governor applies to the President for Federal disaster assistance. A similar assessment of the application and damage estimates is made. If the need for Federal assistance funds is justified, the President issues a major disaster declaration and resources are made available. This system ensures that State and Federal assistance is used wisely and fairly, and that individual disaster victims' needs are met.

Different State emergency management offices often have varying names and procedures for operating. Office titles commonly used include Emergency Management, Civil Defense, Civil Preparedness, and Disaster Services. In this text, the term emergency management is used to refer to these State offices. By whatever name, each State office is involved with mitigation, preparedness, response, and recovery activities within the State. The State is the pivotal point between policy guidance and resources available at the *Federal level* and the implementation of comprehensive emergency management programs at the *local level*.



When a local jurisdiction lacks the resources to protect itself or to recover from a disaster, the State may help with money, personnel, or other resources.

At the *Federal level* of government, the Federal Emergency Management Agency (FEMA) is involved in mitigation, preparedness, response, and recovery activities. FEMA helps the States in several ways. It provides training programs and research information on the latest mitigation measures, and reviews and coordinates state emergency plans. It also provides financial assistance, coordinates services for disaster response and recovery activities, and makes flood insurance available to individuals and businesses in communities that join the National Flood Insurance Program. By subsidizing State and local offices of emergency management, FEMA assists States in maintaining emergency management programs. FEMA also provides guidance and coordination for plans to warn and protect the nation in national

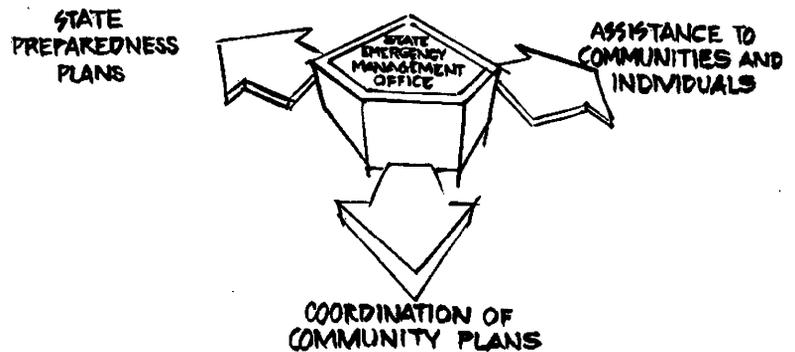
security emergencies.

Additionally, the Federal government, through FEMA, provides *supplemental* resources when communities and States do not have sufficient resources to protect or assist their communities and citizens following a disaster. This assistance is intended to help restore essential services that can get the local economy going again, and to meet disaster-related needs of individuals.

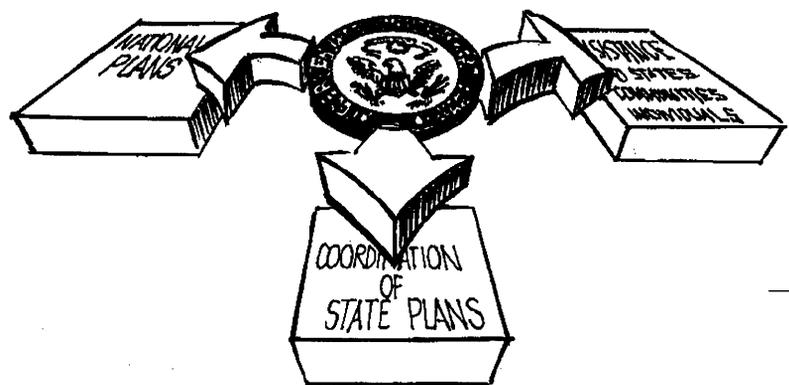
In summary, the goal of emergency management is to provide protection from all hazards for the citizens, properties, and governments within the United States. Effective emergency management includes a functional approach to all emergencies, cooperative planning, appropriate use of resources, and shared responsibilities among the three levels of government.

- The local government is responsible for emergency planning response and continued assessment of its ability to protect citizens and property within the community.
- The State government is responsible for assisting the communities within the State by reviewing plans and providing guidance. The State government also makes plans and assesses its capability to provide protection from large-scale, statewide disasters.
- A State will assist communities within the State that do not have adequate resources to protect themselves or to recover from disaster.
- The Federal government is responsible for assisting the States by reviewing plans, providing guidance, and making plans and assessing its capability to provide protection from large-scale disasters. It supplements State assistance when State and local resources are insufficient to help recovery.

Throughout this course you will learn about major emergencies and how governments at all levels are prepared to respond. You'll learn to follow the same basic steps to safety that your local and State governments follow. The goal of this course is to encourage and prepare you to follow emergency management activities in your own home, because that is where the whole system begins.



State emergency management offices prepare plans for the State, coordinate community plans, and provide disaster-related assistance to communities and individuals.



The Federal Emergency Management Agency (FEMA) provides many services to promote sound emergency management nationally—including coordinating disaster plans at the national level, coordinating with States on planning issues, and assisting States, communities, and individuals through specific disaster-related programs.

CHALLENGE EXERCISE: Responsibilities of Levels of Government

To find out if you understand how the responsibility for your protection is divided among the three levels of government, indicate the level of government—local, State, or Federal—that would be responsible for each of the following activities. (Answers on page A-2)

1. Evacuating an elementary school in your town that is threatened by a chemical spill.
2. Providing resources to help your State recover from a Presidentially declared disaster.
3. Coordinating the evacuation of towns and communities threatened by a hurricane.
4. Establishing zoning laws to regulate home building in a dangerous flood area.



CENTERVILLE: THE FOUR PHASES IN ACTION

To understand how emergency management is applied at the local level and how it relates to you as an individual, let's look at an imaginary community and some of its emergency management activities. We'll call the community Centerville. It is a medium-sized town of 20,000 people, located alongside a river.

One of the major hazards that threatens Centerville is flooding. Centerville joined the National Flood Insurance Program (NFIP) by adopting a local ordinance to regulate building activities in the flood-prone areas. Since Centerville is participating in the NFIP, any resident or property owner is eligible to purchase Federal flood insurance. The Centerville Town Council appointed an emergency manager to prepare plans for handling the flooding problem. These plans included a warning system, evacuation plans, and emergency response teams to help move people to safety from the low-lying areas of the community. The emergency manager distributed flood preparedness information, presented public and school programs on flood hazards and preparedness, and encouraged citizens who lived within the community to buy flood insurance provided by the National Flood Insurance Program through property insurance companies and agents. The local government and the Red Cross pre-identified shelter sites and offered first aid and shelter management courses to the public. In cooperation with the National Weather Service and the State, Centerville installed a series of river gauges at certain points along the river to monitor water levels. This provided an advance warning system.

One spring, a major flood struck Centerville. Warnings were issued, and response teams quickly followed emergency plans and procedures. Citizens in threatened areas were evacuated to Red Cross emergency shelters; no lives were lost and only minor injuries occurred. However, damage to homes, businesses, and farmlands was heavy.

The amount of damage and economic loss was quickly estimated by local disaster assessment teams. Centerville's emergency manager reported the damage assessment to the mayor of Centerville. The mayor contacted the State's Office of Emergency Management and gave the damage report. The State, in turn, contacted the Federal Emergency Management Agency with the damage report, and requested a joint Federal, State, and local assessment. Based on the results of the joint assessment, the Governor requested a Presidential declaration of major disaster through FEMA. The President declared Centerville a major disaster area and authorized release of Federal disaster assistance funds.

FEMA, in coordination with the State and local governments and the Red Cross, established a Disaster Application Center in Centerville where its citizens and business owners applied for disaster relief funds. After applications were reviewed, disaster relief funds from the Federal government were distributed to disaster victims and local jurisdictions.

Those citizens of Centerville who had purchased a flood insurance policy contacted their insurance agents and had the damage assessed immediately. Flood insurance claims were paid quickly, and flood victims began to rebuild in ways that made their property less prone to damage in the next flood. In a few months, Centerville homes and businesses were safer than ever. *How were the citizens of Centerville protected?*

Before a Flood Emergency...

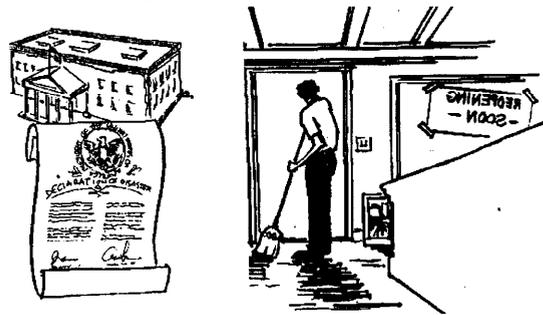
- The local government knew that flooding was a hazard.
- Plans were made to protect people and property in the event of flood.
- A floodplain management ordinance was adopted and enforced.
- A warning system was established.
- Citizens were informed of the risk of floods and were encouraged to buy flood insurance.



Centerville's leaders were aware of the town's vulnerability to floods. The town installed a series of river gauges to monitor water levels and provide an advance warning system.

During the Emergency...

- Warnings were issued.
- Everyone knew what to do.
- The plans made earlier were put into action.
- People were evacuated quickly.
- Shelters were prepared.
- Medical and health services were available.



(Left) The President declared Centerville a major disaster area and authorized release of Federal disaster funds. (Right) Centerville's preparedness—and a willingness to help at the State and Federal levels—helped it to recover from a major emergency.

After the Emergency...

- Damage to property was quickly assessed, and insurance claims were promptly paid.
- Governments (local, State, and Federal), disaster relief organizations such as the Red Cross, and individual citizens worked together to help Centerville recover.

Emergency management is the responsibility not only of the government, but also of individuals like you. By working together and participating actively in emergency management activities, protection from harm and costly damage is possible.

HOW WELL HAVE YOU LEARNED?

Unit One Review

(Answers on page A-2)

Answer each of the following questions by placing a check next to the *best* response.

1. Immediately following an explosion in your small town, fires are extinguished, the injured are cared for, and crowds are controlled. Which level of government is responsible for these activities?
 a. Federal
 b. Local
 c. State
 d. Regional
2. Which of the following should be accomplished *before* an emergency occurs?
 a. Put emergency response plans into action.
 b. Evacuate persons from the threatened area.
 c. Seek emergency help (medical, fire, rescue, or police).
 d. Learn about hazards that could threaten the community.
3. Your local chapter of the Red Cross and emergency management office hold scheduled public meetings to teach the citizens how to prepare themselves for hurricanes. This is an example of which emergency management activity?
 a. Coordination of plans and preparedness
 b. Public education
 c. Training of emergency personnel
 d. Applying mitigation methods
4. Once a year, emergency management personnel in your community practice responding to a major emergency. This is an example of which emergency management activity?
 a. Assessing potential risk
 b. Public education
 c. Training of emergency personnel
 d. Applying mitigation methods
5. What level of government is responsible for establishing mitigation measures such as zoning ordinances?
 a. State
 b. Federal
 c. Local
 d. Regional

2

Analyzing the Risks

In this unit, you will learn

- Descriptions of the major hazards,
- Related hazards that can be caused by another hazard,
- How to determine hazards in your community, and
- Risk factors related to geography and location.

Everyday life has hazards and risks that you can avoid by taking normal precautions. Crossing the street with the WALK signal rather than the DON'T WALK signal is a precaution you can take to avoid being struck by a moving vehicle. This is a simple action that is easy to follow. However, more complex precautions must be taken for hazards that are more complicated and potentially disastrous. To deal with such hazards, you will need to develop a family disaster plan. As you make this plan, you will make decisions that will prepare you for appropriate on-the-spot actions.

In the following units you will begin to develop your family disaster plan by finding out what emergencies are most likely to occur in your community, and what actions should be taken before, during, and after these particular emergencies. For different types of hazards (natural, technological, or national security emergencies) you will follow four steps.

1. Acquire information on local and home hazards.
2. Work with members of your household to develop a family disaster plan.
3. Carry out the preparedness and mitigation steps identified in your family disaster plan.
4. Exercise (practice) your family disaster plan and update it periodically.

Although you should analyze risks for your own community, you also should know some general information about all major hazards. Emergencies can occur any time, even when you are on a trip to another area. While you do not need a specific emergency plan for every possible emergency, you should be familiar with the most common emergencies and know what actions you should take to protect yourself at home or elsewhere.

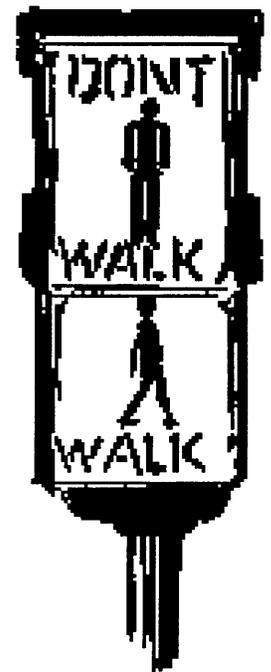
DETERMINING LOCAL HAZARDS

There are many factors to be considered when you determine the dangers to your community from natural hazards, technological hazards, or national security emergencies. These factors include

- Your community's past history of emergencies caused by the hazard,
- Geographical considerations,
- Community characteristics, and
- Distance from transportation routes, large urban areas, large industrial areas, or military bases.

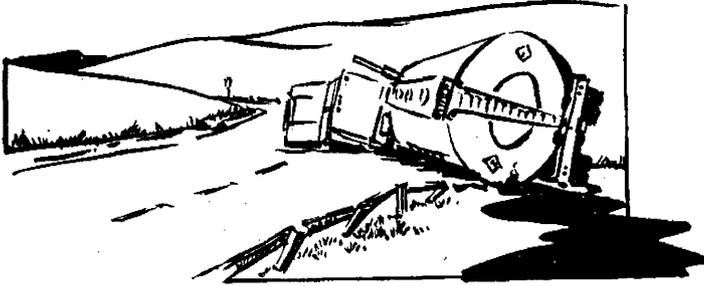
1. *Past History*

Does your community have a past history of certain types of emergencies?



Just as you take precautions in everyday life to avoid unnecessary injuries, there are precautions you can take in emergencies that will help protect your life and property.

If your community has had floods, forest fires, or industrial accidents before, these emergencies could happen again. The risk may be higher than in communities that have not experienced these emergencies. You can learn about the history of emergencies from local newspaper records, emergency management offices, or your local American Red Cross chapter. However, there is no guarantee that *only* those emergencies experienced in the past will happen in the future.



A study of your community's history could reveal its vulnerability to certain types of emergencies—such as hazardous materials accidents, flooding, or earthquakes.



Geographic characteristics could predispose your community to emergencies such as landslides.



The presence of a chemical plant or similar site in your community would indicate a need for specific preparedness steps.

2. *Geographical Characteristics*

If you live near an ocean, a river, a fault line, or mountains, related natural hazards could affect you. Learn the geography in your area, and the associated hazards.

3. *Community Characteristics*

Your community has many important characteristics. A large city with important industries or military bases may be at risk from both natural and technological hazards. A small rural community may have few risks from

technological hazards but high risks from natural hazards. Your emergency manager or city planner can provide information about major industries and the other characteristics of your community relevant to its hazard vulnerability.

4. *Distance from Transportation Routes, Cities, Industries, or Military Bases*

Although your community may appear to have few risks, you may be close to high risk areas. The closer you are, the greater the chance of some disasters. For example, airplanes may fly over your area. Also, hazardous materials are transported by train, truck, or pipeline, and their routes may run through or near your community. Your local emergency management office can give you information to help you analyze your risk from those hazards.

Vulnerability Analysis

To prepare yourself to deal with natural hazards, technological hazards, or national security emergencies, you must learn what the potential disasters are and *which* ones are most likely to affect you. Once you know this, you can learn more about *how* to mitigate and prepare for those specific hazards.

After you have considered all of the risk factors, you can determine which hazards are most likely to impact your community. The next step is to find out how much damage these hazards could cause in your community. This process is called *vulnerability analysis*. Your local emergency manager regularly conducts vulnerability analyses for your community. Ask your emergency manager for the results of these analyses.

WHAT ARE THE MAJOR NATURAL HAZARDS?

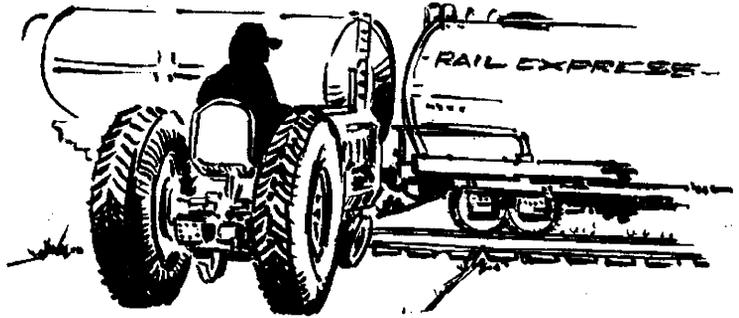
Natural hazards are those caused by natural events that pose threats to lives, property, and other assets society values. We will discuss natural hazards separately from the others, because these often can be predicted, and you can mitigate against many of the damaging effects. Natural hazards tend to occur repeatedly in the same geographical locations either because they are related to *weather patterns* (tornados, blizzards, floods, hurricanes), or because they are related to the *physical characteristics of an area* (volcanos, earthquakes).

In this course, you will analyze the risk to your community from the following natural hazards:

- Severe thunderstorm;
- Flood and flash flood;
- Landslide and mudflow;
- Tornado;
- Hurricane;
- Winter storm;
- Drought and extreme heat;
- Wildfire;
- Earthquake;
- Tsunami;
- Volcanic eruption; and
- Dam failures.

Now let's begin to examine your risk from natural hazards.

The following charts and maps provide an overview of the major natural hazards that may threaten your community. Become familiar with these charts and maps because they include important information for your emergency plans. It is important to know the types of hazards, as well as the locations where these hazards are most likely to strike. This information will help you to understand the nature of the specific hazards that can affect you.



Even communities free from obvious hazards may be a thoroughfare for hazardous materials being transported via train, truck, or pipeline.



An analysis of your community's vulnerability to different types of hazards is an essential step in both family and community preparedness.

Natural Hazards Charts and Maps

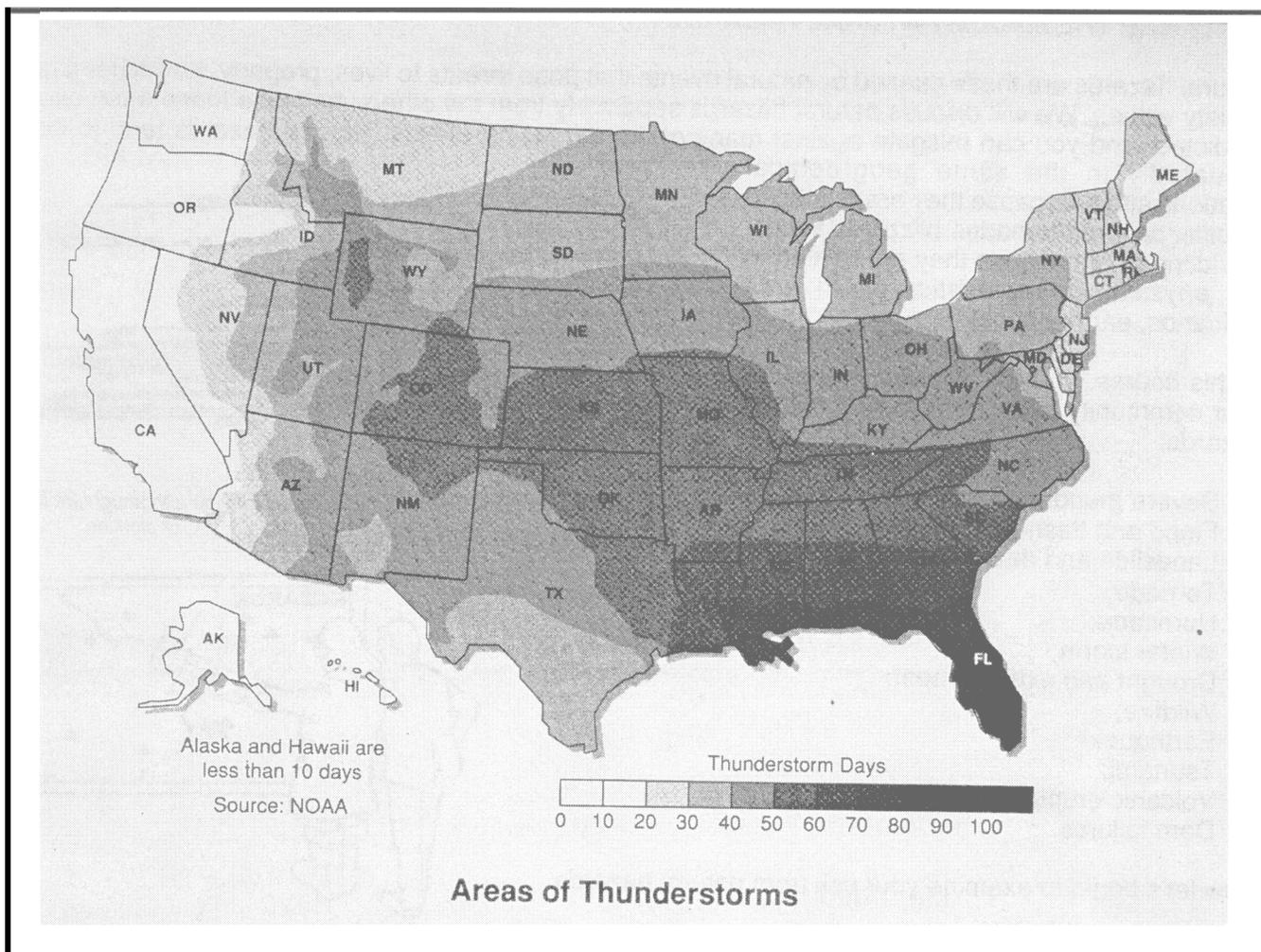
STEP 1 Review maps, descriptions, and geographical considerations.

STEP 2 Read the map key to interpret any shading or symbols used in the map. Locate your State on each map and analyze the risk in your State.

Note that the maps show general areas rather than precise boundaries. You should check local records if your community appears to be near the edge of a risk area.

STEP 3 Put a check in the box next to the description if the map suggests that this hazard could threaten your community.

STEP 4 For each hazard you checked, also check the circle next to any related hazards (other hazards that could be triggered by this one). This check will remind you to study the related hazards.



SEVERE THUNDERSTORM

Description

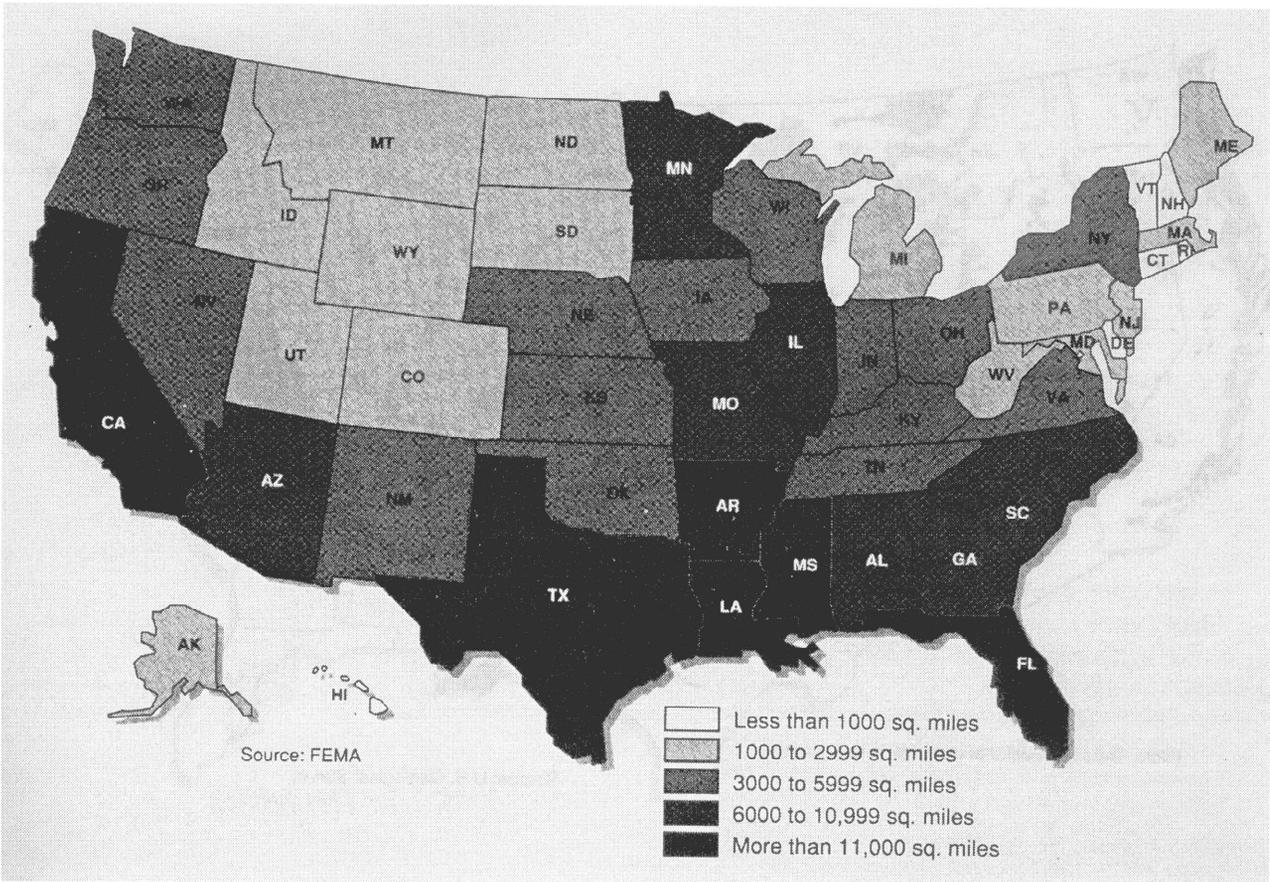
Severe thunderstorms are weather systems accompanied by strong winds, lightning, heavy rain or hail, and possibly tornados. They may occur singly, in groups, or in a long line that can extend hundreds of miles.

Related Hazards

Heavy rains may cause floods and flash floods. Violent thunderstorms can also cause tornados.

Geographical Considerations

Every State receives a few thunderstorms each year; the Southeast and Midwest have the greatest frequency. Florida has the greatest occurrence.



Identified Floodplain Land Areas, 1930-1980

FLOOD AND FLASH FLOOD

Description

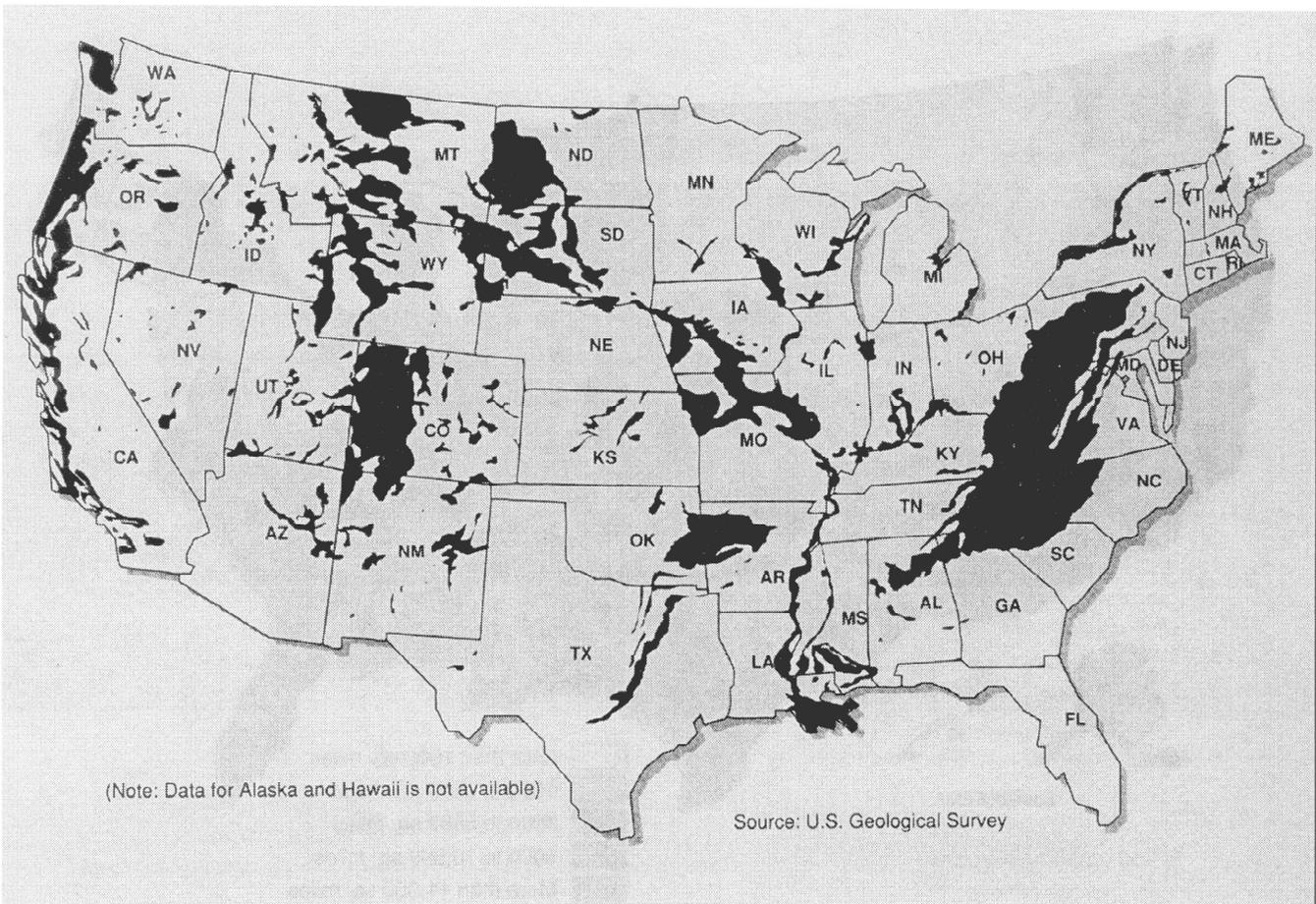
A *flood* occurs when a river or stream overflows its bed onto normally dry land. Floods can be slow to develop, or in the case of *flash floods*, they can occur suddenly with devastating power.

Related Hazards

Floods can cause landslides and mudflows as well as power shortages.

Geographical Considerations

Flooding is the most widespread and costly natural hazard facing America. Floods can occur in any State or community. Often communities with new development face floods caused by urban drainage problems that were not present prior to the development.



Regions at Risk from Landslides

LANDSLIDE AND MUDFLOW

Description

A *landslide* is the movement of unstable soil and rocks down the side of a slope.

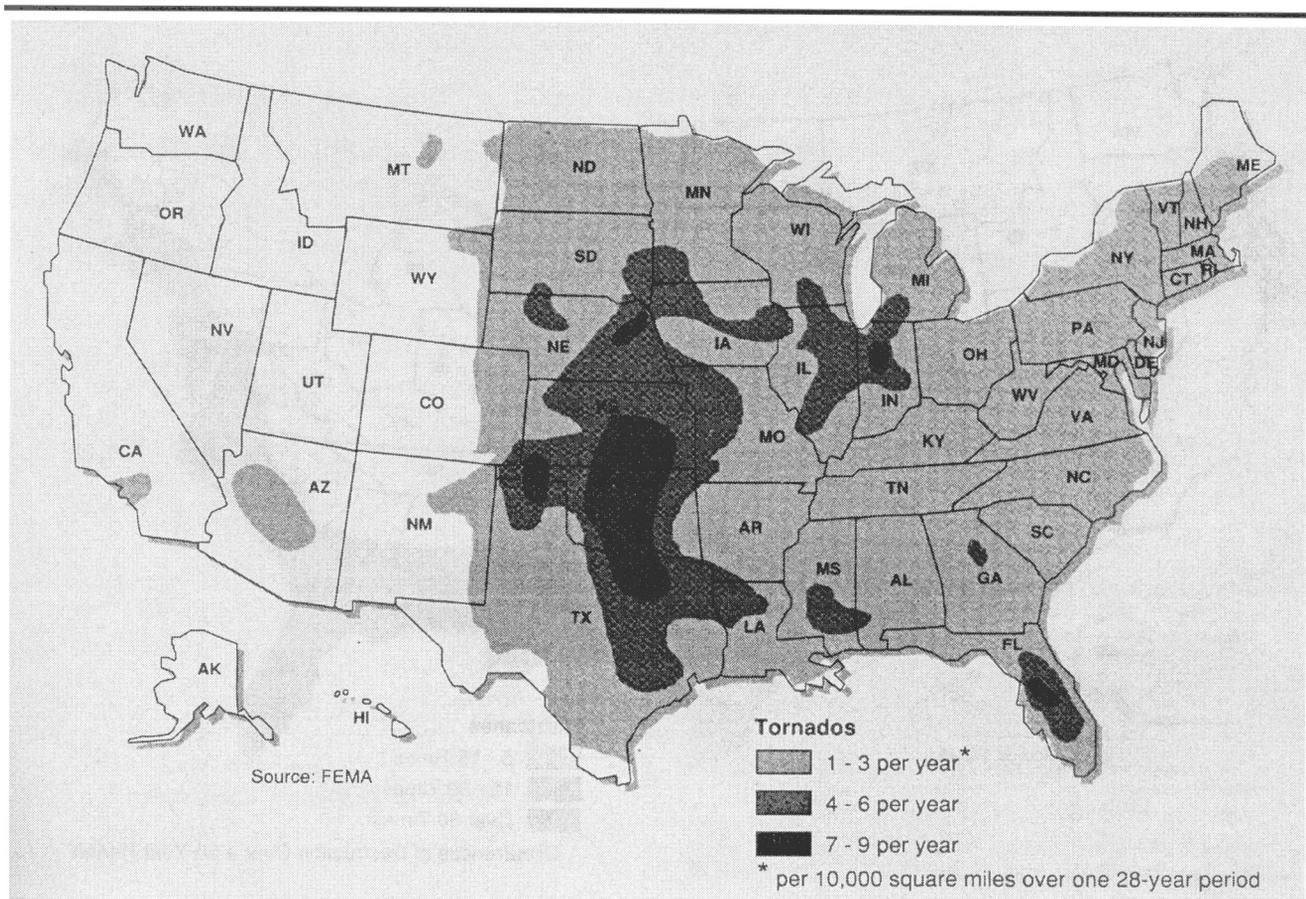
A *mudflow* is a mixture of soil and water that runs like a river of mud down a hillside. It usually is generated by heavy rainfall.

Related Hazards

Landslides can create large crevasses and reroute streams and rivers causing *flash floods*. Also, fires may break out in damaged structures.

Geographical Considerations

Landslides occur in every State. However, the major landslides occur along the West Coast, the western slope of the Rockies, the central Mississippi Valley, and the Appalachian Region.



National Summary of Tornado Occurrences, 1953-1980

TORNADO

Description

Tornados are extremely violent localized windstorms. A tornado is characterized by a funnel cloud that reaches to the ground with wind velocities inside the funnel as high as 200 miles per hour. Tornados are formed by violent thunderstorms and hurricanes. They appear as a vertical funnel cloud reaching to the ground, and creating an incredibly loud roar. Tornados almost always travel from the southwest to the northeast.

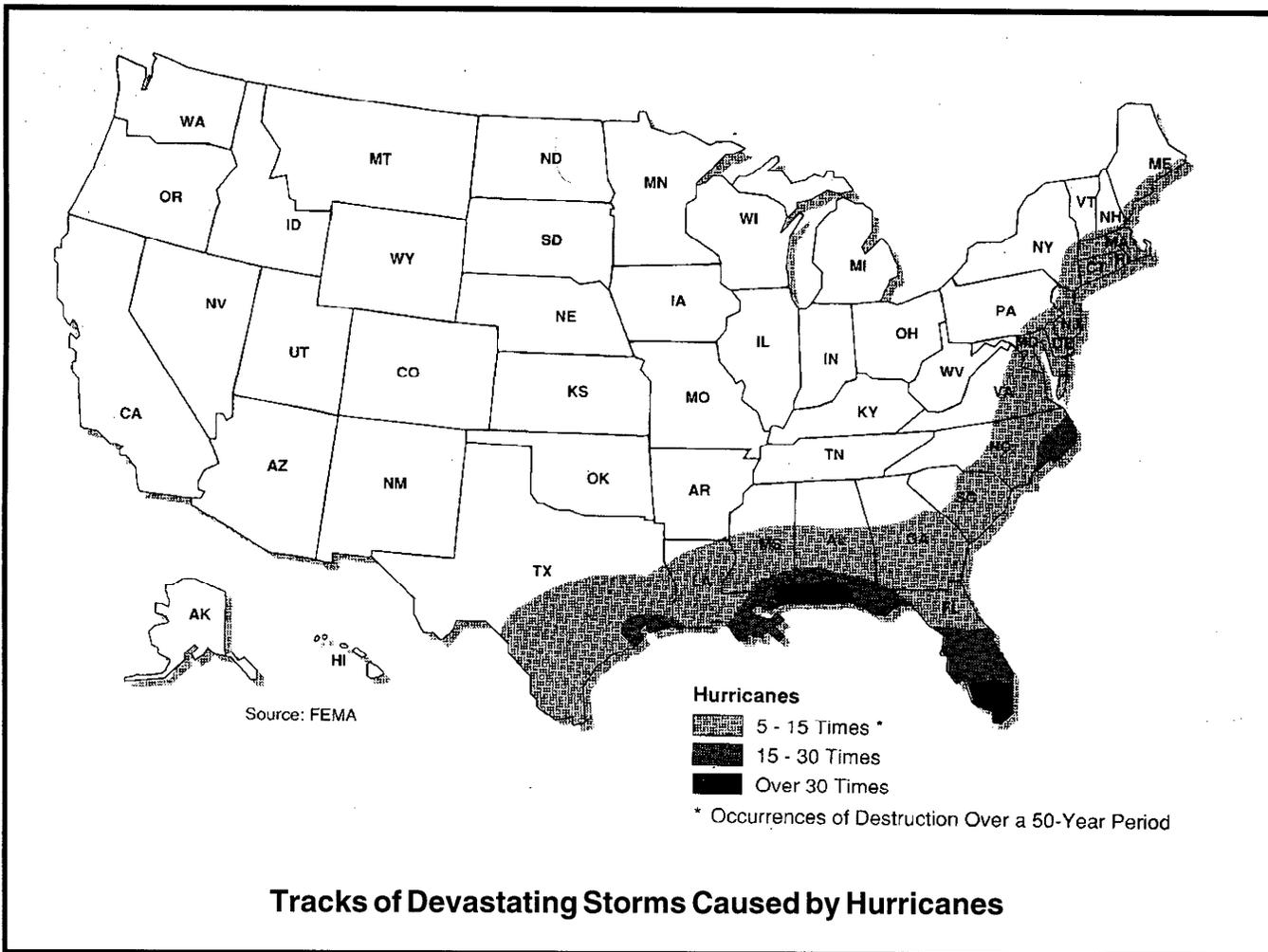
Related Hazards

Tornados are usually part of a severe thunderstorm

and may be accompanied by lightning, high winds, floods, and flash floods from extremely heavy rainfall.

Geographic Considerations

Tornados can occur in every State, but are more frequent in the Midwest, Southeast, and Southwest. The states of Mississippi, Kansas, Arkansas, Oklahoma, Illinois, Indiana, Iowa, Missouri, Nebraska, Texas, Louisiana, Florida, Georgia, Alabama, and South Dakota are at greatest risk.



HURRICANE

Description

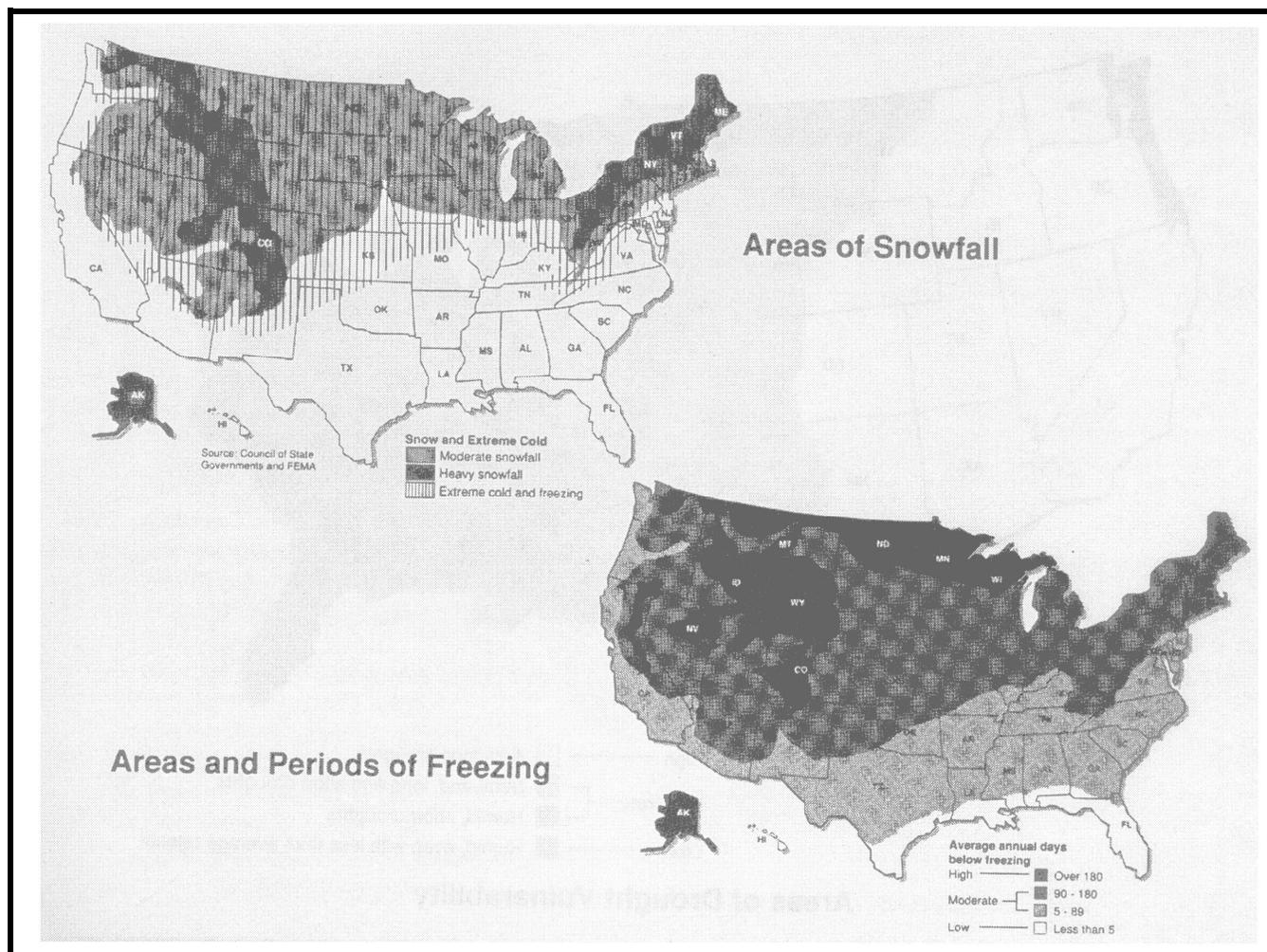
Hurricanes are severe tropical storms that spiral around a calm center known as the eye. Wind speeds range from 74 miles per hour to a high of 220 miles per hour. As hurricanes approach land, they create a storm surge along the coastline that raises water several feet above high tide levels. Hurricanes also dump heavy rains and cause flooding as they travel inland.

Related Hazards

Hurricanes may be accompanied by other severe storm hazards such as lightning, tornados, and flooding.

Geographical Considerations

Vulnerable areas in the United States include the territories in the Caribbean, the coast from Texas to Maine, and tropical areas of the western Pacific Ocean, including Hawaii.



WINTER STORMS

Description

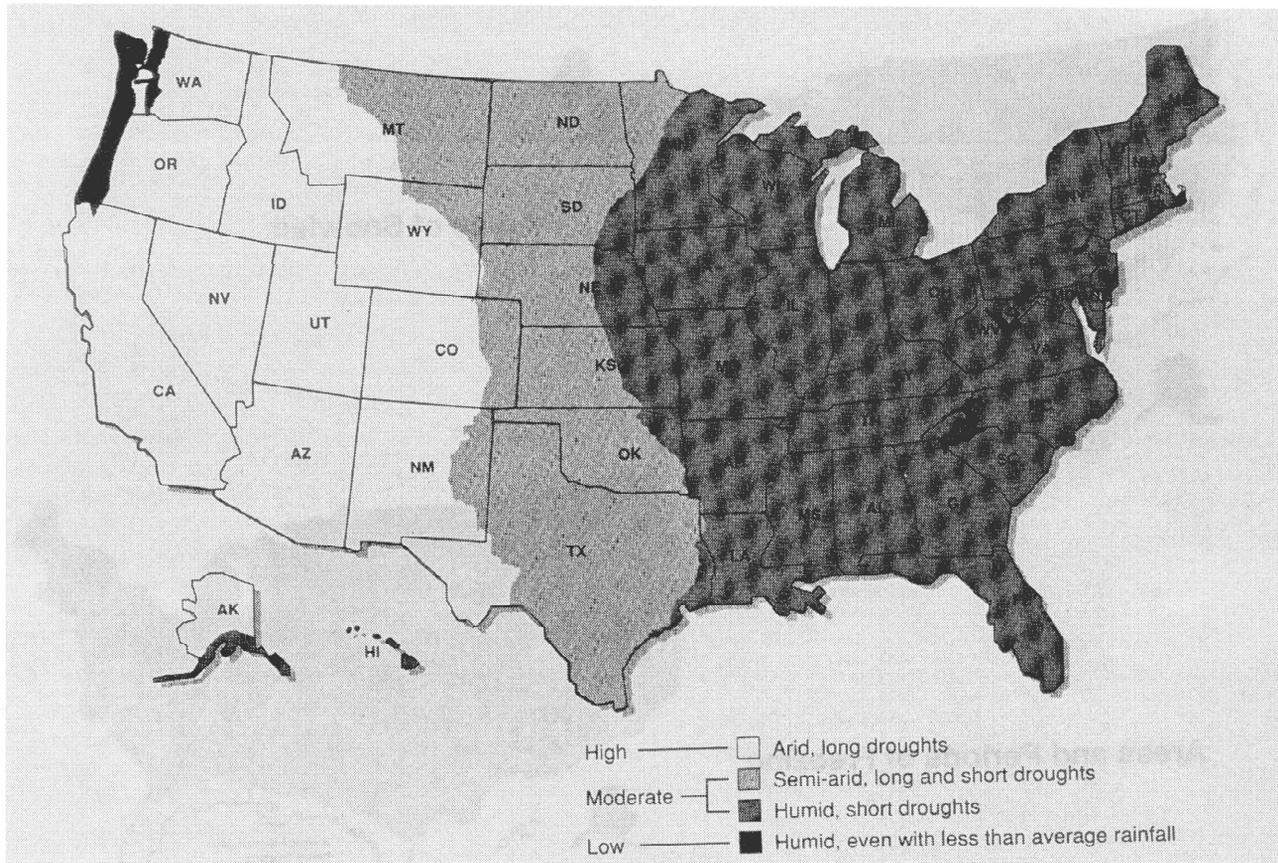
Winter storms vary in size and intensity and may affect a small part of one State or several States at once. Winter storms may be categorized as ice storms, heavy snowfall, or blizzards.

○ Related Hazards

Flooding can occur when large amounts of snow melt in a short period.

Geographical Considerations

Almost the entire United States, except Hawaii and the Territories, are at risk. The level of risk depends on the normal severity of local winter weather. Winter storms known as nor'easters cause extensive coastal flooding, erosion, and property loss in the northeastern and middle Atlantic States.



Areas of Drought Vulnerability

□ DROUGHT AND EXTREME HEAT

Description

A *drought* is an extended period of unusually dry weather. Droughts become severe if several months pass without significant precipitation.

Extreme heat is defined as temperatures that are 10 or more degrees above the average high temperature, and that last for several weeks during the hottest time of the year.

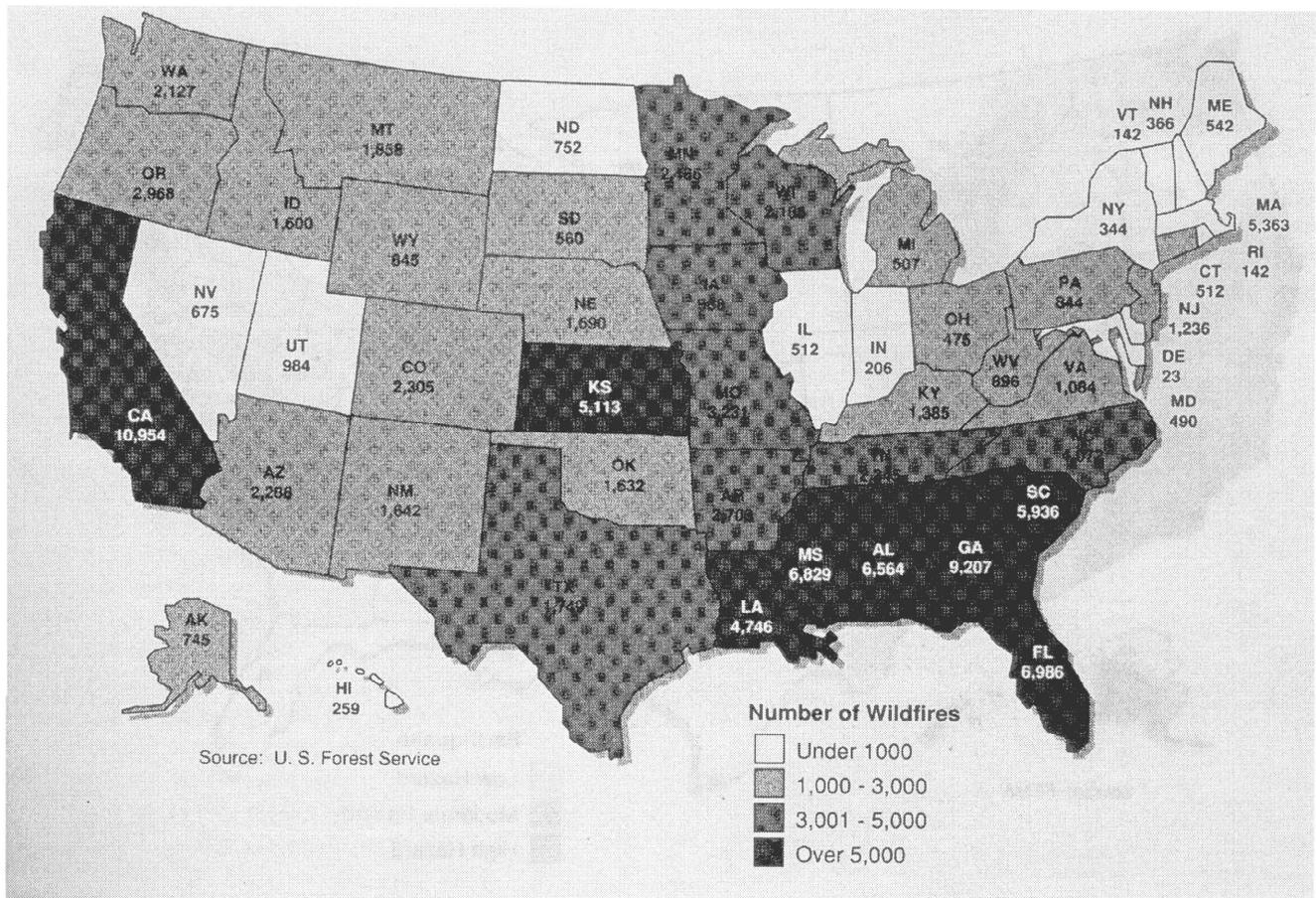
○ *Related hazards*

Drought and extreme heat can cause shortages of water and food crops. Parched lands are more susceptible to wildfires during periods of drought.

Droughts can actually result in later flooding: the vegetation dies without water, and as a result, even an average rain can cause flooding.

Geographical Considerations

Droughts and extreme heat are possible anywhere in the U.S. The possibility for long-term droughts is much greater in the western States—excluding the Pacific Northwest.



Wildfires on Protected Federal, State, and Private Lands, 1990

WILDFIRE

Description

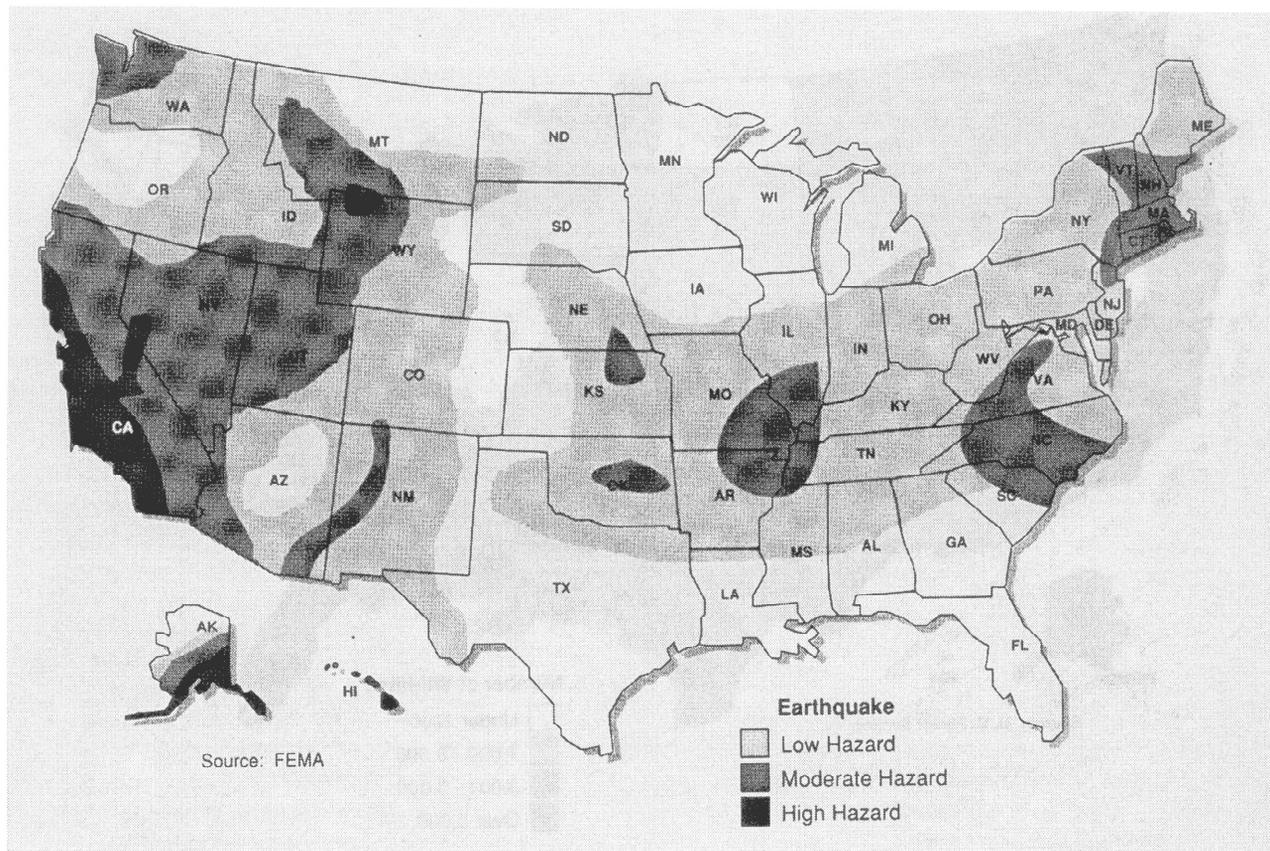
A *wildfire* is any instance of uncontrolled burning in grasslands, brush, or woodlands. Wildfires can be caused by lightning, human carelessness, or arson.

Related Hazards

Soil erosion, landslides, and flash floods are often secondary events of wildfires.

Geographic Considerations

Wildfires can occur in all wooded, brush, and grassy areas—especially those in Kansas, Mississippi, Louisiana, Georgia, Florida, the Carolinas, Tennessee, California, Massachusetts, and the national forests in the western States.



Earthquake Risk Areas

□ EARTHQUAKE

Description

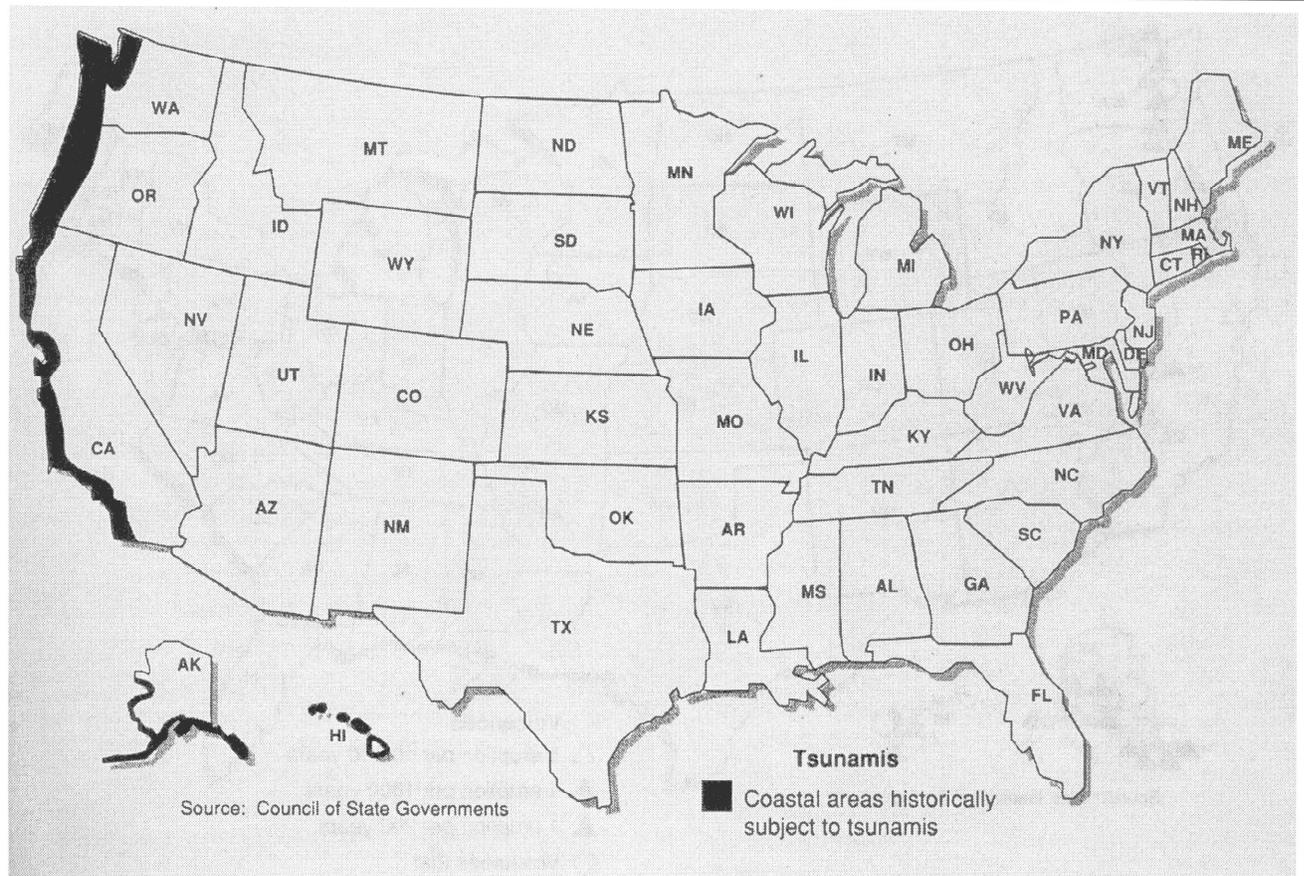
An *earthquake* is a trembling of the ground that results from the sudden shifting of rock beneath the earth's crust.

○ *Related Hazards*

Earthquakes may cause landslides and rupture dams. They also can generate tsunamis, which may strike the coastline thousands of miles from the quake. Severe earthquakes destroy power and telephone lines, gas, sewer, or water mains which, in turn, may set off fires and/or hinder firefighting or rescue efforts. Earthquakes also may cause building and bridge collapses.

Geographical Considerations

Earthquakes occur along fault lines where massive plates of rock located beneath the earth's crust move against one another. Earthquakes have occurred in most areas of the United States. The most frequent earthquake events occur in States west of the Rocky Mountains, although historically the most violent earthquakes have occurred in the Eastern United States and in the Central Mississippi Valley. California is especially vulnerable because of its high seismic activity. Other highly vulnerable areas are Charleston, South Carolina, and the central United States (the New Madrid Seismic Zone), both of which were devastated by earthquakes in the last century.



Coastal Areas Historically Subject to Tsunamis

TSUNAMI

Description

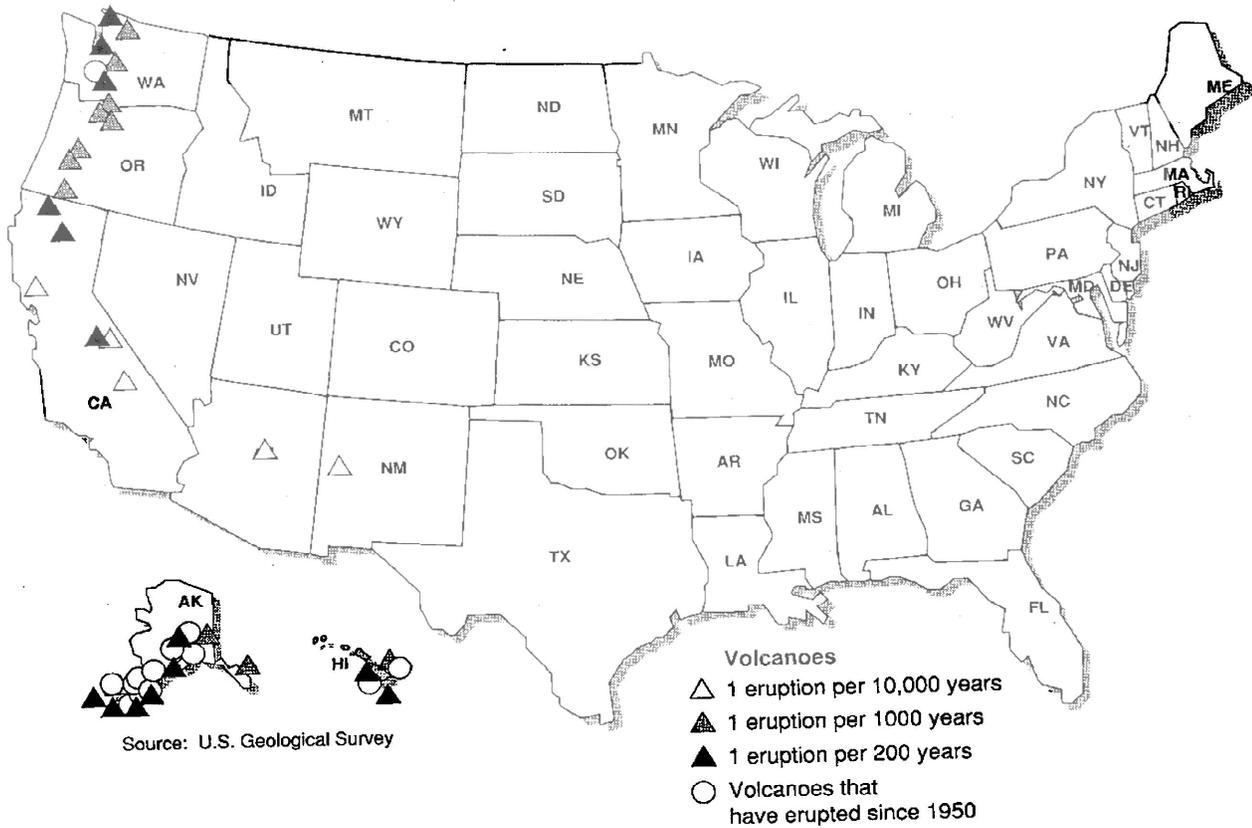
A *tsunami* is a series of giant sea waves. These are generated by earthquake or volcanic action on the ocean floor or near coastal areas. Tsunami waves can travel more than 500 miles per hour through open seas and build to heights of 100 feet or more when approaching the shoreline.

Related Hazards

Tsunamis can cause widespread flooding and erosion.

Geographical Considerations

Tsunamis have occurred mainly in the Pacific. However, it is possible for a tsunami to occur along any coastline.



Areas of Potential Volcanic Activity

VOLCANIC ERUPTION

Description

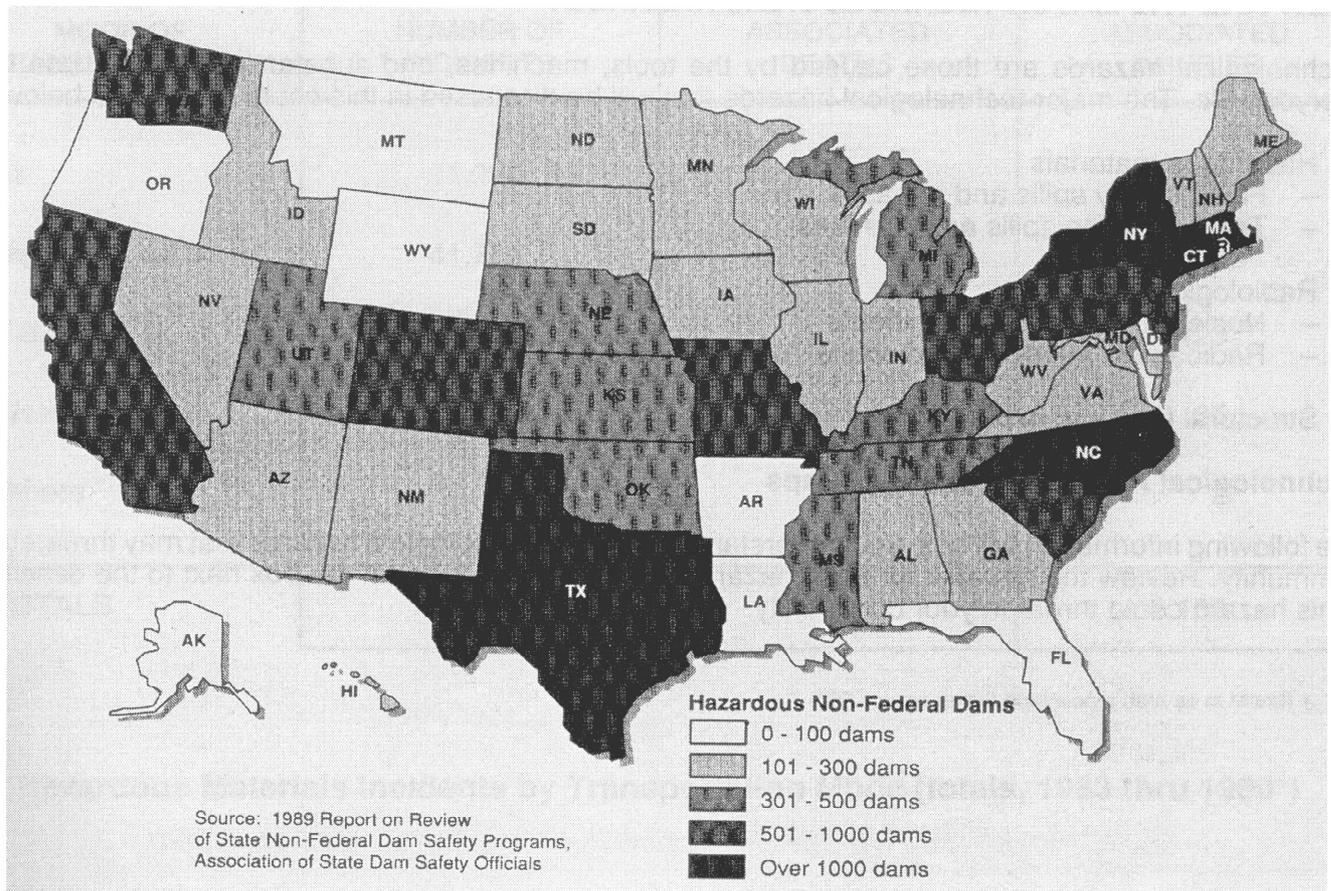
A *volcano* is an eruption from the earth's interior. The material coming from the eruption may be in the form of slow lava flow, or an explosive blast of powdered rock, steam, and other gases.

○ Related Hazards

Volcanic eruptions can generate mild to moderate earthquakes, mudflows, flash floods, and ash clouds that can create intense storms.

Geographical Considerations

The primary areas affected include the Pacific Rim States of Hawaii, Alaska, Washington, Oregon, and California. Montana and Wyoming also are at risk, but to a much lesser extent.



Potentially Hazardous Non-Federal Dams

DAM FAILURE

Description

The *failure of dams* due to excessive rainfall, volcanic eruption, poor construction, poor maintenance, or earthquake activity can cause catastrophic floods.

Geographic Considerations

A dam failure could affect everyone living in the floodplain downstream of a man-made dam. There are more than 80,000 dams throughout the United

States; more than 20,000 are classified as posing "high" or "significant" hazards. These designations mean that if such a dam failed, lives could be lost and extensive property damage would be suffered.

WHAT ARE THE MAJOR TECHNOLOGICAL HAZARDS?

Technological hazards are those caused by the tools, machines, and substances that we use in our everyday life. The major technological hazards that will be discussed in this course are listed below.

- Hazardous materials
 - Fixed facility spills and releases
 - Transportation spills and releases
- Radiological accidents
 - Nuclear power facility accidents
 - Radioactive materials and waste
- Structural fires and explosions

Technological Hazards Charts and Maps

The following information will help you understand the major technological hazards that may threaten your community. Review the material for each hazard carefully. Put a check in the box next to the description if this hazard could threaten your community.

MODE OF TRANSPORTATION	NUMBER OF INCIDENTS	ASSOCIATED DEATHS	ASSOCIATED INJURIES
Air	1,220	0	153
Highway	41,781	79	1,569
Railway	7,886	1	423
Water	83	1	35
Others	29	0	2
TOTALS	50,999	81	2,182

* 1990 figures reflect preliminary data as of March 1, 1991

Hazardous Materials Incidents by Transportation Mode (totals, 1983 thru 1990*)

HAZARDOUS MATERIALS

FIXED FACILITY

Any fixed site where chemicals are manufactured, used, or stored.

An *illegal dump site* is a place where hazardous substances are intentionally and illegally dumped. Sometimes these materials are dumped illegally along roadsides or in open areas, or are buried underground. Legal dump sites for chemical wastes must be selected, prepared, and monitored carefully to ensure that human or animal life is not endangered by a polluted environment.

Geographical Considerations

Major chemical spills can occur at any facility that produces, uses, or stores chemicals. These include chemical manufacturing plants, laboratories,

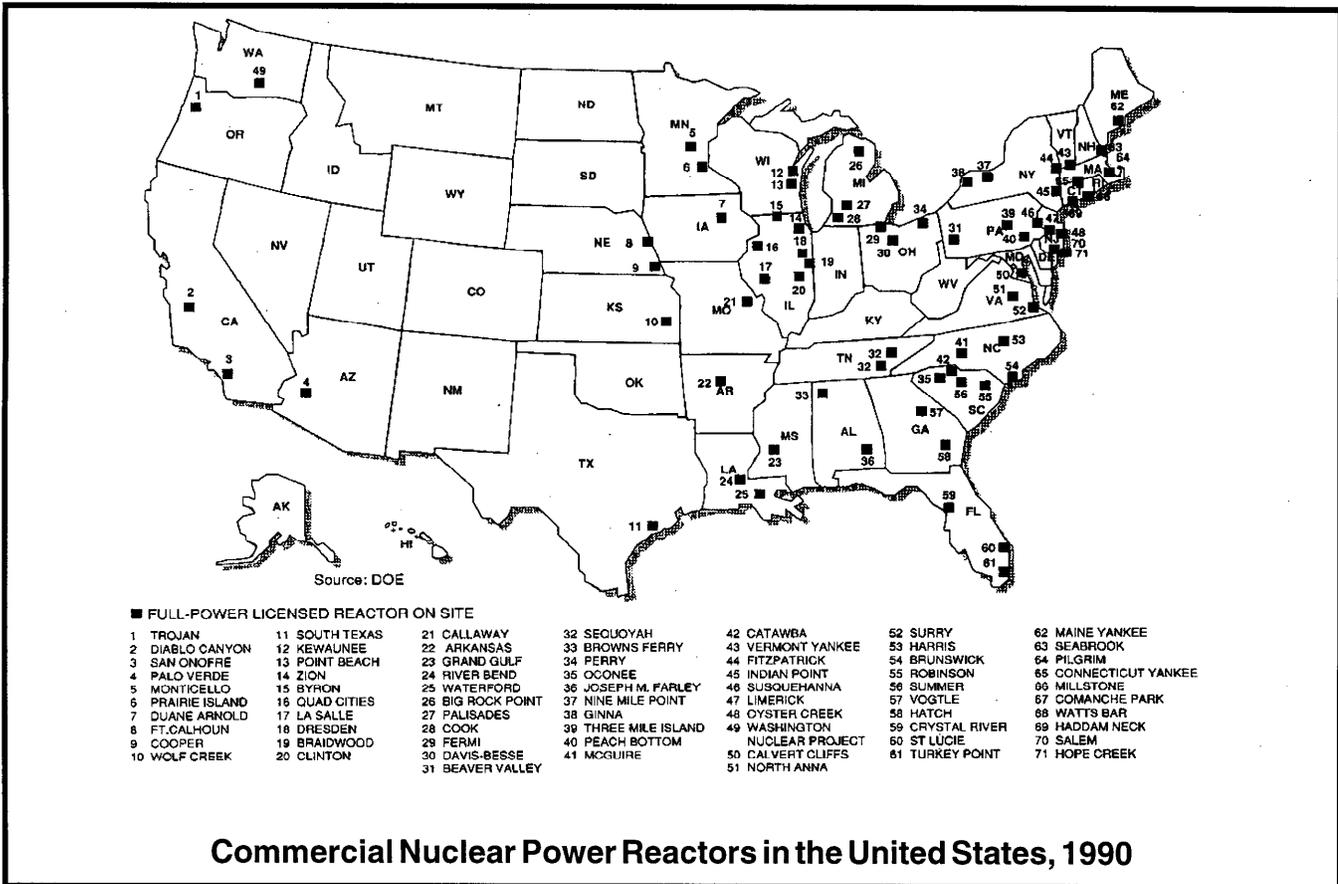
shipyards, railroad yards, warehouses, or chemical disposal areas. Illegal dump sites can appear anywhere.

TRANSPORTATION

Transportation accidents involving hazardous substances occur when a vehicle carrying these materials is involved in an accident that endangers public health or the environment. Because of their increased use, hazardous substances are transported by truck, train, ship, plane, or pipeline.

Geographical Considerations

Areas at risk would be along highways, rail lines, pipelines, rivers, and port areas. Because major highways run through virtually all local jurisdictions, all sections of the country are at risk.



Commercial Nuclear Power Reactors in the United States, 1990

RADIOLOGICAL MATERIALS

NUCLEAR FACILITY

Nuclear power-generating facilities have the greatest concentration of radioactive materials of any private source. Although extensive safeguards are required, accidents can occur. These could affect large populations through the accidental release of radiation

Geographical Considerations

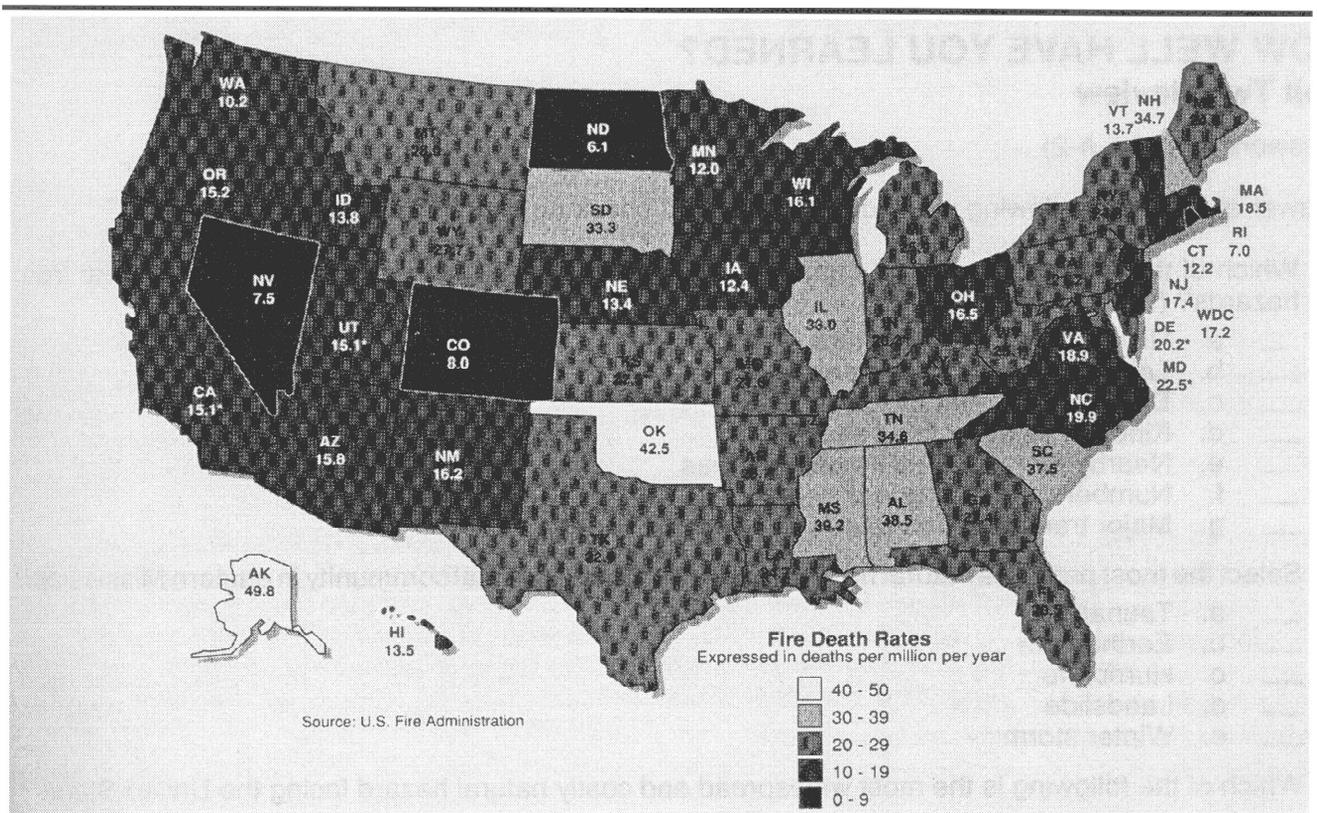
Areas at risk are normally designated as (1) within the *plume emergency planning zone* of such facilities (jurisdictions located within a 10-mile radius of a nuclear power plant) or (2) within the *ingestion emergency planning zone* (jurisdictions within a 50-mile radius of a nuclear power plant). About 75% of the States are affected, in particular the eastern half of the contiguous 48 States and the West Coast States.

TRANSPORTATION AND STORAGE

The transportation and disposal of radioactive materials and waste creates problems because of the long life of radioactive materials. Although precautions are taken in packaging the materials, there is still concern that transportation accidents and other hazards, such as earthquakes near disposal sites, could cause radiation exposure or pollution.

Geographical Considerations

Dangers posed by radioactive wastes are concentrated in the immediate vicinity of the disposal sites or along the transportation routes. Disposal sites are located in remote areas or at nuclear power facilities.



Fire Death Rate Per Million Population, 1990

STRUCTURAL FIRE AND EXPLOSION

Description

Fires and explosions can result in uncontrolled burning in residential, commercial, industrial, or other properties in rural or developed areas.

Geographical Considerations

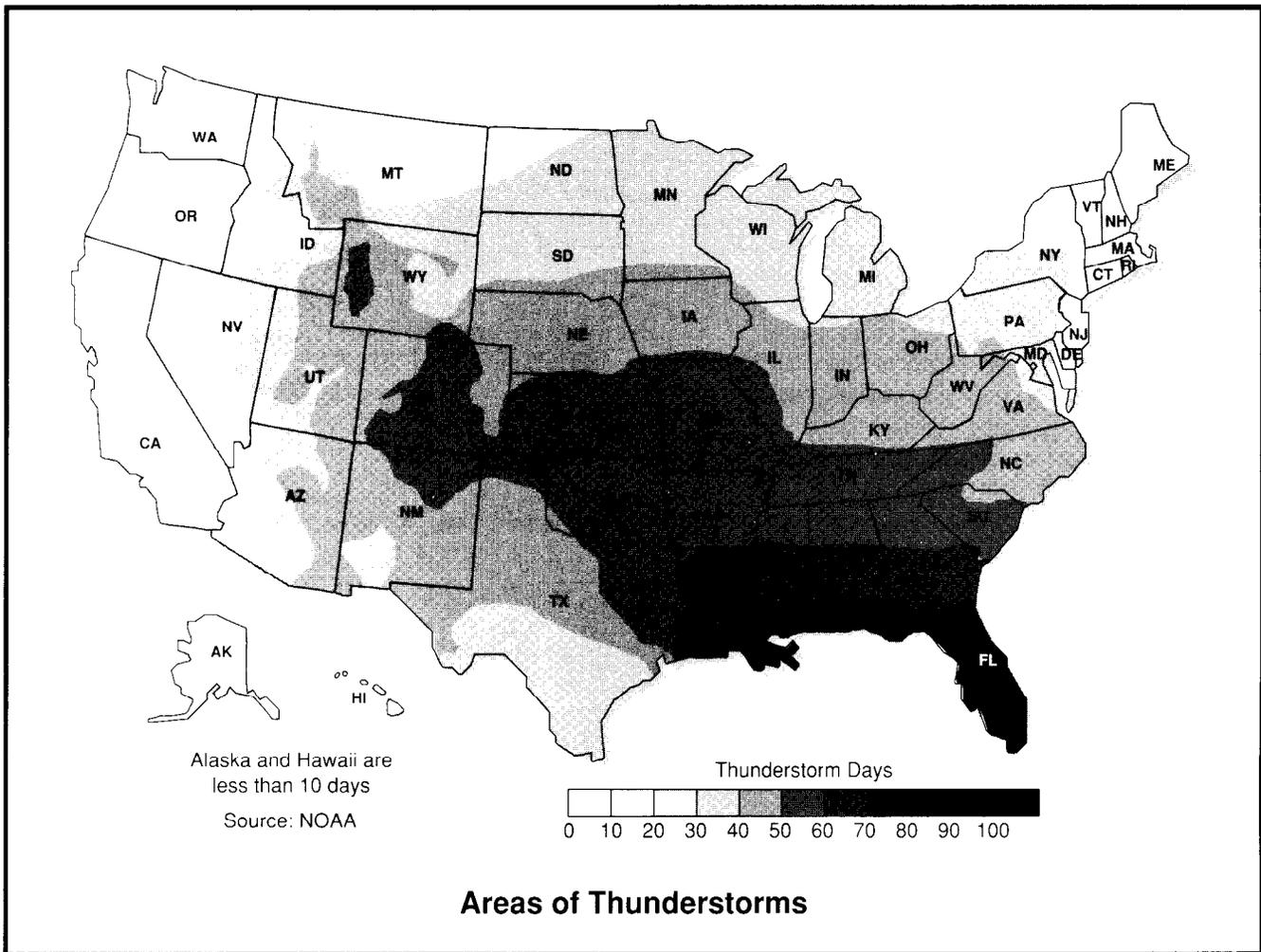
Accidental structural fire and explosion can strike anywhere. Though arson once was confined to major urban areas, it now can occur in practically any community in the United States.

HOW WELL HAVE YOU LEARNED?**Unit Two Review**

(Answers on page A-2)

Answer each of the following questions by placing a check next to the *best* response.

1. Which of the following factors should you consider when analyzing your community's threat from hazards? (Check all that apply.)
 - a. History of natural disasters
 - b. Location of nearby military bases
 - c. Distant rivers and mountains
 - d. Kinds of weather in all seasons
 - e. Nearby factories and industrial areas
 - f. Number of school-age children
 - g. Major transportation routes
2. Select the most probable natural hazard that might affect a coastal community in eastern Mississippi.
 - a. Tsunami
 - b. Earthquake
 - c. Hurricane
 - d. Landslide
 - e. Winter storm
3. Which of the following is the most widespread and costly natural hazard facing the United States?
 - a. Blizzard
 - b. Thunderstorms
 - c. Flood and flash flood
 - d. Hurricane
 - e. Storm surge
4. Which of the following is an example of a technological hazard?
 - a. Tsunami
 - b. Wildfire
 - c. Tornado
 - d. Factory explosion
 - e. Storm surge
5. Which community might be in the greatest danger from a radiological accident?
 - a. A community with a minimum security prison
 - b. A community with a nuclear power plant
 - c. A community with a clothing manufacturing plant
 - d. A community on a large river
 - e. A community on a seashore



SEVERE THUNDERSTORM

Description

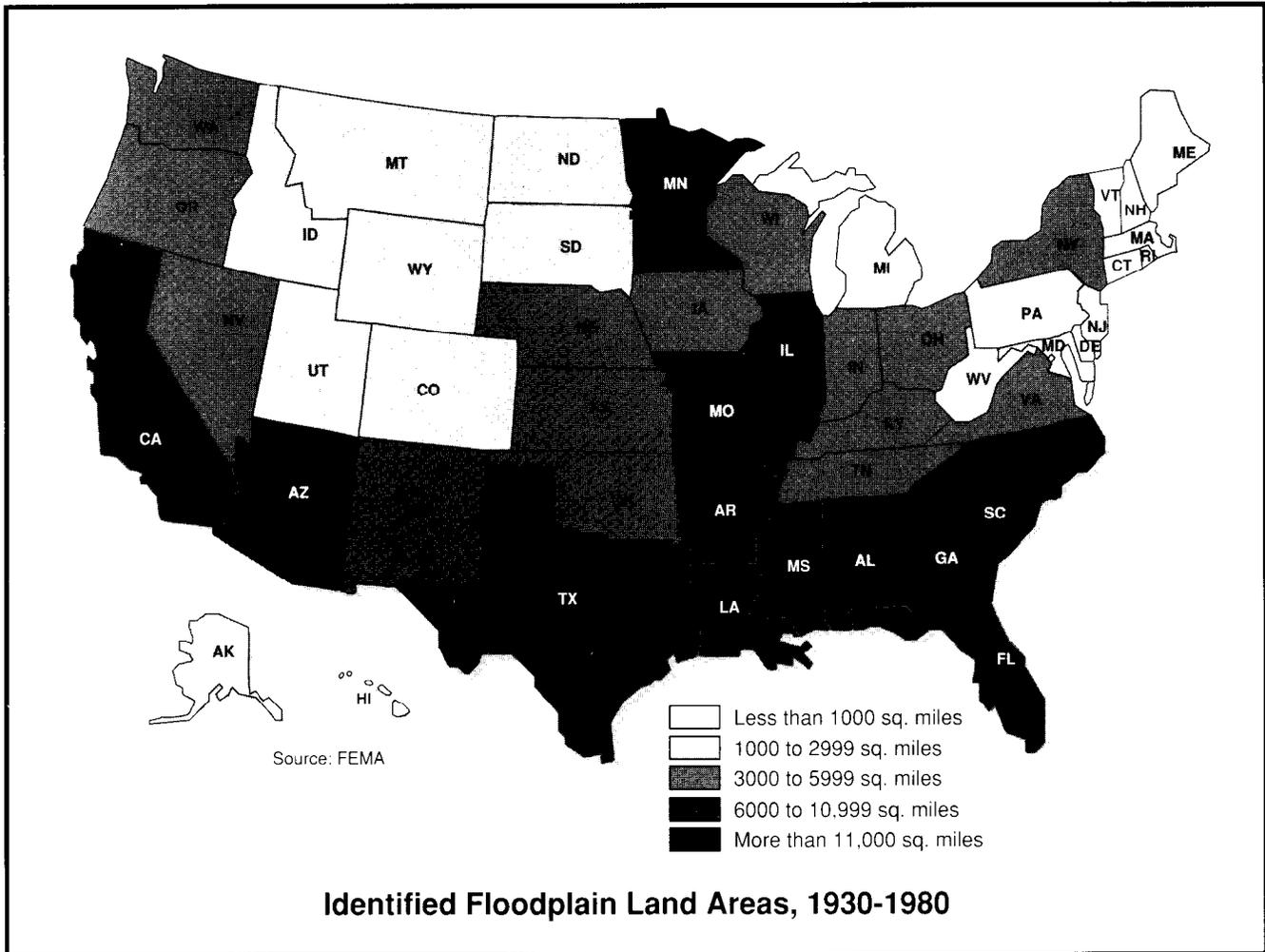
Severe thunderstorms are weather systems accompanied by strong winds, lightning, heavy rain or hail, and possibly tornados. They may occur singly, in groups, or in a long line that can extend hundreds of miles.

○ *Related Hazards*

Heavy rains may cause floods and flash floods. Violent thunderstorms can also cause tornados.

Geographical Considerations

Every State receives a few thunderstorms each year; the Southeast and Midwest have the greatest frequency. Florida has the greatest occurrence.



FLOOD AND FLASH FLOOD

Description

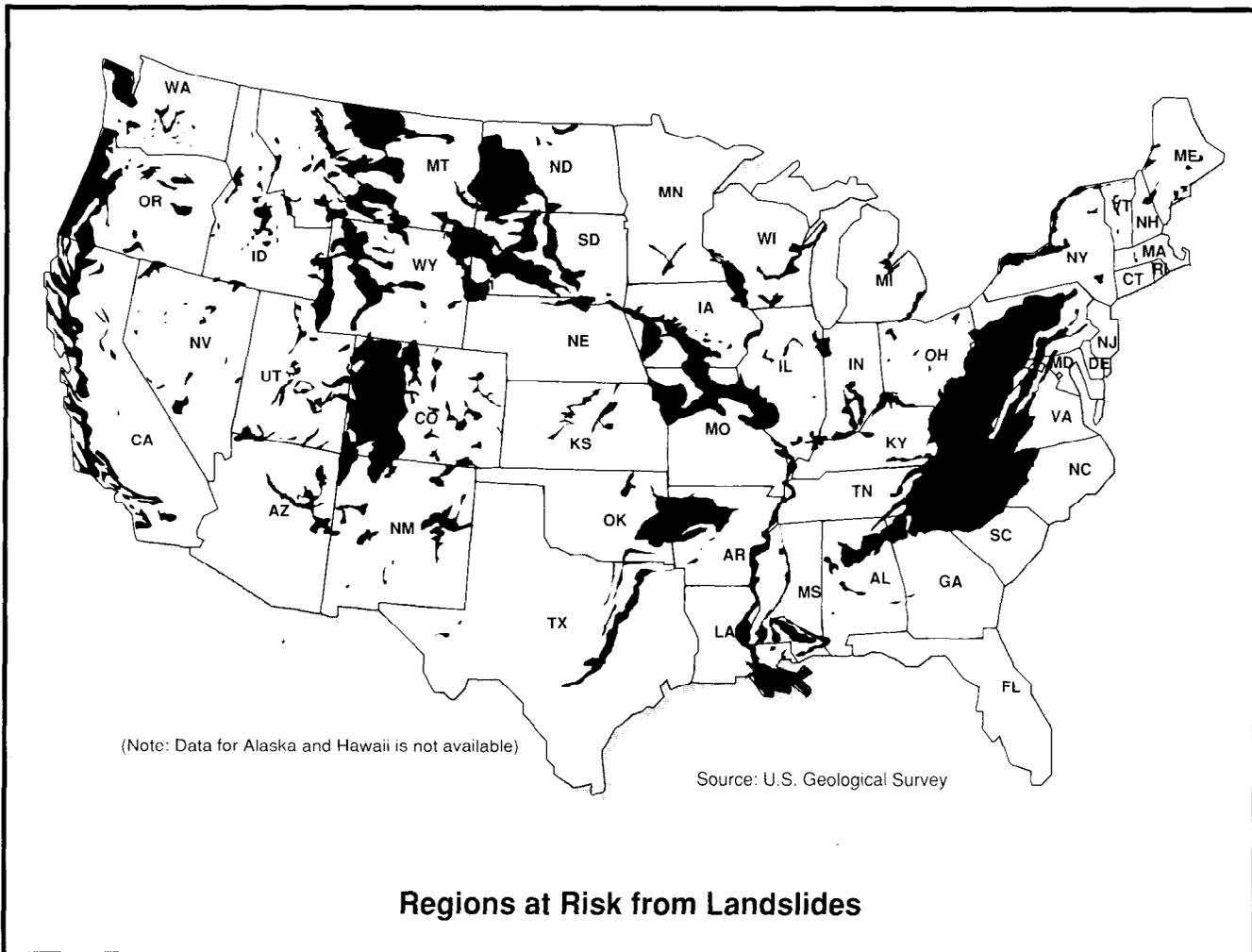
A *flood* occurs when a river or stream overflows its bed onto normally dry land. Floods can be slow to develop, or in the case of *flash floods*, they can occur suddenly with devastating power.

Related Hazards

Floods can cause landslides and mudflows as well as power shortages.

Geographical Considerations

Flooding is the most widespread and costly natural hazard facing America. Floods can occur in any State or community. Often communities with new development face floods caused by urban drainage problems that were not present prior to the development.



LANDSLIDE AND MUDFLOW

Description

A *landslide* is the movement of unstable soil and rocks down the side of a slope.

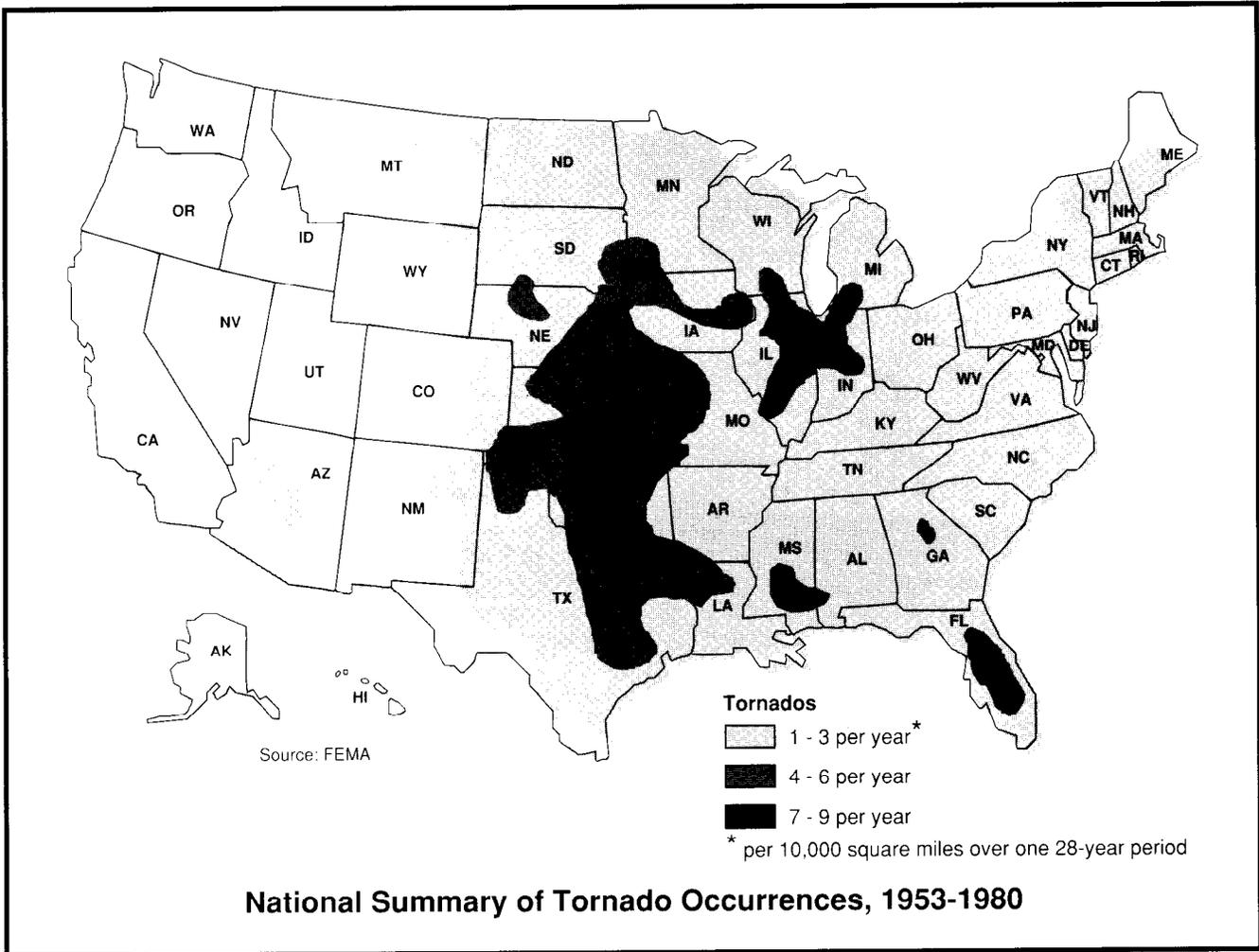
A *mudflow* is a mixture of soil and water that runs like a river of mud down a hillside. It usually is generated by heavy rainfall.

Related Hazards

Landslides can create large crevasses and reroute streams and rivers causing *flash floods*. Also, fires may break out in damaged structures.

Geographical Considerations

Landslides occur in every State. However, the major landslides occur along the West Coast, the western slope of the Rockies, the central Mississippi Valley, and the Appalachian Region.



TORNADO

Description

Tornados are extremely violent localized windstorms. A tornado is characterized by a funnel cloud that reaches to the ground with wind velocities inside the funnel as high as 200 miles per hour. Tornados are formed by violent thunderstorms and hurricanes. They appear as a vertical funnel cloud reaching to the ground, and creating an incredibly loud roar. Tornados almost always travel from the southwest to the northeast.

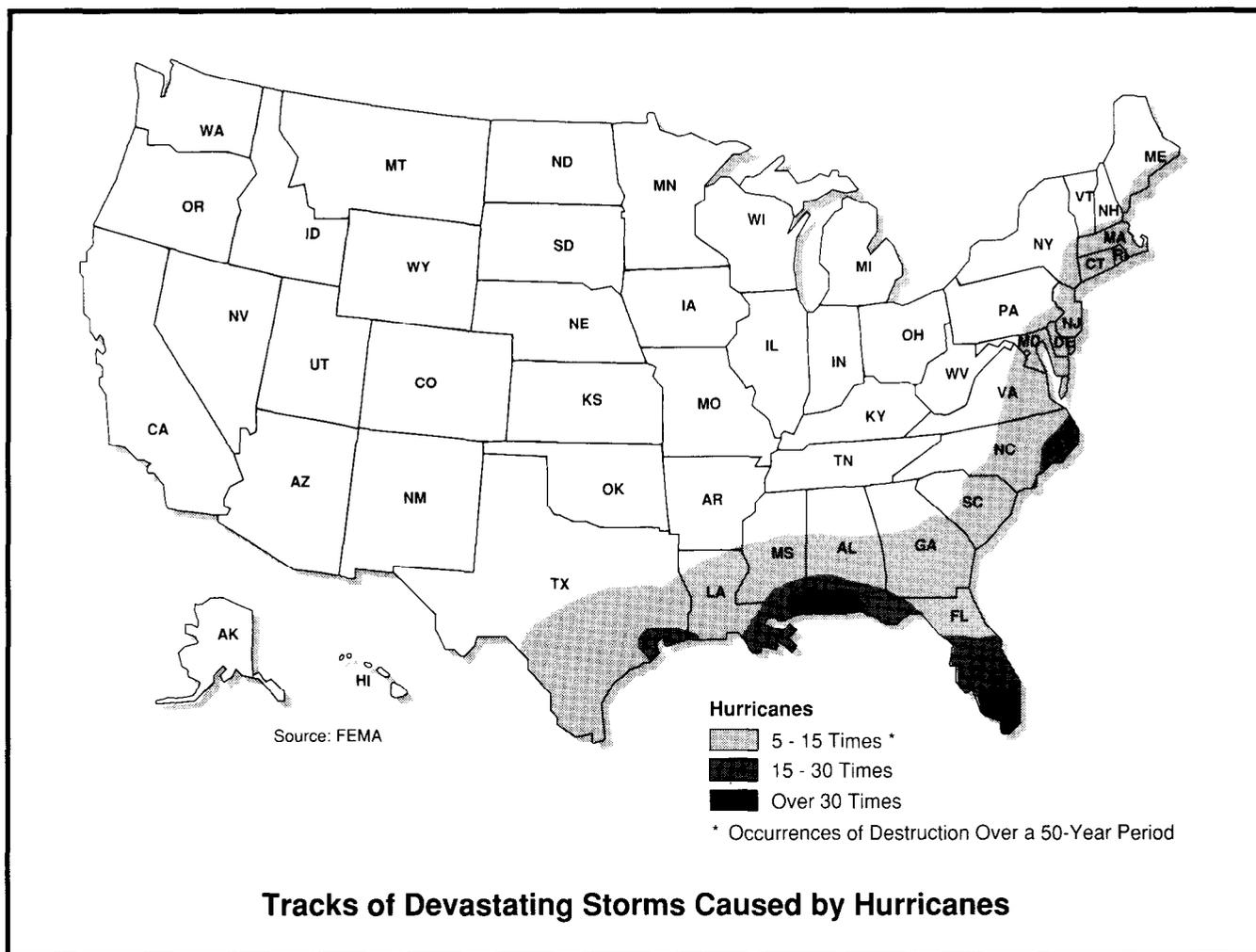
Related Hazards

Tornados are usually part of a severe thunderstorm

and may be accompanied by lightning, high winds, floods, and flash floods from extremely heavy rainfall.

Geographic Considerations

Tornados can occur in every State, but are more frequent in the Midwest, Southeast, and Southwest. The states of Mississippi, Kansas, Arkansas, Oklahoma, Illinois, Indiana, Iowa, Missouri, Nebraska, Texas, Louisiana, Florida, Georgia, Alabama, and South Dakota are at greatest risk.



HURRICANE

Description

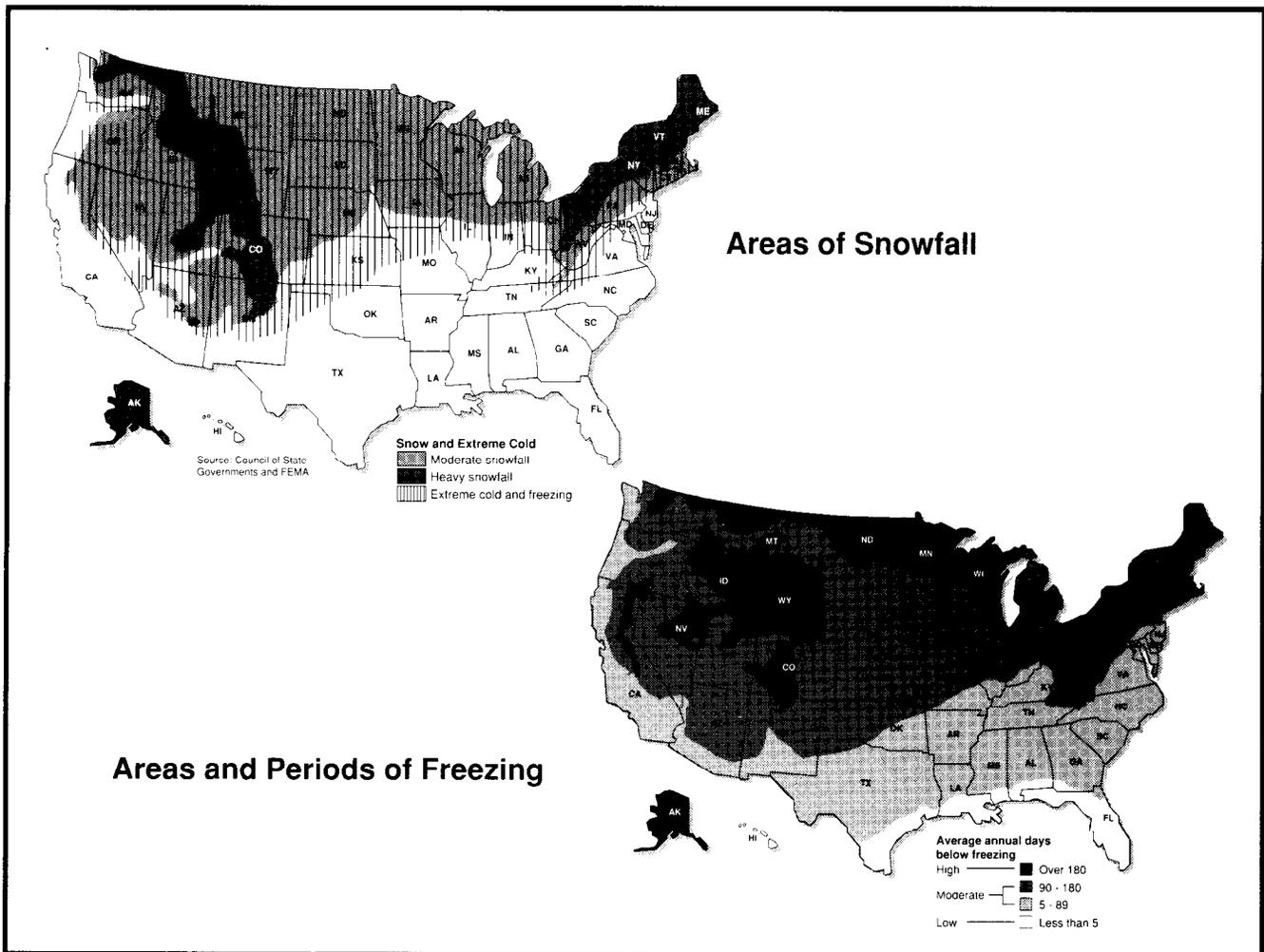
Hurricanes are severe tropical storms that spiral around a calm center known as the eye. Wind speeds range from 74 miles per hour to a high of 220 miles per hour. As hurricanes approach land, they create a storm surge along the coastline that raises water several feet above high tide levels. Hurricanes also dump heavy rains and cause flooding as they travel inland.

Related Hazards

Hurricanes may be accompanied by other severe storm hazards such as lightning, tornados, and flooding.

Geographical Considerations

Vulnerable areas in the United States include the territories in the Caribbean, the coast from Texas to Maine, and tropical areas of the western Pacific Ocean, including Hawaii.



WINTER STORMS

Description

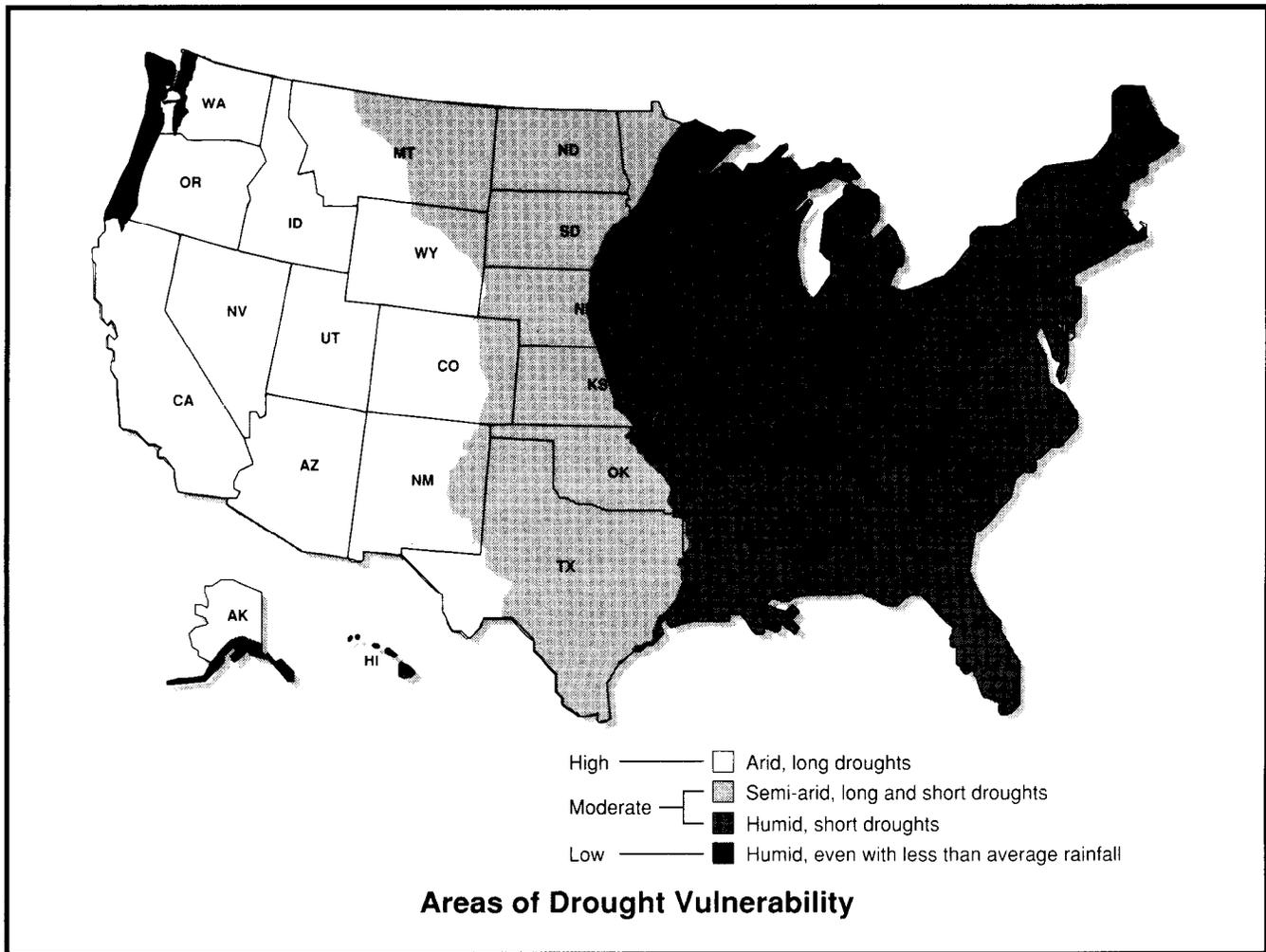
Winter storms vary in size and intensity and may affect a small part of one State or several States at once. Winter storms may be categorized as ice storms, heavy snowfall, or blizzards.

Related Hazards

Flooding can occur when large amounts of snow melt in a short period.

Geographical Considerations

Almost the entire United States, except Hawaii and the Territories, are at risk. The level of risk depends on the normal severity of local winter weather. Winter storms known as *northeasters* cause extensive coastal flooding, erosion, and property loss in the northeastern and middle Atlantic States.



□ DROUGHT AND EXTREME HEAT

Description

A *drought* is an extended period of unusually dry weather. Droughts become severe if several months pass without significant precipitation.

Extreme heat is defined as temperatures that are 10 or more degrees above the average high temperature, and that last for several weeks during the hottest time of the year.

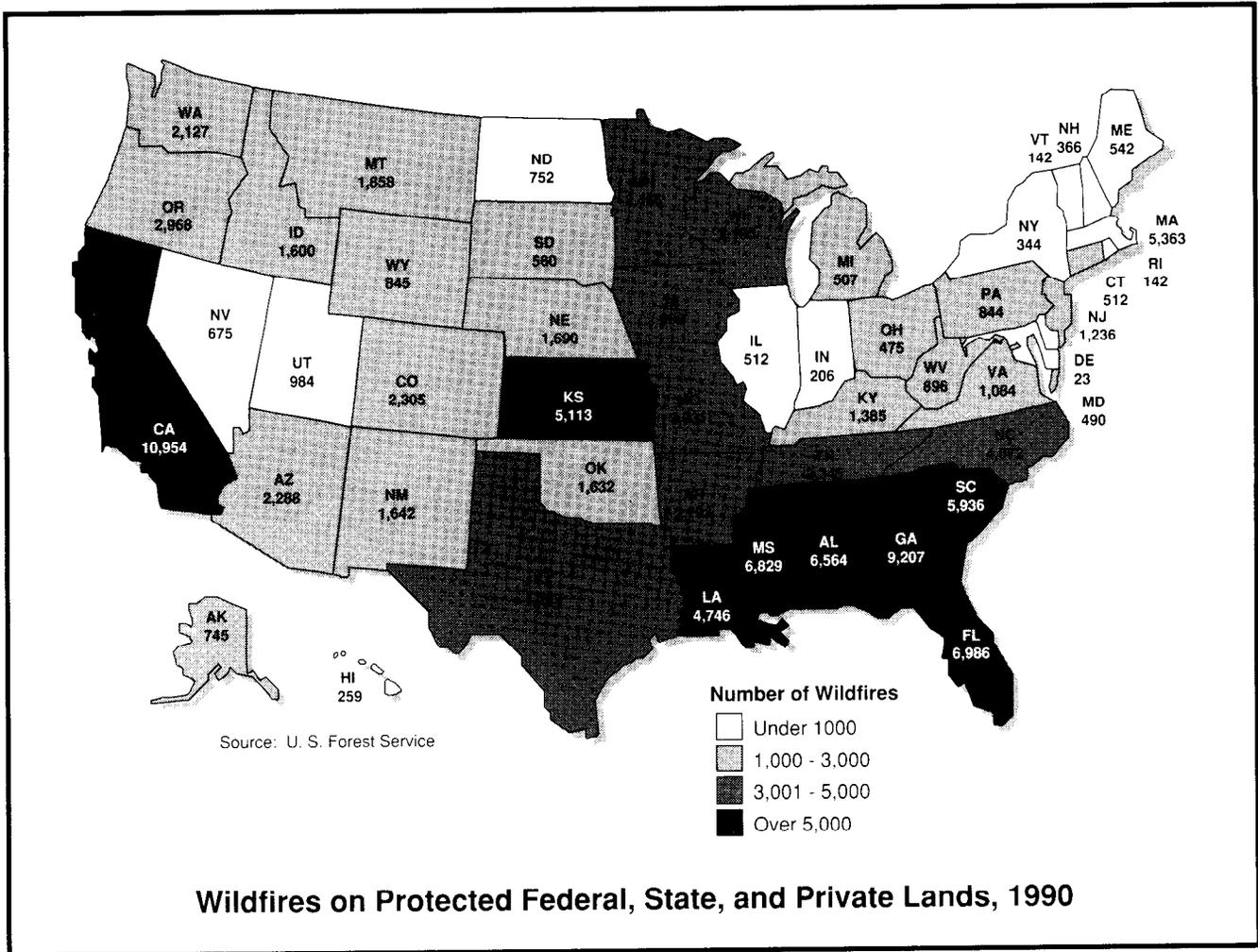
○ **Related hazards**

Drought and extreme heat can cause shortages of water and food crops. Parched lands are more susceptible to wildfires during periods of drought.

Droughts can actually result in later flooding: the vegetation dies without water, and as a result, even an average rain can cause flooding.

Geographical Considerations

Droughts and extreme heat are possible anywhere in the U.S. The possibility for long-term droughts is much greater in the western States—excluding the Pacific Northwest.



Wildfires on Protected Federal, State, and Private Lands, 1990

WILDFIRE

Description

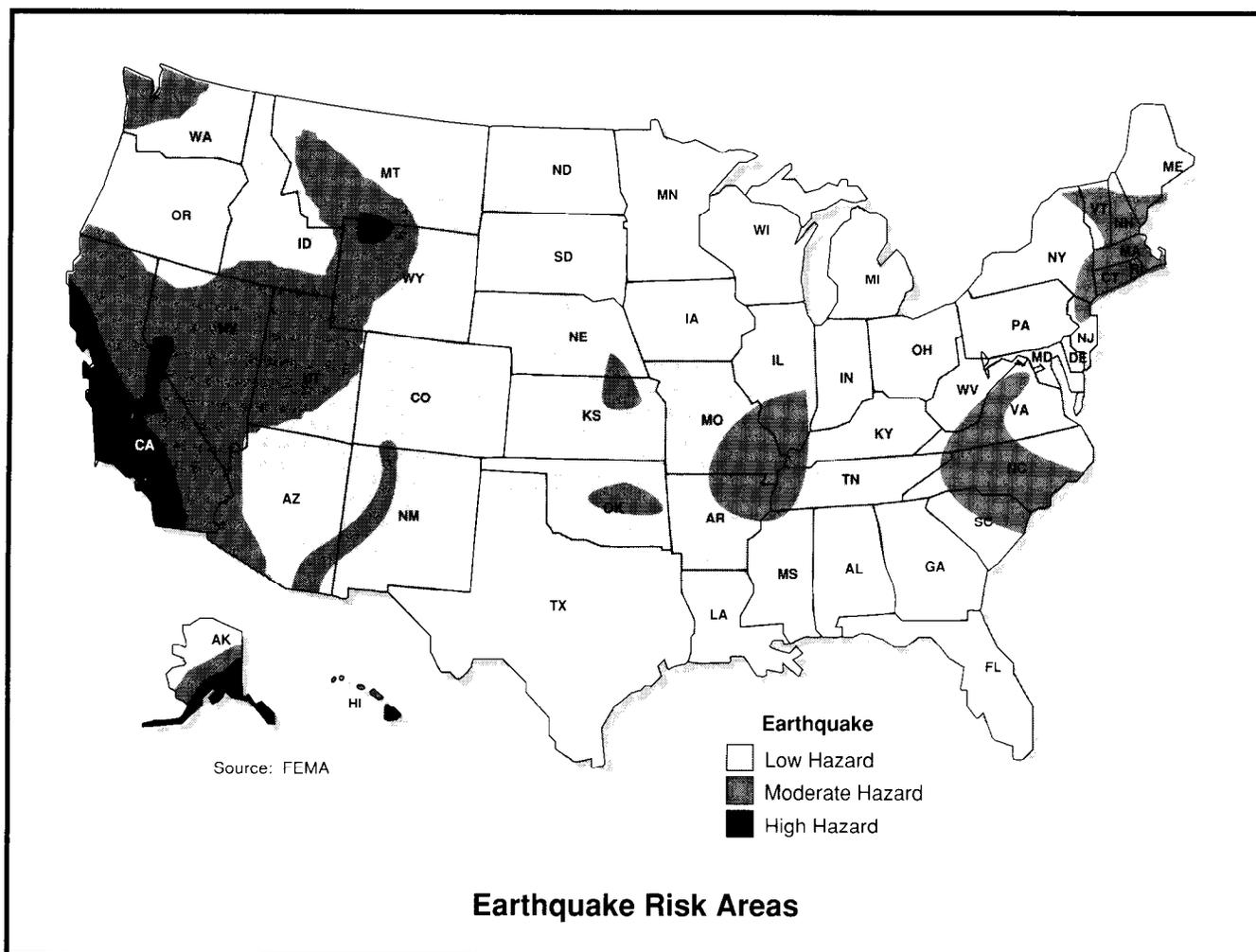
A *wildfire* is any instance of uncontrolled burning in grasslands, brush, or woodlands. Wildfires can be caused by lightning, human carelessness, or arson.

Related Hazards

Soil erosion, landslides, and flash floods are often secondary events of wildfires.

Geographic Considerations

Wildfires can occur in all wooded, brush, and grassy areas—especially those in Kansas, Mississippi, Louisiana, Georgia, Florida, the Carolinas, Tennessee, California, Massachusetts, and the national forests in the western States.



□ EARTHQUAKE

Description

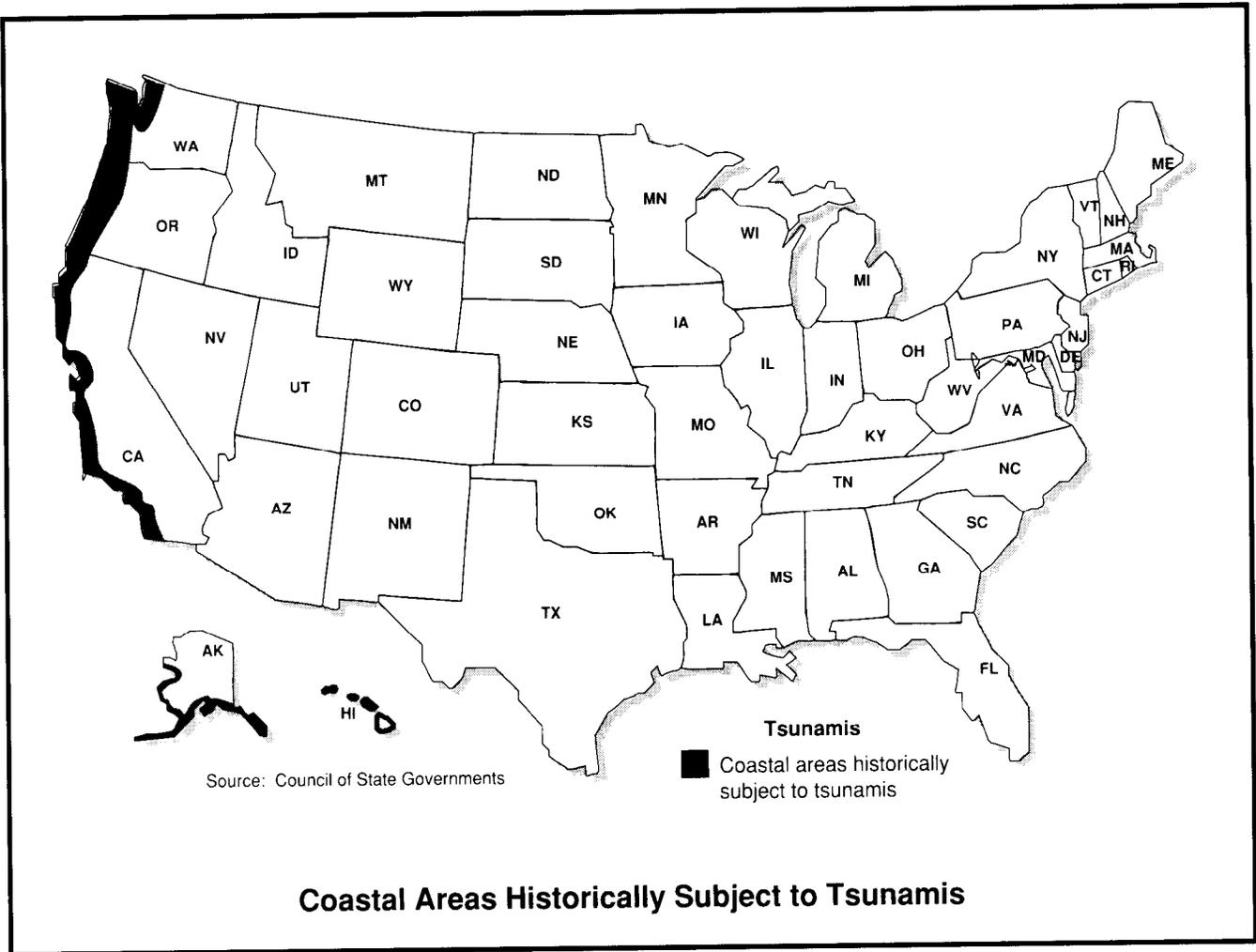
An *earthquake* is a trembling of the ground that results from the sudden shifting of rock beneath the earth's crust.

○ *Related Hazards*

Earthquakes may cause landslides and rupture dams. They also can generate tsunamis, which may strike the coastline thousands of miles from the quake. Severe earthquakes destroy power and telephone lines, gas, sewer, or water mains which, in turn, may set off fires and/or hinder firefighting or rescue efforts. Earthquakes also may cause building and bridge collapses.

Geographical Considerations

Earthquakes occur along fault lines where massive plates of rock located beneath the earth's crust move against one another. Earthquakes have occurred in most areas of the United States. The most frequent earthquake events occur in States west of the Rocky Mountains, although historically the most violent earthquakes have occurred in the Eastern United States and in the Central Mississippi Valley. California is especially vulnerable because of its high seismic activity. Other highly vulnerable areas are Charleston, South Carolina, and the central United States (the New Madrid Seismic Zone), both of which were devastated by earthquakes in the last century.



TSUNAMI

Description

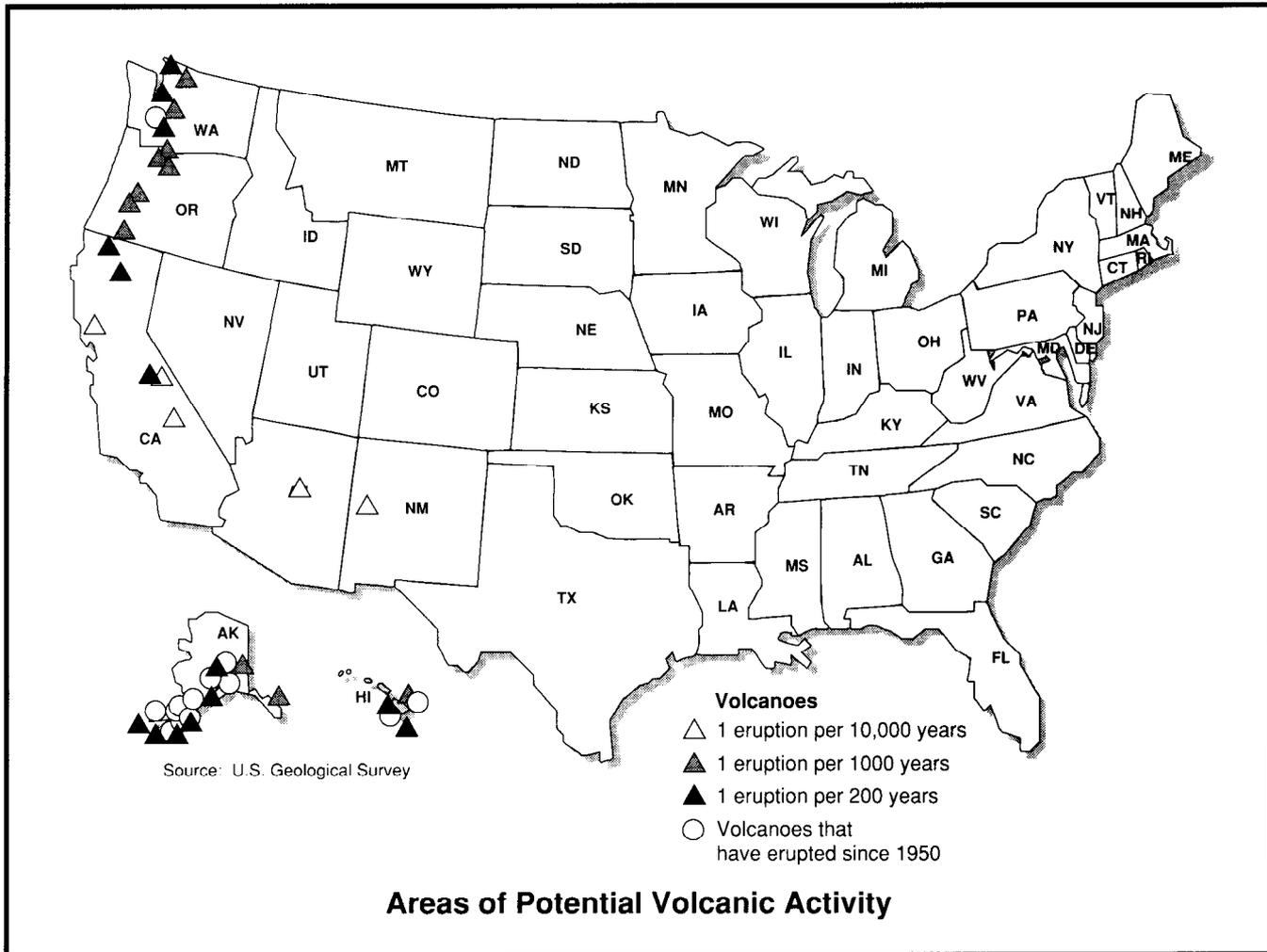
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Related Hazards

Tsunamis can cause widespread flooding and erosion.

Geographical Considerations

Tsunamis have occurred mainly in the Pacific. However, it is possible for a tsunami to occur along any coastline.



VOLCANIC ERUPTION

Description

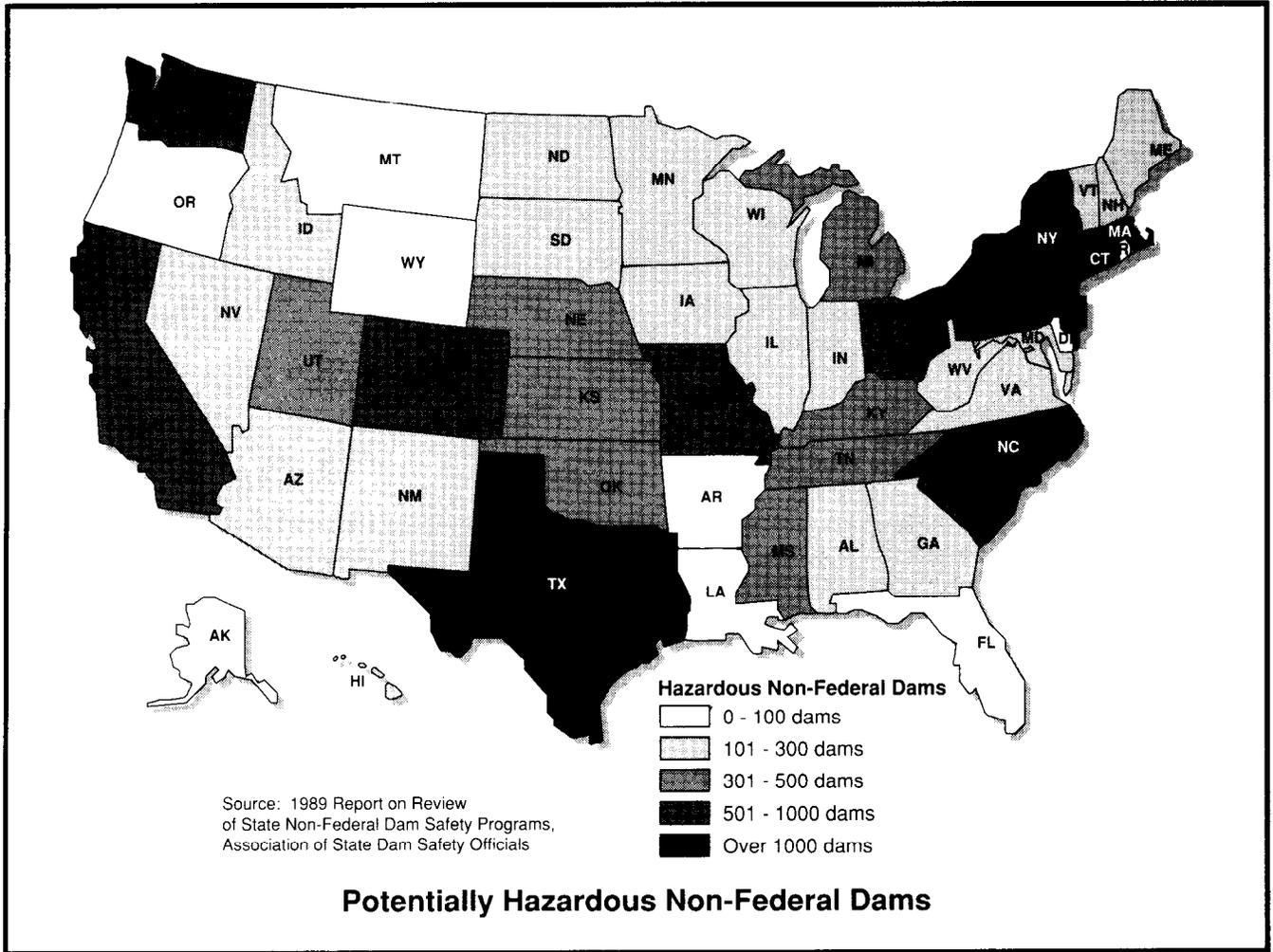
A *volcano* is an eruption from the earth's interior. The material coming from the eruption may be in the form of slow lava flow, or an explosive blast of powdered rock, steam, and other gases.

Related Hazards

Volcanic eruptions can generate mild to moderate earthquakes, mudflows, flash floods, and ash clouds that can create intense storms.

Geographical Considerations

The primary areas affected include the Pacific Rim States of Hawaii, Alaska, Washington, Oregon, and California. Montana and Wyoming also are at risk, but to a much lesser extent.



DAM FAILURE

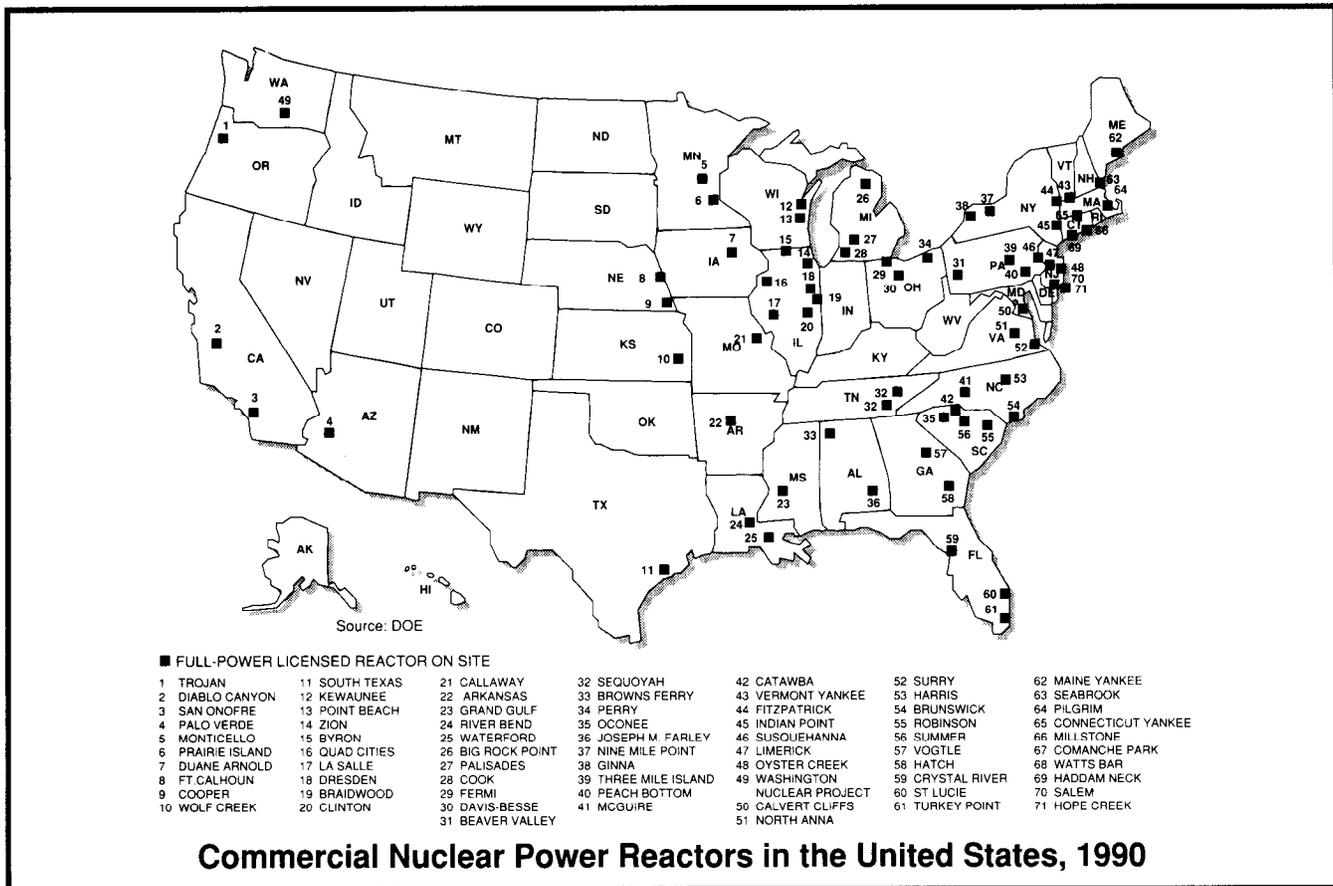
Description

The *failure of dams* due to excessive rainfall, volcanic eruption, poor construction, poor maintenance, or earthquake activity can cause catastrophic floods.

Geographic Considerations

A dam failure could affect everyone living in the floodplain downstream of a man-made dam. There are more than 80,000 dams throughout the United

States; more than 20,000 are classified as posing "high" or "significant" hazards. These designations mean that if such a dam failed, lives could be lost and extensive property damage would be suffered.



Commercial Nuclear Power Reactors in the United States, 1990

RADIOLOGICAL MATERIALS

NUCLEAR FACILITY

Nuclear power-generating facilities have the greatest concentration of radioactive materials of any private source. Although extensive safeguards are required, accidents can occur. These could affect large populations through the accidental release of radiation.

Geographical Considerations

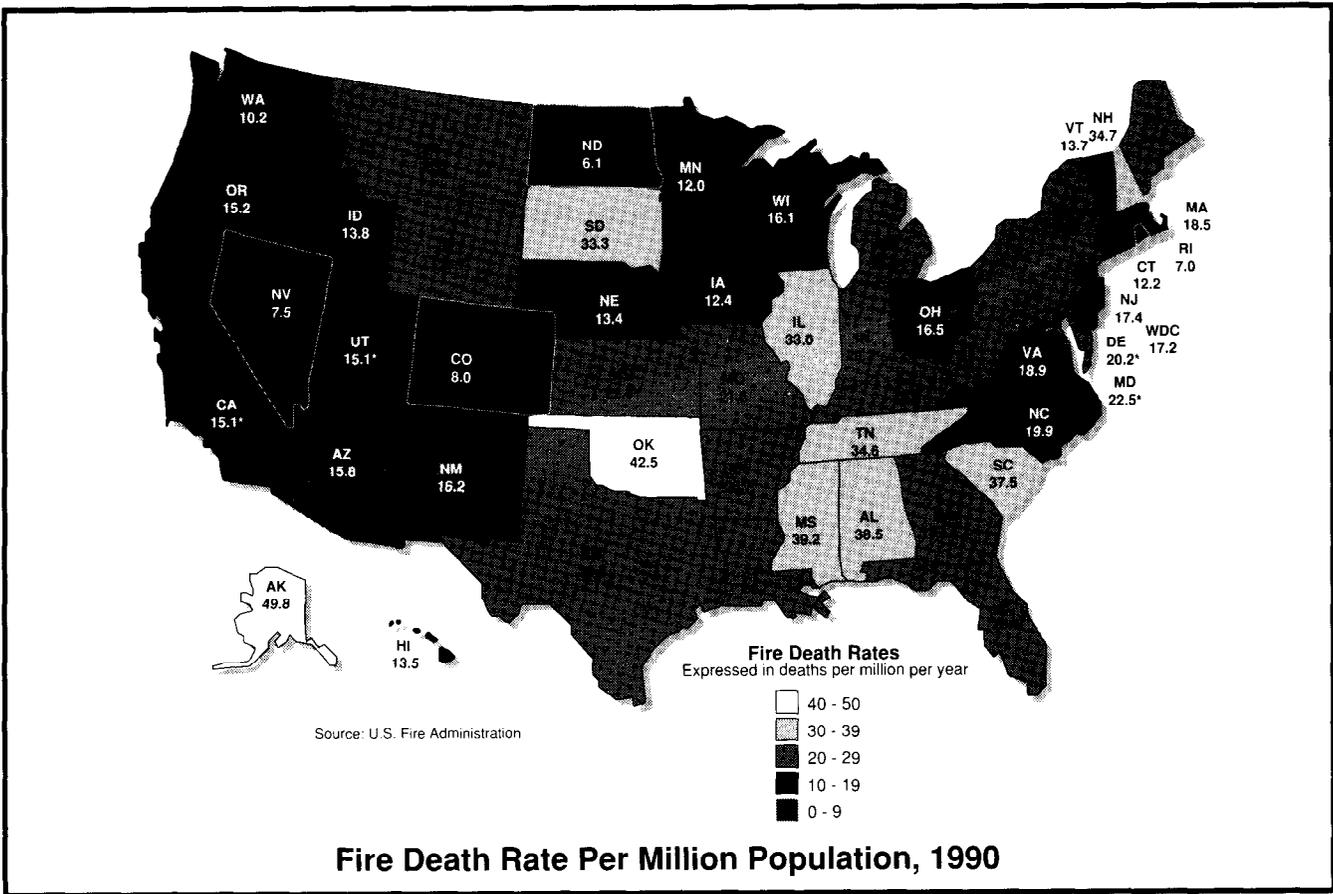
Areas at risk are normally designated as (1) within the *plume emergency planning zone* of such facilities (jurisdictions located within a 10-mile radius of a nuclear power plant) or (2) within the *ingestion emergency planning zone* (jurisdictions within a 50-mile radius of a nuclear power plant). About 75% of the States are affected, in particular the eastern half of the contiguous 48 States and the West Coast States.

TRANSPORTATION AND STORAGE

The transportation and disposal of radioactive materials and waste creates problems because of the long life of radioactive materials. Although precautions are taken in packaging the materials, there is still concern that transportation accidents and other hazards, such as earthquakes near disposal sites, could cause radiation exposure or pollution.

Geographical Considerations

Dangers posed by radioactive wastes are concentrated in the immediate vicinity of the disposal sites or along the transportation routes. Disposal sites are located in remote areas or at nuclear power facilities.



Fire Death Rate Per Million Population, 1990

STRUCTURAL FIRE AND EXPLOSION

Description

Fires and explosions can result in uncontrolled burning in residential, commercial, industrial, or other properties in rural or developed areas.

Geographical Considerations

Accidental structural fire and explosion can strike anywhere. Though arson once was confined to major urban areas, it now can occur in practically any community in the United States.

3

Natural Hazards: Applying the Four Phases

In this unit, you will learn

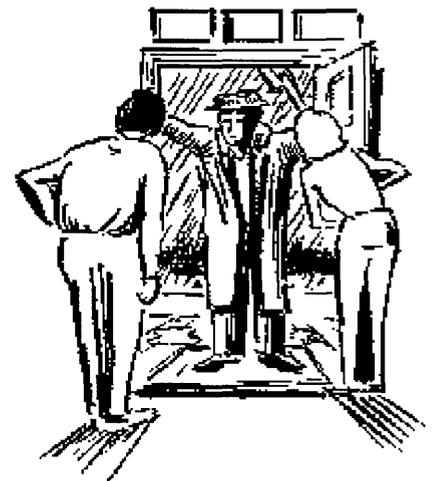
- Definitions of major natural hazards,
- Signs and warnings of each natural hazard,
- Immediate and long-term dangers posed by each natural hazard,
- Mitigation, preparedness, response, and recovery measures that are appropriate for each natural hazard, and
- Related emergencies that can follow in the event of an emergency involving a particular natural hazard.

The largest single category of repetitive threats results from weather or geological events that can affect any area of the country. Their impact can be localized or widespread, predictable or unpredictable; resulting damage can range from minimal to major. Depending on the severity of the incident, they can have a long-term impact on the infrastructure (roads, bridges, and utilities) of any given location. Threats involving natural forces include dam failure, drought, earthquake, flood, hurricane, landslide, tornado, tsunami, volcano, wildfire, thunderstorm, and winter storm.

Natural hazards are more predictable than any other type of hazard. Although we cannot know exactly when they will occur, precisely where they will strike, or how severe they will be, we do recognize from past experience which geographical areas are most vulnerable to certain types of natural hazards. This knowledge helps to better prepare for and respond to natural hazards.

Warnings for natural disasters are usually issued by a Federal agency and announced over the radio or television. *Mitigation* measures can be taken to increase the safety of your home. You also can determine what kind of damage your home is likely to suffer. For some disasters, response will include finding *shelter* in your home. For others you will *evacuate* to a shelter outside of the threatened area. *Recovery* will include assessing the damage, filing a claim with your insurance company, and repairing the damage. If the disaster is severe, you may be eligible to apply for governmental assistance.

As you read through the following fact sheets on natural hazards, remember that each type of hazard has unique characteristics. These characteristics permit you to prepare and protect yourself. Learn them. Know how to protect yourself and your home from the natural hazards that threaten you, and know how to respond safely to all natural emergencies, particularly those most likely to occur in your geographical area.



Floods, hurricanes, and thunderstorms are common examples of natural hazards.



Natural hazards are more predictable than any other type of hazard. Knowledge of past events can give clues to whether a community may be vulnerable to certain kinds of natural hazards.



Thunderstorms are a violent form of convection. Convection is a process in which cold upper air sinks and warm, moist air rises. As the warm air rises, storm clouds called *thunderheads* develop. These clouds make thunderstorms that bring strong winds, lightning, hail, and rain. *Lightning*, the discharge of electricity within the storm cloud, always accompanies a thunderstorm.

Thunderheads may be miles across at the base and reach heights of 40,000 feet or more. They can dump large amounts of rain or hail on localized areas. Violent lightning can strike the ground several miles away from its parent cloud. In addition, tornados and flash floods can be caused by thunderstorms.

There are at least 100,000 thunderstorms annually across the United States. Statistics show that an average of more than 100 people are killed and about 250 injured each year by lightning. Annual property loss is estimated in the hundreds of millions of dollars.

At any given moment, nearly 2,000 thunderstorms are in progress over the earth's surface. Their frequency and potential for violence make them one of nature's greatest killers and destroyers.



SIGNS AND WARNINGS

- Lightning, thunder, and storm clouds occur together. Dark, towering, or threatening clouds are the first indication of possible thunderstorms. Distant lightning and thunder is another sign. Because light travels so much faster than sound, lightning flashes can be seen long before the resulting thunder is heard. To estimate how many miles away a thunderstorm is from your area, count the number of seconds between a flash of lightning and the next clap of thunder, and then divide by five. For example, if there are 10 seconds between the lightning flash and thunder, the storm is two miles away (10 seconds divided by five).
- Because thunderstorms may occur singly, in clusters, or in lines, it is possible that several thunderstorms may affect you in the course of a few hours.
- The National Severe Storms Forecast Center in Kansas City, Missouri, issues severe thunderstorm watches. Local National Weather Service offices issue warnings and statements about severe weather and localized storms.
- A *severe thunderstorm watch* means that conditions are right for lightning and/or damaging winds greater than 58 miles per hour, hail that could reach a diameter of three quarters of an inch, and heavy rain.
- A *severe thunderstorm warning* means that severe thunderstorms have been sighted in your area.



IMMEDIATE DANGERS

- Sudden strong winds often accompany a thunderstorm and may blow down trees across roads and power lines. In a severe thunderstorm the winds can cause extensive damage to roof and windows and may tip over mobile homes.
- Lightning presents the greatest immediate danger during a thunderstorm. In an

average year lightning kills more people in the United States than the number of persons killed from tornados, floods, and hurricanes combined.

- Flash floods and tornados can develop during thunderstorms.
- Hail can severely damage agricultural crops.

LONG-TERM DANGERS

- One or more severe thunderstorms occurring over a period of less than a week can cause extensive power outages, agricultural damage, and may lead to flooding.



MITIGATION

- Install lightning rods on all high-risk buildings. Lightning rods will carry the dangerous electrical charge of lightning bolts safely to the ground.
- Crops can be insured against loss from storm damage through the Federal Crop Insurance Corporation of the U.S. Department of Agriculture.
- Support the adoption and enforcement of a floodplain management ordinance.
- Buy flood insurance through your local property insurance agent.

PREPAREDNESS

- If you plan to be outdoors, check the latest weather forecast and keep a weather eye on the sky. When you observe signs of an impending storm—towering thunderheads, darkening skies, lightning, increasing wind—tune in your NOAA Weather Radio, AM-FM radio, or television for the latest weather information.
- If you live in a mobile home, you should make sure that it has been securely tied down to a solid foundation or ground anchors to keep the wind from shifting it or turning it over.
- Designate a safe area in or near your home to shelter your family in a severe thunderstorm.
- Teach all family members to pay attention to storm warnings and educate them on what to do in a storm if they are at home, outside, or in a car.
- Stock your shelter with candles or flashlights and with a battery-powered radio to listen to weather reports.



RESPONSE

- Do not stay in a mobile home during a severe thunderstorm.
- Get inside a storm shelter, home or large building, or inside a vehicle (but not a convertible).

**SEVERE
THUNDERSTORMS
(continued)**

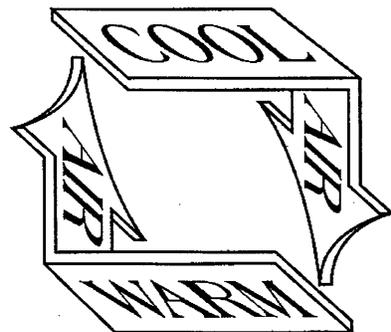
- If you are inside a home, avoid using the telephone except for emergencies.
- If you are outside and do not have time to reach a safe building or an automobile, follow these rules:
 - Do not stand underneath a natural lightning rod such as a tall, isolated tree in an open area.
 - Get out of and away from open water.
 - Get away from tractors and other metal farm equipment.
 - Get off of and away from motorcycles, scooters, golf carts, and bicycles. Put down golf clubs.
 - Stay away from wire fences, clotheslines, metal pipes, rails, and other metallic paths that could carry lightning to you from some distance away.
 - In a forest, seek shelter in a low area under a thick growth of small trees. In open areas, go to a low place such as a ravine or valley, but remain alert for flash floods.
 - If you are isolated in a level field or prairie and you feel your hair stand on end (which shows that lightning is about to strike), drop to your knees and bend forward, putting your hands on your knees. Do not lie flat on the ground.
- If you are in a car, pull safely onto the shoulder and turn on your emergency flashers until the heavy rain subsides.
- A person struck by lightning will receive severe electrical shock and may be burned; however, the individual will carry no electrical charge and can be handled safely. Give first aid and call emergency medical assistance immediately.
 - If a victim is not breathing, mouth-to-mouth resuscitation should be given immediately to prevent permanent brain damage.
 - Victims who appear only stunned or otherwise unhurt may also need attention. Check for burns, especially at fingers and toes and next to buckles and jewelry.
- More than one storm may strike an area within a few hours. Once one storm subsides, be certain there are no more storms approaching before resuming your normal activity.

RECOVERY

- Have damage to your home and property assessed as required by your property insurance company. Clean up and repair damage as soon as authorized by your insurer.

RELATED EMERGENCIES

Keep in mind that thunderstorms can cause other major natural hazards. *Tornados* and *flash floods* may be caused by severe storms. Also, lightning is a major cause of *wildfires*.



Thunderstorms originate in clouds called "thunderheads" which form in warm, moist air as it rises above cold air.

The transformation of a calm, slow-flowing river into a violent and destructive *flood* occurs hundreds of times each year in this country. Floods can be slow or fast rising. They are sometimes seasonal, as when winter or spring rains and melting snow fill river basins with too much water too quickly. *Flash floods* are usually the result of extremely heavy rain or snow and are sudden. Raging torrents rip through river beds after these heavy rains, surging well beyond the normal banks and sweeping everything before them. Houses, bridges, and boulders can be tossed and rolled by a flash flood.

No area in the United States is completely free from the threat of floods. On the average, each year more than 300,000 people are driven from their homes by floods, 200 flood-related fatalities occur, and \$2 billion in total flood damages are sustained.

The worst recorded flood in terms of loss of lives was the 1889 flood in Johnstown, Pennsylvania, which resulted in the loss of more than 2,200 lives. The flood itself was actually caused by the failure of a dam upstream from Johnstown. This flood is a classic example of the secondary effects that can occur from another event. The worst economic losses were incurred in the 1972 floods that resulted from Hurricane Agnes (\$4.7 billion) and the 1973 flood of the Mississippi River system (\$1.2 billion).

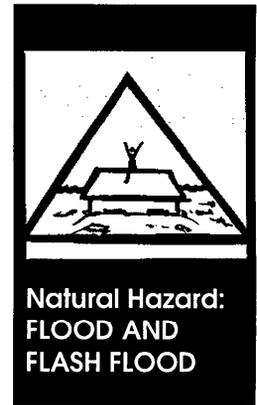
Proper land use management and strict enforcement of building codes, with special attention to floodplains, has helped reduce some of the high cost of losses due to flooding. Special flood hazard areas for some 18,000 communities are identified on a Flood Hazard Boundary Map or a Flood Insurance Rate Map issued by FEMA. Many maps provide base flood elevations. Every community participating in the National Flood Insurance Program (NFIP) is required to maintain a repository for their flood maps.

The NFIP is a Federal program enabling property owners to purchase flood insurance. FEMA administers the NFIP in communities throughout the United States. The NFIP is based on an agreement between local communities and the Federal government which states that if a community will implement floodplain management measures to reduce flood risks to new construction and substantially improve structures in flood hazard areas, the Federal government will make flood insurance available. Communities in the NFIP must require new buildings in the special flood hazard area to be constructed so that the lowest floor will be located at or above the base flood elevation.

FEMA also provides many communities with data to help them designate a floodway. The floodway is that part of the stream channel, plus any adjacent floodplain land, that must be reserved in order to allow the discharge of the base flood ("100-year flood") without increasing flood heights. In other words, *no development or encroachment*, including buildings, fill, mining, dredging, or grading, is allowed within a designated floodway if it would increase flood elevations.

SIGNS AND WARNINGS

- Floods and flash floods almost always occur during or after a period of heavy rain or sudden snowmelt. A flood may be building in your area when you notice local



**FLOOD AND
FLASHFLOOD
(continued)**

streams and rivers flowing more swiftly and at a noticeably higher level than normal. Listen to your radio for flood forecasts.

- Flash floods occur swiftly. If you hear a flash flood warning on the radio, or hear the roar of approaching waters, act immediately. Head for the nearest high ground. Seconds may make the difference between life and death.
- Many communities have installed water gauges to help monitor water levels.
- Flood warnings are issued by the National Weather Service. Local police, the sheriff, the highway patrol, the county flood control district office, and other local agencies may also supply flood warnings.
 - A *flash flood watch* is issued when flash flooding is possible within the designated watch area: be alert.
 - A *flash flood warning* is issued when a flash flood has been reported or is imminent: take necessary precautions.
 - A *flood warning* is issued as an advance notice that a flood is imminent or is in progress at a certain location or in a certain river basin. Take precautions as directed.


IMMEDIATE DANGERS

- The immediate danger from flash floods is from the strength of the water current as it surges through an area, carrying debris and causing injuries and drowning.
- Floods can interrupt power, disable fuel sources, and make roads impassable. People may be stranded in their homes, or be unable to reach their homes.


LONG-TERM DANGERS

- Dangers include the outbreak of disease, widespread animal death, broken sewage lines and widespread water supply pollution, broken gas lines, downed power lines, and fires.
- Large-scale flooding can disrupt a community for a long time while utilities are restored, debris is cleared, and property is repaired.
- Agricultural lands can be ruined and crops destroyed by flooding.

MITIGATION

- Through the National Flood Insurance Program (NFIP), people can protect themselves from financial ruin due to property loss from floods. Ask your local property insurance agency about flood insurance.
- Avoid building in a floodplain unless you elevate and reinforce your home. Check local building codes and ordinances. While the cost of protecting your home may be expensive, the investment will save you from the potential of even costlier damage. Remember, the cherished possessions of a lifetime cannot be replaced by money.

PREPAREDNESS



- Stockpile emergency building materials such as sandbags, plywood, plastic sheeting, and lumber.
- Install check valves in building sewer traps to prevent flood water from backing up in sewer drains.
- Keep your car fueled. If electric power is disrupted, gas station pumps may be out of operation for several days.
- Make family evacuation plans. If you are in a flash flood area, have several alternate routes to ensure rapid evacuation.
- Maintain emergency supplies such as a first aid kit, water, and foods that require little or no cooking and no refrigeration. A portable radio, emergency cooking equipment, and flashlights should all be maintained in a designated area.
- Store drinking water in jugs, bottles, and pans.

RESPONSE

- As flood waters rise, take these key precautions.
 - Secure all outdoor items or store them inside on upper levels.
 - Move all valuable household possessions to upper levels away from rising floods.
 - Move cars, machinery, and all livestock to higher ground.
 - Check emergency food and water supplies—keep them high and dry.
- Listen to radio announcements from emergency officials. If you are told to evacuate, do so immediately. Use only those routes recommended by local authorities. Any other route could be blocked or otherwise made impassable by flooding.
- If there is time before evacuation, turn off all utilities at the main switch. Do not touch any electrical equipment unless it is in a dry area, or you are well insulated with rubber footwear and gloves.
- Do not attempt to drive over a flooded road; you can become stranded or trapped. If your car stalls while in flowing water, abandon it immediately. Cars may only serve as traps in the face of a raging flood.
- Do not attempt to cross a flowing stream where water is above your knees.
- In a flash flood warning, the only thing to do is *move immediately to high ground*. Because of the speed with which a flash flood travels, you have no time to save any possessions or implement any precautionary measures. Save your life by moving to high ground without any hesitation.

RECOVERY

- If your home, apartment, or business has been damaged and you have a flood

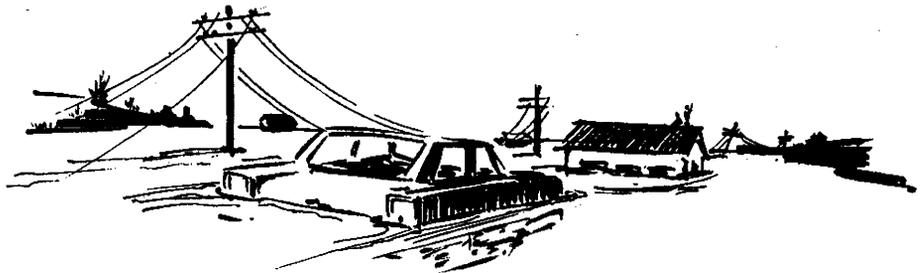
**FLOOD AND
FLASH FLOOD
(continued)**

insurance policy, immediately call your property insurance agent for advice on what you should do next to receive assistance.

- Do not use fresh food that has come in contact with flood waters. Have all drinking water tested by local health authorities before using. Wells should be pumped out and the water tested before drinking.
- Before entering a building, check for structural damage; make sure it is not in danger of collapsing.
- Open the building and let it air out for several minutes before entering to remove foul odors or escaped gas.
- Upon entering the building, do not use a match or lantern as a source of light because of the possibility of gas buildup; a battery powered flashlight is recommended. Check for electrical shorts and live wires. Make certain the power is turned off and do not use any appliances or lights until an electrician has checked your electrical system.
- Report broken utility lines to appropriate authorities.
- Open all doors and windows to help dry the building. Shovel out mud while it is still moist to give walls and floors an opportunity to dry.

RELATED EMERGENCIES

Keep in mind that floods can cause *landslides, mudflows, and power outages.*



If you must travel during a flood, listen to a battery-powered radio to obtain information on the safest routes. Several alternate routes should be planned BEFORE starting out on your trip.

Landslides are characterized by the downslope movement of rock, soil, or other debris. Landslides occur in all parts of the country, particularly in hilly areas that have a lot of rainfall. Frequently, they accompany other natural hazards such as floods, earthquakes, and volcanic eruptions. Landslides can occur as a result of land mismanagement. Increased housing development in landslide-prone areas will also increase potential damage if a landslide occurs.

Landslides can occur either very suddenly or slowly. They can be triggered during earthquakes, heavy rainstorms, rapid snowmelts, volcanic eruptions, storm-generated ocean waves, or other landslides. Landslides also can result from triggers such as freeze-thaw cycles, shrink-swell cycles, root wedging, animal burrows, natural erosion or deposition, or the thaw of ice-bearing soils such as permafrost. While most landslides are single events, more than one-third of the cases are associated with heavy rains or the melting of winter snows.

The annual death rate from landslides is 25 to 50, with annual economic losses estimated at \$1 to \$2 billion. These extensive economic losses include not only the replacement and repair of damaged facilities, but also associated costs such as lost productivity, disruptions to utility and transportation systems, and loss of revenue for affected communities.

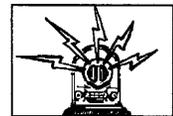
Mudflows are defined as flows or rivers of liquid mud down a hillside. They occur when water accumulates under the ground, usually following long and heavy rainfalls. If there is no brush, trees, or groundcover to hold the soil, mud will form and flow down the slope.



Natural Hazard:
LANDSLIDE
AND MUDFLOW

SIGNS AND WARNINGS

- Landslide warning signs include opening of cracks on hillslopes—evidence of slow, downhill movement of rock and soil; tilting of trees, poles, or walls; or perceptible changes such as the formation of sags and bumps in the slope.
- Mudflows are most commonly triggered by high-intensity rainstorms, but can also occur following forest fires when soil is newly bare. They tend to flow in channels, but will often spread out over the floodplain. They generally occur in places where they have occurred before.
- If you suspect a slope is unstable, have a specialist examine the slope. Possible signs of slope failure include the following:
 - Doors or windows sticking or jamming for the first time;
 - New cracks appearing in plaster, tile, brick, or foundations;
 - Outside walls, walks, or stairs beginning to pull away from the building;
 - Slowly developing, widening cracks appearing on the ground or on paved areas such as streets or driveways;
 - Underground utility lines breaking;
 - Fences, retaining walls, utility poles, or trees tilting or moving; and/or
 - Water or bulging ground appearing at the base of a slope.



IMMEDIATE DANGERS

- Immediate dangers from landslides or mudflows include injuries, fatalities, and destruction of property as rocks, mud, and water slide downhill or downstream.



**LANDSLIDE
AND MUDFLOW
(continued)****LONG-TERM DANGERS**

- Long-term, slow-moving landslides destroy many structures each year by gradual downhill movement. Once such movement begins it is very difficult to control.
- Associated dangers include broken electrical, water, gas, and sewage lines. Fires also may be started by damaged electrical wires and gas lines.
- Other long-term dangers from this hazard include the continued threat of landslides due to unstable land. Erosion from the loss of adequate groundcover could be very damaging and lead to flash flooding during periods of heavy rain or following heavy snows.

MITIGATION

- Before buying land or building on any property, check with the county land commissioner or with the local office of the U.S. Geological Survey for ground composition, drainage, and stability.
- Plant groundcover on slopes, or build retaining walls.
- Reinforce the foundation and walls of your home.
- Install flexible rather than stiff pipe fittings to avoid gas or water leaks in the event of a landslide or mudflow.
- In mudflow areas, construct channels or reinforced masonry walls to direct the mudflows around your home or buildings.
- Mudflow is covered by flood insurance policies from the National Flood Insurance Program. Buy flood insurance through your local property insurance agent.

PREPAREDNESS

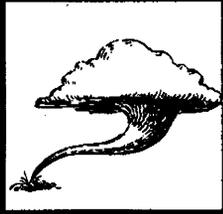
- Be prepared to evacuate your home.

RESPONSE

- If you are warned of an impending landslide or mudflow, evacuate at once to stable ground.
- If you are inside a building during a landslide, stay inside and get under a desk, table, or other piece of sturdy furniture.
- If you are outside and cannot get into a sturdy building while scattered rocks and debris tumble toward you, curl into a tight ball and protect your head.
- Usually, you can survive a mudflow only by avoiding it. If you are in a valley, get out as soon as possible once you hear rumbling from upstream or feel the ground tremble. These are signs that a mudflow may be coming your way.

RECOVERY

- If a landslide or mudflow has occurred near your home, thoroughly check the foundation, chimney, and surrounding land to be sure no damage has occurred. Check for damaged gas, electrical, or water lines. Do not strike a match or attempt to turn on electricity until you are sure it is safe. Report damages to the appropriate utility companies.
- Stabilization of new land should take place as quickly as possible to reinforce against secondary slippage.
- Replanting damaged land will help tremendously in both short- and long-term recovery.



Natural Hazard:
TORNADO

Tornados are relatively short-lived local storms. They are composed of violently rotating columns of air that descend in the familiar funnel shape from thunderstorm cloud systems. The weather conditions that tend to generate tornados are unseasonably warm and humid earth surface air, cold air at middle atmospheric levels, and strong upper-level jet stream winds. Tornados can occur anywhere in the United States during any month of the year. However, the Great Plains and Gulf Coast States experience the largest number of tornados. The greatest frequency of tornados occur in April, May, and June.

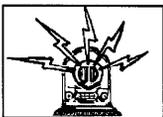
The destruction path of a tornado averages about 250 yards in width and 15 miles in length. However, in extreme conditions, a tornado may travel more than 300 miles and leave a path of total destruction more than a mile wide. Tornados will travel up to sixty miles per hour, with wind speeds approaching 400 miles per hour within the tornado's center. Tornados *usually* travel from a westerly direction to an easterly direction. However, this pattern does not apply to tornados caused by hurricanes.

Tornados occur as single storms, but sometimes several can develop at the same time. On Friday, May 31, 1985, a series of tornados ripped through eastern Ohio, western Pennsylvania, western New York, and Ontario, Canada, killing 90 persons, injuring hundreds, leaving thousands homeless, and causing hundreds of millions of dollars in damage.

Tornado warning networks are in operation in this country and help save many lives each year. Each community in high- and moderate-risk tornado areas should have a group of volunteer spotters who watch the sky during threatening weather. They should report any signs of a tornado to local emergency management officials and to the regional office of the National Weather Service.

On May 6, 1975, a tornado tore through a 200-block area of Topeka, Kansas. At least 31,000 people lived or worked in the area, which caught the full fury of the storm. While more than 2,000 homes, apartments, and businesses were destroyed, only three people died and 200 were injured because of adequate warning and quick action. An estimated 500 persons could have lost their lives in that storm had there been no warning system or if the citizens had not heeded the warnings.

SIGNS AND WARNINGS



- Tornados develop during severe thunderstorms and hurricanes. While not all thunderstorms and hurricanes create tornados, the potential is there. During violent weather, keep tuned to a local television or radio station for tornado reports.
- If you are outside and see a funnel-shaped cloud with obvious rotating motion, it may be a tornado. As a tornado develops, it will produce a loud roar that grows louder as the funnel cloud touches the ground. When nearby, a tornado has a loud sound comparable to the combined roars of several jet engines.
- The National Severe Storms Forecast Center in Kansas City, Missouri, issues tornado watches. Local National Weather Service offices issue tornado warnings. Local officials may sound sirens in a tornado warning.
 - A *tornado watch* indicates that conditions are right for a tornado to develop and that the sky should be watched.

- A *tornado warning* indicates a tornado has been sighted or is spotted on radar. Warnings will give the location of the tornado and the area immediately affected by the warning.

IMMEDIATE DANGERS

- The immediate threat from tornados is danger to life and damage to property from violently whirling winds and debris hurled through the air by the winds.



LONG-TERM DANGERS

- Long-term risks include the possibility of building collapse, fallen trees and power lines, broken gas lines, broken sewer and water mains, and the outbreak of fires. Agricultural crops and industries may be damaged or destroyed.



MITIGATION

- Follow relevant building code practices such as the use of wind-resistant design.

PREPAREDNESS

- The best preparation for a tornado is to designate a safe place in or around your home as a tornado shelter. Tornado shelters are safest if they are underground. A storm cellar or basement away from windows offers the best protection.
- If neither of these is available, plan to find shelter under heavy furniture or mattresses near an inside wall of your house on the ground floor. Get under solid furniture or cover yourself with mattresses pulled off the bed.
- Plan tornado drills with your family so everyone knows what to do.
- Know the location of the designated shelter where you work or go to school.
- Plan to evacuate your manufactured (mobile) home.
- Make an inventory of your household furnishings and other possessions. Supplement the written inventory with photographs or video. Keep inventories and pictures in a safe deposit box or some other safe place away from the premises.



RESPONSE

- If you have a storm cellar or shelter, go to it immediately with your family. If no shelter is available, go to your basement and get under a heavy work bench or stairs. Do not position yourself directly underneath heavy appliances on the floor above you.
- If your home has no basement, stay in the center of the house away from the windows or in a small room on the ground floor that is away from outside walls. Take cover under solid furniture or mattresses. Protect your head.

TORNADO
(continued)

- In mobile homes or vehicles, leave and take shelter in a substantial structure. If there is no nearby shelter, lie flat in the nearest ditch or ravine with your hands shielding your head.
- In any large building, such as an office or a department store, avoid all large, poorly supported roofs. Go to the basement or to an inner hallway on a lower floor.
- *Do not drive.* You are safer in a home or basement shelter than in a car.
- If you are driving in a city and spot a tornado, get out of your car and go into a nearby building.
- If you are driving in open country, drive at a right angle away from the tornado's path *if you can safely do so.* Do not try to outrun the storm. If you cannot avoid the tornado, get out of your car. Lie flat in the nearest depression, such as a ditch, culvert, or ravine. Protect your head, and stay low to the ground.

RECOVERY

- After a tornado passes, keep tuned to the local radio or TV station to get an all-clear signal before leaving your shelter. Sometimes more than one tornado will develop during a violent storm.
- Re-enter buildings with extreme caution.
- Be alert to fire hazards such as broken electrical wires or damaged electrical equipment, gas or oil leaks, or smoldering piles of wet hay or feed. Report broken utility lines to appropriate authorities.
- Have damage to your property assessed by your insurance company.

RELATED EMERGENCIES

Tornados are part of a severe thunderstorm and bring with them the dangers of *lightning, high winds, floods, and flash floods* from extremely heavy rainfall.

Hurricanes can strike coastal areas from Texas to Maine, Hawaii, Puerto Rico, the Pacific territories, and the Virgin Islands. A hurricane begins as a tropical depression (a low pressure center); if conditions are right, a tropical storm may develop and strengthen until it becomes a hurricane. The term *hurricane* is used when winds reach constant speeds of 74 miles per hour or more. These winds blow in a large spiral around a relatively calm center known as the *eye* of the hurricane. Around the rim of the eye, winds may gust to more than 200 miles per hour. The entire storm dominates the ocean surface and the lower atmosphere over tens of thousands of square miles. In the western Pacific, hurricanes are called *typhoons*. South of the equator and in the Indian Ocean, they are called *cyclones*.

One of the greatest dangers associated with hurricanes is what is known as a *storm surge*. The storm surge is a dome of water, often 50 miles wide, that may flood the coastline near the area where the eye of the hurricane makes landfall. This surge of water may cause flooding up to 20 feet above normal sea level and is topped by battering waves and incredibly strong winds. Nine out of 10 hurricane-related fatalities are caused by the storm surge.

On the average, six Atlantic hurricanes occur each year. Most occur in August, September, and October, but the six-month period from June 1 to November 30 is considered the Atlantic hurricane season. Not all of these violent storms strike land, but when they do the destruction to coastlines and islands in their paths can be tremendous. The worst such recorded event happened in Galveston, Texas, in 1900, when 6,000 lives were lost. The greatest economic damage resulted from Hurricane Hugo in 1989, with an estimated loss of \$10 billion.

Not only coastal areas are affected by hurricanes. Hurricane Diana, in 1955, caused little damage as it moved inland, but long after its winds subsided, it brought floods to Pennsylvania, New York, and New England that killed 200 persons and caused an estimated \$700 million in damage. In 1972, Hurricane Agnes fused with another storm system, causing more than a foot of rain to fall in less than 12 hours, resulting in severe flooding from Virginia to New England. That hurricane killed 117 people and caused \$4.7 billion in damage.

Communities in areas that may be threatened by hurricanes should develop plans for action that specify what areas would be likely to be evacuated and by what routes, what shelters would be used, and how local emergency forces and public service units would respond. Once the plan is in place, the community should conduct exercises (simulations of emergency situations) to determine whether planned procedures are effective and everyone prepared to execute them.

To help communities prepare to help special populations, FEMA publishes *Action Guidelines for Senior Citizens and School Children*. See the Resource section, page R-2, for ordering information.

SIGNS AND WARNINGS

- As a hurricane approaches, the skies will gradually darken over the ocean or gulf, and winds will continue to grow in velocity. The barometric pressure will fall, winds will increase, and rain will fall in torrents.

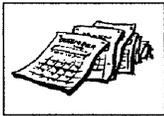


HURRICANE
 (continued)

- The National Hurricane Center in Miami monitors weather data and will issue forecasts for hurricanes in the Atlantic Ocean, Caribbean Sea, Gulf of Mexico, and the eastern Pacific Ocean. Your local National Weather Service office, as well as local and State officials, may disseminate hurricane information.
- Learn the terminology used to convey hurricane emergency information.
 - A *hurricane advisory* tells where the storm is located, the intensity of wind speeds, and the direction of movement.
 - A *hurricane watch* is issued for a coastal area when there is a threat of hurricane conditions within 24 to 36 hours. In some more vulnerable areas, actions for protection of life and property should begin at this point.
 - A *hurricane warning* is issued when hurricane conditions are expected in a specified coastal area in 24 hours or less. Hurricane conditions include winds of 74 miles an hour (64 knots) and/or dangerously high tides and waves. Final actions for protection of life and property should be completed as quickly as possible before high winds and heavy rains arrive.


IMMEDIATE DANGERS

- The storm surge can destroy property along a coastline and is the major threat to life. Dangers associated with a hurricane emergency include extremely high winds that can demolish houses, uproot trees, and fill the air with debris. Tornadoes may develop as a hurricane passes.


LONG-TERM DANGERS

- Long-term hazards come in the form of interrupted gas, water, and electric power, fires and explosions from gas leaks, fallen power lines, electrical short circuits, and contaminated food and water.

MITIGATION

- Retrofit your home to withstand wind and flooding. Coastal homes in flood hazard areas should be elevated. All windows should be shuttered, and structural connectors reinforced. Unreinforced masonry should be strengthened. Consult FEMA's *Coastal Construction Manual* (FEMA-55) for guidance (see page R-1).
- Support the adoption and enforcement of floodplain management requirements.
- In addition to your property insurance, buy a flood insurance policy from your insurance agent. Renters also can buy a flood policy for personal property.


PREPAREDNESS

- Learn about hurricanes—the warnings, the dangers, and how to protect your property, your family, and yourself.
- Be prepared as each hurricane season begins. Every June, recheck your window shutters and supply of boards, tools, batteries, nonperishable foods, bottled water, and other equipment needed to ensure your safety.

- Plan a flood-free evacuation route if your area is vulnerable to flooding or if you live in a mobile home.
- Notify your local emergency manager if you do not have transportation.
- Make a household inventory with pictures or a video, and keep it with your insurance policies in a safe place such as a safety deposit box.

RESPONSE

- When your area receives a hurricane watch, keep calm; plan your time before the storm arrives and avoid a last-minute rush that might leave you marooned or unprepared. Take the following precautions.
 - Listen for weather updates.
 - Moor your boat securely, or move it to a designated safe area.
 - Board up your windows, or protect them with shutters or tape to reduce danger from wind-driven debris and high wind pressure.
 - Secure outdoor objects such as tools, porch furniture, garbage cans, and bicycles that could become deadly projectiles in hurricane winds. Store them inside if possible.
 - Store drinking water in clean bathtubs, bottles, and pans. Ensure batteries are fresh and in sufficient quantity.
 - Keep your car's gas tank filled during a hurricane watch. Service stations may be closed for several days after a hurricane, due to power outages and flooding.
- Manufactured (mobile) homes are extremely susceptible to high winds and should be evacuated for more substantial shelter.
- Evacuate low-lying areas when ordered by officials, and turn off utilities at the main switch, if time permits.
- Stay at home only if it is safe to do so. If you are advised to evacuate, follow directions of local officials.
- When a hurricane strikes, stay indoors away from windows.
- Travel is extremely dangerous during high winds and storm surges. Do not attempt to travel by car or foot once high winds reach your area.
- If the storm center passes directly overhead, the wind will calm down for a period lasting from a few minutes to half an hour or more. Do not be fooled into thinking the hurricane has passed while the eye is over your area. Many people lose their lives by making this mistake. When the winds begin again, they will grow rapidly to hurricane force, and come from the opposite direction.
- Severe flooding may follow hurricanes as they move inland. Stay away from river banks and streams. Monitor National Weather Service advisories on flood stages.

RECOVERY

- If you evacuated, return home when authorities tell you it is safe. Before entering,

**HURRICANE
(continued)**

be sure the structure is safe to enter.

- Call your insurance agent and take pictures of damage to your house and its contents. Hose down hard goods such as major appliances and furniture, even if they are destroyed. You need to keep these for the adjuster's inspection. The adjuster will help you make decisions on whether to repair possessions or replace them.
- Throw out perishable or water-contaminated foods.
- Avoid loose or dangling wires, and report them to the power company.
- Report broken sewer or water mains to the water department.
- Check for gas leaks, and do not strike a match or relight appliances until they have been inspected.
- Open windows and doors to let the air circulate. This will help remove foul odors and protect you from escaping gas. It also will help dry out the house.
- Pump out the basement if it is flooded, but do it gradually. Drain one-third of the flood waters each day, to minimize further structure damage. Shovel out the mud while it is still moist, and dry rugs and carpets thoroughly.
- Make any temporary repairs necessary to prevent further losses.
- Assure that substantially damaged structures are elevated above the base flood elevation when reconstructed.

RELATED EMERGENCIES

Hurricanes can be accompanied by other severe storm hazards such as *lightning*, *tornados*, and *flooding*.

Winter storms vary in size and strength. A storm may be large enough to affect many States or only a portion of a single State. There are three categories of winter storms.

A blizzard is the most dangerous of all winter storms. It combines low temperatures, heavy snowfall, and high winds that blow the snow into drifts and reduce visibility to only a few yards.

A heavy snowstorm is one that drops four or more inches of snow in a 12-hour period, or six or more inches in a 24-hour period. Again, high winds may accompany the storm, blowing the snow into drifts and causing poor visibility.

An ice storm occurs when moisture falls from clouds and freezes immediately upon impact. This type of storm makes driving and even walking extremely hazardous.



SIGNS AND WARNINGS

- The National Weather Service issues watches and warnings for hazardous winter weather. Keep informed by listening to weather forecasts on radio or TV and reading local newspapers. Know the terms used to describe storm status.
 - *Winter storm watch* Severe winter weather may affect your area.
 - *Winter storm warning* Severe winter weather conditions are expected.
 - *Ice storm warning* Significant, possibly damaging, ice accumulation is expected.
 - *Heavy snow warning* A snowfall of at least four inches in 12 hours or six inches in 24 hours is expected.
 - *Blizzard warning* Large amounts of falling or blowing snow and winds of at least 35 miles per hour are expected for several hours.
 - *Severe blizzard warning* Considerable falling or blowing snow, winds of at least 45 miles per hour, and temperatures of 10 degrees Fahrenheit or lower are expected for several hours.
 - *High wind warning* Winds of at least 40 miles per hour are expected to last at least one hour.
 - *Travelers' advisory* Ice and snow are expected to hinder travel, but the anticipated weather conditions are not serious enough to require warnings.



IMMEDIATE DANGERS

- Heavy snowfall and blizzards can trap motorists in their cars, cause major traffic accidents, and trap people in their homes.
- Ice storms can break power lines, causing widespread blackouts.
- Fire during winter storms presents a great danger because water supplies may freeze and firefighting equipment may not be able to get to the fire.
- One of the more serious dangers accompanying any winter storm is the threat of



**WINTER STORM
(continued)**

physical overexertion that can lead to heart attacks and strokes. While this occurs more often among older people, younger individuals also should take precautions.

LONG-TERM DANGERS

- If the storm lasts more than one or two days, there is a greatly increased possibility of utility failures and interruption of services. This can lead to extreme hardship and even death from extended exposure to cold temperatures.

MITIGATION

- Purchase a flood insurance policy to cover possible flood damage that may occur during the spring thaw.

PREPAREDNESS

- Be prepared for isolation at home, particularly if you live in a rural area. It is highly possible that a severe winter storm could isolate you for one or two weeks.
- Insulate your home so you will be able to conserve heat better.
- Use your radio, television, and newspapers to keep informed of current weather conditions in your area. You can better understand weather predictions by knowing the different types of winter storms. Knowledge of weather predictions will also help you to prepare better for the storm before it hits.
- Have fuel and a safe type of emergency heating equipment available in case of power failures that would shut down standard furnaces. A camp stove with fuel or a supply of wood or coal for your fireplace could be used for emergency heat. Be prepared to keep at least one room of your house warm enough to live in for a week or two.
- Be sure that all family members know how to use your emergency heating and lighting equipment safely to prevent fires or dangerous fumes. Proper ventilation is essential. Never use fuel in equipment that was not designed for that fuel. Burning charcoal will give off deadly amounts of carbon monoxide. Burning it indoors, even in a fireplace, is dangerous.
- Stock an emergency supply of food and water. It is more practical to have some foods that do not require cooking or other preparation.
- Should a power failure occur, have a battery-powered radio and extra batteries on hand so you can listen to weather forecasts, emergency information, and other advice broadcast by local authorities. Also, have flashlights, lanterns, candles, and matches ready for use.
- Always have on hand simple tools and other equipment needed to fight a small fire. Winter storms may interrupt fire department services.
- Keep your car winterized with antifreeze. Carry a winter car kit that includes food and water, a windshield scraper, a flashlight, a tow chain or rope, a shovel, tire

chains, a blanket, a bag of sand or salt, a fluorescent distress flag, and an emergency flare, in case you are trapped in a winter storm. Keep extra mittens, hats, and outerwear in the car.

RESPONSE

- Do not be fooled if a winter storm seems mild as it begins. Some storms may take several hours to move into an area and may last for several days.
- Cold weather itself, without any physical exertion, puts an extra strain on your heart. If strenuous physical activity such as shoveling snow, pushing a car, or even walking fast or far through deep snow is added to your body's overworked system, you are risking serious or fatal results. In any cold weather, and especially during winter storms, be aware of this danger and avoid overexertion.
- *Avoid all unnecessary trips.* If you are at home when a winter storm strikes, plan to stay there.
- If you must be outdoors, wear several layers of loose-fitting, lightweight, protective clothing rather than a single layer of thick clothing. Mittens are warmer than gloves. Hoods should be worn to protect your head and face. Cover your mouth to protect your lungs from the extremely cold air.
- If you are travelling and your car breaks down, or if you become stalled or lost, think through the problem, decide what is the safest and best thing to do, and do it slowly and carefully.
- If you are stuck on a well-travelled road, display a trouble signal—turn on your flashing hazard lights, raise the hood of your car, or hang a bright cloth from the antenna or car window.
- Stay in your car and wait for help. Do not leave your car to search for assistance unless you are absolutely certain you can find help within one hundred yards of your car. It is very easy to become disoriented and lost during a severe storm.
- While in your car awaiting assistance, take the following precautions.
 - If you run your engine to keep warm, remember to keep snow away from the exhaust pipe. Keep a window open slightly to provide proper ventilation and protection from carbon monoxide poisoning.
 - Do not let everyone in the car sleep at the same time.
 - At night, turn on the inside dome light so work crews can spot you.

RECOVERY

- After the storm, check on the neighbors in your immediate area. Be sure they have proper heating and sufficient supplies to get them through the emergency.
- Check roofs for damage from heavy snow.
- Avoid overexertion while clearing snow by working slowly and taking frequent breaks, particularly if you become dizzy or tired.

WINTER STORM
(continued)**RELATED EMERGENCIES**

Keep in mind that large amounts of snow can lead to localized *flooding* if warmer temperatures melt the snow in a short period of time.

A *drought* occurs when there is no substantial rainfall for a long period of time. Since different sections of the country receive widely differing amounts of rainfall, the amount of time it takes for drought conditions to develop differs throughout the country.

Extreme heat is defined as temperatures 10 degrees or more above the average high temperature, lasting for several weeks. Because of differences in the average temperature of different sections of the country and at different times of the year, extreme heat conditions vary. When drought and extreme heat occur at the same time, the conditions can be very dangerous.



SIGNS AND WARNINGS

Local community officials will alert you through your local newspaper, radio station, or television station when drought and extreme heat conditions exist in your area. Although extreme heat conditions are easily recognized, drought conditions develop so slowly that it is recommended that you keep track of local weather advisories so you can take proper action as drought conditions become more likely.



IMMEDIATE DANGERS

There are three stages of danger from extreme heat.

- *Strain* Occurs when hot weather and/or exertion threaten to raise your body core temperature above 99; Fahrenheit.
- *Impairment* Occurs when your body temperature approaches 102; Fahrenheit, creating an abnormal internal state that disrupts normal physical and mental functions.
- *Emergencies* When heat strain from overexposure lasts too long or becomes too severe, collapse from water depletion, heatstroke, or heart attack may occur.



LONG-TERM DANGERS

A prolonged drought can have serious economic impact on a community. Agricultural production can be damaged or destroyed by loss of crops or livestock, resulting in food shortages. Increased demand for water and electricity can result in shortages of these resources. When combined with extreme heat, droughts can make life very difficult, especially if the situation lasts for a long time.



MITIGATION

- Practice personal water conservation measures to avoid depletion of water supplies both before and during periods of extended drought. An example of a water conservation measure is to place a brick, or other large, solid object, in the flush tank of your toilet. This reduces the amount of water used in flushing.
- If you are a farmer, consider establishing alternative sources and supplies of water.
- Conserve electricity. During periods of heat and drought, people use a lot of power

**DROUGHT AND
EXTREME HEAT
(continued)**

for air conditioning. Excessive drain on the community's energy supply could lead to another emergency, such as a power shortage or outage. Insulating your home will reduce the demand for air conditioning; keeping the thermostat set to 78°F will also reduce energy use.


PREPAREDNESS

- All family members should learn to recognize heat impairment symptoms and administer appropriate first aid.

HEAT DISORDER	SYMPTOMS	FIRST AID
Sunburn	Redness and pain. In severe cases swelling of skin, blisters, fever, headaches.	Ointments for mild cases if blisters appear and do not break. If breaking occurs, apply sterile dressing. Serious, extensive cases should be seen by a physician.
Heat cramps	Painful spasms usually in muscles of legs and abdomen. Heavy sweating.	Firm pressure on cramping muscles, or gentle massage to relieve spasm. Give sips of water. If nausea occurs, discontinue use.
Heat exhaustion	Heavy sweating, weakness, skin cold, pale, and clammy. Pulse thready. Normal temperature possible. Fainting and vomiting.	Get victim out of sun. Lay down and loosen clothing. Apply cool, wet cloths. Fan or move victim to air conditioned room. Give sips of water. If nausea occurs, discontinue use. If vomiting continues, seek immediate medical attention.
Heat stroke (or sunstroke)	High body temperature (106°F or higher). Hot dry skin. Rapid and strong pulse. Possible unconsciousness.	HEAT STROKE IS A SEVERE MEDICAL EMERGENCY. SUMMON EMERGENCY MEDICAL ASSISTANCE OR GET THE VICTIM TO A HOSPITAL IMMEDIATELY. DELAY CAN BE FATAL. Move the victim to a cooler environment. Reduce body temperature with cold bath or sponging. Use extreme caution. Remove clothing, use fans and air conditioners. If temperature rises again repeat process. Do not give fluids.

For more information, enroll in a First Aid course through your local Red Cross.

RESPONSE
Extreme Heat

- During periods of extreme heat, limit your heat exposure by wearing loose-fitting, porous clothing, and a hat with a wide brim.
- While in direct sunlight, keep as much of your skin covered as possible and use a sunscreen lotion with a rating of 15 or above. Sunburned skin cannot sweat.
- Pace yourself while working. Begin at a very slow pace and continue until you achieve normal pulse and breathing rates at your working level. Do not exceed this pace.
- Replace sweat by drinking water to keep the body fluid volume and salt level as close to normal as possible. Although beer and other alcoholic beverages appear to satisfy thirst, they cause further dehydration of your body.
- Check with your physician to see if you should take additional salt during times of heat.

- Rest regularly. This allows your natural *cooling system* to work. A few minutes of sweat-free rest every hour will help restore physical and mental energy. Soaking hands or feet in cool water also will help lower your body temperature.

Drought

- Curtail all non-essential water uses. Watering your lawn and washing your car are not essential to your well-being.
- Re-use water whenever possible.

RECOVERY

- Continue to conserve water ever after the drought appears to have ended.
- If you own a farm and your crop is lost, contact the county Farmers' Home Administration Office for disaster assistance information.

RELATED EMERGENCIES

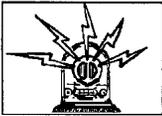
Keep in mind that drought conditions, with or without extreme heat, can greatly increase the risk of *forest fires*. As the forest dries up, debris on the forest floor, as well as the trees themselves, become prone to fire, even from the slightest spark. The loss of vegetation in the absence of sufficient water can result in flooding, even from average rainfall, following drought conditions.



Natural Hazard:
WILDFIRE

A *wildfire* is any instance of uncontrolled burning in grasslands, brush, or woodlands. Wildfires not only destroy property and valuable natural resources, but also threaten lives. Throughout the summer of 1988, the nation followed news of firefighters trying to save America's wildlands and the communities surrounding them. Their tireless defense of Yellowstone National Park was tracked daily by national news networks. Although these firefighters protected the world-famous geysers, historic park structures, and gateway towns, the fires still destroyed a million acres of National Forest.

Each year, wildland fires pose an increasing threat to residential America. These fires devastate communities and natural resources, and too often take their toll in the loss of lives. In 1987, 53,000 fires consumed more than two million acres. By October 1988, almost 70,000 fires had claimed more than four million acres. The increase in fires is the result of population growth in rural communities. With more and more people in the wildland/urban interface—where wildlands and structures meet—there is a greater risk of fire starts and fire disasters.



SIGNS AND WARNINGS

- Wildfires can occur at any time of the year, but usually are concentrated during hot, dry weather.
- Wildfires are usually signalled by dense smoke that fills the air for miles around.
- The National Weather Service, U.S. Forest Service, and State forestry agencies combine to give fire weather forecasts. Local radio and TV stations broadcast forecasts and warnings concerning local fire conditions.
- Large forested areas may have watchtowers where spotters look for signs of fires and alert firefighters immediately.



IMMEDIATE DANGERS

- The immediate danger from wildfire is destruction of timber, property, wildlife, and injury or loss of human life. Persons who live in the affected area or who are using recreational facilities in the forested area where the fire breaks out are in danger of being trapped.



LONG-TERM DANGERS

- Wildfires can leave a large amount of scorched and barren land. This land may take many years or decades to return to its pre-fire condition. Major fires can destroy groundcover, which leads to erosion. If heavy rains follow a major fire, flash floods, landslides, and mudflows can occur. Once trees are gone, there is nothing left to hold soil in place or to hold back rainwater or slopes.

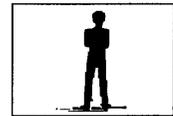
MITIGATION

- Use only fire-resistant materials on the exterior of your home, including roof, siding, decking, and trim.

- Use fire carefully and wisely so that you do not cause a fire. Teach family members safe practices.
- Install a spark arrestor on your chimney.
- Keep your chimney clean and avoid open burning during dry weather.
- Store firewood well away from your home.
- Clean roof surfaces and gutters regularly.

PREPAREDNESS

- Learn how to recognize dangerous fire conditions.
- Provide wide spacing between trees. For trees within 100 feet of your house, remove tree limbs within 15-20 feet of the ground or over roofs, and limbs that are above or near a chimney.
- Use fire-resistive plants. Check with local fire officials about the best species for your area.
- Plan several evaluation routes in case fires block your escape.
- Clear an open space around your house to serve as a fire break—at least 30 feet wide for all structures and 75 feet wide for homes built in pine forests.
- Have fire tools handy: a ladder, garden hose, shovel, rake, and bucket.



RESPONSE

- If water sprinklers and adequate water are available, leave sprinklers on roofs and anything else that might be damaged by fire. Be sure that efforts by you and your neighbors to protect your property do not leave firefighters without the huge amounts of water that will be needed to fight the blaze. Place valuables that will not be damaged by water in a pool or pond, or take them with you.
- If officials are evacuating your area, do not hesitate to leave. Fires can spread rapidly and unpredictably.
- If you are on an outing in a forest when a fire breaks out, note the weather conditions and wind direction. Find out the direction of the fire and plan your escape routes in other directions. Evacuate quickly—fires can spread at rapid speeds.
- If you are caught in a wildfire, knowledge of survival techniques could save your life.
 - Look for a nearby body of water and crouch in it, covering your head and upper body with a wet shirt or other article of clothing.
 - Look for a rock outcropping or cleared area to obtain shelter from the fire.
 - If possible, breathe through a wet handkerchief or wet piece of clothing to avoid scorching your lungs or inhaling smoke.
 - Oxygen may be in short supply, so try to remain calm to reduce the rate at which

WILDFIRE
(continued)

- you use oxygen. If possible, breathe the less smoky air close to the ground.
- Do not try to outrun a fire that is burning uphill. Instead, move at right angles to the path of the fire.

RECOVERY

- Care must be taken in reentering burned forest areas. There still may be hot spots that could flare up without warning.
- Replant burned-out forests quickly and efficiently in order to reduce the soil erosion caused by the loss of trees in an area. Ask your State forestry commission for guidelines.
- Consult your insurance agent and have damages assessed as soon as possible.

RELATED EMERGENCIES

Keep in mind that *landslides*, *mudflows*, and *floods* can occur following a wildfire. Once trees and groundcover have been burned away, there is not much left to hold soil in place on steep slopes and hillsides.

An *earthquake* is a wave-like movement of the earth's surface. The earth's crust and upper part of the mantle are constantly pushing and moving against one another along what are known as fault lines. When rock masses slip along a fault, the energy of an earthquake is released in seismic waves. An earthquake also can be produced by volcanic eruptions. Earthquakes can be extremely violent, but often they are little more than a minor trembling of the ground.

The damage caused by an earthquake depends on its severity or intensity. The most widely known indicator of severity, the Richter scale, measures the energy released when large rock masses in the upper earth suddenly shift. A change of one full point in the Richter scale represents a difference of a factor of about 30 in energy released. Thus, an earthquake of magnitude 7 is roughly 30 times as powerful—in terms of energy released—as one of magnitude 6.

Damage from earthquakes of the same Richter magnitude, however, can vary radically from one location to another because of differences in geological conditions that affect the extent of ground shaking. The rock formations and soil conditions in California, for example, transmit the waves from earthquakes over much smaller regions than those in the eastern parts of the United States.

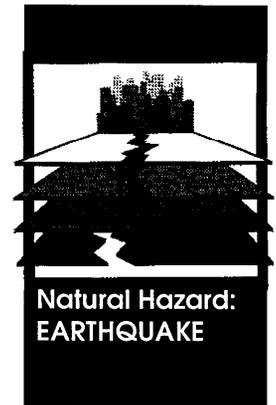
Today, geologists use what is known as the Modified Mercalli (MM) intensity scale (named after Giuseppe Mercalli, who introduced it in 1902) to measure the intensity of ground shaking at a particular site. The MM scale has 12 gradations. Quakes of intensity I-IV are minor and often are not even noticed. By intensity V nearly everyone senses the movement, and earthquakes of intensity greater than VII are deemed to be major.

One of the most violent earthquakes in the United States occurred in 1964 in Alaska. That earthquake and the tsunami that followed caused more than \$100 million in damages and the loss of more than 100 lives. Although the 1989 Loma Prieta Earthquake was of a lower magnitude, it proved to be much more costly in terms of property damage, because it occurred in a heavily populated urban area. Economic damage was estimated at \$10 billion.

SIGNS AND WARNINGS

Earthquakes usually occur without warning. If an earthquake is occurring in your area, you will feel a trembling in the ground or floor. You may notice curtains or trees vibrating and swaying.

- Earthquake monitoring is conducted by the U.S. Geological Survey, the National Oceanic and Atmospheric Administration, and universities throughout the United States. However, the exact time and place an earthquake will occur still cannot be predicted precisely.
- Earthquakes tend to reoccur along fault lines (fractures in the earth's surface). Though quakes usually strike without warning, scientists have produced risk maps that show areas where an earthquake is likely to occur. Other clues to the probability of a quake come from studying faults, measuring the tilt of the earth's crust, watching changes in the water levels of wells, and even observing the behavior of animals.



EARTHQUAKE
(continued)**IMMEDIATE DANGERS**

- The actual movement of the ground is seldom the direct cause of death or injury. Earthquake-related casualties are commonly caused by (1) partial or total building collapse, including toppling chimneys or walls, falling ceiling plaster, light fixtures, and pictures; (2) flying glass from broken windows and skylights (this danger may be greater from windows in high-rise structures); (3) overturned bookcases, fixtures, and other large furniture and appliances; (4) fires from broken chimneys and broken gas lines; (5) fallen power lines; and (6) an inappropriate or drastic human reaction caused by fear.
- Fires caused by earthquakes are particularly dangerous. Water mains may be broken and firefighting equipment may be unable to reach the fire. Broken gas lines often are a major cause of earthquake-related fires.

**LONG-TERM DANGERS**

Earthquakes can cause damage to buildings, utility lines, bridges, or dams. Water supplies can become contaminated by seepage around broken water mains. Damage to roadways and to other means of transportation may create food and other resource shortages if transportation is interrupted.

MITIGATION

- Check your home for potential earthquake and fire risks. Bolt down or reinforce water heaters and other gas appliances, since fire damage can result from broken gas lines and appliance connections. Use flexible connections wherever possible. Place large and heavy objects on lower shelves, and securely fasten shelves to walls. Brace-anchor all tall or top-heavy objects.
- Affix tabletop equipment (such as computers or typewriters) with industrial strength velcro. Overhead lighting fixtures should be anchored solidly in place. A little extra wire is usually all that is necessary.
- Deep plaster cracks in ceilings and foundations should be investigated and repaired by experts, especially if there are signs of structural defects.
- Be sure the house is firmly anchored to its foundation.
- Purchase earthquake insurance.
- Support local safe land use and building codes that regulate land use along fault lines. Insist on code inspection and enforcement in areas where damaging earthquakes can be expected. Modern engineering can produce structures that resist earthquake damage much better than older masonry buildings, and existing buildings can be "retrofitted" to better withstand tremors. If you live in a high-risk area where no such regulations or codes exist, you should support their enactment.

Consider the consequences of an earthquake to your child's school, local hospitals, businesses, and your home. How safe are your community and its buildings?

PREPAREDNESS



- Provide your family with the knowledge of how to protect themselves during an earthquake. Conduct calm family discussions about earthquakes and other possible disasters. Do not tell frightening stories about disasters. Be prepared to survive for 72 hours without any assistance, even from local resources.
- Help organize and support earthquake preparedness programs in your community. For example, your local emergency management agency, schools, volunteer agencies active in disasters, or civic organizations could hold earthquake drills and public education programs to prepare citizens for when earthquakes occur.
- Teach responsible members of your family how to turn off gas, electricity, and water at main switches and valves. Check with your local utilities offices for instructions.
- Learn how to extinguish small fires and to provide emergency first aid.
- Conduct family earthquake drills. Know where the safest places are at home, work, or school.
- Ensure that batteries are on hand for your radio and for flashlights in the event of power failure.

RESPONSE

Above all, remain calm, try to reassure others, and think through the consequences of any action you take. If you are indoors, stay indoors; if outdoors, stay outdoors.

- If you are *indoors*, take cover under a sturdy piece of furniture (such as a heavy desk, table, or bed) to protect yourself from falling objects such as falling plaster, bricks, light fixtures, high bookcases, china cabinets, shelves, and other furniture that might slide or topple. Stay away from objects that can shatter (such as windows, mirrors, or skylights) and from chimneys. DO NOT run outside—you could be injured by falling objects or live wires. Encourage others to follow your example.
- If you are in a *high-rise building*, do not dash for exits. Stairways may be broken or jammed with people. Power for elevators may fail.
- If you are in a *crowded store or mall*, do not rush for a doorway since many other people may have the same idea. If you must leave the building, choose your exit as carefully as possible.
- If you are *outside*, get away from buildings, walls, utility poles, downed wires, and all other objects that could fall. If possible, move to an open area away from hazards and stay there until the shaking stops.
- If you are in a *car*, stop as quickly as safety permits, but stay in the vehicle until the shaking stops. Avoid bridges, underpasses, and tall buildings.
- Check for injuries and attend to them; seek medical help if necessary.

EARTHQUAKE
(continued)

- Check for fires or fire hazards.

RECOVERY

- If you are unsure of a building's safety, do not enter until it has been inspected by a qualified person.
- Check utilities. Earth movements may have broken gas, electrical, and water lines. If you smell gas, open windows and shut off the main gas valve. Shut off electrical power if there is damage to your house wiring. Leave the building and report damage to the appropriate utility companies; follow their instructions. Do not use matches, lighters, or open-flame appliances until you are sure there are no gas leaks. Do not operate electrical switches on appliances if gas leaks are suspected.
- Do not eat or drink from open containers near shattered glass.
- Immediately clean up spilled medicines and potentially harmful materials.
- Check to be sure that sewage lines are intact before permitting toilets to be flushed.
- Do not use your telephone except for genuine emergency calls. Turn on your battery-operated radio for damage reports and information.
- Check closets and all storage shelf areas. Open closet and cupboard doors carefully, watching for objects falling from the shelves.
- Check your chimney over its entire length for cracks and damage. First check from a distance, and then move closer if it appears to be safe. Check particularly in the attic and at the roofline. Unnoticed damage could lead to a fire. Always approach chimneys with extreme caution.
- Be prepared for additional earthquake shocks (called aftershocks). While the aftershocks are usually smaller than the main shock, some may be large enough to cause additional damage.
- Have damage to your home assessed by your property insurance claims adjuster.
- Do not go sightseeing; stay away from beach and waterfront areas where seismic sea waves (tsunamis) may strike. Keep the streets clear for passage of emergency vehicles. Stay out of severely damaged buildings. Aftershocks can shake them down.
- Execute repairs that will increase the structure's ability to withstand future quakes.

RELATED EMERGENCIES

Keep in mind that natural disasters, such as earthquakes, have the potential to trigger other emergency conditions such as *tsunamis*, *fires*, *major landslides*, *dam failures*, *power plant ruptures*, and *hazardous materials spills*. Be certain you are prepared for all of these disasters if you live in an earthquake-prone area.

A *tsunami* (pronounced “soo na' mee”) is a series of giant ocean waves produced by a major underwater or coastline disturbance such as an earthquake or volcanic eruption. A series of waves sometimes lasts several hours, with 20 or 30 minutes between waves. Tsunamis can occur in all oceans, but they are most common in the Pacific. In this century, more than 200 tsunamis have been recorded in the Pacific. Areas thousands of miles from where an earthquake occurs can be struck by a resulting tsunami. A tsunami can travel at speeds of up to 500 miles per hour. The waves appear to be normal ocean waves until they approach the coastline, where a gigantic wall of water can build on the ocean surface. Tsunamis reaching heights of more than 100 feet have been recorded. Traveling at tremendous speeds, these waves smash into land with great destructive power.

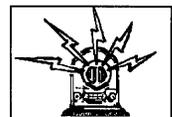
On April 1, 1946, a tsunami with wave heights of 55 feet above sea level struck Hawaii, killing 173 people and causing property damage estimated at \$26 million. Generated by an earthquake near the Aleutian Islands in Alaska, the tsunami traveled from the Aleutians at about 490 miles per hour, with a wave length of about 100 miles.

A tsunami following the Prince Rupert Sound (Alaska) Earthquake in 1964 directly affected the three West Coast States and Alaska, resulting in 122 deaths and damage totaling \$96 million. Hawaii also was affected, but damages were significantly lower. Tsunami-generated waves of 20 feet crashed ashore at Crescent City, California, and waves ranging from 10 to 16 feet occurred along parts of other coastal areas of California, Oregon, and Washington.



SIGNS AND WARNINGS

- If you live near a coastal area and have experienced or heard of a recent earthquake or volcano, listen to your radio for a tsunami warning. The Pacific Tsunami Warning System in Honolulu issues tsunami warnings to affected coastal areas.
- Tsunamis can be detected before they strike land. If you hear of a tsunami warning, do not go down to the beach to look for the tsunami. If you can see it, you will be too close to escape it.
- Approaching tsunamis usually are preceded by a pronounced rise or fall of coastal water. This action is nature's tsunami warning and should be heeded. Many people have been trapped while exploring the newly uncovered sea bottom in the aftermath of a rapid retreat of ocean water beyond the normal low-tide line.
- The Pacific Tsunami Warning System in Honolulu monitors disturbances that could trigger a tsunami. Local warning systems, developed for Alaska and Hawaii, augment the Pacific system. When a tsunami is spotted, it is tracked and a tsunami warning is issued to the threatened area. This warning should be heeded.
- Your community may be warned by radio or television announcements. Local police, fire, or emergency officials may go door-to-door in threatened areas. Outdoor sirens may sound to warn of the dangers.



TSUNAMI
 (continued)

IMMEDIATE DANGERS

- Immediate dangers from tsunamis are drowning, flooding, and widespread property damage.

LONG-TERM DANGERS

- Associated risks include broken sewage lines, polluted water supplies, damaged gas lines, and downed power lines.

MITIGATION

- The most effective mitigation measure to avoid property damage is not to build or live in buildings within several hundred feet of the Pacific coastline. Even the strongest buildings can be damaged or undermined by a powerful tsunami.
- If you must live in a coastal building, purchase flood insurance to assure that you will be financially protected in the event of a flood-related loss.


PREPAREDNESS

- Plan several escape routes to high ground. Your primary escape route might be damaged or destroyed if a local earthquake strikes. Be prepared to evacuate low-lying coastal areas immediately.
- Learn the warning signs and signals and heed them.
- Stay off the beach during unusual tidal action.

RESPONSE

- Upon hearing an official tsunami warning or detecting signs of a possible tsunami, *move inland to higher ground as quickly as possible*. Tsunamis can travel at such tremendous speeds that any warning must be acted upon immediately.
- Since a tsunami is not a single wave but a series of waves, stay out of dangerous areas until an “all clear” is issued by an authorized official.
- Check for injuries and seek medical help if necessary.

RECOVERY

- If your home, apartment, or business has been damaged, immediately call your insurance agent, who will advise you what to do next.
- Do not use fresh food that has come in contact with flood waters. Have all drinking water tested by your local health department before use; wells should be pumped out and the water tested before drinking.

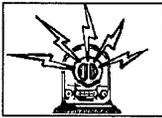
- Before entering a building *air it out* for several minutes to remove foul odors or escaped gas.
- Upon entering the building, do not use a match or lantern as a source of light because of the danger of gas build-up; use a battery-powered flashlight instead. Check for electrical shorts and live wires. Make certain power is turned off, and do not use any appliances or lights until an electrician has checked your electrical system.
- Open all doors and windows to help the building dry. Shovel out mud while it is still moist to give walls and floors an opportunity to dry.



Volcanoes are mountains that have a vent to a reservoir of molten rock (magma) deep below the surface of the earth. Volcanoes form where weak spots or breaks in the earth's crust allow the magma to push toward the surface. When the pressure of gas and magma becomes too great, the volcano erupts. Magma may pour through the vent opening in lava flows or shoot into the air as dense clouds of gas and dust (ashfall).

In the United States, the chance of eruptions that could damage populated areas is greatest in the active volcanoes of Hawaii and Alaska. Active volcanoes of the Cascade Mountain Range in California, Oregon, and Washington have created dangers. The danger area around a volcano covers approximately a 20-mile radius. Associated dangers may extend 100 miles or more from the volcano.

In 1980, the violent eruption of Mt. St. Helen's resulted in 60 deaths and caused approximately \$1.5 billion in damages. The eruption spread thick layers of ash over thousands of square miles and caused massive flooding and mudflows in the immediate area. The Mt. St. Helen's eruption renewed interest in the possibility of future eruptions in the Cascade Range.



SIGNS AND WARNINGS

- A volcano may show signs of erupting weeks or months in advance. Earthquakes, earth tremors, and steam vents around a volcano can signal an eruption.
- Volcanoes can erupt with a force that makes the earth tremble and fills the air with a deafening roar.
- The U.S. Geological Survey assesses all information related to the development of impending geological disasters. They inform the public and appropriate local, State, and Federal authorities. Warnings include information about the approximate time, place, and extent of the effects, as well as the uncertainties involved in making the prediction.
- Communities located near active volcanos should have warning sirens to be sounded if a major eruption occurs.



IMMEDIATE DANGERS

- The degree of hazard to human life and property resulting from a volcano depends upon the type and distance from the eruption. Hazards include lava flows, rockfalls, ashfalls, earthquakes, mudflows, and flash floods.



LONG-TERM DANGERS

- Secondary eruptions and lava flows can occur days, weeks, or months after a volcanic eruption.
- Hazards within the immediate vicinity of the volcano come from heavy ashfall, which can darken the sky as if it were nightfall. The increased demand for electric

lighting could result in power failures. The ash may be carried by winds for thousands of miles and affect distant areas long after the eruption.

- The ash is actually pulverized rock. A one-inch layer weighs ten pounds per square foot. Ash can clog waterways, reservoirs, and machinery, and its weight can cause roofs to collapse.



PREPAREDNESS

- Learn methods of protecting your family and home from ashfall from your local emergency office.
- Have emergency lighting and heating supplies available in case of a power failure.

RESPONSE

- Heed official warnings of imminent volcanic eruption. If told to evacuate, do so immediately.
- If caught in a small rockfall (not a landslide), roll into a ball and protect your head.
- Immediately following an eruption, flash floods resulting from glacier outbursts can overflow dams and reservoirs. Avoid stream beds and valleys in the vicinity of a volcano. If caught in a low area, run uphill to avoid a flash flood or mudflow.
- During ashfall, close all windows, doors, and dampers in your home. Put all machinery inside a garage or barn. Bring animals and livestock into closed shelters. If ash is falling, stay indoors until the ash has settled.
- If caught outside during ashfall, keep your mouth and nose covered to avoid inhalation of ash. Cover your eyes and keep your skin covered to avoid irritation or burns.
- Do not attempt to drive in heavy ashfall. Driving will stir up more ash and ultimately clog and stall your vehicle.

RECOVERY

- Clear roofs of ashfall as soon as possible to avoid collapse from too much weight.

RELATED EMERGENCIES

Volcanic eruptions can generate mild to moderate *earthquakes*, *mudflows*, *flash floods*, and *huge ash clouds*, which can create intense *lightning storms*.

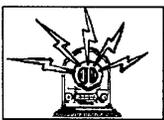


Dams are subject to tremendous amounts of pressure from the water in the reservoirs behind them. *Dam failure* can occur from too much rainfall or melted snow. Earthquakes can weaken or collapse dams. Volcanic eruptions that fill the reservoir with mud and debris, engineering or construction mistakes, inadequate maintenance, or a combination of any of these factors can cause failure. Dams can be weakened by incidents such as burrowing animals and slippage. Flood damage can be caused by events such as floodwater going over the top of the dam. Regardless of the cause, when a dam fails, huge quantities of water rush downstream with great destructive force.

Dam failures in the United States have resulted in thousands of people injured, many killed, and billions of dollars of property damage. Below are some recent examples.

- 1972, Buffalo Creek Dam, West Virginia—125 dead.
- 1976, Teton Dam, Idaho—14 dead, more than \$1 billion in damages.
- 1977, Laurel Run Dam, Pennsylvania—40 dead.
- 1977, Kelly Barnes Dam, Georgia—39 dead.

The U.S. Army Corps of Engineers completed a one-time inspection of operational dams in September 1981. The responsibility to correct problems discovered by the Corps and conduct future inspections rests with the dam owner or the State. Monitoring of new dam construction is the responsibility of the State in which the dam is built. The State may or may not have an effective safety program. Individual communities may press for stricter guidelines and enforcement to enhance dam safety. Additionally, communities should establish land-use management practices to decrease the potential for damage from a collapsed dam.



SIGNS AND WARNINGS

- Your area may have an outdoor warning signal. Warnings may be issued by sirens, horns, radio, television, or door-to-door canvassing by local emergency personnel.
- Federal agencies conduct stream-flow monitoring to provide advanced warning of a flash flood.



IMMEDIATE DANGERS

- The *immediate danger* is the powerful torrent of rushing water that causes injuries, drowning, and property damage from collapsed buildings and bridges.
- The potential for catastrophic loss of life and property damage is great because of the speed and devastating power of such large amounts of rushing water.



LONG-TERM DANGERS

- Associated *risks* include the potential for the spread of disease, animal deaths, and a contaminated water supply. Utility equipment can be damaged, resulting in power outages and possible fires and explosions. Buildings may be dangerously weakened.

MITIGATION

- Before you build or buy a home below a dam, learn as much as you can about its safety record and the safeguards followed by the owners.
- When you build, follow local building codes and take extra measures to reinforce and floodproof your home or building.
- Flood insurance is available through the National Flood Insurance Program. You can buy this insurance coverage through your property insurance agent before an emergency occurs.
- Attend public meetings to learn your area's dam failure preparedness plans.
- Support strong local and State dam safety programs.



PREPAREDNESS

- Learn your community's warning systems.
- If you are in a risk area, plan several alternate evacuation routes to higher ground.

RESPONSE

- If an emergency flash flood warning is issued, *do not hesitate*. Go to higher ground immediately and stay there.
- If you hear the roar of a rushing torrent of water, *get to the highest ground possible*. If you can hear the roar, you may have only seconds to reach safety.
- Stay in your safe spot until the water has subsided or an all clear announcement is made over local media or by a local emergency official.

RECOVERY

- If your home, property, or business has been damaged, immediately call your insurance agent, who will advise you what to do next.
- Do not use food that has come in contact with floodwaters. Have all drinking water tested by local health authorities before using. Wells should be pumped out and the water tested before drinking.
- Avoid loose or dangling electrical wires, and report them to the utility company.
- Report broken sewer lines or water mains to the water department.
- Before entering a building, check for structural damage; make sure it is not in danger of collapsing.
- Open the building and let it air out for several minutes before entering to remove foul odors or escaped gas.
- Upon entering the building, do not use a match or lantern as a source of light because of the possibility of gas buildup; a battery-powered flashlight is recommen-

ded. Check for electrical shorts and live wires. Make certain the power is turned off; do not use appliances or lights until an electrician has checked the electrical system.

- Open all doors and windows to help the building dry. Shovel out mud while it is still moist to give walls and floors an opportunity to dry.

HOW WELL HAVE YOU LEARNED?**Unit Three Review**

(Answers on page A-2)

Answer each of the following questions by placing a check next to the *best* response.

1. Which of the following is a long-term danger following a wildfire?
 a. Tsunami
 b. Earthquake
 c. Tornado
 d. Floods
2. The National Weather Service issues watches and warnings for hazardous winter weather conditions. A *winter storm watch* means that
 a. Severe winter weather conditions will *definitely* strike your area.
 b. Snowfall of at least four inches in 12 hours is expected.
 c. Damaging ice accumulation is expected.
 d. Severe winter weather conditions may affect your area.
3. Which of the following statements is true about thunderstorms?
 a. Tornadoes always occur afterwards.
 b. Manufactured (mobile) homes are safe places to be in severe storms.
 c. Several different thunderstorms can affect you in a few hours.
4. Nine out of ten hurricane-related fatalities are caused by
 a. Tornadoes.
 b. High winds.
 c. A storm surge.
 d. Downed power lines.
5. The safest response in a flash flood emergency is to
 a. Take shelter under a heavy piece of furniture.
 b. Move immediately to higher ground.
 c. Buy flood insurance.
 d. Turn off all utilities at the main switch in your house.
6. If you are driving along and spot a tornado, what should you do?
 a. Pull off the road and remain in the car until the storm passes.
 b. Attempt to outrun the storm.
 c. If there is no substantial building nearby to go to, lie flat in a ditch or low-lying area.
 d. Leave your car and start walking in a direction opposite the storm.

4

Technological Hazards: Applying the Four Phases

In this unit, you will learn

- Definitions of major technological hazards.
- Signs and warnings of each technological hazard.
- Immediate and long-term dangers posed by each technological hazard.
- Mitigation, preparedness, response, and recovery measures that are appropriate for each technological hazard, and
- Related emergencies that can follow in the event of an emergency involving a technological hazard.

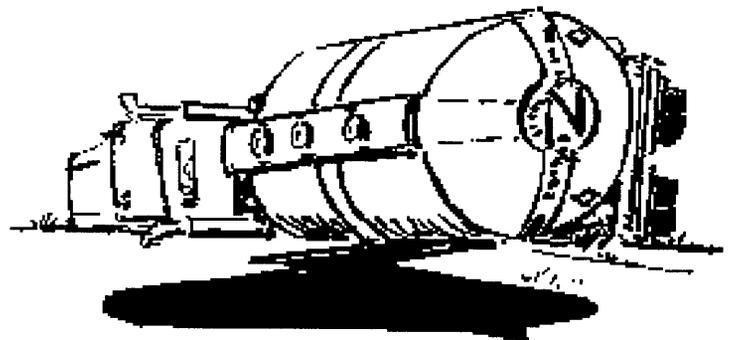
GENERAL MEASURES

Technology is the product of our attempt to manipulate our environment through application of scientific principles that have proved useful for adapting the world to meet our needs and objectives. Technological or man-made threats represent a category of events that have expanded dramatically throughout this century along with advances in modern technology. Emergencies involving technological hazards include hazardous materials incidents at fixed facilities, hazardous materials incidents resulting from transportation accidents, radiological incidents at fixed facilities, radiological incidents resulting from transportation accidents, structural fires, and power or communications outages.

Like natural threats, technological hazards can (1) affect localized or widespread areas, (2) be frequently unpredictable, (3) result in substantial loss of life (in addition to the potential for damage to property), and (4) pose a significant threat to the infrastructure of a given area. But technological hazards differ from natural hazards in some important ways. First, unlike weather phenomena such as rainfall, winds, or tornados, which are apparent to the casual observer, the warnings associated with technological hazards are often complex and may require recognition by trained personnel. Second, while mitigation measures still require intervention before the event to reduce impact (for example, community planning), sometimes corrective measures can and should be taken by trained personnel at the onset of an incident to reduce its effects.

Individuals do not have the resources to prevent or reduce the effects of most technological disasters effectively. But you are not unprotected. Local, State, and Federal governments can provide effective control through regulations and monitoring. New laws have been enacted at each level of government that give the citizen considerable power to influence mitigation actions. These and other tools focus on the role of local control, management, and prevention.

It is up to you to be aware of the potential hazards in your community. The best protection for you and your family is to be aware of the possibilities and to know how to react safely and appropriately in the event of an incident. This unit discusses the kinds of actions that can be taken to protect you from technological hazards.



Corrective measures frequently can and should be taken by trained personnel at the onset of technological hazard incidents to reduce harmful effects.



Hazardous materials are substances or materials which, because of their chemical, physical or biological nature, pose a potential risk to life, health or property if they are released. Potential hazards can occur during any state of production, storage, transportation, use, and disposal.

The storage and use of hazardous materials does not occur only in and around chemical manufacturing plants. Commercial facilities also store and use hazardous materials. For example, local service stations' supply of gasoline and diesel fuel can be hazardous. Hospitals regularly store flammable materials as well as other potentially hazardous substances used in medical treatment. In fact, many hazardous materials are located in your home.

A number of public and private sector initiatives are in place to increase the awareness of the hazardous materials problem. In addition, they provide a higher level of preparedness. Several are of particular significance.

In 1986, Congress passed the Superfund Amendments and Reauthorization Act (SARA) of 1986. Title III of this legislation requires that each community establish a Local Emergency Planning Committee (LEPC). The LEPCs are responsible for gathering information about hazardous materials in the community. This information is used to help communities plan their emergency response to hazardous materials incidents. It also provides information for citizens who are concerned about the risk of such incidents. Local facilities that maintain stocks of substances designated as extremely hazardous are required to notify the LEPC, fire department, and the State of the presence, quantities, and location of such materials. These facilities also are required to strategically post this information at their locations.

The National Response Center is a single-call referral system that streamlines the Federal response mechanism by providing a continuously staffed location to receive and refer action for all reports of oil and hazardous materials spills throughout the United States. It can activate a host of resources of the National Response System (NRS) after receiving notification via its 24-hour toll-free 800 number. This service is funded by the U.S. Department of Transportation (DOT) and the Environmental Protection Agency (EPA), and staffed by the U.S. Coast Guard (USCG) and Marine Science technicians, who can render assistance and refer information to appropriate agencies in response to any oil spill, hazardous chemical release, or radiological incident. The toll-free number is (800) 424-8802.

In addition to the large quantities of hazardous materials maintained in communities, hazardous materials are transported daily in this country by air, water, road, rail, and pipeline. Of the 1.5 billion tons of materials transported each year, more than half move by trucks along the nation's highways. The Department of Transportation requires any carrier transporting hazardous materials across a State line to display a clearly visible sign identifying the substance and the type of hazard it could cause. Additionally, DOT restricts the routes and speed limits available for the movement of hazardous materials.

The Chemical Manufacturers' Association (CMA) is also involved in working with the community to reduce chemical risk. CMA has set up a voluntary, industry-wide *Community Awareness and Emergency Response Program* (CAER). The program encourages plant managers to work with the community to ensure safe handling, storage, transportation, and disposal of dangerous chemicals.

Emergency response personnel use hazardous materials information required by SARA Title III as well as information posted on vehicles carrying hazardous materials to assist them in handling hazardous materials incidents.

Another program available for emergency personnel is CHEMTREC, which stands for CHEMical TRANsportation Emergency Center. This is a public service of the Chemical's Manufacturers' Association, located in Washington, D.C. CHEMTREC provides immediate advice for emergency personnel who are at the scene of an accident or spill.

SIGNS AND WARNINGS

When an emergency occurs involving hazardous substances, people in the area will be alerted by police, fire officers, or highway patrol personnel. Warnings and instructions also will be issued through radio and television.



IMMEDIATE DANGERS

- Immediate dangers from hazardous materials include fires, explosion, and the possible contamination of a community's air, land, and water.
- The release of some toxic gases may cause immediate death or disablement if inhaled.
- Contaminated water resources may be unsafe and unusable, depending on the amount of contaminant.
- Some chemicals cause painful and damaging burns to skin if you come in direct contact with them.
- Contamination of air, ground, or water may result in harm to fish, wildlife, livestock, and crops.
- Many dangerous substances have little or no color or odor; other substances that do smell often will quickly disable one's sense of smell. Therefore, signals that alert the human senses are very unreliable and may be unsafe. Assume the worst when acting for your safety or on behalf of others. KEEP A SAFE DISTANCE.
- A number of chemicals are skin-absorbed nerve toxins, which are often odorless and colorless. Frequently a long delay exists between exposure and the onset of symptoms. These symptoms can be agonizing and often are enhanced because the victim stayed in the danger zone while thinking there was no risk, due to the lack of smell or color. Again, assume the worst.



LONG-TERM DANGERS

- The release of hazardous materials into the environment may cause debilitation, disease, or birth defects over a long period of time.
- Loss of livestock and crops may lead to economic hardships within the community and to food shortages in communities supplied by the affected area.



**HAZARDOUS
MATERIALS
(continued)**

- Exactly how the loss of wildlife would affect a particular area is unknown. Certainly the economy of a community that is dependent on its wildlife would suffer.

MITIGATION

- Use data accessible through Title III to identify companies in your community that manufacture or use dangerous chemicals and substances. Learn what the chemicals are, their hazardous properties, and their dangerous effects. Find out if antidotes are available. Ask the manufacturer for a copy of the product's safety sheet.
- Try to avoid building or buying a house near potentially dangerous chemical sites.


PREPAREDNESS

- Know what hazardous substances may be in your community, and by what routes they are transported.
- Keep clearly labeled antidotes on hand for any hazardous substances you store at home. Family members should know when and how to use them.
- Post the number of the nearest poison control center by the telephone.
- Have several evacuation routes planned in case an emergency develops in your community.
- Keep foam-type fire extinguishers in your home and car. Consult your local fire department for recommendations.
- Learn to recognize symbols and identifiers on placards that mark carriers containing hazardous substances.

Know These Warning Symbols and Terms


Placards marked **FLAMMABLE** or **COMBUSTIBLE** indicate that the material will burn. The substance may be ignited by heat, sparks, or flame, and the container may explode.



A placard marked **EXPLOSIVE** means that the substance inside may explode if fire reaches it.



POISON or **CORROSIVE** on any container means that the substance is poisonous if swallowed. If inhaled, the substance may be harmful, and contact may cause burns to skin and eyes or possible poisoning by absorption through the skin. Fire may produce irritating or poisonous gases. Corrosives must be kept in special containers that cannot be corroded or eaten away by the chemical.



An OXIDIZER may ignite wood, paper, oil, or other combustibles. Oxidizers may explode if mixed with fuels, are in the heat of a fire, or undergo friction or shock. Some also can cause burns to skin, eyes, or mucous membranes if touched or inhaled.



An ORGANIC PEROXIDE must be kept refrigerated or it will ignite or explode by itself. Heat from exposure to sparks and flames may cause explosion and intense burning.

Finally, you should inquire about your role in supporting your community's Local Emergency Planning Committee (LEPC). Through the LEPC you may have access to information about chemicals at facilities that are located near your residence, business, or recreation centers.

RESPONSE

- *If you are at or near the scene of a chemical accident...*
 - Do not walk toward the spill or touch any spilled material.
 - Do not inhale gases, fumes, and smoke.
 - Do not assume that gases and vapors are harmless merely because there is no odor.
 - Move away from the accident. Try to stay upstream, uphill, and upwind. You should go at least 10 city blocks (one-half mile) from the danger area; for many incidents. You may need to go further if so advised by emergency response personnel.
 - If the wind is coming from the accident area do not move directly toward or away from the wind. Move so that you feel the wind on the side of your face to avoid the direct path of the fumes.
 - If the wind is blowing toward the accident, walk away from the accident and into the wind.
 - After you are safe, immediately contact emergency services: police, highway patrol, fire department, or emergency medical services. If your community has one telephone number for all emergencies, such as 911, report the nature and location of the accident, and the dispatcher will contact the appropriate service.
 - **DO NOT INTERVENE** in any way. Lack of training in proper procedures could endanger you and others. Wait for authorities and trained personnel.

If you are at home, work, or school, local officials may ask you to evacuate or to remain indoors and seek in-place protection.

- *If you are asked to evacuate...*
 - Do so immediately; quick and efficient evacuation can greatly reduce or eliminate any danger. Information on where to go, how to get there, and what to take is discussed in Unit Six.
- *If you are instructed by authorities to seek in-place protection...*
 - Close windows and doors, and seal cracks with wet towels, blankets, or tape.
 - Turn off all ventilation, including furnaces, air conditioners, vents, and fans.

**HAZARDOUS
MATERIALS
(continued)**

- Remain in protected areas such as hallways and away from windows until danger has passed. Keep a radio with you to remain updated.

RECOVERY

- Follow local instructions concerning the safety of locally available food and water.
- Clean up and dispose of residue carefully. Follow instructions from emergency officials concerning clean-up methods.
- State and Federal agencies are prepared to assist in the clean-up of chemical spills. Such agencies utilize containment and scrubbing equipment, special neutralizing materials, and other apparatus specifically designed for such emergencies.

If you want to learn more about hazardous materials, take FEMA's home study course *Hazardous Materials: A Citizen's Orientation* (HS-5). The course addresses hazardous materials and human health, regulations governing hazardous materials, identification of hazardous materials, preparation for hazardous materials incidents, and hazardous materials in the home.

A **radiological accident** is an event that involves the release of potentially dangerous radioactive materials into the environment. Radiological accidents can occur *anywhere* that radioactive materials are used, stored, or transported. Hospitals, universities, research laboratories, industries, major highways, railroads, and shipping yards could be sites of a radiological accident. Radioactive materials are dangerous because of the harmful effect of certain types of ionizing radiation on the cells of the body. A radiological accident could allow radiation to contaminate the environment. The degree and area of contamination could vary greatly depending on the type and amount of radioactivity.

Radioactive materials are composed of atoms that are unstable. An unstable atom gives off its excess energy until it becomes stable. The energy emitted is **radiation**. The process by which an atom changes from an unstable state to a more stable state by emitting radiation is called **radioactive decay**, or **radioactivity**.

Because the atoms that make up radioactive materials slowly decay and stop emitting radiation, radioactive materials eventually lose most of their radioactivity. How long particular materials remain hazardous depends on how long it takes for all the atoms to change to a stable state. This process can last from less than a second to a million years, depending on the type and amount of radioactive material.

Radiation cannot be seen, tasted, smelled, or felt. A radiological accident requires specialized emergency service personnel who have been trained to handle radiation hazards safely and who have specialized equipment to detect and monitor radiation.

On March 28, 1979, the most serious accident ever to occur at a United States commercial nuclear power plant occurred at the Three Mile Island facility near Harrisburg, Pennsylvania. A malfunction that damaged the nuclear reactor core threatened to release radioactive substances into the environment. With assistance from government officials and nuclear scientists, a serious release of radioactive substances was avoided.

As a result of the incident at Three Mile Island, major changes were instituted in the regulation of the nuclear power industry. FEMA was given the responsibility for review and approval of State and local radiological emergency plans and preparedness for jurisdictions located within a 10-mile radius of commercial nuclear power plants—the area known as the **plume emergency planning zone**—and the 50-mile radius known as the **ingestion emergency planning zone**.



Radiological substances are strictly monitored and controlled to avoid hazards from unsafe handling or transportation.



An accident at a nuclear power plant would not cause the widespread destruction of a nuclear weapon. No mushroom cloud would be produced. Although radioactive materials could be released in a cloud or **plume**, which could be carried downwind by air currents, no fallout is produced to endanger people. Emergency services would not be interrupted, and radiation levels would be monitored by

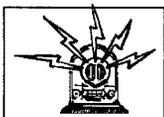
**RADIOLOGICAL
ACCIDENT
(continued)**

government officials to determine the potential danger and to warn the public. In all probability, the persons in most danger of radiation exposure would be the emergency personnel at the plant. Local citizens would be evacuated or instructed about how to avoid radiation hazards.

For commercial nuclear power facilities, the Nuclear Regulatory Commission (NRC) has set up strict guidelines for licensing construction and operation. Inspectors regularly visit all construction sites and remain on-site at commercial power plants that are licensed to operate. The environment surrounding nuclear facilities undergoes constant monitoring for radioactive contamination.

Each State and local community within a 10-mile radius of a nuclear power plant must have an emergency plan for an accident at the plant. The State and local community must participate in an emergency exercise at least every two years and meet specific standards and criteria for preparedness.

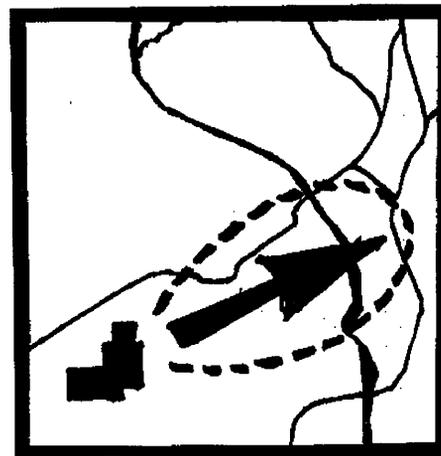
The transportation and storage of radioactive materials is strictly regulated by the Department of Transportation (DOT) and the Nuclear Regulatory Commission. Shipping containers with large quantities of radioactive materials must be appropriately and clearly marked. The DOT restricts the speed limits and routes available for the movement of highest quantities of radioactive materials, and vehicles transporting large quantities must bear a radioactive placard. Communities located on major transportation routes should develop and practice an emergency plan for handling transportation accidents involving radiological materials.



SIGNS AND WARNINGS

An individual cannot detect radiation by sight, smell, or any other sense. However, you should learn the emergency warning system in your community if you live near a nuclear power plant, a major shipping route, or a facility that stores nuclear materials, wastes, or spent fuels. This radiation symbol marks areas of buildings and containers where radioactive materials are used and stored.

If an accident occurs involving radioactive materials, many emergency services are likely to be involved in the response. If the radiation levels are dangerously high, the area immediately around the accident site may be evacuated. The size of the evacuated area will depend on the type and amount of radiation and on weather factors. Special warning systems such as sirens, tone-alert radios, and/or route alerting have been established around nuclear power plants to alert the public during time of emergency.



Markings on this map denote the area downwind of a nuclear power plant that might be evacuated in the event of an incident. The size of the evacuated area is determined by the weather and by the type and amount of radiation released.

IMMEDIATE DANGERS



Radioactive materials emit different types of radiation, each of which presents its own danger to the human body. Some types of radiation can penetrate the skin and travel through the body. If the level of radiation is high, these types are dangerous just from being close to them. This danger is called an *external radiation hazard*. Other types of radiation are more dangerous when the radioactive materials are taken inside the body by inhaling contaminated air, getting the radioactive material in open wounds, or eating or drinking radioactive substances. This danger is called an *internal radiation hazard*.

All radiological accidents will not necessarily result in radiation exposures that can cause severe health effects and possible death. Due to packaging requirements and other regulations, an accident involving the transport of radioactive material may not even result in a release of the material into the environment. The potential health effects resulting from a radiological accident will depend on the type and quantity of radioactive material released and the amount of exposure received. An accident involving the shipment of small quantities of radiopharmaceuticals to hospitals would be far less severe than an accident involving the release of a significant quantity of radioactive materials from a commercial nuclear power facility.

- The immediate danger from radiological accidents is from exposure to radiation, either internally or externally. The level of radiation that is harmful depends on the total amount of exposure. Radiation effects are cumulative. The greater your total exposure, the higher the risk of serious damage to your body.
- The danger from external radiation varies depending on the type of radiation, the length of the exposure, the distance you are from the source of the radiation, and the amount of shielding between you and the source. Your body weight and general state of health also are factors to be considered.
- Radiation exposure causes damage to the cells of the body. Any exposure to radiation is likely to cause some cell damage. Your body can recover from a limited exposure to a small amount of radiation. The more you are exposed to radiation, the greater the cell damage and the more likely you are to become ill.
- Radiation sickness can result from a *single exposure* to a large amount of radiation or from *repeated exposure* to small amounts. The more exposure and the more cell damage, the greater the effect on your body. If many cells are damaged, you are likely to experience more severe symptoms such as nausea, vomiting, and diarrhea. Radiation exposure can also impair the production of white blood cells and weaken the body's ability to fight infection. Therefore, a high degree of total radiation exposure makes your body susceptible to infection. The combined effect of high cell damage and lowered resistance causes severe radiation sickness and possible death. In cases of very high exposure, death is probable.
- If radioactive substances are taken internally, the damaging rays continue to be emitted while natural *radioactive decay* occurs. The natural process of the body may get rid of some of the radioactive substances, but others may be retained.
- Radiation sickness is not contagious. You cannot *catch* radiation sickness from someone who has been exposed to radiation. The illness is a result of cell damage and the weakening of the body's defenses. No drugs can *cure* radiation sickness. Medical care and antibiotics can reduce the danger from infection while the body repairs itself.

**RADIOLOGICAL
ACCIDENT
(continued)**

- The chances of recovery depend on the amount of damage and the general state of health at the time of exposure. Children, pregnant women, and persons in poor health are likely to experience greater damage from smaller total amounts of radiation than adults in good health.
- The only way to avoid radiation sickness is to avoid exposure to external hazards, avoid breathing radioactive dust particles in the air, and avoid consuming contaminated water or food. If you cannot avoid the exposure, at least limit the exposure as much as possible. Seek medical help if you know that you have been exposed or that you have consumed contaminated food or water.

**LONG-TERM DANGERS**

Although the effects of radiation many months or years after exposure are not clearly known, but they are thought to include leukemia, cancer, cataracts, sterility, birth defects, and genetic disorders. While radiation itself may not be the cause of these effects, scientists believe that a link exists between exposure to dangerous levels of radiation and the chances of suffering some of these effects later.

MITIGATION

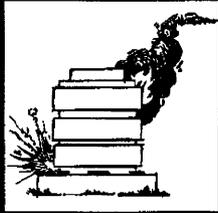
- Know the locations of nuclear power plants, radioactive storage sites, radioactive waste dumps, and facilities that use radioactive materials in or near your community.
- If you live near a nuclear power plant, attend public information meetings to learn about radioactivity, safety precautions, and mitigation measures being taken by the utility company, the local community, and the State.

**PREPAREDNESS**

- Public information materials are available from all nuclear power plants to tell you what actions to take in the event of an emergency at the plant. If you live within 10 miles of such a facility and have not received these materials in the mail, call the operating company or the local emergency management office and ask for a copy. You should read and retain these materials and refer to them in time of emergency.
- Know which emergency broadcast radio or television stations (and station frequency or channel number) will be used to announce warnings and emergency instructions.
- Keep an emergency supply of food, water, and any special medicines required by you and your family members. (Unit 6 will provide specific information on supplies you would be likely to need.)
- Have several evacuation routes planned. Your routes should be consistent with those planned by emergency management officials. Know what to take, how to locate family members at any time of the day or night, and how to close your house so that you can leave promptly.

RESPONSE

- If a radiological accident occurs in your community, remain calm. Listen to local radio or television for announcements. If you or your home is in any danger, local emergency officials will advise you by radio or television of the actions you should take.
- If you are told to evacuate, do so immediately. Follow the officially recommended route, even if it is crowded. You will be sent in a direction that will not put you in danger of the radioactive plume carried by the wind.
- If you are told to take shelter in your home or office, stay there. Close doors and windows. Turn off fans. Do not run air conditioners unless emergency officials tell you it is safe to do so. Stay in your basement or in a central part of your house. Listen to your local radio or television station for emergency information. Do not go outside until an *all clear* announcement is made.
- There are three ways to minimize radiation exposure to your body: shielding, distance, and time.
 - *Shielding* Heavy, dense material between you and the source of the radiation can serve as protection.
 - *Distance* The more distance between you and the source of radiation, the less radiation you will receive.
 - *Time* Limiting the time spent near the source of radiation reduces the amount of radiation you will receive.
- When the immediate danger has passed, avoid using foods from your garden or milk from your cows or goats until these can be inspected by a local emergency official. Contamination can affect areas many miles from the accident site.



Technological
Hazard:
**STRUCTURAL FIRE
AND EXPLOSION**

A structural fire is a fire in a house or building from natural, human, or technical causes. An explosion is a rapid and powerful combustion.

The threat of fire and explosion exists in every building. Fire and explosion can be caused by accidents, by electrical wiring, or by careless use of fire. They can also be caused intentionally, as in the case of arson or terrorism. Although arson once was confined to major urban areas, it now occurs in communities all over the United States. Fires are most devastating when they occur in large skyscrapers where hundreds of people work or live. Even in buildings that are structurally resistant to fire, lives can be lost from inhaling smoke.

Late in 1980, the MGM Grand Hotel in Las Vegas, Nevada, experienced a devastating fire. Improper ventilation of elevator shafts caused smoke to spread quickly to upper floors. More than 80 people were killed and hundreds more were injured. Many people staying at the hotel had to be evacuated by helicopter. Property damage was in the millions.

Accidental explosions have caused deaths, injuries, and major damage to large grain storage bins when gases given off by high concentrations of grain have exploded. Explosives have been deliberately planted for purposes of extortion or terrorism in public buildings, casinos, and airport terminals.

Approximately three-quarters of all fire fatalities occur in residential dwellings. The greatest number of fires, fire-related deaths, and injuries occur in the nation's homes.

One striking aspect of the nation's fire problem is the indifference with which citizens confront it. Destructive fires take a huge toll in lives, injuries, and property losses, yet there is no need to accept those losses with resignation. There are many measures—often very simple precautions—that can be taken to reduce them significantly.

For example, fire drills and prominent exit signs are mandatory fire safety measures in all public buildings. Other measures that communities can take to reduce losses from fire include establishing fire codes for all public and private buildings, with inspections made regularly by local and State officials to ensure compliance. Adopting smoking laws in high-risk areas can eliminate the fire hazard of careless smoking. Fire departments can also develop mutual aid agreements with other jurisdictions to ensure adequate assistance in the event of a major fire.



SIGNS AND WARNINGS

Fire alarms are installed in public buildings. Other warning devices, such as smoke detectors, can alert families to fire in their homes. Intense heat, flames, and smoke are recognizable signs of fire in a structure. Explosions usually are accompanied by a loud bang, blast waves, and flying debris.



IMMEDIATE DANGERS

Heat and smoke present the most immediate danger from structural fires. The force

of an explosion may cause injury or unconsciousness. In crowded public buildings, panicked behavior may present the greatest danger.

LONG-TERM DANGERS

The spread of fire to other buildings or to fuel supplies could cause their destruction and long-term economic effects.



MITIGATION

- Teach family members the proper way to handle fire. Fire safety information is available from local officials, the State Fire Marshal's Office, the U.S. Fire Administration, and the American Red Cross.
- Follow fire and life safety building codes when building a home. Avoid the use of materials that have proven particularly vulnerable to fire or could foster its spread to other houses—such as many types of wooden shingles and shakes. In older homes, have wiring and fireplaces inspected by a fire safety inspector. In a home of any age, chimneys must be cleaned regularly to avoid the possibility of a chimney



Once smoke detectors have been installed, they should be tested on a regular basis. Batteries should be replaced at least once a year, or as specified by the product's instructions.

fire that could spread to the roof and other parts of the house. Be sure that wood stoves are properly installed. Incorrect installation, often by homeowners, is a common cause of fires in some areas.

- Do not store combustible materials in closed areas or near a heat source.
- Do not overload electrical circuits.
- Replace frayed electrical cords.
- Buy fire insurance for your home and/or business.

PREPAREDNESS

- Plan alternate escape routes from all levels of your house. Review the plan with



**STRUCTURAL FIRE
AND EXPLOSION
(continued)**

- all family members.
- Hold periodic fire drills.
 - Install metal or rope ladders as fire escapes from the upper floors of your house.
 - Install smoke detectors and test them every month. If you own a business, install fire alarms and sprinkler systems. Replace the batteries at least once each year, or as indicated in the instructions. Smoke detectors, alarms, and automatic sprinklers are preventive measures designed to discover and suppress fires before they spread.
 - Equip your home with residential fire sprinkler systems to assure a safer environment for your family and protection of your investment and irreplaceable family possessions.
 - Post the number for the fire department and emergency medical service by the telephone. Teach all family members how to report a fire emergency.
 - Teach family members what to do in various fire conditions such as heavy smoke or blocked exits.
 - Keep fire extinguishers in your home and car. Learn how to use them, and teach family members. Ensure that these are inspected regularly. Read the instructions on the extinguisher for inspection details.
 - Learn how to treat burns; contact your local Red Cross for available first aid courses.

RESPONSE

- If you see a fire, immediately report it to the local fire department. Give clear and exact information concerning the fire's location.
- If a fire alarm sounds in a public building, leave immediately. Remain calm. Do not run. Use fire exits or stairs. Do not use elevators.
- If possible, contain the fire. Use the correct firefighting method. If there is an electrical fire, do not use water unless the electricity is turned off. If a flammable liquid is burning, smother it; do not splatter it.
- Stay low in a burning building. Heat and smoke will rise. Hot air can scorch your lungs and smoke may contain toxic fumes. Take short breaths and, if possible, cover your face with a damp cloth and breathe through your nose.
- Be sure of your escape route. Do not let the fire get between you and a way out.
- Check doors before opening them. If a door is hot, do not open it. Open a door carefully if it is cool, keeping your head to one side to avoid any blast of hot air.
- If your clothing catches fire, drop and roll.

- Once you and your family safely escape a fire, do not go back inside a building for *any* reason.

RECOVERY

- Have the damage to your home assessed by your insurance company. File a claim as soon as possible.
- You may need to find temporary housing, food, clothing, and other assistance. Your insurance company may help to pay for the expense, or you can contact your local chapter of the American Red Cross or the Salvation Army.

HOW WELL HAVE YOU LEARNED?**Unit Four Review**

(Answers on page A-2)

Answer each of the following questions by placing a check next to the *best* response.

1. If you are at or near the scene of a chemical accident, what is the correct action to take?
 - a. Attempt to identify the material.
 - b. Move a safe distance from the accident and summon emergency assistance.
 - c. Remain at the scene to assist authorities.
 - d. Contact emergency services from the scene.
2. You live a few miles from a nuclear power plant. If you hear sirens, what should you do first?
 - a. Evacuate immediately.
 - b. Listen to local radio reports and prepare to evacuate if necessary.
 - c. Close your doors and windows and take shelter in your basement.
 - d. Do nothing because you probably live outside the endangered area.
3. If you are caught in a burning building, what is the correct action to take?
 - a. Stay low—heat and smoke will rise.
 - b. Open all doors immediately.
 - c. Extinguish any electrical fires with water.
 - d. Once you and your family are safe, go back inside to save valuables.
4. If you are caught outside during a hazardous materials accident, you should immediately
 - a. Try to identify the hazardous material.
 - b. Move to an area upstream, uphill, and upwind.
 - c. Begin cleanup efforts.
 - d. Secure the area.
5. Which of the following should NOT be done when seeking in-place protection following a hazardous materials release?
 - a. Seal doors and windows as tightly as possible.
 - b. Turn off all ventilation.
 - c. Open a window to get a better view of what is happening.
 - d. Keep a radio nearby to remain updated.

5

Preparing Your Family Disaster Plan

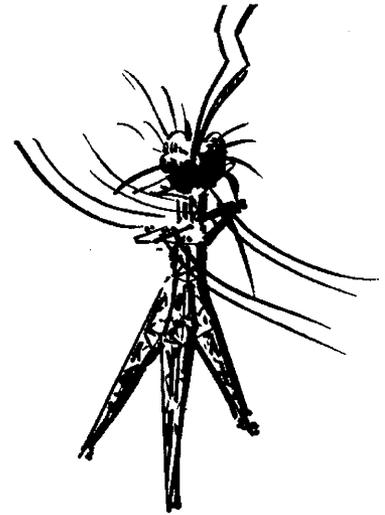
In this unit, you will learn

- How to prepare a disaster plan for your family, and
- How to practice and maintain your plan.

There are four steps to creating a family disaster plan.

1. *Find out what could happen to you.* You need to confirm the analysis of the hazards most likely to affect your community that you completed earlier in this course and learn more facts about your community's preparedness plans.
2. *Create a disaster plan.* You need to meet with other household members to determine how you can work together as a team to survive a disaster.
3. *Complete preparedness activities.* FEMA has identified a number of activities you can perform that will help your family prepare for a disaster.
4. *Practice and maintain your plan.* It is important to be sure your family remembers what steps should be taken if a disaster should occur, and that certain preparedness measures should be carried out regularly.

The remainder of this unit will give you more information on these four steps and how they can protect you and your family from preventable losses, injury, or death.



Thunderstorm-related power outages are common to most localities. What other types of emergencies have the potential to occur in your community?

STEP 1 FIND OUT WHAT COULD HAPPEN TO YOU

In previous units you identified the hazards that are most likely to affect your community. To ensure that your analysis is accurate, call your local emergency manager and local Red Cross Chapter. Ask whether your list agrees with your community's assessment, and request from them additional information about how you can prepare for these hazards.

Next, you will need some additional information to better prepare your family for whatever disasters are most likely to occur. You will want to know, for example, what *warning signals* your community would use in the event of emergency so that you can take appropriate actions when you hear them. For example, your community may have agreed on different siren sounds that would be used to signal different types of emergencies. Your local emergency manager will be able to identify these warning signals.

If you have pets, you should be aware that animals usually are not allowed inside emergency shelters due to health regulations. Find out from your local emergency manager what provisions for animal care are included in your community's local emergency plan. If animal care has not been addressed in your community's plan, encourage the emergency planning staff to include provisions. For information on planning for pet safety in a disaster, request "Guidelines for Disaster Planning" from the American Kennel Club. Write to the American



As most emergency shelters do not permit pets due to health regulations, other arrangements should be made for their safety.

Kennel Club, Public Affairs Department, 51 Madison Avenue, New York, NY 10010.

Your household or community may be home to elderly or disabled persons who would require special assistance in an emergency, especially if evacuation were required. Ask your emergency manager or Red Cross representative what you can do as a responsible citizen to help them.

It is very possible that you or other household members might not be at home when an emergency occurs, or that members of your household might be scattered throughout a number of different locations. Therefore, you need to find out about the emergency response plans for places where household members spend time—such as work places, schools or day care centers, nursing homes, or recreation centers. You will need to find the appropriate contact at each location to obtain this information.

To ensure your child receives prompt medical treatment in your absence, you should complete a Medical Release and have a copy on file at your child's school, doctor's office, and nearest hospital. A sample Medical Release is provided on page 6-11. Check with your physician or hospital to see if any other information would be needed. The completed medical release form should be reviewed and updated annually.

STEP 2

CREATE A DISASTER PLAN

All members of your household, including children, need to know what they should do if a disaster occurs. Children with knowledge and assigned responsibilities often feel less vulnerable or panicky.

Plan a meeting with your family and discuss why you need to prepare for disaster. When you meet with your family, plan to serve as the "guide." Make sure everyone participates. While this is a serious subject, preparedness activities can be fun projects. Keep your messages positive—use "do's" not "don'ts." Ask questions to get everyone thinking and to keep them involved. Plan to share responsibilities and work together as a team.

Tell your children about the hazards most common in your area, but don't frighten them. Explain the steps that reduce the danger of disaster. It is important to make the possibility of an emergency real, but instill in all the family members the confidence that each one knows the appropriate actions to take before, during, and after each type of disaster. These actions should be based on the information contained in Units 3, 4, and 5 of this course. You should supplement this information with data gathered from your local emergency manager and American Red Cross.

You will want to address the following points in your plan and discuss them with all family members.

Pick two places to meet. First choose a location near your home in case of a sudden emergency, such as a fire. Choose a familiar spot that will be a safe distance from heat, smoke, and flames. This place may be a neighbor's home, a street corner, tree, or other neighborhood landmark. This will help family members and rescue workers avoid needless and dangerous searches for missing persons.

Select one location outside of your neighborhood in case you can't return home. If family members are away from home when emergency strikes, gathering at a central location will help you determine if everyone is okay. Make sure everyone knows the address and phone number of this meeting place.

Ask an out-of-state friend or relative to be your “check-in” contact. Trying to find out where and how other family members are can be the most stressful part of an emergency. To help household members communicate with each other, determine appropriate points of contact outside the community where each of you can call if you become separated.

Even when local telephone service is disrupted, long distance service often works. After an emergency, separated family members should call your “check-in” contact to let him or her know where you are. Make sure everyone knows your contact’s phone number. Teach children how to make long distance calls. Included on page 6-11 is a form you can use to document meeting places and contacts.

Discuss what to do in an evacuation. What would you do if you were asked to evacuate your home? Evacuation can be a frightening experience. Knowing what to do can make the process safer and more efficient, as well as reduce your fears and uncertainty about leaving.

After a disaster, your community will establish emergency public shelters in schools, or other public buildings. Emergency officials or radio and TV reports will announce where these shelters are located and when you should go. Listen for instructions. If an evacuation is recommended, go to the shelter designated for your area as soon as possible. If you have friends or relatives outside of the threatened area with whom you could stay, you may prefer to make arrangements with them.

If you will require assistance in an emergency situation, ask a neighbor, friend, or co-worker to be your “buddy.” Give this person any pertinent information that can be used to help you. You may wish to give your “buddy” an extra key to your home.

Evacuation periods can range from a few hours to several days or weeks. Red Cross shelters frequently provide food and first-aid, but you may have to evacuate to a shelter that is not equipped with emergency supplies. If disaster occurred today, would you have enough supplies handy to meet your family’s needs for at least three days? To be prepared, assemble and take with you a Disaster Supply Kit for each member of your family containing the items each would most likely need in an evacuation. The information on what to include in a Disaster Supply Kit is addressed in Step 3.

If you are advised to evacuate, do so immediately. Remember, your home and possessions can be replaced. If time permits, put away all perishable food. Close and lock windows and doors. Turn off lights and electrical appliances. Turn down the heat or air conditioner. Included on page 6-12 is an evacuation checklist to assist you if you have to evacuate. Review the list and determine who will be responsible for each task.

Your plan should address those disasters most likely to occur in your area in relative detail. *Every* household should specifically address the special actions that should be taken for fire.

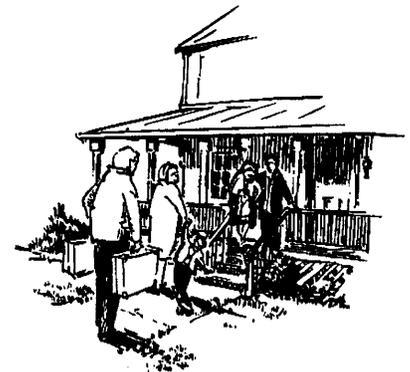
- *Before...*
 - Review how to use the fire extinguisher *once a year.*



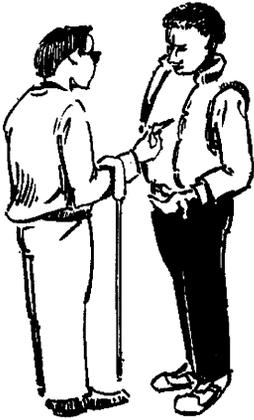
A family meeting is an essential step in equipping your household to survive the types of emergencies most likely to occur in your area.



Many lives are lost needlessly by persons attempting to rescue a family member who has already reached safety. Your household plans should specify a place where everyone should gather once they have made their escape.



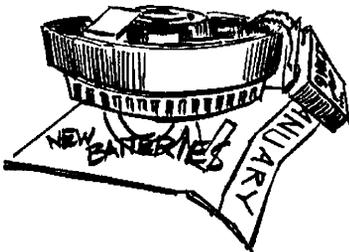
You may be able to stay at the home of other family members or friends following an emergency.



If you require special assistance in an emergency, make advance arrangements for a neighbor to act as your "buddy."



Prepared in advance, a checklist will help you to remember what needs to be taken care of in the event of an evacuation.



Your smoke detector can help save your life but only if you remember to change its battery at least once a year.

- Test the extinguisher as recommended by the manufacturer.
 - Test smoke detectors every month.
 - Change smoke detector batteries at least once a year.
 - Check that combustibles are not stored in closed areas or near heat sources.
 - Determine the best fire escape routes. Find at least two ways out of each room.
 - Designate a safe place outside the home where family members can meet after escaping fire in the home.
 - Conduct a fire drill once a year and practice use of alternate escape routes.
- *During...*
 - Warn others loudly.
 - Exit using pre-determined routes. *Stay low.*
 - The first person out should report the fire using a nearby but safe telephone. It is wise to consider what telephone you would use.
 - *After...*
 - Contact your insurance representative about damage assessment.
 - Plan to stay with friends or relatives until arrangements can be made with the insurance company.

STEP 3

COMPLETE THESE PREPAREDNESS ACTIVITIES

In the event of an emergency, there is little time to learn a new skill or try to locate information. Lives can be saved by knowing *in advance* how to conduct basic emergency procedures. Consider learning the following valuable skills and taking precautionary steps to protect your family.

1. *Learn how to give first aid.*
Learn basic first aid to enable you to access injuries and perform basic procedures such as how to stop bleeding wounds, or avoid aggravating the injury of a potentially broken limb. Your local Red Cross should have information on training programs.
2. *Learn how to perform CPR.*
Learn to conduct cardiopulmonary resuscitation (CPR). Effective, timely CPR has saved the lives of drowning and other victims who have stopped breathing. Again, your local Red Cross will have information on CPR classes in your vicinity.
3. *Post emergency telephone numbers.*
Because every moment is precious in an emergency, emergency numbers should be posted for ready reference. Post emergency telephone numbers by phones (fire, police, etc.). A form to document this information is provided on page 6-12.
4. *Ensure that all household members can summon help in an emergency.*
Be sure that all members of your household know how and when to call 911 or your local emergency services number for help. When calling for help, tell the operator
 - The location of the emergency situation (address, floor and room number, city or town, nearest cross-

- street, and any helpful landmarks),
- Your name and telephone number,
- What happened,
- How many people need help, and
- What is being done to assist them.

Always let the person on the other end of the line hang up first.



Be sure that even the children in your household know how to summon help in an emergency.

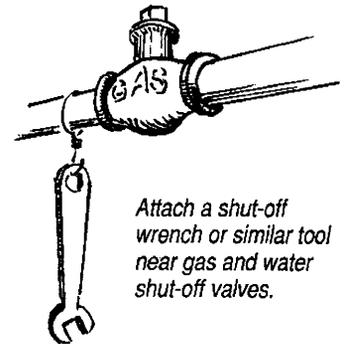
5. *Learn how to shut off utilities.*

Be sure that all responsible household members know how and when to turn off the water, gas, and electricity at the main switches. Locate your main electric fuse box, water service main, and natural gas main, and clear the area around shut-off switches for easy access. You should also

- Attach a shut-off wrench or specialty tool to a pipe or other convenient location near gas and water shut-off valves, and
- Paint shut-off valves with white or fluorescent paint to increase visibility.

You should document the location of utility shut-offs. A form is included on page 6-13 that you can use for this.

Shut off the utilities only if you suspect the lines are damaged or if local officials give instructions to do so. If you turn the gas off, only a professional should turn it back on.



Attach a shut-off wrench or similar tool near gas and water shut-off valves.

6. *Know how to purify water.*

In emergency situations the water in water heaters, toilet tanks (not bowls), and ice cubes may be purified and used. There are three basic procedures for purifying water.

a. *Boiling*

Boiling is the safest method of purifying water. Bring water to a rolling boil for ten minutes, keeping in mind that some water will evaporate. To improve taste, pour from one container to another several times.

b. *Purification tablets*

These tablets are available at most sporting goods or drug stores. Follow directions on the package. Usually one tablet is enough for one quart of water. Double the dose for cloudy water.

c. *Bleach purification*

Liquid household bleach can also be used if the label lists sodium hypochlorite as the only active ingredient and there is no perfume (such as "lemon-scent") in the bottle. Add bleach according to the table below, stir and let stand for 30 minutes. If the water does not taste and smell of chlorine after 30 minutes, add another dose and let stand another 15 minutes. (Note: Do not use this method to purify water in a waterbed. Use a manufacturer-provided purifier that will not harm the plastic.)

AMOUNT OF WATER	CLEAR WATER	CLOUDY WATER
1 quart	2 drops	4 drops
1 gallon	8 drops	16 drops
5 gallons	1/2 teaspoon	1 teaspoon

7. *Stock emergency supplies and assemble a Disaster Supply Kit.*

Keep enough supplies in your home to meet your needs for at least three days. Assemble a Disaster

Supply Kit with items you may need in an evacuation. Store these supplies in sturdy, easy-to-carry containers such as backpacks, duffle bags or covered trash containers. Include these items:

- A three-day supply of water (one gallon per person per day) and food that won't spoil;
- One change of clothing and footwear per person, and one blanket or sleeping bag per person;
- A first aid kit that includes your family's prescription medications;
- Emergency tools including a battery-powered radio, flashlight, and plenty of extra batteries;
- An extra set of car keys and a credit card, cash, or traveler's checks;
- Sanitation supplies;
- Special items for infants and for elderly or disabled family members; and
- An extra pair of glasses.

Correct storage and maintenance of your Disaster Supply Kit is important if it is to be ready for use when needed. Be sure to store it in a convenient place near an exit and known to all family members. If possible, it should be a cool, dry and dark location. In addition, observe the following precautions:

- Keep items in air tight plastic bags;
- Change your stored water supply every three months so it stays fresh;
- Rotate your stored food every six months;
- Re-think your kit and family needs at least once a year, replacing batteries, updating clothes, etc.; and
- Ask your physician or pharmacist about storing prescription medications.

Keep important documents in a waterproof container near your Disaster Supply Kit.

Provided on pages 6-14 through 6-16 is a more complete list of disaster supplies you will most likely need whether you evacuate or remain at home.

You will also want a Disaster Supply Kit to carry in your car in case of an emergency when you are away from home. Suggestions for such a kit may be found on page 6-16.

8. *Assess your insurance coverage.*

You should carefully assess your insurance coverage with your insurance agent to be sure you have adequate coverage on your home and possessions for the hazards in your area. At the same time, you should take the opportunity to review your health and medical, automobile, and life insurance coverage to be sure they provide adequate protection to ensure your family's financial security.

9. *Determine the best escape routes from your home, in case regular exits are blocked.*

Find at least two ways out of each room. If you choose a window, make sure you can reach the ground safely (consider the need for an escape ladder or rope). Plan how to get to ground level if elevator service is not available.



Be sure to include necessary prescription medications in your family's first aid kit.

10. *Find safe places in your home for each hazard.*

Several hazard response measures call for taking shelter in or near your home. You need to determine for each type of hazard the safest locations. For example, in a tornado, go to the basement or storm cellar. In an earthquake, take cover under a heavy desk, table, or bench.

Many apartment buildings have shelter areas located in the middle of the building, generally on the ground floor or in the basement. Contact your building superintendent if you do not know where the designated shelter for your apartment building is located.

Manufactured home parks are often the scene of massive destruction during many disasters. Manufactured homes offer

almost no protection in the face of many natural disasters. Many manufactured home communities throughout the country have taken the initiative to build centrally located concrete shelters to offer protection for their residents. If you live in a manufactured home, you should seek shelter other than in your home during emergency situations. Part of your plan must include locating a shelter away from your home.

11. *Conduct a home hazard hunt.*

You can reduce the risk of being injured in your home by reducing potential hazards. (Anything that can move, fall, break, or cause a fire is a *home hazard*.) You and your family should conduct a hazard hunt in your home at least once a year to identify potential hazards that can be reduced or eliminated. Go from room to room and imagine what would happen to furniture, appliances, fixtures, and other objects during a disaster. Check for frayed electrical cords or overloaded circuits. Check for rags or paper goods stored near electrical equipment, and for flammable materials. The following procedures can help you take the necessary steps to correct any problems in your home.

Check for electrical hazards.

- Replace frayed or cracked extension and appliance cords and loose prongs and plugs.
- Correct overloaded outlets and extension cords.
- Remove electrical cords that are run under rugs, over nails, heaters, pipes, or in high traffic areas.
- Cover exposed outlets and wiring.
- Repair or replace appliances that overheat, short out, smoke, or spark.
- Provide overload protection by either circuit breakers or fuses.
- Have do-it-yourself wiring checked for safety by a professional.

Check for chemical hazards.

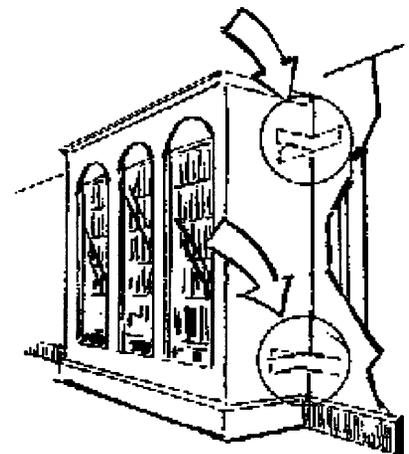
- Move combustible liquids such as paint thinner, kerosene, charcoal lighter fluid, and turpentine away from heat sources. Store flammable liquids such as gasoline, acetone, benzene, and lacquer thinner in metal cans away from the home.
- If flammable materials must be stored in the home, use a storage can with an Underwriter's Laboratories (UL) or Factory Method (FM) approved label.
 - Move them away from heat sources, open flames, gas appliances, and children.
 - Place containers in a well ventilated area.
 - Close lids tightly.
 - Secure containers to prevent spills.
- Place oily polishing rags or waste in covered metal cans.
- Instruct family members that gasoline, benzene, and other flammable fluids should not be used for starting fires or cleaning indoors.

Check for other fire hazards.

- Clear storage areas of old rags, papers, mattresses, broken furniture, and other flammable materials.
- Move clothes, curtains, rags, and paper goods away from electrical equipment, gas appliances, or flammable materials.
- Remove dried grass cuttings, tree trimmings, and weeds from the property.
- Clean and repair chimneys, flue pipes, vent connectors, and gas vents.



Plan alternate escape routes for all members of the household and practice using them.



Anchor heavy objects such as bookcases to prevent them from toppling and causing injuries during an earthquake.

- Move heaters and candles away from curtains and furniture.
- Place portable heaters on a level surface, away from high traffic areas. *(Make sure that they are equipped with automatic shut-off switches and avoid the use of extension cords.)*

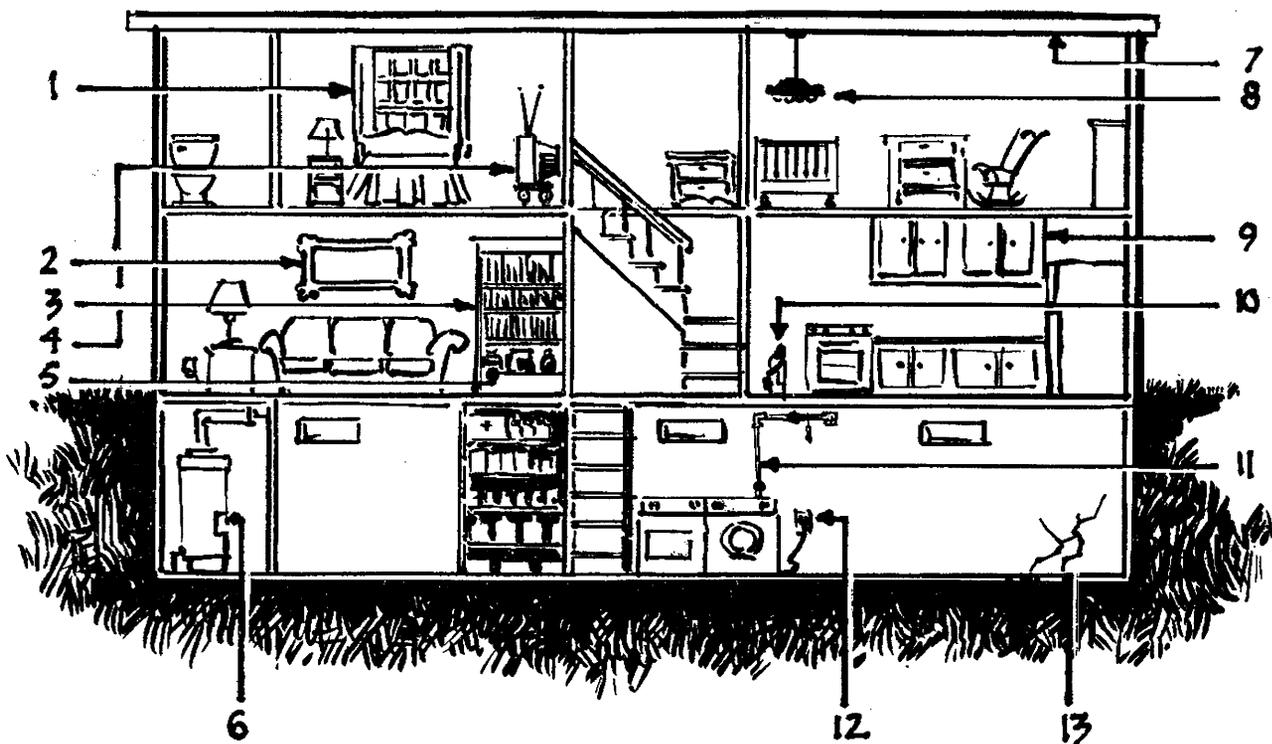
Check fire safety equipment.

- Install at least one smoke detector on each level of the home, especially near bedrooms.
 - Test every month.
 - Change batteries at least once a year, or as directed by the manufacturer's instructions.
- Acquire and learn to use a fire extinguisher (ABC type). Review the instructions provided with your fire extinguisher to learn its application (such as the type of fire that the extinguisher is designed to put out) and how it works. Be sure others in your household also understand how it works and where it is kept. This location should be easy to reach and near an exit. Maintain and recharge according to manufacturers instructions.

12. *Take the following preparedness steps.*

The following graphic illustrates a number of specific actions you can take to ready your home. Many of these steps apply to earthquake preparedness. Find out what safety measures are necessary in your area.

1. Beds should not be directly under glass windows. Locate beds away from tall, heavy furniture, bookcases, or filing cabinets. Replace heavy hangings over beds with lightweight alternatives.



2. Place heavy picture frames or mirrors away from couches, beds, or other well-occupied places.
3. Tall, heavy furniture can topple over in an earthquake. Bookcases, china cabinets, wall units, and the like should be securely bolted to studs with metal braces.
4. Large objects (such as TV sets, refrigerators, or computers) on wheeled bases should have the wheels in the locked position and be located away from exit routes.
5. Display breakables and/or heavy objects on a low shelf.
6. Hot water heaters can topple over easily and rupture gas lines. Be certain to have your water heater

- properly strapped to the wall, even it is located in a closet or in the garage.
7. Nail plywood to ceiling joists to protect occupants from falling chimney bricks.
 8. Anchor hanging lamps with closed hooks, or relocate them.
 9. Unlatched cabinet doors can swing open in an earthquake. Secure latches to prevent swinging open.
 10. Keep fire extinguishers accessible, near exits.
 11. Use flexible connectors where gas lines meet appliances.
 12. Replace frayed electrical cords, and correct overloaded circuits.
 13. Repair any deep cracks in ceilings or foundations.

STEP 4**PRACTICE AND MAINTAIN YOUR PLAN**

You should practice your family disaster plan through periodic drills. Quiz your children every six months so they remember what they are to do. Conduct fire and emergency evacuation drills in which family members practice escaping by agreed-upon routes.

It is important that information in your plan be reviewed and updated as changes occur. For example, phone numbers, insurance carriers, or contacts may change, and your plan should be updated to reflect these changes.

Emergency supplies should be changed periodically. You should replace stored water every three months and stored food every six months.

Remember—your plan can save your life and the lives of those you love. It must, however, be practiced and maintained if you are to be prepared when disaster strikes.

HOW WELL HAVE YOU LEARNED?

Unit Five Review

(Answers on page A-2)

Answer each of the following questions by placing a check next to the *best* response.

1. Who should know how to use 911 to summon help (or other local emergency numbers if your area does not use 911)?
 - a. Only adults in the family
 - b. Elderly persons who are more likely to need it
 - c. Only children
 - d. All family members
2. Smoke detectors should be tested how often?
 - a. Once a year
 - b. Once a month
 - c. Twice a year
 - d. When batteries are changed
3. What is the first step in preparing a disaster plan?
 - a. Find out what can happen.
 - b. Conduct a family meeting.
 - c. Complete preparedness activities.
 - d. Assess insurance coverage.
4. What should be included in the Disaster Supply Kit?
 - a. Water, food, and first aid
 - b. Clothing, bedding, and emergency supplies
 - c. Sanitation supplies or special items for family members with unique needs
 - d. All of the above
5. To ensure your child receives prompt medical care in the event of an emergency, you should
 - a. Telephone your doctor with instructions.
 - b. Tell the child to convey your wishes.
 - c. Complete a Medical Release Form and file it at the school, doctor's office, and nearest hospital.
 - d. Inform the school secretary by phone.
6. What potential hazard should be addressed in every Family Disaster Plan?
 - a. Earthquake
 - b. Fire
 - c. Hurricane
 - d. Winter storm
7. Once your family plan is done, it should be
 - a. Filed at your office.
 - b. Filed at your local emergency management office.
 - c. Practiced and updated regularly.
 - d. Considered complete and taken to the bank for safe storage.

SAMPLE MEDICAL RELEASE FOR A CHILD

This is a sample form of a Medical Release for a Minor Child, which may permit treatment in an emergency. While there are other methods for hospitals and other medical facilities to obtain permission to treat a minor child in the absence of parental consent, it is a good idea to have one of these permission slips on file in your child's school and at your doctor's office, as well as the nearest hospital, just to be sure there is no delay in case of an emergency. Many schools provide their own medical release forms. This information should be updated annually. You should consult with your physician to determine what specific information is required in your State.

I, _____, Parent or Legal Guardian of _____, a minor child, hereby authorize any Medical or Surgical treatment that may be necessary in an emergency, and in my absence, for the well being of the above mentioned minor. I agree to hold the physician or hospital treating the above mentioned minor harmless.

_____ has the following Allergies: _____

and has the following Medical Conditions: _____

Hospital Insurance

Name of Company _____

Policy Number _____ Group Number _____

Date _____ Signature of Parent or Legal Guardian _____

MEETING PLACES AND CONTACTS

Meeting Place In Neighborhood _____

Outside the Neighborhood _____

Family Contact (long distance)

If we are separated in an emergency, we will all contact the following person and give our location and phone number:

Name _____

Phone Number _____

Address _____

EVACUATION CHECKLIST

Evacuate IMMEDIATELY if told to do so.

Listen to your battery-powered radio and follow the instructions of local emergency officials. Remember, your home and possessions can be replaced.

- Wear protective clothing and sturdy shoes.
- Take your Disaster Supply Kit.
- Lock your home (windows and doors).
- Use travel route specified by local authorities—don't use shortcuts, as certain areas may be impassable or dangerous.

If you're sure you have time...

- Shut off water, gas, and electricity before leaving, if instructed to do so.
- Tell someone when you left, your destination, medical condition of family members, and whether all family members are accounted for.
- Take pets to predetermined animal shelter areas.
- Turn off lights and electrical appliances.
- Turn down heat or air conditioner.
- Put away all perishable foods.

EMERGENCY TELEPHONE NUMBERS

Fire Department _____	Paramedics _____
Ambulance _____	Poison Control Center _____
Doctor _____	Hospital Emergency Center _____
Police Department _____	County Sheriff _____
Search and Rescue _____	Coast Guard/Harbor Patrol _____
Other _____	Other _____
Other _____	Other _____
Other _____	Other _____
Father Work _____	Mother Work _____
Local Friend/Relative (name/phone) _____	
Out-of-State Contact (name/phone) _____	

UTILITY INFORMATION

Location of Utility Shut-Offs

Main gas valve outside of home _____

Location of wrench or gas shut-off tool _____

Water valve inside of home _____

Main water shut-off valve near sidewalk or street _____

Shut-off tool for above _____

Electrical panel (fuse or breaker box) in home _____

House electrical meter (main disconnect switch) outside _____

Other _____

DISASTER SUPPLIES

There are seven kinds of basic disaster supplies: water, food, first aid, sanitation, tools and supplies, clothing and bedding, and special items. Information on what may be required for each of these follows.

WATER

Water should be stored in plastic containers such as soft drink bottles. Avoid using containers that will decompose or break, such as milk cartons or glass bottles. A normally active person needs to drink at least two quarts of water each day. Hot environments and intense physical activity can double that amount. Children, nursing mothers, and ill people will need more.

Store one gallon of water per person per day (two quarts for drinking and two quarts for food preparation/sanitation).

FOOD

Store at least a three-day supply of non-perishable food. Select foods that require no refrigeration, cooking, or preparation, and little or no water. If you must heat food, include a can of sterno. Select food items that are compact and lightweight. Take into account your family's food preferences.

Ready-to-eat canned meats, fruits, and vegetables
 Canned juices, milk, soup (if powdered, store extra water)
 Staples—sugar, salt, pepper
 High energy foods—peanut butter, jelly, crackers, granola bars, trail mix
 Comfort/stress foods—cookies, hard candy, sweetened cereals, lollipops, instant coffee, teabags
 Vitamins
 Foods for infants, elderly persons, or people on special diets

FIRST AID KIT

You should have a first aid kit in your home and another for your car. Your first aid kit should include the following supplies.

Sterile adhesive bandages in assorted sizes	Two-inch sterile gauze pads (8 or 12)
Three-inch sterile gauze pads (8 or 12)	Hypoallergenic adhesive tape
Triangular bandages (3)	Two-inch sterile roller bandages (3 rolls)
Three-inch sterile roller bandages (3 rolls)	Scissors
Tweezers	Needle
Safety razor blade	Bar of soap
Moistened towelettes (8-10 individual packages)	Antiseptic spray
Thermometer	Tongue blades and wooden applicator sticks
Tube of petroleum jelly or other lubricant	Assorted sizes of safety pins
Cleansing agent—soap	Latex gloves

Contact your local American Red Cross chapter to obtain a basic first aid textbook.

Non-Prescription Drugs

Aspirin or non-aspirin pain reliever
 Antacid (for stomach upset)
 Eye wash
 Emetic (use to induce vomiting if advised by the Poison Control Center)
 Antiseptic or hydrogen peroxide

Anti-diarrhea medication
 Laxative
 Rubbing alcohol
 Activated charcoal (use if advised by the Poison Control Center)

SANITATION

Toilet paper, towelettes
 Feminine supplies
 Plastic bucket with tight lid
 Personal items—shampoo, deodorant, toothpaste, tooth brushes, comb and brush, lip balm

Soap, liquid detergent
 Plastic garbage bags, ties
 Disinfectant
 Household chlorine bleach

TOOLS AND SUPPLIES

Mess kits, or paper cups, plates and plastic utensils
 Battery-operated radio and extra batteries
 Cash or traveler's checks, change
 Fire extinguisher: small canister, ABC type
 Pliers
 Compass
 Aluminum foil
 Signal flare
 Needles, thread
 Shut-off wrench, to turn off household gas and water
 Plastic sheeting

Emergency preparedness manual
 Flashlight and extra batteries
 Non-electric can opener, utility knife
 Tube tent
 Tape
 Matches in a waterproof container
 Plastic storage containers
 Paper, pencil
 Medicine dropper
 Whistle

CLOTHING AND BEDDING

Sturdy shoes or work boots
 One blanket or sleeping bag per person
 Thermal underwear

Rain gear
 Hat and gloves
 Sunglasses

SPECIAL ITEMS

Remember family members with special needs such as infants, elderly, or disabled individuals.

For baby

Formula
 Diapers
 Bottles
 Powdered milk
 Medications

For adults

Heart and high blood pressure medication
 Insulin
 Prescription drugs
 Denture needs
 Contact lenses and supplies
 Extra eye glasses

Entertainment

Coloring books, crayons, games for children; books, knitting and other projects for adults.

Important Family Documents

Will, insurance policies, contracts, deeds, stocks and bonds

Passports, social security cards, immunization records

Savings and checking account numbers

Credit card account numbers and companies

Inventory of valuable household goods, important telephone numbers

Family records (birth, marriage, death certificates)

EMERGENCY CAR KIT

Battery-powered radio and extra batteries

Blankets

Fire extinguisher (5 lb. ABC type)

Bottled water and non-perishable high energy foods

Shovel

Flares

Flashlight and extra batteries

Booster cables

First aid kit and manual

Maps

Tire repair kit

6

Personal Action Plans: Where to Go Next

In this unit, you will learn

- Who is responsible for emergency management activities,
- What emergency services are available and how to access them,
- How to get specific information about mitigation, preparedness, response, and recovery in your community,
- What uses you can make of your emergency management knowledge,
- What the emergency service groups are and how to join, and
- Where to go for additional training or information.

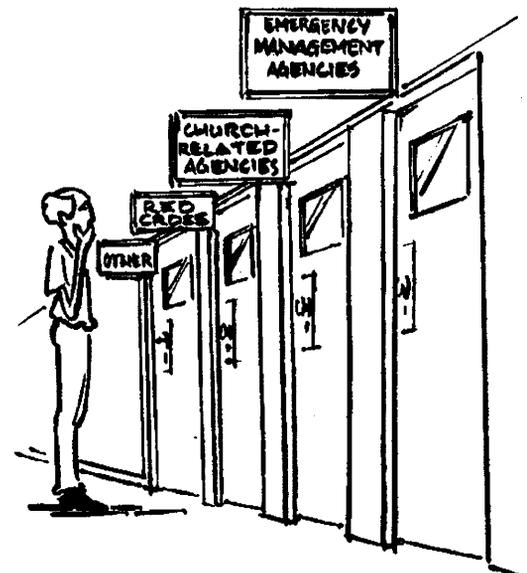
Now that you have reached this unit, you know a great deal about emergencies. You have learned about many natural and technological hazards, and you have made plans to protect you and your family from those most likely to occur in your area. You have studied the risks and dangers from national security emergencies and the plans Federal, State, and local governments are making to help you. You have discovered what actions you can take to help yourself and your family survive a nuclear attack.

Now you may have questions about where to go next. You also may have some real fears or concerns about the dangers around you. You may want more details about the protection available in your community or State.

A course such as this one cannot provide information about preparedness and response plans in specific communities. We can only tell you the general activities that should be taking place. But we can tell you who is responsible for those activities, and where to go for specific information about your community's preparedness.

You may be wondering how to use your new knowledge to help your community. Your workplace, church, or community service organization may benefit greatly from what you have learned about emergency preparedness and protection. Perhaps you are interested in volunteering your services to your local emergency organization. Also, there are many ways that you can use your knowledge. In this unit we will point out some of them.

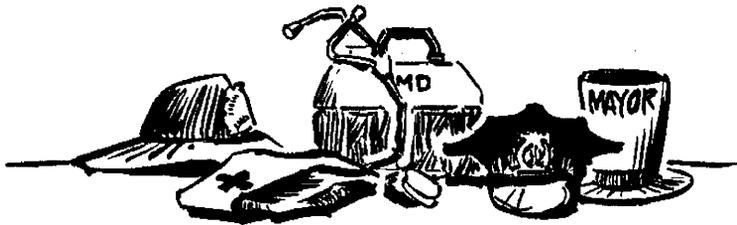
In Unit 1 you learned that emergency management involves a network of emergency programs and services in local, State, and Federal governments. Now that you understand some of the complexities of emergency preparedness, it is time to look at that network again. Your plans will be more effective if you coordinate them with plans in your community. Also, it should be clear that protection against major disasters is not something that you can handle entirely by yourself. You will want to know how to find out what your community considers the major risks, and what is being done to mitigate against and prepare for potential emergencies.



There are many opportunities for you to use what you have learned about emergency management to benefit your community.



It is a good idea to become familiar with your community's emergency plan.



Your local emergency manager works with other members of the emergency management network to implement direction provided by elected officials.

PUBLIC OFFICIALS AND EMERGENCY MANAGEMENT

Within any community certain elected officials are responsible for public safety and protection. Some appointed officials also will be authorized to perform certain emergency management duties. The roles and responsibilities of these public officials are important to know. By becoming familiar with the local government structures designed to carry out emergency management duties, including lines of authority, you will know where to go for reliable information and what kinds of information to expect. You will also be better able to find assistance more effectively relating to any of the four emergency phases.

Responsibility for protection of citizens at the local level belongs to the local elected official(s), who may include a mayor, a council, or a board of commissioners, depending upon the political structure of your community. Public protection is only one of many responsibilities these officials hold. Therefore, the job of carrying out local emergency activities is delegated to the local emergency office. The level of protection within your own community is determined by your local elected officials and carried out by your local emergency manager. This individual is your communication link to the emergency management network.

A similar delegation of authority exists at the State level. As an elected official and head of the State, the governor is responsible for the safety and protection of citizens within the State. The governor, often acting under State law, authorizes a State emergency

management office to perform activities for statewide protection and preparedness. Under the leadership of a person appointed by the governor, your State emergency management office guides the structure and support of emergency-related activities within your State.

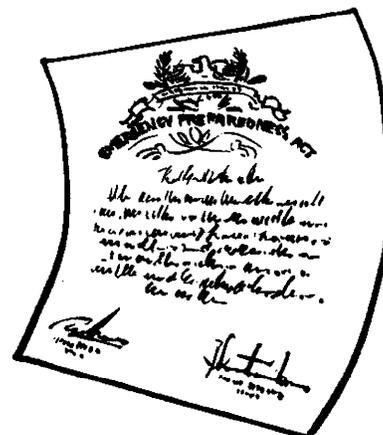
At the Federal level, *responsibility* for public protection belongs to the President of the United States. The President is responsible for making a disaster declaration before Federal funds are released to aid disaster victims. The President has *authorized* the Federal Emergency Management Agency (FEMA) to carry out emergency management activities at the Federal level. This agency, under the leadership of a person appointed by the President, coordinates national emergency management activities. FEMA provides information to the President concerning matters of national interest. It also provides information to help the President make decisions about disaster declarations.

The table below shows the relationship between responsible officials and authorized agencies at three levels of government.

LEVEL OF GOVERNMENT	RESPONSIBLE OFFICIAL	AUTHORIZED AGENCY OR OFFICE
Local	Local elected official	Local emergency management office
State	Governor	State emergency management office
Federal	President of the United States	Federal Emergency Management Agency (FEMA)

EMERGENCY MANAGEMENT PROGRAMS AND SERVICES

Emergency management needs designated roles and responsibilities to work effectively. You have been learning about different aspects of the system: the dangers, the actions that can be taken, the way the system divides responsibilities, and the responsibilities that you have for your own protection. The system depends on each person making plans and taking action to protect his or her home. It depends on each community to protect its citizens and government to the best of its ability, and it depends on each State to ensure that its citizens and communities are protected. The emergency management network also depends on Federal programs and private agencies to provide resources and emergency-related services to States, communities, and citizens.



Your State has laws that determine how emergency-related responsibilities are carried out at the State level, and by whom.

Several important programs you should be aware of—most of which provide services directly to State and local governments and citizens—are noted on the tables on the following pages. This information is presented here so that you will know what resources are available to your community officials. For additional information on the services provided, contact your local emergency manager.



The President of the United States has authorized the Federal Emergency Management Agency (FEMA) to carry out emergency management activities at the Federal level.

PROGRAMS AND SERVICES FOR EMERGENCY MANAGEMENT BEFORE A DISASTER

AGENCY	PROGRAM OR SERVICE	PURPOSE	ADDITIONAL INFORMATION
FEMA	Federal Insurance Administration (FIA)	Administers the National Flood Insurance Program	For flood insurance, contact a local property insurance agent. For building information, contact local building officials or the floodplain building management administrator.
FEMA	Emergency Public Information Program	Provides information to the public about disasters and national security threats, and protective actions they can take to survive.	Contact your local emergency manager.
FEMA	U.S. Fire Administration	As the national leader in fire safety and prevention, supports the efforts of local communities to reduce the number of fires and fire deaths.	Contact your local fire department or emergency medical service.
FEMA	Natural and Technological Hazards Program	Coordinates research and safety programs, including earthquake hazards, flood hazard mitigation, dam safety, radiological emergency preparedness, and hazardous substances.	Contact your local emergency manager for reports and publications.
FEMA	Family Protection Program	Encourages and supports efforts to get citizens, families, and neighborhoods to take immediate actions to increase their emergency preparedness capabilities.	Contact your local emergency manager for reports and publications.
Department of the Interior	U.S. Geological Survey (USGS)	Monitors earthquakes, volcanic action, and land shifts; issues warnings.	Publications and maps are available through regional public inquiry offices. Check your local telephone directory.
Department of Transportation (DOT)		Publishes national transportation maps showing Federal highways, defense highways, and major railroads.	Contact the public information office of the DOT.
Department of Commerce	National Oceanographic and Atmospheric Administration (NOAA)	Monitors oceanographic activities and coastal erosion; operates National Weather Service.	Publications are available through public information office of NOAA and National Technical Information Service (NTIS). Contact your local weather service office.
Department of Commerce	National Weather Service	Operated by NOAA. Monitors weather and issues public warnings for severe weather and storms, hurricanes, floods, and tsunamis.	Listen to weather reports on radio or television, or contact your local weather service.
American Red Cross (ARC)	Community Education/ Training	Provides information that raises individuals' awareness of hazards and helps them prepare for and cope with disaster.	Contact your local Red Cross chapter.

PROGRAMS AND SERVICES FOR EMERGENCY MANAGEMENT DURING A DISASTER

AGENCY	PROGRAM OR SERVICE	PURPOSE	ADDITIONAL INFORMATION
FEMA	Emergency Broadcast System and Emergency Alert System	National communications system—warns public of emergencies	Listen to local radio.
U.S. Air Force/State		Conducts air search and rescue operations	Contact the State emergency management office.
U.S. Coast Guard/State	Civil Air Patrol	Conducts sea search and rescue operations	Contact the State emergency management office.
State	Coast Guard and Coast Guard Auxiliary	Conducts disaster response, rescue, and security functions	Contact the State emergency management office.
State/local	National Guard		Check the local directory for an emergency telephone number.
State/local	Emergency Medical Service	Provides emergency medical assistance and transportation to emergency room	Check the local directory for an emergency telephone number.
State/local	Police and Fire	Conducts emergency response, rescue, and security functions	Listen to local media for information on shelter openings; check the local directory for emergency telephone numbers.
American Red Cross (ARC)	Disaster Relief	Provides mass sheltering, food, first aid, and other disaster relief assistance to disaster victims	Check the local directory for an emergency telephone number.
Salvation Army	Disaster Assistance	Provides shelter, food, and other assistance to disaster victims	

PROGRAMS AND SERVICES FOR EMERGENCY MANAGEMENT **AFTER** A DISASTER

AGENCY	PROGRAM OR SERVICE	PURPOSE	ADDITIONAL INFORMATION
FEMA	Federal Disaster Assistance Program	FEMA, along with the Small Business Administration and the U.S. Department of Agriculture, provides disaster relief, loans, grants, and other assistance to victims of Presidentially declared emergencies or disasters	Disaster Application Centers are set up in disaster areas where victims can apply for aid; check local newspaper, radio, and/or television.
State	State Disaster Assistance	Provides State agency assistance and implements governor's or legislature's approved programs	Contact the State or local emergency management office, or check local newspaper, radio, and/or television.
State	National Guard	Provides community clean-up assistance and security in disaster areas	Contact the State emergency management office.
American Red Cross (ARC)	Individual/Family Disaster Assistance	Provides mass sheltering, food, clothing, comfort kits and clean-up kits, and financial assistance for recovery to disaster victims	Generally, ARC will have designated shelters for victims, will set up service centers near the disaster site, and will have representatives in the FEMA Disaster Application Center. Check with local media for locations.
Salvation Army	Disaster Assistance	Provides shelter, food, clothing, and counseling to disaster victims	Check local media or the local telephone directory.
Mennonite Disaster Service	Disaster Assistance	Provides assistance to disaster victims for clean-up, repair to homes, and rebuilding of homes	Contact a representative in the ARC service center or local Mennonite Church.
Church of the Brethren	Disaster Assistance	Provides clean-up assistance to disaster victims; coordinates the cooperative childcare programs that provide childcare in shelters and in the Disaster Application Centers	Check with local media or contact ARC service center.
Seventh-Day Adventist Church Community Services	Disaster Assistance	Provides distribution to disaster victims of processed clothing, bedding, and other supplies	Contact your local Seventh-Day Adventist Church, check local media, or contact the ARC service center.

CHALLENGE EXERCISE: Programs and Services for Emergency Management

Based on the tables on the preceding pages, answer the following questions by placing a check next to the *best* response. (Answers on page A-2)

1. Where could you obtain information about the National Flood Insurance Program?
 a. Contact the local fire department.
 b. Contact the Department of the Interior.
 c. Contact a local property insurance agency.
2. How would you find out about recent research in flood hazard mitigation?
 a. Contact the local emergency manager.
 b. Contact NOAA.
 c. Contact the local power company.
3. How would you obtain information about weather conditions and trends?
 a. Contact the National Weather Service.
 b. Contact the Department of the Interior.
 c. Contact the Department of Transportation.
4. How should you get information on shelter openings?
 a. Listen to local media.
 b. Call the U.S. Geological Survey.
 c. Call the U.S. Coast Guard.
5. Where would you apply for disaster relief if your area was devastated in a Presidentially declared disaster?
 a. At a shelter set up by the Red Cross
 b. At a Disaster Application Center set up by FEMA
 c. At the office of your local emergency manager

USING YOUR LOCAL EMERGENCY MANAGEMENT NETWORK

Although the emergency management network is a complex organization of government agencies, Federal programs, and private organizations, you have a simple way to access all of its resources. *You should turn first to your local government for assistance, either before, during, or after a major emergency or disaster.* To find out what mitigation measures you can take, what places have been designated as shelters, or what potential emergencies threaten your community, contact your local emergency manager.

Your Local Emergency Manager

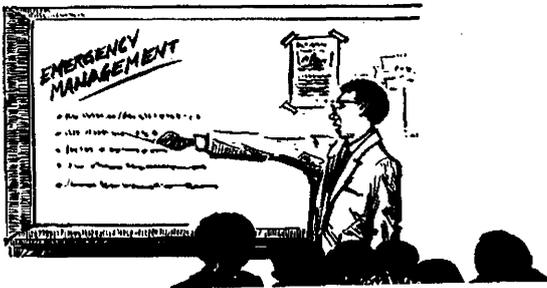
A local emergency manager is usually appointed by local elected officials to coordinate all of the emergency-related activities of a community. The actual job of emergency management coordination will vary depending on the community. In a rural community with a small population, this person may have many other responsibilities besides emergency management. In a large city, this individual is kept busy solely with emergency management activities; he or she may also have a staff that works entirely on emergency management.

We have already said that the emergency manager coordinates the emergency management activities in your community. Some of this person's general activities will include the following:



Particularly in smaller communities, the person responsible for emergency management coordination may also carry additional responsibilities.

- Conducting a vulnerability analysis to determine which hazards threaten your community;
- Working with local government officials to establish mitigation measures;
- Locating resources (equipment, personnel, medical services) within the community;
- Establishing mutual-aid agreements for sharing resources with other communities;
- Establishing warning systems;
- Planning evacuation routes;
- Coordinating local response activities in an actual emergency;
- Enlisting and training volunteers;



Educating the public is a vital part of a community's emergency management responsibilities.

- Ensuring that sheltering is provided for all types of hazards, and coordinating sheltering activities with the American Red Cross; and
- Educating the public.

Whether your community is large or small, the emergency manager is the *first and primary source of information about the emergency management activities in your community, your State, and the country.*

The title of the emergency manager may vary in different communities. To locate the emergency manager, look in the local telephone directory. If you check the listings for

your local government, you may find the number listed under any of the following titles.

- Emergency coordinator
- Civil defense director
- Civil preparedness coordinator
- Emergency manager
- Disaster services
- Public safety
- Emergency preparedness

For example, can you find the emergency manager in the following excerpt from a Centerville telephone directory?

Centerville City Government		
Communications Center		
314 N. Main Street		555-4173
Civil Preparedness—Emergency Coordinator		
314 N. Main Street		555-4173
Credit Union City Hall		555-4177
Elections Board		
Judicial Building		555-5745
Fire Department		
Emergency		911
Routine Business		555-4322

In Centerville, under the heading “Centerville City Government,” the emergency manager is listed as Civil Preparedness—Emergency Coordinator.

Emergency Manager	
Heading	_____
Listing	_____
Phone	_____

Look in your own telephone directory to find your emergency manager. Write the listing below. If you cannot find a listing, call your city, town, or county government’s main number and ask how to find a telephone number for the emergency manager. You may have to refer to one of the other listings shown on page 7-8 to establish contact.

Your emergency manager can help you in your efforts to mitigate, prepare, respond, or recover. Your manager is likely to be very busy with emergency management activities for your community; therefore, to get the most help, you should know what questions to ask and when to ask them. You will get more cooperation and better results if you ask a few informed questions. The following section will help you develop your questions.

ANSWERING YOUR QUESTIONS ON PLANNING AND MITIGATION

You have already determined the major natural, technological, and national security hazards that could happen in your community. You have identified some of the things that you can do to mitigate the effects of those hazards in your home. However, you still may have some additional questions.

- 1. ***What are the natural and technological hazards that present the greatest threat to me and to my community?***

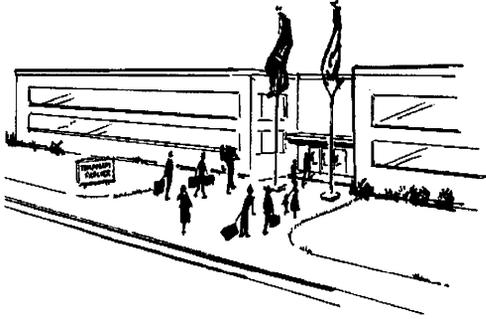
To find the answer...
 Consult your community’s *vulnerability analysis* study. (One should have been conducted.) Inform your local emergency manager that you have tried to analyze the risks to your community. List the natural, technological, and national security threats that you selected as posing the greatest risks. Ask if your analysis agrees with the results of the community’s vulnerability analysis.

CHECK THE BOX ABOVE IF THIS IS A QUESTION THAT CONCERNS YOU.

- 2. ***What are the public warning signals in my community for natural, technological, and national security emergencies?***

To find the answer...
 Ask your emergency manager about your community’s established public warning signals for natural, technological, or national security emergencies. If such signals have been established, s/he will be able to tell you what they are. Chances are the warning will be announced on local radio or television stations, or the signal may be a siren.

CHECK THE BOX ABOVE IF THIS IS A QUESTION THAT CONCERNS YOU.



Evacuees who are unable to stay at the homes of friends or relatives are often given temporary shelter in schools or other community facilities.

3. **Where would I go to seek shelter in an emergency involving one of the natural or technological hazards that threatens my community?**

To find the answer...

Chances are that you have friends or relatives with whom you could stay if an emergency forced you to evacuate. However, if you had to seek shelter fast and couldn't get to your friends or relatives, you would need to find a public shelter. The location of these shelters would be announced in the local media, but it is a sensible precaution to inquire in advance.

CHECK THE BOX ABOVE IF YOU NEED TO FIND OUT WHERE PUBLIC SHELTERS ARE LOCATED.



Your local emergency management office can provide you with specifics on your community's preparedness plans.

4. **I live in a community that may be eligible for flood insurance. How do I find out about this insurance program?**

To find the answer...

Ask your property insurance agent if your community is eligible. If your agent does not know, contact your emergency manager, building official, or local floodplain management administrator.

CHECK THE BOX ABOVE IF YOU NEED TO FIND THE ANSWER TO THIS QUESTION.

5. **How can my friends and I learn about the preparedness plans in my community?**

To find the answer...

Ask your emergency manager to speak to your neighborhood, church, school, or community service group. An invitation extended by a group makes good use of the emergency manager's time and offers a good environment for sharing information and concerns.

CHECK THE BOX ABOVE IF YOU WANT TO INVITE THE EMERGENCY MANAGER TO SPEAK.

6. **How can I have my preparedness plans checked to see if they are complete and if I have made the best choices?**

To find the answer...

Ask your emergency management office or local Red Cross chapter for publications or public education programs specifically about preparedness in your community. Ask if you can make an appointment to go over your plans.

CHECK THE BOX ABOVE IF YOU NEED TO FIND OUT ABOUT LOCAL PUBLICATIONS, PUBLIC EDUCATION PROGRAMS, OR NEED TO MAKE AN APPOINTMENT WITH THE EMERGENCY MANAGER OR RED CROSS OFFICE.

7. ***I would like to learn more about stocking food and emergency equipment in case I am forced to take shelter in my home. Where do I find information about this?***

To find the answer...

Consult FEMA and Red Cross publications that recommend emergency supplies. These publications provide detailed lists of foods, supplies, and tools that would be useful in a shelter. Your local emergency management office or the American Red Cross may have these publications or be able to help you obtain them. See the Resource Section on page R-3 for a list of publications you can order.

CHECK THE BOX ABOVE IF YOU NEED TO ORDER PUBLICATIONS.

8. ***I live in an older house, and building codes may have changed since it was built. How can I find out if it is safe from fire, flood, earthquake, high winds, or landslide damage?***

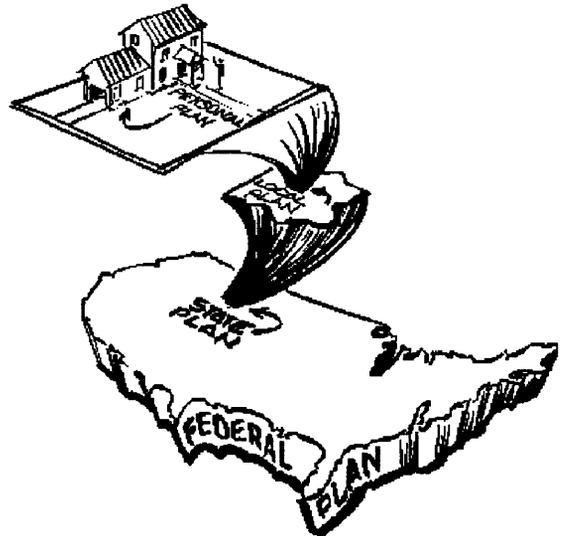
To find the answer...

Contact your local building inspector, who can send someone to check your dwelling. For fire safety, contact your local fire department. The fire department offers fire safety inspections as a regular public service. If you live in a rural area that has no enforced building codes, you should contact your local emergency management office for advice.

CHECK THE BOX ABOVE IF YOU NEED TO HAVE YOUR HOME INSPECTED.

Look over the boxes that you have checked. The checks that you made represent actions that you should take to ensure your emergency preparedness.

If you have other questions about mitigation and preparedness for your local emergency manager, write them down before you contact this individual.



To be effective, emergency preparedness must take place at all levels—Federal, State, local, and individual.

Use this space to list additional questions you would like to ask your local emergency manager about your planning and mitigation.

ANSWERING YOUR QUESTIONS ABOUT EMERGENCY RESPONSE

If a major emergency or disaster happens in your community, you and your community will put into effect the preparedness plans that you have made. If you must evacuate, you will be advised to do so by local officials. If you must seek shelter in your home, warnings and instructions will probably come from the local radio and television stations.

You may have many questions about how to get help if you are stranded in your car, in your home, or in some remote place such as a field, a lake, or a wooded area. Your response in situations such as these depends on the emergency in which you are involved.

9. *How do I find out how to respond to many different emergency conditions?*

To find the answer...

Get a copy of FEMA's publication H-34, *Are you Ready? Your Guide to Disaster Preparedness*. Your local emergency management office will probably have a copy for you to take. If not, see the resource section of this book on page R-1 for information on how to order it. Keep the book where you or your family members can find it in an emergency. It might be a good idea to have one copy for your home and one for your car. This handbook will tell you what to do if you find yourself in most major emergency situations. You can also obtain publications on disaster preparedness from your local Red Cross.

CHECK THE BOX ABOVE IF YOU NEED TO GET COPIES OF PUBLICATIONS ON DISASTER PREPAREDNESS.

10. ***Are there any special services available to help handicapped persons in an emergency situation?***

To find the answer...

Ask your local emergency manager about established procedures for assisting you if you are handicapped, ill, or injured and need special help. Often fire, police, and emergency medical services have special services for handicapped or incapacitated persons. To make certain that help will be available when you need it, you should contact your emergency manager before an emergency occurs.

CHECK THE BOX ABOVE IF YOU HAVE A PARTICULAR PROBLEM THAT WOULD REQUIRE SPECIAL HELP IN AN EMERGENCY.

ANSWERING YOUR QUESTIONS ABOUT EMERGENCY RECOVERY

After a major emergency or disaster, you, your family, and your community will probably be overwhelmed. If you had to evacuate, you will be eager to return to your home. If your home has been damaged, you may be at a loss, wondering what to do and where to go for help; and so will everyone else who has suffered damage.

If you have been evacuated, wait until local authorities have cleared the area before you go back to your home. If you are in a public shelter, an announcement will be made when it is safe to return to your home. If you found shelter elsewhere, your local media will be providing announcements when it is safe to return.

If your home has been damaged or destroyed, you may need answers to these questions.

11. ***How do I find temporary lodgings?***

To find the answer...

Finding a place to stay is your responsibility. Your insurance policy may have coverage for temporary living expenses. You may want to go to the home of a friend or relative. If you cannot obtain lodging, contact the Red Cross or Salvation Army. Check your local telephone directory for the phone listing for these agencies. Also, your local media will publicize information on where to go for help.

CHECK THE BOX ABOVE IF YOU NEED TO CONTACT YOUR INSURANCE AGENT ABOUT TEMPORARY LIVING EXPENSES.

12. ***How do I repair or rebuild?***

To find the answer...

Your insurance company will send a damage assessor to estimate the cost to repair or rebuild. The insurance agent will help you file a claim. If your insurance does not cover all the damages, you may be eligible for assistance through local, State, and volunteer agencies.

If your community has been declared a disaster area by the President, you may be eligible for Federal disaster assistance. If your home has been destroyed, you may be able to get a grant or loan to help pay for your housing and the rebuilding or repair of your home. A Disaster Application Center will be set up in your community where you can file a request for a Federal disaster assistance grant or loan. The location of the center and a telephone number will be announced in your local newspaper or on television or radio. Your local emergency management office also can provide this information.

CHECK THE BOX BY QUESTION 12 IF YOU NEED TO REVIEW YOUR INSURANCE COVERAGE FOR REPAIRING/REBUILDING DAMAGED PROPERTY AND REPLACING PERSONAL BELONGINGS.

SHARING YOUR KNOWLEDGE WITH YOUR COMMUNITY

Now that you are better prepared, you may want to help prepare others or you may want to join one of the emergency service groups in your community. Here are some useful ways to share your knowledge. Check the box next to the activities that interest you.

- Start a neighborhood preparedness group.*
Organize a group of your neighbors to make neighborhood emergency preparedness plans. You may want to share resources to build and stock a group shelter, make evacuation plans with shared responsibilities for locating all members, children, and pets, or help each other improve the safety of your homes by planting ground cover, windbreaks, or reinforced walls, especially in areas threatened by landslides or floods.
- Organize an educational group to prepare more people in your community.*
Your church group, community service group, or other group of concerned citizens can increase the preparedness of its members by planning an educational program on emergency management. You can use this course as the basis of your program. As a group, you can study other FEMA courses designed to help citizens prepare for specific emergencies. You can also enroll in Red Cross training programs to learn how to help yourself and others. By reading other publications, watching films, or inviting speakers, you will increase your own emergency management awareness, knowledge, and preparedness, and also be able to make suggestions to improve the overall preparedness of your community.
- Become a leader for a youth group.*
Educating young people in emergency management is an effective way to increase public awareness of the need for emergency preparedness. Scout groups focus on self-help and survival training. Church youth groups emphasize community service. Through emergency management projects, young people can help their families to be better protected. As more young people get involved in emergency management, the number of prepared, involved citizens in the community will increase.
- Volunteer to assist a group that serves your community through emergency management activities.*
The table below names some groups active throughout the United States—and there may be other groups in your specific area. Check the groups that you might like to join.

NAME	ACTIVITIES	WHO TO CONTACT
<input type="checkbox"/> Local Emergency Management	Aid emergency manager in preparedness, response, and recovery operations; serve as radiological monitor, for example.	Local emergency manager
<input type="checkbox"/> American Red Cross	Aid disaster victims. Manage public shelters in time of emergency. Help the public prepare for, respond to, or cope with disaster.	Local Red Cross
<input type="checkbox"/> Radio Amateur Civil Emergency Services (RACES)	Serve the local emergency communications systems; must be a licensed amateur radio operator.	Local emergency manager to see if RACES has been organized in your community
<input type="checkbox"/> Civil Air Patrol (CAP)	Fly search-and-rescue missions in emergencies; pilot license is not required.	State emergency management office to find out where your State wing is located
<input type="checkbox"/> Coast Guard Auxiliary	Participate in search-and-rescue missions at sea or on other large bodies of water.	State emergency management office to find out where to reach your State Coast Guard Auxiliary

Use this space to write down other ways that you can think of to help your community. Contact your local emergency management official or American Red Cross for additional suggestions.

UNIT SIX PREPAREDNESS CHECKLIST

In this unit, you checked the actions that you should take to get information. You also checked actions that you want to take to share your emergency management knowledge. Go back through the unit and review the actions that you checked. Mark those actions below.

INFORMATION TO GET

- 1. Compare the natural hazards and the technological hazards that I selected as posing the greatest threats with the results of my emergency manager's vulnerability analysis.
- 2. Ask my emergency manager what the public warning signals are in my community for natural and technological emergencies.
- 3. Ask my emergency manager or local Red Cross chapter about community plans for sheltering.
- 4. Ask my property insurance agent if I am eligible for flood insurance.
- 5. Ask my emergency manager what evacuation plans have been made for this community.
- 6. Invite the emergency manager or a Red Cross representative to speak to my neighborhood group, church group, school group, or community service group.
- 7. Find out about publications or public education programs from my local emergency management office and the local chapter of the Red Cross.
- 8. Find out about publications on stocking supplies from my local emergency manager.
- 9. Have my home inspected for safety from disasters that threaten this community.
- 10. Order publications about preparing a home fallout shelter (see the Resource section of this book, page R-3).
- 11. Get a copy of FEMA's publication H-34, *Are You Ready*, and contact my local Red Cross for similar publications.
- 12. Ask my emergency manager about special help for handicapped persons in emergencies.
- 13. Ask my insurance agent about coverage for temporary living expenses.
- 14. Review with my insurance agent my coverage for repairing and rebuilding damaged property, as well as for replacing personal belongings.

SPECIAL INTERESTS

- 1. Start a neighborhood preparedness group.
- 2. Organize an educational group to prepare more people in this community.
- 3. Become a youth leader.
- 4. Become a community emergency volunteer.
- 5. Become a shelter manager.
- 6. Become a radiological monitor.
- 7. Join the Civil Air Patrol.
- 8. Join the Coast Guard Auxiliary.
- 9. Join the Radio Amateur Civil Emergency Service.
- 10. Join the following emergency service: _____

- 11. Help my community in the following ways: _____

HOW WELL HAVE YOU LEARNED?

Unit Six Review

(Answers on page A-2)

Answer each of the following questions by placing a check next to the *best* response.

1. Responsibility for protection of citizens at the local level belongs to
 - a. The Fire Chief.
 - b. The Police Chief.
 - c. The Federal government.
 - d. Local elected officials.
2. At the Federal level, responsibility for public protection belongs to
 - a. Congress.
 - b. The Federal Emergency Management Agency.
 - c. The President of the United States.
 - d. The Supreme Court.
3. To access resources within the emergency management network, you should first turn to
 - a. Your local government.
 - b. The Federal Emergency Management Agency.
 - c. Your family lawyer.
 - d. Your insurance agent.
4. The general activities of an emergency manager typically include
 - a. Planning evacuation routes.
 - b. Locating resources within the community.
 - c. Enlisting and training volunteers.
 - d. All of the above.
5. Another name for "civil defense director" or "civil preparedness coordinator" is
 - a. Mayor.
 - b. Fire Chief.
 - c. Emergency Manager.
 - d. Governor.

7

Emergency Management Review

At the beginning of this course, we presented a series of six emergency situations and asked how you would react. Now that you have completed the text, we would like you to review what you have learned by considering those situations again.

In the next several pages, each of those six situations is presented, followed by several questions for you to answer. Page numbers are listed after each question to assist you in referring to the parts of the text where you can find information to help answer the question. Sometimes you will be able to find the answer directly in the text, but in some cases you will have to form your own answer from the information given.

After you write answers for each situation, you can check them with the responses found on pages A-3 and A-4. Your responses will not be exactly like those given, but they should have the same ideas or elements.

SITUATION ONE

Remember this situation? How would you answer the questions now?



You are enjoying a quiet evening at home when you sense a vibration in the building. Your dog begins to whine. Suddenly your lamp starts to sway and books fall out of your bookshelves. Cracks appear in your ceiling. You realize that you are in an earthquake.

Would you know how to protect yourself and your family?

Responding to Situation One (Answers on page A-3)

1. What is the first action that each family member should take?

(See page 3-31)

2. When the shaking and trembling stops, what are the most important actions that you should take to protect your family?

(See page 3-31)

3. What Federal agency monitors earthquake activity and publishes earthquake information?

(See page 3-29)

4. How can you find out to what extent earthquakes are considered a probable threat to your community?

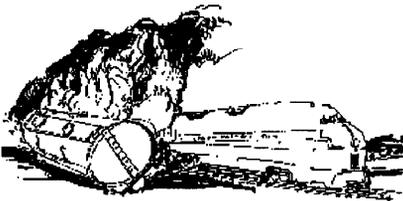
(See pages 2-1 to 2-2; 2-12; and 5-1 to 5-2)

5. How can you learn what mitigation measures to take to reduce earthquake damage to your home?

(See page 6-4)

SITUATION TWO

Consider the following situation.



A freight train carrying hazardous chemicals derailed in your town and bursts into flames. News reports say that people are being evacuated from homes near the accident because deadly chlorine gas is leaking from a tank car. You feel safe since the accident is several blocks away, but late that night an emergency official comes to your door and you are told that the chlorine leak is endangering homes in your area and you must leave.

Would you know where to go and what to take with you?

Responding to Situation Two (Answers on page A-3)

1. A hazardous chemical transportation accident is an example of what kind of disaster?

(See pages 4-1 to 4-3)

2. People often are reluctant to leave their homes, even in an emergency. Why should you leave when an evacuation is advised?

(See page 5-3)

3. Where should you go when you are asked to evacuate your home?

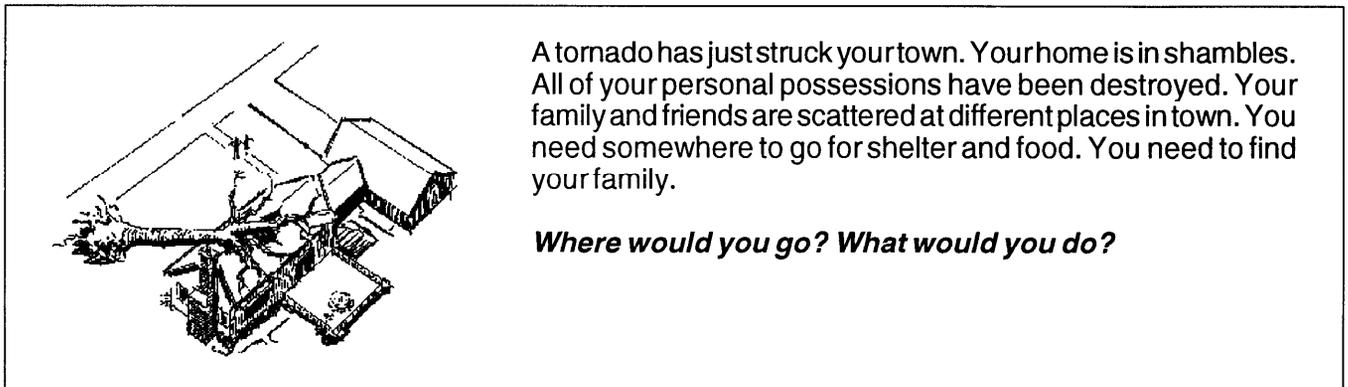
(See page 5-3)

4. Which items should be included in your family Disaster Supply Kit, which you should take with you.
- | | |
|-----------------------------------|-----------------------------------------|
| a. Ready-to-eat food and utensils | h. Footwear |
| b. Bottled water | i. Alcoholic beverages |
| c. Medication | j. Plants |
| d. Sanitation supplies | k. TV |
| e. Clothing | l. Battery-powered radio and flashlight |
| f. First aid kit | m. Batteries |
| g. Sleeping bag or bedding | |
- (See pages 5-14 to 5-16)
5. IF TIME PERMITS, how should you prepare your home before you evacuate?

(See page 5-12)

SITUATION THREE

What if you found yourself in this situation?



Responding to Situation Three (Answers on page A-3)

1. How would you know where to locate your family members?
- (See pages 5-2 to 5-4)
2. Where could you find temporary shelter for you and your family until your house was repaired?
- (See pages 5-2 to 5-4)
3. What is the first action you should take in the process of getting your home repaired?
- (See pages 1-3 and 3-1)

- 4. What action must take place before most forms of Federal disaster assistance are made available to you? Who must perform this action?

(See pages 1-8 and 1-11)

- 5. How would you find out if your community has received a Presidential declaration of disaster and what assistance might be available to you?

(See page 1-11)

- 6. Where would you apply for Federal assistance funds?

(See page 1-11)

SITUATION FOUR

What would you do in the following situation?

	<p>You are buying a home, and have finally found the perfect house. It has everything you want at a price you can afford. The house even has a beautiful view of a lovely river. Before you sign the contract, it occurs to you that if the river should flood, the house might be in the floodplain.</p>
<p><i>Should you buy it anyway? Is there anything you can do to protect the house? What would you do?</i></p>	

Responding to Situation Four
(Answers on page A-3)

- 1. How would you determine the probable threat of flooding?

(See pages 2-1 to 2-2; 3-5)

- 2. Whom should you ask for information about flood hazard mitigation measures for home owners?

(See page 3-6)

- 3. If you buy the house, what preparedness and mitigation plans should you make?

(See pages 3-6 and 3-7)

4. What mitigation measures should your community take to protect you and others who live in the floodplain?

(See page 3-6)

5. a. What Federal agency monitors flooding and issues flood warnings?

(See page 3-6)

b. How would you expect to hear about the warnings?

(See page 3-6)

SITUATION FIVE

How would you respond to the following situation?



A nuclear power plant has begun to operate in your area. Opinions are divided about the benefits and dangers from the plant. Some people are strongly in favor of the plant. They argue that it provides clean power and cuts the high cost of electricity. Others object to the plant and insist that nuclear power is dangerous. They point to the accident at Three Mile Island as an example of our inability to handle nuclear power and radioactive materials.

Where would you turn for information? What are the dangers of such a plant? What safety measures are being taken for your benefit? If an accident did happen at the plant, would you know what to do?

Responding to Situation Five

(Answers on page A-4)

1. Who can give you information about the safety measures in effect to protect your community from radiological hazards from the nuclear power plant?

(See page 4-10)

2. What are the dangers to you from an accident at the plant?

(See pages 4-9 to 4-10)

3. What type of systems would be used to warn the public?

(See page 4-8)

4. How can you minimize your body's exposure to radiation?

(See pages 4-8 to 4-11)

5. What are the major differences between the radiological dangers of a nuclear power plant accident and a nuclear attack?

(See pages 4-7 to 4-11)

SUMMARY

Take a moment now to summarize the most important facts and ideas that you have learned in this course. Read the following list.

Emergency management involves four phases of protection:

1. Mitigation—the actions you take to *prevent* disasters or to reduce the damage caused by the hazards that cannot be avoided;
2. Preparedness—the actions you take and plans you make *before* an emergency to protect yourself and to help you respond safely;
3. Response—the actions you take *during* an emergency to protect yourself; these should be your preparedness plans put into action; and
4. Recovery—the actions you take to put your property and your life back to normal *after* an emergency or disaster.

Federal, State, and local governments are involved in an emergency management network. The activities that take place at government levels are meant to protect individuals from emergencies. By knowing the political structure of emergency management, you know where to go for information.

You should know about the emergency management plans and activities in your community in order to

1. Know how your local government is protecting you from possible hazards,
2. Coordinate your own emergency plans with those of your community, and
3. Use the resources available in your community to make you safer. These resources could include
 - Laws and ordinances to ensure safer housing,
 - Public education programs or publications to teach you how to prepare yourself,
 - Warning signals to alert you to dangers,
 - Evacuation plans,
 - Public shelters, and
 - Emergency services.

In order to prepare yourself, your home, and your family, you need to know

1. What hazards actually threaten your community,
2. The warning signs that will alert you to danger and how they will be issued,
3. The immediate and long-term dangers,
4. Recommended mitigation measures,

5. Preparedness actions you and your family can take,
6. Safe response actions, and
7. What to do to recover after a disaster.

Your emergency plans should include

1. An analysis of probable hazards,
2. Activities that should be performed before, during, and after an emergency,
3. Plans to evacuate when necessary,
4. Plans for preparing a shelter in your own home,
5. A schedule of routine daily activities for each member of your household,
6. Knowledge of your own home: the floor plan, shutoff valves for gas, electricity, and water, and location of doors, windows, and heavy furniture,
7. A Disaster Supply Kit, and
8. Provisions to practice and maintain your plan.

You should be aware of who in government is responsible for emergency management, to know

1. Who to contact for information in your community, and
2. Where to go for help before, during, and after an emergency.

You should know about emergency-related agencies and emergency services, which include

1. Where to go for help or information,
2. What information you can get, and
3. How you can become a part of the emergency management network.

Perhaps there are other facts or ideas that you consider important that are not included in this list. If so, write them in the space below so you will not forget them.

CONCLUSION

You have completed the instructional part of *Emergency Preparedness U.S.A.* You now should be ready to take the final examination. You also should be better prepared for emergencies and disaster.

Emergency management is a broad and complex system. You have learned much about the network, the phases, and the purpose of emergency management. You have learned how to analyze the risk of emergency in your community and have begun to develop a family disaster plan. The questions that you have raised will help you decide what to do next.

Perhaps you have begun to notice more news items about natural and technological hazards and emergencies. Emergencies and disasters probably are not increasing in number. The difference is in you. You are more aware of hazards than you were before you began this course. That awareness is a very important step toward protection from disasters and emergencies. When you are aware of the dangers and know that you *can* protect yourself, you already have begun to be prepared. We hope that you will continue to update and exercise your preparedness plans and that you will share your knowledge with others.

Before you take the final examination, look back at the reviews that follow each of the units. Those reviews will help you remember the facts and concepts of emergency management.

When you are ready, turn to the final examination. You should allow approximately 60 minutes to take the test.

TURN TO PAGE E-1 WHEN YOU ARE READY TO BEGIN THE FINAL EXAMINATION



Answer Key

ANSWERS TO PRETEST

1. a (Material covered in Unit One)
2. c (Material covered in Unit One)
3. b (Material covered in Unit One)
4. d (Material covered in Unit One)
5. b (Material covered in Unit Two)
6. a (Material covered in Unit Two)
7. c (Material covered in Unit Two)
8. b (Material covered in Unit Two)
9. a (Material covered in Unit Three)
10. d (Material covered in Unit Three)
11. e (Material covered in Unit Three)
12. b (Material covered in Unit Three)
13. d (Material covered in Unit Four)
14. a (Material covered in Unit Four)
15. b (Material covered in Unit Four)
16. c (Material covered in Unit Four)
17. a (Material covered in Unit Five)
18. e (Material covered in Unit Five)
19. e (Material covered in Unit Six)
20. c (Material covered in Unit Six)
21. d (Material covered in Unit Six)
22. a (Material covered in Unit Six)

ANSWERS TO CHALLENGE EXERCISES

Unit One, The Phases of Emergency Management

(page 1-4)

1. Planning what to do in an emergency is called PREPAREDNESS.
2. Action taken to protect yourself and others in an emergency is called RESPONSE.
3. Repairing damages caused during an emergency and returning to normal life is called RECOVERY.
4. Preventing emergencies is called MITIGATION.
5. Taking steps beforehand to reduce the amount of danger and damage from potential emergencies is called MITIGATION.
6. The phases of emergency management that should take place before an emergency are called MITIGATION and PREPAREDNESS.
7. The phases of emergency management that should take place during or immediately after an emergency are called RESPONSE and RECOVERY.

Unit One, Responsibilities of Levels of Government

(page 1-10)

1. Evaluating an elementary school in your town that is threatened by a chemical spill is a LOCAL responsibility.
2. Providing resources to help your State recover from a Presidentially declared disaster is a FEDERAL responsibility.
3. Coordinating the evacuation of towns and communities threatened by a hurricane is a STATE responsibility.
4. Establishing zoning laws to regulate home building in a dangerous flood area is a LOCAL responsibility.



Unit Six, Programs and Services for Emergency Management
(page 6-7)

1. c (Review the “Before a Disaster” table, page 6-4)
2. a (Review the “Before a Disaster” table, page 6-4)
3. a (Review the “Before a Disaster” table, page 6-4)
4. a (Review the “During a Disaster” table, page 6-5)
5. b (Review the “After a Disaster” table, page 6-6)

ANSWERS TO “HOW WELL HAVE YOU LEARNED?”

Unit One

1. b (See pages 1-7 to 1-8)
2. d (See pages 1-3 to 1-5)
3. b (See page 1-6)
4. c (See pages 1-6 to 1-8)
5. c (See page 1-7)

Unit Two

1. a, b, d, e, and g (See pages 2-1 to 2-2)
2. c (See page 2-8)
3. c (See page 2-5)
4. d (See page 2-16)
5. b (See page 2-18)

Unit Three

1. d (See page 3-26)
2. d (See page 3-19)
3. d (See page 3-2)
4. c (See page 3-15)
5. b (See page 3-6)
6. c (See page 3-14)

Unit Four

1. b (See page 4-5)
2. b (See pages 4-8 and 4-11)
3. a (See page 4-14)
4. b (See page 4-5)
5. c (See page 4-5)

Unit Five

1. d (See pages 5-4 to 5-5)
2. b (See page 5-8)
3. a (See page 5-1)
4. d (See pages 5-6 and 5-14 to 5-16)
5. c (See pages 5-2 and 5-11)
6. b (See page 5-3)
7. c (See page 5-9)

Unit Six

1. d (See page 6-2)
2. c (See page 6-2)
3. a (See pages 6-8 to 6-9)
4. d (See pages 6-7 to 6-8)
5. c (See page 6-8)



ANSWERS TO UNIT SEVEN, EMERGENCY MANAGEMENT REVIEW

Your answers for all situations should be similar to the ones below, though they will not be exactly the same.

Situation One

1. If an earthquake strikes, take immediate cover under sturdy furniture such as a desk. Stay inside and avoid windows and falling objects.
2. First check for and attend to injuries. Check for serious damage and, if necessary, turn off gas and electricity at the main valve or switch to prevent further damage.
3. The U.S. Geological Survey monitors earthquakes and provides probabilities of earthquake occurrences.
4. To determine the threat, you can do several things. You can ask long-time residents of the community. You also can consult earthquake risk maps from the U.S. Geological Survey. Some areas of the country have not had an earthquake for almost 100 years. People may not remember, but past earthquakes will be recorded on the maps. You can ask your local emergency manager, who will have current information about earthquake hazards in your community.
5. Check with your local emergency manager for mitigation information.

Situation Two

1. A hazardous chemical accident is an example of a TECHNOLOGICAL disaster.
2. Evacuation is ordered only when a hazardous condition exists that endangers the lives of persons in an area.
3. If you are asked to evacuate, you should go to the home of a friend or relative outside of the endangered area, or to the public shelter designated by local officials.
4. Recommended items include (a) ready-to-eat food and utensils, (b) bottled water, (c) medication, (d) sanitation supplies, (e) clothing, (f) first aid kit, (g) sleeping bag or bedding, (h) footwear, (i) battery-operated radio and flashlight, and (m) batteries.
5. Prepare your home by turning off lights and appliances, putting perishable food in the refrigerator, turning down heat or air conditioning, and locking doors and windows. *If time is short, dispense with any activity that does not directly accelerate your leaving the property.*

Situation Three

1. Each member would have found shelter according to the emergency plans of the school, office, or facility where they were located when the tornado struck. You should look for them at each location according to your family disaster plan.
2. You can find temporary shelter with friends, relatives, or with the local Red Cross or Salvation Army, or you could go to a hotel or motel if you have provisions to cover the expenses.
3. The first action you should take is to have the damage assessed by your insurance company.
4. The President of the United States must declare your community a disaster area before any Federal money will be released.
5. Information about disaster assistance will probably be announced in the local newspaper or on radio and television broadcasts. You could also ask your local emergency manager.
6. You would apply for funds at the local Disaster Application Center set up by FEMA to help disaster victims.

Situation Four

1. Consult flood insurance rate maps published by FEMA. You also should talk with the local emergency manager, building official, or floodplain management administrator. State coordinating agencies for the National Flood Insurance Program (NFIP) also can help.
2. Consult your local building official or local floodplain management administrator.
3. You will want to buy flood insurance and prepare for flash flood conditions by planning alternate evacuation routes and by being alert to warnings from community sirens, radio, or television.



4. Some of the ways in which your community can increase protection are by (1) improving land-use management practices, (2) strictly enforcing building codes, (3) participating in the National Flood Insurance Program (NFIP), and (4) installing flood monitoring systems.
5. The National Weather Service (NWS) monitors flooding and issues flood warnings. The U.S. Geological Survey and the FEMA Hazard Mitigation Program are also involved in flood mitigation, but NWS and your local emergency program office issue the warnings. You would hear about the warnings through local radio or television broadcasts. Flood watches probably also would be announced in local newspapers. Flash-flood warnings might be issued through the news media, by officials going from door-to-door, or by the sounding of a siren, horn, or bells.

Situation Five

1. Your power plant or local emergency manager can give you information about the safety measures in effect, such as radiological monitoring, licensing requirements, and response training exercises.
2. An accident at a nuclear power plant could put you in danger from external and internal radiation, but the chances are that you would not be exposed to either kind of radiation because of the many plant safeguards.
3. Special warning systems such as sirens, tone alert radios, and/or route alerting have been established around nuclear power plants to alert the public during time of emergency.
4. There are three ways to minimize radiation exposure to your body: shielding, distance, and time.
5. The dangers of a nuclear power plant accident and a nuclear attack differ in magnitude or *amount* of serious effects. A nuclear power plant accident may affect an area covering a radius of 50 miles or more. Radiation levels will be much lower than from a nuclear attack, and no fallout will be present. A nuclear attack is caused by a destructive weapon designed to kill and destroy. The effects of nuclear attack will include an intense heat flash, a destructive blast wave, initial nuclear radiation if you are located within a few miles of the detonation, and radioactive fallout that may cover an area of hundreds of square miles and extend up to 500 miles or more downwind. The magnitude of an accident at a nuclear power plant would be less significant than that of a nuclear detonation.



Final Examination

HOW TO TAKE THE FINAL EXAMINATION

The following final examination is a test to find out how much you have learned about emergency management from this course.

A final examination answer sheet is included with the course. Fill in your name, address, social security number, and the date. Mark your answers in the appropriate spaces. Use a soft lead (#2) pencil.

While taking the test, read each question carefully and select the answer that you think is correct after reading all the possible choices. Complete all of the questions. You may refer to the course materials to help you answer the questions.

When you have answered all the questions, prepare the answer sheet as directed and drop it in the mail. Your answers will be scored and the results returned to you as quickly as possible. If you score at least 75 percent, you will receive a certificate of completion from FEMA. If you score less than 75 percent, you will have another chance to take the test.

The final examination consists of 48 questions. The test should take no more than 60 minutes. Find a quiet spot where you will not be interrupted during this time.

FINAL EXAMINATION: EMERGENCY PREPAREDNESS USA

DIRECTIONS: Carefully read each question and all of the possible answers before you mark your answers on the answer sheet. There is only one correct answer for each test item. Mark all of your answers on the final exam answer sheet by properly filling in the appropriate space with a soft lead (#2) pencil.

1. State and local emergency managers develop and coordinate preparedness plans. This emergency management activity is an example of
 - a. Preparedness.
 - b. Applying mitigation.
 - c. Research.
 - d. Emergency response.
 - e. Disaster assistance.
2. The safe and orderly return of evacuated persons to their homes within a community is coordinated by the local emergency manager with police and fire officials. This is an example of an event that takes place
 - a. Before an emergency.
 - b. During an emergency.
 - c. After an emergency.
3. A Federal program enabling property owners to purchase flood insurance is called
 - a. National Flood Assistance Program.
 - b. National Flood Monitoring Program.
 - c. Emergency Management Assistance.
 - d. National Flood Insurance Program.



Emergency Preparedness U.S.A.

4. When a community has established a system to prepare for natural and technological disasters, to respond appropriately during a disaster, to recover from the effects of a disaster, and to prevent or lessen the damage from disasters, we say it is practicing
 - a. Damage prevention.
 - b. Community awareness.
 - c. Preparedness planning.
 - d. Emergency management.
 - e. Mitigation measures.

 5. In order to develop your family disaster plan, you need to determine which hazards are probable threats to your community. What source of information could best help you to do this?
 - a. Insurance agent
 - b. Local radio station
 - c. Hazard risk maps
 - d. Neighbors
 - e. Your church

 6. How can communities reduce losses from flooding?
 - a. Develop volunteer monitoring systems
 - b. Manage land use and enforce building codes
 - c. Stock emergency supplies
 - d. Establish emergency shelters
 - e. Prepare a risk analysis

 7. Which of the following is an example of a technological hazard?
 - a. Landslide
 - b. Storm surge
 - c. Drought
 - d. Flashflood
 - e. Radioactive waste spill

 - 8-12. Identify the agency or office that issues warnings for each of the following emergencies by filling in the space on the answer sheet under the letter that corresponds to the correct role.

a. National Weather Service	c. Federal Emergency Management Agency
b. U.S. Geological Survey	d. Local emergency management office

 8. _ Tornado
 9. _ Hurricane
 10. _ Flood
 11. _ Dangerous gas leak
 12. — Volcanic eruption

 13. Which of the following is true of in-house shelter during a disaster?
 - a. It is almost never an option.
 - b. It is so unlikely that there is no need to prepare for the possibility.
 - c. It is sometimes the best option to protect occupants from harm.
 - d. It is always safer than evacuation.

 14. Appropriate treatment for heat stroke includes
 - a. Summoning medical assistance or getting the victim to a hospital immediately.
 - b. Seeking medical attention if the victim continues to vomit when given water.
 - c. Giving fluids.
 - d. Applying firm pressure to cramping muscles.
-



15. Appropriate preparedness measures for wildfires include
- Moving plants closer to the home.
 - Clearing an open space around the home as a fire break.
 - Installing wood shingles to protect the roof.
 - Buying less fire-resistant plants to reduce smoke.
16. Which of the following is a long-term danger from an earthquake?
- Change in weather patterns
 - Damaged roads and ruptured dams
 - Fire outbreak
 - Increase in drownings
 - Injury from falling debris
17. Which of the following hazards should be addressed in every family disaster plan?
- Fire
 - Hurricane
 - Dam failure
 - Landslide
 - Drought
18. An explosion and fire at a chemical plant has caused considerable damage to the plant and surrounding areas. The response to the immediate dangers must be coordinated to ensure quick and smooth action. Who would coordinate this response?
- State emergency officials
 - Local emergency officials
 - FEMA administrator
 - Citizens
 - Governor's aide
19. A storm with wind speeds above 74 miles per hour moving in a large spiral around a center of calm is called a
- Tornado
 - Storm surge
 - Tsunami
 - Winterstorm
 - Hurricane
20. Federal disaster funds are available to communities after
- A disaster declaration by the governor.
 - A disaster declaration by the President.
 - A disaster declaration by the Congress.
 - A disaster declaration by local officials.
21. What is the appropriate action to take if a hurricane watch has been issued?
- Develop your family disaster plan.
 - Locate family members and pets, prepare your home, and listen to local radio reports for possible evacuation instructions.
 - Locate family members and pets, board up windows, and go immediately to your basement storm shelter.
 - Prepare a risk analysis by consulting a hazard risk map—your actions will be determined by the results.
 - Go to the beach to see for yourself how serious the situation is.



22. Which of the following hazards are most likely to occur with tornados?
- Earthquakes, wildfires, and additional tornados
 - Lightning, earthquakes, and landslides
 - Radiological accidents, wildfires, and structural fires
 - Lightning, high winds, floods, and flash floods
23. After a house in your community is damaged by fire, you and your neighbors decide to have your houses inspected for possible fire hazards. Who should you contact to help you with this inspection?
- Local emergency manager's office
 - Local building contractor
 - State fire marshal's office
 - Local fire department
 - Your fire insurance agent
24. If a nuclear power generating plant had an accident with its reactor, what may pose a danger to the community?
- Release of radioactive materials
 - Severe storms
 - Extreme heat flash
 - Shockwaves
 - Earth tremors
25. A *blizzard warning* means
- Rainfall of at least four inches in 12 hours.
 - Moderate winter weather may affect your area.
 - Temperatures of 10 degrees or more above the average high temperature are expected.
 - Large amounts of snow, and winds of at least 35 miles an hour.
 - Heavy winds are expected, but no precipitation will occur.
26. Which of the following is a frequent cause of landslides?
- Land mismanagement
 - Too little development
 - Overplanting
 - Declining population
27. Which of the following is the most immediate danger from a hurricane?
- Hail storms
 - Storm surge
 - Earthquakes
 - Tsunami
 - Cyclone
28. Which of the following would be an appropriate action to make a home more secure for unnecessary damage and injuries in the event of an earthquake?
- Put large, movable objects such as televisions on rollers near exit routes.
 - Bolt tall, heavy furniture to the wall.
 - Ensure that cabinet doors can swing open freely.
 - Move all beds to be near glass windows.
29. Which of the following is the goal of emergency management?
- Support the adoption of legislation that would authorize the Federal government to assume all responsibility for emergency management.
 - Encourage communities to develop plans when disaster strikes and the real need for planning exists.
 - Develop response plans for dealing exclusively with natural hazards since these represent the greatest risk.
 - Provide protection for citizens, property, and government from all hazards.



30. You live in a community on a major river that is overflowing its banks upstream from you. Because the flood waters will strike your community within a few hours, an order to evacuate to a public shelter has been issued. Which of the following is the most important to take with you?
- Portable cots and beds
 - Tools for repair
 - Cooking utensils
 - Your television
 - Prescription medication
- 31-35. Identify the appropriate phase of emergency management associated with each of the following activities by filling in the space on the answer sheet u-rider the letter that corresponds to the correct phase.
- Mitigation
 - Preparedness
 - Response
 - Recovery
31. — Carefully inspect your home for any structural damage after an earthquake.
32. — Stay low in a burning building, away from smoke and toxic fumes.
33. — Maintain a Disaster Supply Kit containing food, water, and a first aid kit.
34. — Buy flood insurance through your local property insurance agent.
35. — If your car breaks down during a winter storm, display a trouble signal.
36. If you learn from a neighbor that a hurricane is approaching your community, how should you get additional information?
- Visit the local emergency management office.
 - Call the State emergency manager.
 - Visit the local newspaper office.
 - Call the sheriff's office.
 - Turn on your radio or television.
37. What is a *preparedness* measure that you can take to help reduce the potential danger of a tornado?
- Leave your trailer or mobile home if a tornado is approaching.
 - Designate a safe place as a tornado shelter.
 - Plan several evacuation routes.
 - Contact your insurance agent about damages following a tornado.
 - Drive at right angles away from the tornado.
38. Teaching responsible family members how to shut off gas, electricity, and water at the main switches and valves in your home is an example of an event that should take place
- Before an emergency.
 - During an emergency.
 - After an emergency.
39. Smoke detector batteries should be changed how often?
- At least once a year
 - Every other year
 - Twice a year
 - Whenever the alarm hasn't sounded in a while



40. Your community has just received word that an earthquake along the ocean's floor has caused a tsunami that may threaten your coastal town. What can the townspeople do to reduce the danger to life?
- Build storm shelters and stock supplies.
 - Continuously monitor landshifts.
 - Evacuate low areas.
 - Monitor the sea levels for any unusual changes.
 - Setup emergency shelters in basements.
41. What is the most direct method of finding out about flood insurance for your home?
- Contact your NFIP State Coordinating Agency.
 - Contact the Federal Insurance Administration.
 - Contact the Realtor who sold you your home for information on whether or not you are located in a floodplain.
 - Contact your property insurance agent.
 - Contact your local emergency manager.
42. There is a service coordinated by FEMA that provides disaster relief, loans, and grants to victims of Presidentially declared disasters. This service is known as the
- U.S. National Guard.
 - Federal Disaster Assistance Program.
 - Federal Insurance Administration.
 - Emergency Broadcast System.
 - Natural and Technological Hazards Program.
43. You are walking in the downtown area of a major city when a violent earthquake suddenly strikes. Listed below are five places where you could go quickly. Which is the safest?
- A parking garage filled with parked cars
 - A large transit bus pulled off the road
 - A high rise apartment building
 - A city park with baseball fields and basketball courts
 - The main post office
44. You are caught in a wildfire. Which of the following would be an appropriate response?
- Attempt to outrun a fire that is burning uphill.
 - Avoid breathing air close to the ground.
 - Avoid taking shelter in a rock outcropping or cleared area.
 - Evacuate in the direction of the fire.
 - Breathe through a wet handkerchief or wet piece of clothing.
45. You have just experienced a serious earthquake that has damaged your home. After the tremors have stopped, what is the first thing you should do?
- Contact the local fire department.
 - Call the emergency medical service.
 - Go to a local emergency shelter.
 - Check for gas leaks and fire.
 - Go outside and check the walls and chimney.
46. Your Disaster Supply Kit should contain enough supplies to meet your needs for at least how long?
- 8 hours
 - 24 hours
 - 2 days
 - 16 hours
 - 3 days



47. If you are caught outside in a thunderstorm with no time to reach a safe building or automobile, what should you do?
- a. Get under a tall, isolated tree.
 - b. Stand on a hilltop.
 - c. Seek shelter near open water.
 - d. Go to a low place such as a ravine or valley.
 - e. Stay near metal paths such as metal pipes and rails.
48. What is a proper response to a radiological accident?
- a. Clear roofs of ash and avoid inhaling ashfall.
 - b. Roll into a ball and protect your head.
 - c. Apply for disaster assistance funds.
 - d. Stay at home and do nothing.
 - e. Prepare to evacuate if instructed by public officials.

END OF FINAL EXAMINATION