# Chapter I
# Disaster Preparedness

**In this chapter you will learn about:**

- **Disasters and disaster workers:** What defines a disaster, and who makes up the disaster workforce.
- **Disaster threats:** Characteristics of various types of disasters and the potential for occurrence in your area.
- **Impact on the infrastructure:** The potential effect of disasters on transportation, electrical service, telephone communication, fuel and water supplies, and emergency services.
- **Structural and nonstructural hazards:** Potentially hazardous conditions in various types of structures and their contents during a disaster.
- **Safety precautions during a disaster:** What to do if you are inside, outside, or driving a vehicle.
- **Individual and worksite preparedness:** How you can prepare in advance to reduce structural and nonstructural hazards and survive the initial period after a disaster.
- **Community preparedness:** How a community can prepare in advance to respond in a disaster situation.

# *Disasters And Disaster Workers*

## *What Is A Disaster?*

According to Webster's Dictionary, a disaster is:

> *Any event that overwhelms existing resources to deal with the event.*

Disasters may be natural or caused by human actions, may occur in any season of the year, and may cover a limited or a wide-ranging geographic area. The following are some examples of the wide range of events that may reach disaster proportions:

- Earthquake
- Hurricane
- Tornado
- Blizzard
- Flood
- Act of terrorism (e.g., bombing)
- Civil disturbance (e.g., riot)
- Hazardous materials incident

## *What Is A Disaster? (Continued)*

Whatever the cause, disasters have several key elements in common:

- The event is *relatively unexpected*, with little or no prior warning or opportunity to prepare.
- Available personnel and emergency services may not be available during the initial stages of a disaster because of demands for their services.
- Lives, health, and the environment are *endangered*.

## *Who Are "Disaster Workers"?*

A variety of services, agencies, and programs work together to provide emergency services and disaster assistance to local residents after a disaster event. However, these service providers cannot be everywhere at once, and initial needs may be greater than they can handle immediately with available resources. During these initial hours after a disaster, when damage is heavy or widespread and emergency services are stretched thin, many people are called upon to provide assistance to those around them.

Individuals and families help themselves. Neighbors help neighbors. Coworkers help each other. Able-bodied people turn out to offer their services to the emergency services workers. Volunteers play an extremely important role in reducing the death, injury, and damage in the period immediately after a disaster. They bring a wide variety of skills and experience to the task, and through teamwork can help build a vital network that links all parts of the disaster area. (See Figure I-1 on page I-5.)

## *Who Are "Disaster Workers"? (Continued)*

- COWORKERS
- SELF AND FAMILY
- NEXT-DOOR NEIGHBORS
- CERT-AREA OF RESPONSIBILITY
- PROFESSIONAL DISASTER ASSISTANCE WORKERS

**Figure I-1. Disaster Workers**

# *Disaster Threats*

The potential threat of different types of disasters varies across the United States. This section provides overviews of the following types of disasters:

- Earthquakes
- Hurricanes And Coastal Storms
- Tornadoes
- Floods
- Hazardous Materials Accidents

You may wish to highlight key parts that relate especially to your area, as outlined by your instructor.

# *Earthquakes*

## *Introduction*

Earthquakes are a shaking or trembling of the earth, caused by underground volcanic forces or by breaking and shifting of rock beneath the surface. Although the area of greatest earthquake risk is the west coast, where tectonic activity occurs along the San Andreas fault, other areas of the United States are also at risk of earthquakes. For example, Memphis, Tennessee and St. Louis, Missouri are located along major faults. The map in Figure I-2 on page I-9 shows locations of moderate or greater earthquakes throughout the U.S.

## *Earthquake Classifications*

Earthquakes are classified as *small, moderate, major,* or *great* based on the Richter scale (a measure of energy released during the quake). The Richter scale has a logarithmic base, so each increment on the scale is multiplied by a factor that is 10 times larger than the previous factor. (For example, an earthquake of magnitude 8.6 would not be twice as violent as one of 4.3, but rather would be 10,000 times worse.) Although there are other methods of determining earthquake intensity and magnitude, the Richter scale is the most widely used method today. Earthquake classifications based on Richter scale magnitudes are shown in the table below.

| *Classifications* | *Richter Scale Magnitudes* |
|---|---|
| Small | 5.0-5.9 |
| Moderate | 6.0-6.9 |
| Major | 7.0-7.9 |
| Great | 8.0-8.9 |

**Table I-1. Earthquake Classifications**

## *Earthquake Prediction*

Although it is still impossible to predict earthquakes accurately, scientists have been able to derive some probabilities about future earthquakes in the United States, including:

- Areas along the west coast are at risk for earthquakes every day.
- Major earthquakes appear to occur in cycles of between 50 and 275 years.
- It is likely that a major earthquake will hit California and perhaps other parts of the U.S. in the next decade or two.

## *Earthquake Prediction* *(Continued)*

A map of the United States that shows areas of moderate or greater earthquake occurrences. The dots show us that more earthquakes have occurred in the West, but there is evidence that the mid-eastern United States has had moderate or greater earthquakes.

**Figure I-2. Sites Of Moderate Or Greater Earthquakes**

# *Hurricanes And Coastal Storms*

## *Introduction*

Hurricanes are violent areas of low pressure forming in the tropical Atlantic Ocean from June to November. (Similar Western Pacific Ocean storms are called typhoons.) Hurricanes have winds of 75 miles per hour or more and are accompanied by torrential rains and—along coastal regions—a storm surge. Although coastal storms may have hurricane-force winds and may cause similar kinds and amounts of damage, they are not classified as hurricanes because they do not originate in the tropics. Together, hurricanes and coastal storms cause billions of dollars in damage annually in the United States.

## *Hurricane Classifications*

Hurricane strength is classified using the Saffir-Simpson Hurricane Damage Potential Scale. This scale correlates hurricane strength to barometric pressure, windspeed, and storm surge as shown in the table below.

| *Category* | *Barometric Pressure (Inches)* | *Windspeed (Miles Per Hour)* | *Storm Surge (Feet)* |
|---|---|---|---|
| I - Minimal | Above 28.94 | 74-95 | 4-5 |
| II - Moderate | 28.50-28.91 | 96-110 | 6-8 |
| III - Extensive | 27.91-28.47 | 111-130 | 9-12 |
| IV - Extreme | 27.17-27.88 | 131-155 | 13-18 |
| V - Catastrophic | Less Than 27.17 | More Than 155 | More than 18 |

**Table I-2. Hurricane Classifications**

## *Hurricane Prediction*

On average, the coasts along the Gulf of Mexico and the Southeastern seaboard are struck by more than five hurricanes each year. Although meteorologists now have many ways in which to predict hurricanes, tracking storm movement and landfall remains an inexact science. The National Hurricane Center, located in Miami, Florida, has predicted that 1992 was the first year of a 10-year cycle of severe hurricane activity. The map in Figure I-3 on page I-12 shows areas of high hurricane and coastal storm activity.

## *Hurricane Prediction* *(Continued)*

This picture of the United States shows that hurricanes occur from Texas and all along the East Coast, including Louisiana, Alabama, Mississippi, Georgia, Florida, and North and South Carolina.

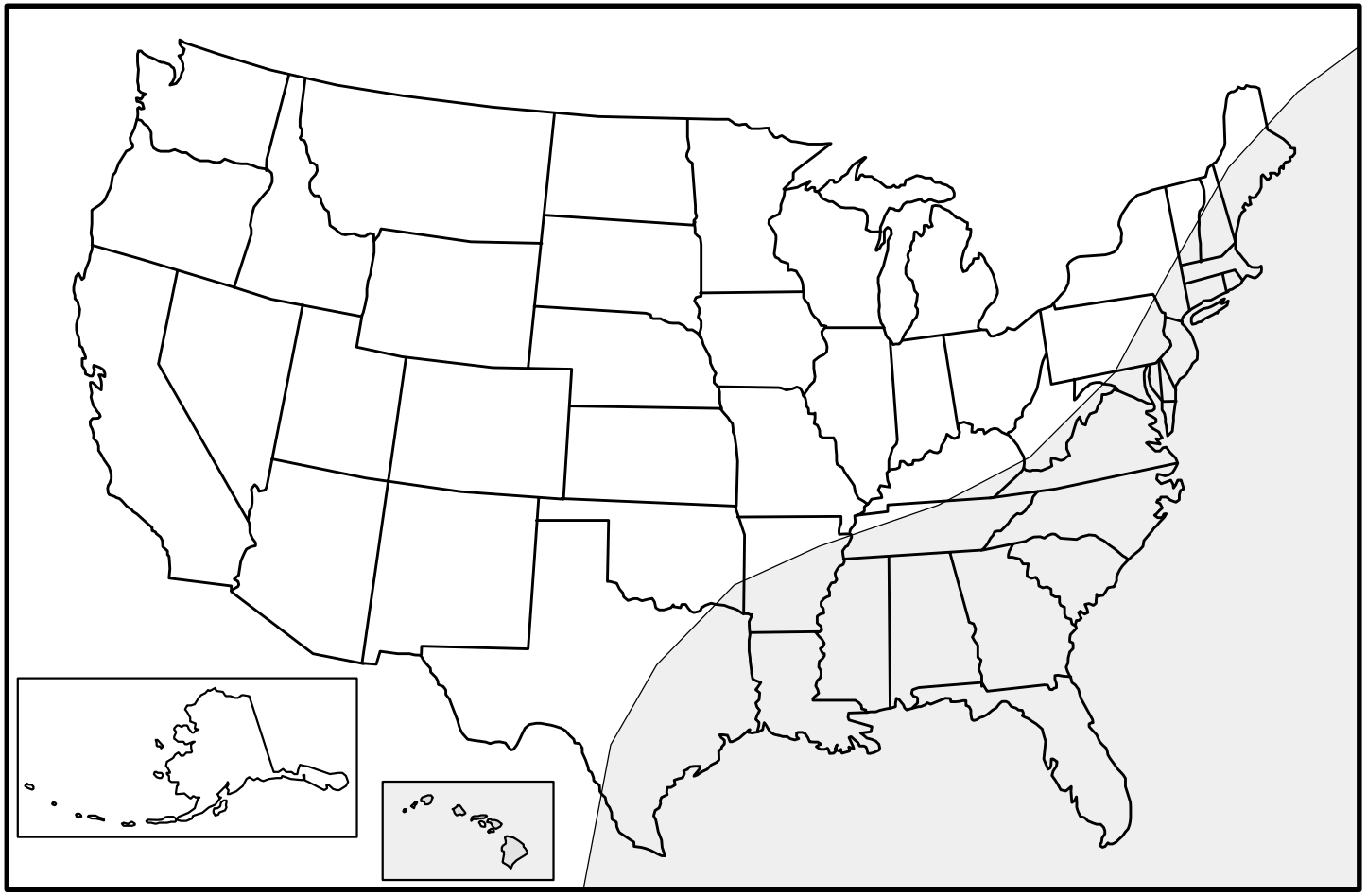


**Figure I-3. Areas Of High Hurricane And Coastal Storm Activity**

# *Tornadoes*

## *Introduction*

Tornadoes are powerful, circular windstorms that may be accompanied by winds of 200 or more miles per hour. Tornadoes may range in width from several hundred yards to more than one mile across. Although tornadoes may occur throughout most of the United States, areas in the Midwest and South are particularly susceptible to tornado activity. Parts of Texas, Oklahoma, Kansas, Missouri, Nebraska, Mississippi, Alabama, Georgia, and Florida are at highest risk of tornado strike. (See the map in Figure I-4 on page I-15 showing tornado incidence.)

## *Tornado Classifications*

Tornadoes are classified using the Fujita Wind Damage Scale. This scale correlates damage with windspeed, as shown in the table below.

| *Category* | *Windspeed (Miles Per Hour)* | *Damage* |
|---|---|---|
| F0 | Up to 72 mph | Light |
| F1 | 73-112 mph | Moderate |
| F2 | 113-157 mph | Considerable |
| F3 | 158-206 mph | Severe |
| F4 | 207-260 mph | Devastating |
| F5 | More than 260 mph | Incredible |

**Table I-3. Tornado Classifications**

## *Tornado Prediction*

With the help of sophisticated radar and other measures, meteorologists are now able to predict when favorable conditions for tornado formation exist and are better able to warn the public. However, even given an average of 700 confirmed reports of tornadoes each year in the United States, many remain unreported.

## *Tornado Prediction* *(Continued)*

This map shows areas in the Midwest that have had the most occurrences of tornadoes.

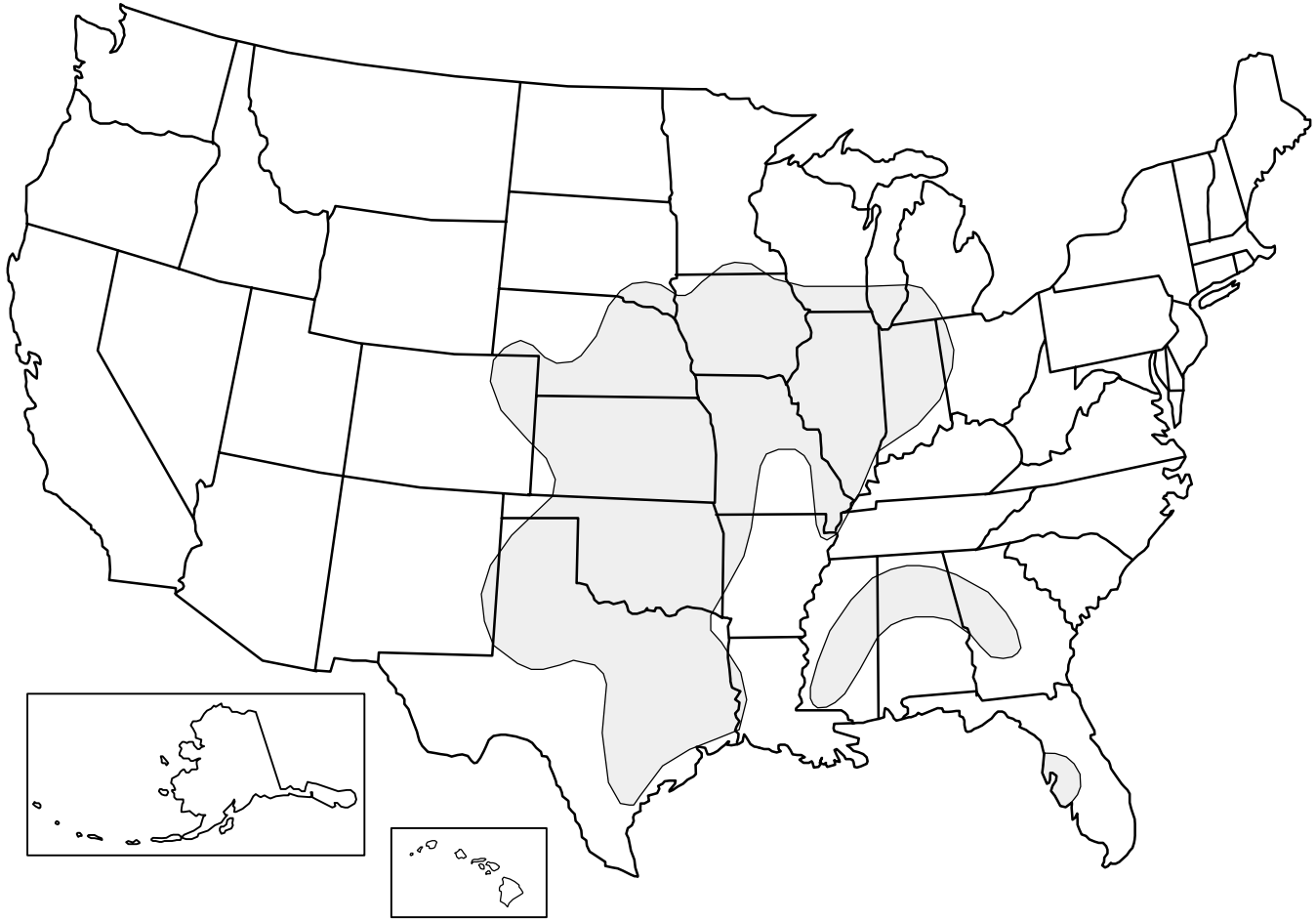


**Figure I-4. Areas Of High Tornado Incidence**

# *Floods*

## *Introduction*

A flood occurs any time a body of water rises to cover what is usually dry land. Floods have many causes, including heavy rain, spring snowmelt, hurricanes and coastal storms, and dam or levee failure. When flooding occurs, affected areas may sustain damage to structures and personal property, as well as severe damage to the environment in the form of soil erosion and deforestation, and damage to utilities and transportation systems. Flash floods, for which there is little or no warning, cause great risk to humans and animals. Land along rivers and streams, lakeshores, and coastlines are particularly susceptible to flooding. Under some conditions, however, even inland areas that are not normally threatened by flooding may be immersed.

## *Flood Classifications*

Floods are measured according to the heights the waters reach. Their magnitude is based on the chances that water flow will equal or exceed a certain level on a recurring basis.

## *Flood Prediction*

Satellite technology combined with river forecast centers and hydrologic service areas enable meteorologists to predict flood occurrence and severity with reasonable accuracy and provide warnings to those in high-risk areas. On average, rivers overflow their normal boundaries once every 2 years. Severe coastal flooding, however, can result in conjunction with any hurricane or coastal storm, the track of which cannot be predicted with complete accuracy. Clearly, the risk of damage or injury resulting from floods cannot be downplayed.

# *Blizzards*

## *Introduction*

The National Weather Service defines a blizzard as considerable falling or blowing snow accompanied by winds of 35 miles per hour or more. Blizzards are also accompanied by frigid temperatures and extremely limited visibility. Blizzards in the United States occur most frequently in the northern Midwestern States but may occur inland of Atlantic coastal storms and at high altitudes in the Western States. When blizzards occur, much of the infrastructure in the affected area may be disrupted for several days.

## *Blizzard Classification*

Blizzards are classified by their windspeed and concurrent visibility. Blizzard classifications are shown in the table below.

| *Type* | *Windspeed* | *Visibility* |
|---|---|---|
| Blizzard | 35 - 44 miles per hour | Less than 500 feet |
| Severe Blizzard | 45 miles per hour or greater | Approaching zero |

**Table I-4. Blizzard Classifications**

## *Blizzard Prediction*

With the help of satellites and other methods, meteorologists can predict when conditions are favorable for blizzard conditions to develop, which allows them to issue blizzard watches and warnings to the public. It remains impossible, however, to predict blizzards with complete accuracy or to predict the exact track that a storm will follow.

# *Hazardous Materials Accidents*

## *Introduction*

According to the Resource Conservation and Recovery Act of 1976, a hazardous material is any product that corrodes other materials, explodes or is easily ignited, reacts strongly with water, is unstable when exposed to heat or shock, or is otherwise toxic to humans, animals, or the environment. While the United States has a body of law governing the safe handling, transport, and disposal of hazardous materials, accidents can and do occur throughout the country on a regular basis. Additionally, while the risk of exposure to radioactive materials in nuclear power facilities, mining operations, and storage facilities is strictly regulated, it remains possible for a radioactive materials incident to occur.

## *Hazardous Materials Classifications*

Hazardous materials are not classified in the same way as natural hazards. Also, hazardous materials are classified differently depending on whether they are being stored or transported. Both classification systems are discussed more fully in Chapter II: Disaster Fire Suppression.

## *Hazardous Materials Accident Prediction*

While there is no way to predict hazardous materials accidents, certain areas are at some degree of risk, including those located near interstate highways; manufacturing, storage, or disposal facilities; and nuclear power facilities. Prevention of accidents, rather than prediction, is central to avoiding potential damage, loss, or other contamination from hazardous materials.

# *Impact On The Infrastructure*

## *Introduction*

When a disaster occurs, it has a cascading effect because of its impact on the infrastructure: transportation, utilities, communications systems, fuel supplies, and water supplies—the services and delivery systems on which we depend. When one of these important elements in our support system breaks down, it has a domino effect, causing other elements to falter. When multiple elements break down, the effect can be crippling. Some of the ways in which the infrastructure can be affected in a disaster or emergency are shown in the table below.

| *Service* | *Effect* |
|---|---|
| Transportation | • Inability to get emergency service personnel into the affected area.<br>• Inability to transport victims away from the area. |
| Electrical | • Increased risk of fire and electrical shock.<br>• Possible disruption to transportation system if downed lines are across roads. |
| Telephone | • Lost contact between victims, service providers, and family members.<br>• System overload due to calls from or to friends or relatives. |
| Water | • Disruption of service to homes, businesses, and medical providers.<br>• Inadequate water supply for firefighting.<br>• Increased risk to public health if there is extensive damage to the water supply or if it becomes contaminated. |
| Fuel Supplies | • Increased risk of fire or explosion from ruptured fuel lines.<br>• Risk of asphyxiation from natural gas leaks in confined areas. |

**Table I-5. Possible Effects Of Damage To The Infrastructure**

## *Emergency Services*

Each instance of damage to the infrastructure may severely restrict the abilities of police, fire, and paramedic services to provide service following a disaster. Some types of damage and their effects on emergency services are shown in the table below.

| *Type Of Damage* | *Effect On Emergency Services* |
|---|---|
| Road | • Inability to assess damage accurately.<br>• Ambulances prevented from reaching victims and/or victims prevented from reaching emergency medical services.<br>• Police prevented from reaching areas of civil unrest.<br>• Fire departments prevented from getting to fires.<br>• Flow of needed supplies is interrupted. |
| Structural | • Damaged hospitals unable to receive patients.<br>• Increased risk of damage from falling debris. |
| Disrupted Communication | • Victims unable to call for help.<br>• Coordination of services is hampered. |
| Fuel Line Damage | • Fire and paramedic services overburdened. |
| Disrupted Water Service | • Firefighting capabilities restricted.<br>• Medical facilities hampered. |

**Table I-6. Possible Effects Of Damage On Emergency Service Providers**

## *Service Priorities*

Because emergency services are likely to have inadequate resources to meet the needs in a disaster situation, those resources must be applied according to highest priority need:

| | |
|---|---|
| Police: | Establish order and safe ingress/egress to and from the disaster area. |
| Fire: | Suppression of *major* fires. |
| Paramedic: | *Life-threatening* injuries. |

Lower priority needs may have to be met in other ways.

# *Structural And Nonstructural Hazards*

## *Introduction*

During and following a disaster, damage to building structures presents one of the greatest hazards. Damage will vary according to the type of disaster, the type and age of the structure, and location in relation to the disaster center. The following is an overview of disaster hazards related to building structures and their contents.

## *Hazards Related To Structure Type*

### *High-Rise And Apartment Buildings*

Engineered buildings, such as most high-rise structures, have performed well in earthquakes and other disasters. Older high-rise buildings with steel and concrete construction are more susceptible to damage than the newer ones which use curtain construction and prefabricated panels. Primary hazards in and around high-rise buildings include:

- Broken glass.
- Falling panels.

Hazards in and around apartment buildings depend largely on the age and condition of the structure. Hazards may include:

- Collapsing walkways and stairways.
- Crumbling cornices and other trim.
- Broken glass.

### *Detached Homes*

Age, type of construction, and type of disaster are major factors in potential damage to detached homes and garages. Homes built before 1940 generally were not bolted to the foundation, making them subject to being shaken, blown, or floated off their foundations. Older homes constructed of unreinforced brick are less stable than newer construction. Porches without support beams may collapse. Damage to single homes from tornadoes and hurricanes can range from little damage to total destruction. Following a disaster event, there is the potential for further collapse and fire due to ruptured gas lines.

### *Mobile Homes*

When mobile homes are displaced in a disaster (whether earthquake, storm, flood, or other), utility connections are easily damaged, and broken gas lines may cause fires.

### *Other Public Places*

Malls, sports arenas, airports, places of worship, and other places where people may gather may pose hazards in some types of disasters. For example, in an earthquake, overhead structures may collapse. Widespread panic in large crowds can result in casualties.

## *Nonstructural Hazards*

Fixtures and items within a home, garage, or office can pose hazards during or after a disaster event. The following are examples of some of the nonstructural hazards that may be encountered:

- Gas line ruptures from water heaters or ranges displaced by shock or water.
- Damage from falling books, dishes, or other cabinet contents.
- Risk of injury or electric shock from displaced appliances and office equipment.
- Hazardous products within reach of children.

# *Disaster Hazard Mitigation*

## *Introduction*

Regardless of the event or the amount of warning offered, there are safety precautions that one can take to reduce or prevent injury. These measures include:

- Personal safety.
- Home and worksite preparation.
- Community preparation.

## *Personal Safety*

The personal safety measures that you should take vary depending on the circumstance. Precautions for natural hazards are shown in the table on pages I-25 through I-30.

## *Personal Safety* *(Continued)*

| *Event* | *Time* | *Take The Following Action* |
|---|---|---|
| Earthquake | Before | • Have a home earthquake plan, and know what to do after the earthquake occurs.<br>• Have a plan for reuniting all family members after an earthquake occurs.<br>• Have an out-of-state family phone contact.<br>• Have supplies on hand including water, a flashlight, a portable radio, food, a fire extinguisher, and tools.<br>• Bolt bookshelves and water heaters into wall studs, and latch cabinets.<br>• Move beds away from windows.<br>• Move pictures and other hanging objects away from beds.<br>• Keep a pair of shoes next to your bed. |
| Earthquake | During | • Drop, cover, and hold.<br>• Get under a heavy table or desk and hold on, or sit or stand against an inside wall.<br>• Keep away from windows.<br>• If indoors, stay there.<br>• If outdoors, stay outdoors away from falling debris, trees, and power lines.<br>• If in your car, drive to a clear spot and stay in the car. Avoid stopping on or under overpasses.<br>• Do not use elevators. |
| Earthquake | After | • Expect aftershocks. They are just as serious as the main earthquake.<br>• Put on shoes to protect from broken glass.<br>• Check for injuries and fires.<br>• Use a flashlight to inspect your residence for damage including gas, water, and electrical lines and appliances.<br>• If you smell gas or if there is a fire, turn off the main gas valve. Switch off individual circuit breakers (or unscrew individual fuses), then switch off the main circuit breaker (or unscrew the main fuse).<br>• Do not go into damaged areas.<br>• Do not use telephones except in emergencies.<br>• Do not use vehicles except in emergencies.<br>• Use a portable radio for information.<br>• If your home is unsafe, get everyone out. |

**Table I-7. Personal Precautions Against Natural Hazards**

## *Personal Safety* *(Continued)*

| *Event* | *Time* | *Take The Following Action* |
|---|---|---|
| Hurricane Or Coastal Storm | Before | • Know the risks of the area, the evacuation routes, and the location of shelters.<br>• Have a home hurricane plan of action.<br>• Know what a hurricane "watch" and "warning" mean. [Note: A hurricane watch means a hurricane may hit your area. A hurricane warning means such a hurricane is headed for your area.]<br>• Have a portable radio and flashlight, as well as other supplies.<br>• Ensure that enough nonperishable food and water supplies are on hand to last for at least 2 weeks.<br>• Floodproof your home.<br>• Tie down mobile homes.<br>• Keep trees and shrubbery trimmed.<br>• Review your insurance policy to ensure that it provides adequate coverage. |
| Hurricane Or Coastal Storm | During | **Watch Phase (24-48 hours before landfall)**:<br><br>• Board up all windows.<br>• Fill your car's gas tank and prepare to evacuate.<br>• Check mobile home tie-downs.<br>• Check batteries and stock up on canned food, medical supplies, and drinking water.<br>• Bring in outside objects (e.g., garbage cans, lawn furniture, bicycles).<br>• Listen to the advice of local officials, and evacuate if told to do so.<br><br>**Warning Phase (24 hours or less before landfall)**:<br><br>• Listen to the advice of local officials, and evacuate if told to do so.<br>• If you are not advised to evacuate, stay indoors and away from windows.<br>• Stay away from flood waters; never drive through them.<br>• Be aware of the calm "eye"; the storm is not over.<br>• Be alert for tornadoes. |

**Table I-7. Personal Precautions Against Natural Hazards**
(Continued)

## *Personal Safety* *(Continued)*

| *Event* | *Time* | *Take The Following Action* |
|---|---|---|
| Hurricane Or Coastal Storm (Continued) | After | • Wait until an area is declared safe before entering.<br>• Use a flashlight to inspect for damage including gas, water, and electrical lines and appliances.<br>• Stay away from downed power lines.<br>• If you smell gas or if there is a fire, turn off the main gas valve. Switch off individual circuit breakers (or unscrew individual fuses), then switch off the main circuit breaker (or unscrew the main fuse).<br>• Do not use telephones except in emergencies.<br>• Use a portable radio for information. |
| Tornado | Before | • Know the tornado risks of the area.<br>• Prepare a home tornado plan, and know the safest places to go during a tornado.<br>• Know what a tornado "watch" and "warning" mean. [Note: A tornado watch means a tornado may hit your area. A tornado warning means such a storm has been spotted and is about to strike. Go to safety immediately.]<br>• Have a portable radio and flashlight and other emergency supplies. |
| Tornado | During | **Watch Phase (up to 6 hours before)**:<br>• When you hear a "watch," keep your eye out for the approaching storm or listen to the radio or TV.<br>• Consider an immediate plan of action.<br>**Warning Phase (0-1 hour before)**:<br>• Get away from all windows.<br>• Use telephones only for life-threatening emergencies.<br>• Go to the basement, and get under sturdy furniture or stairs.<br>• If you do not have a basement, go to an inside closet, a bathroom, or a hallway on the lowest level of the building.<br>• If you are in a car, get out and go inside a sturdy house or building. Do not try to outrun a tornado with your car.<br>• If you are caught outside, get into a ditch or low-lying area. |

**Table I-7. Personal Precautions Against Natural Hazards**
(Continued)

## *Personal Safety* *(Continued)*

| *Event* | *Time* | *Take The Following Action* |
|---|---|---|
| Tornado (Continued) | During (Continued) | • Keep away from buildings with widespan roofs like cafeterias, auditoriums, and shopping malls.<br>• If you are in a mobile home, go to a storm shelter or, if one is not available, get out and lie in a ditch and cover your head. |
| | After | • Listen to a portable radio for information.<br>• Use a flashlight to check for damage including gas, water, electrical lines, and appliances.<br>• If you smell gas or if there is a fire, turn off the main gas valve. Switch off individual circuit breakers (or unscrew individual fuses), then switch off the main circuit breaker (or unscrew the main fuse).<br>• Stay out of the disaster area.<br>• Do not use telephones except in emergencies.<br>• Do not use vehicles except in emergencies. |
| Flood | Before | • Know the flood risk and the elevation of the area.<br>• Prepare a home flood evacuation or escape plan.<br>• Get flood insurance, if available.<br>• Keep insurance papers, important documents, and other valuables in a safe-deposit box.<br>• Know what a flood and a flash flood "watch" and "warning" mean. [Note: A flood watch means a slow rising flood is possible for your area. A flood warning means flooding is already occurring or will occur soon in your area. A flash flood watch means there is a chance that flash flooding could occur anytime within the next few hours. A flash flood warning means you may only have seconds to evacuate to higher ground.]<br>• Have a family plan, and choose a safe area in advance.<br>• Have a portable radio, flashlight, and emergency supplies. |
| Flood | During | **Watch Phase (2-3 days for flood; 2-12 hours for flash flood)**:<br>• Sandbag windows and doors.<br>• Move furniture and other items to higher levels.<br>• Fill your car's gas tank.<br>• Listen to radio or TV for up-to-the-minute information. |

**Table I-7. Personal Precautions Against Natural Hazards**
(Continued)

## *Personal Safety* *(Continued)*

| *Event* | *Time* | *Take The Following Action* |
|---|---|---|
| Flood (Continued) | During (Continued) | **Warning Phase (24-48 hours for flood; 0-1 hour for flash flood)**:<br>• Use telephones only for life-threatening emergencies.<br>• Evacuate, if necessary, and follow instructions.<br>• Do not walk or drive through flood waters.<br>• Stay off bridges where water is covering them.<br>• Heed barricades blocking roads.<br>• Keep away from waterways during heavy rain. If you are in a canyon area and hear a warning, get out of your car and get to high ground immediately.<br>• Keep out of storm drains and irrigation ditches. |
| Flood | After | • Listen to a portable radio for information.<br>• Boil drinking water before using (rolling boil for 10 minutes). Wells should be pumped out and the water tested for purity before drinking.<br>• Use a flashlight to check for damage including gas, water, and electrical lines and appliances.<br>• If you smell gas or if there is a fire, turn off the main gas valve. Switch off individual circuit breakers (or unscrew individual fuses), then switch off the main circuit breaker (or unscrew the main fuse).<br>• Stay out of the disaster area.<br>• Do not use telephones except in emergencies.<br>• Do not use vehicles except in emergencies. |
| *Event* | *If You Are . . .* | *Take The Following Action* |
| Blizzard | Outside | • Find shelter and try to stay dry.<br>• Cover all exposed parts of the body.<br>• If there is no shelter, you should:<br>- Prepare a lean-to, wind-break, or snow cave for protection from the wind.<br>- Build a fire for heat and to attract attention.<br>- Place rocks around the fire to absorb and reflect heat. |

**Table I-7. Personal Precautions Against Natural Hazards**
(Continued)

## *Personal Safety* *(Continued)*

| *Event* | *If You Are . . .* | *Take The Following Action* |
|---|---|---|
| Blizzard (Continued) | Outside (Continued) | • Mark your location for rescuers.<br>• Do not drink alcoholic beverages. Avoid falling asleep.<br>• Avoid eating snow. It will lower your body temperature. Melt it first. |
| Blizzard | In a car or truck | • Stay in the vehicle. Disorientation occurs quickly in snow and cold.<br>• Run the motor about 10 minutes each hour for heat.<br>• Open the window a little for fresh air to avoid carbon monoxide poisoning. Make sure the exhaust pipe is not blocked.<br>• Make yourself visible to rescuers.<br>- Turn on the dome light at night when running the engine.<br>- Tie a colored cloth (preferably red) to your antenna or door.<br>- Raise the hood indicating trouble after snow stops falling.<br>• Exercise from time to time to keep blood circulating and to keep warm. |
| Blizzard | At home or in a building | • Stay inside.<br>• Use telephones only for life-threatening emergencies.<br>• Use fire safeguards for heat and properly ventilate.<br>• If there is no heat, close off unneeded rooms and stuff towels or rags in cracks under doors. Cover windows at night.<br>• Eat and drink plenty.<br>• Wear layers of loose-fitting, lightweight, warm clothing. Remove layers to avoid overheating, perspiration, and chill. Wear a hat. |

**Table I-7. Personal Precautions Against Natural Hazards**
(Continued)

## *Personal Safety (Continued)*

Prevention of injury from hazardous materials in the home lies in proper storage and handling. The acronym for safe storage procedures is *L.I.E.S.* (Limit, Isolate, Eliminate, Separate):

- *Limit* the amount of hazardous materials in storage.
- *Isolate* products in approved containers, store them inside closed cabinets, and protect them from sources of ignition. Keep containers tightly covered.
- *Eliminate* products that are no longer necessary by disposing of them properly.
- *Separate* incompatible materials (e.g., chlorine products and ammonia).

When handling hazardous materials, be sure to:

- Read the warnings on product labels.
- Use the safety precautions (e.g., gloves, goggles, or breathing mask) recommended by the manufacturer.
- Limit contact to the degree possible.

*If you are not sure of the product with which you are dealing—or if the product produces a noxious odor, smoke, or steam—leave the area immediately.* Call the local emergency service operator (usually 911) and observe the material from uphill, upwind, and at a distance until qualified personnel arrive. If necessary, enlist the help of neighbors to warn others of the danger. If evacuation is required, evacuate to an upwind location. Moving uphill and upwind will prevent reintroduction to the hazard via the wind.

## *Home And Worksite Preparations*

Preparedness is the key to survival in a disaster or emergency. Individuals, families, and worksites can take steps that will help minimize structural and nonstructural hazards during a disaster, facilitate escape, and promote survival in the period immediately following the event.

### *Reducing Structural And Nonstructural Hazards*

Many injuries from structural and nonstructural hazards are easily preventable. Some steps that you can take to reducing structural and nonstructural hazards are shown in the table below.

| ***Type Of Hazard*** | ***Precautions*** |
|---|---|
| Structural | • Bolt older houses to the foundation.<br>• Board or place protective tape on windows and glass doors to minimize flying glass.<br>• Strap mobile homes to their concrete pads. |
| Nonstructural | • Anchor such furniture as bookshelves, hutches, and grandfather clocks to the wall.<br>• Secure appliances and office equipment in place with industrial-strength Velcro7.<br>• Secure cabinet doors with childproof fasteners.<br>• Locate and label gas, electricity, and water shut-offs before disasters occur. After a disaster, shut off the utilities as needed to prevent fires and other risks. (See page I-33.) Store a shut-off wrench where it will be immediately available.<br>• Secure water heaters to the wall to safeguard against a ruptured gas line or loose electrical wires. (See page I-34.) |

**Table I-8. Precautions Against Structural And Nonstructural Hazards**

*Reducing Structural And Nonstructural Hazards (Continued)*

Illustrations of utility shut-offs are shown below.

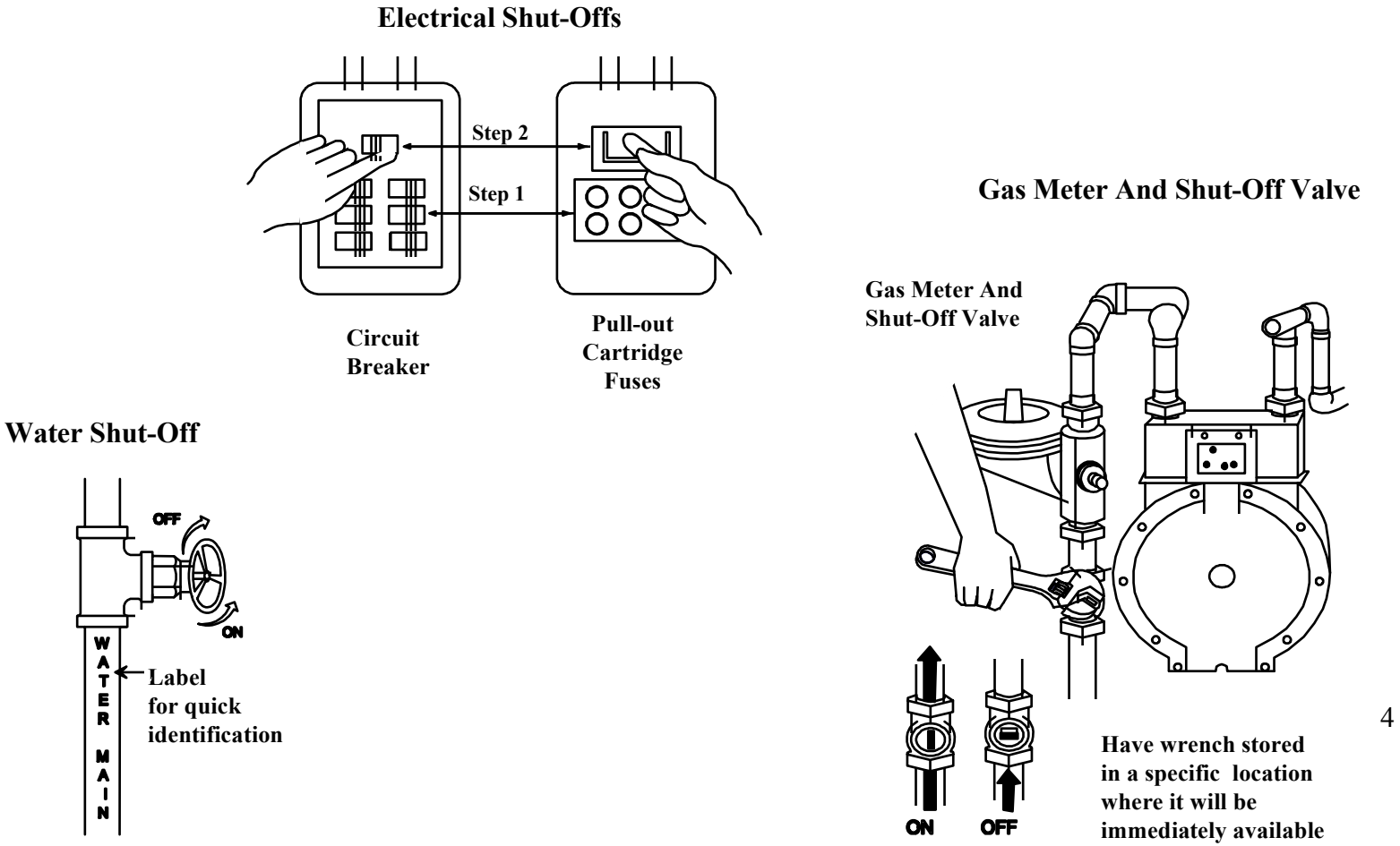



**Figure I-5. Utility Shut-Offs**

*Reducing Structural And Nonstructural Hazards (Continued)*

The figure below shows how to brace a residential-use water heater.

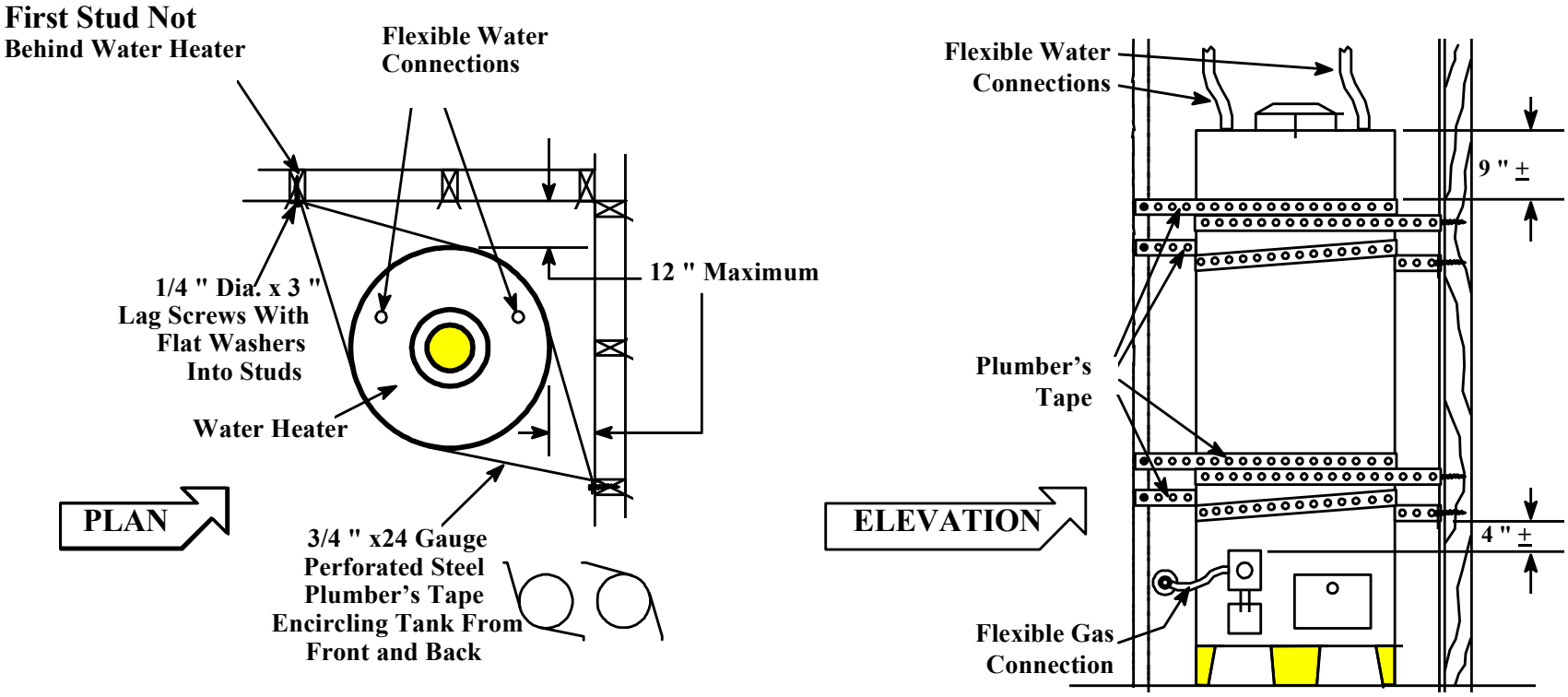



**Figure I-6. Water Heater Bracing**

## *Assembling And Storing Survival Supplies*

You can cope best by preparing for disaster before it strikes. One way to prepare is by assembling a Disaster Supplies Kit. Once disaster hits, you won't have time to shop or search for supplies. But if you've gathered supplies in advance, you and your family can endure an evacuation or home confinement.

## *To Prepare Your Kit*

1. Review the checklist on the next few pages (from FEMA L-189, ARC 4463, Your Family Disaster Supplies Kit).

2. Gather the supplies that are listed.

3. Place the supplies you're apt to need for an evacuation in an easy-to-carry container. These supplies are listed with an asterisk (*).

### *Water*

Store water 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 2 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 1 gallon of water per person per day (2 quarts for drinking, 2 quarts for food preparation/sanitation.)*
- Keep at least a 3-day supply of water for each person in your household.

*To Prepare Your Kit (Continued)*

*Water*
*(Continued)*

If you have questions about the quality of the water, purify it before drinking. You can heat water to a rolling boil for 10 minutes or use commercial purification tablets to purify the water. You can also use household liquid chlorine bleach if it is pure, unscented 5.25% sodium hypochlorite. To purify water, use the following table as a guide:

| *WATER QUANTITY* | *BLEACH ADDED* |
|---|---|
| 1 Quart | 4 Drops |
| 1 Gallon | 16 Drops |
| 5 Gallons | 1 Teaspoon |

**Table I-9. Ratios For Purifying Water With Bleach**

After adding bleach, shake or stir the water container and let it stand thirty minutes before drinking.

~

*To Prepare Your Kit (Continued)*

*Food*

Store at least a 3-day supply of nonperishable food. Select foods that require no refrigeration, preparation, or cooking and little or no water. If you must heat food, pack a can of Sterno. Select food items that are compact and lightweight. *Include a selection of the following foods in your Disaster Supplies Kit:

- 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
- Vitamins
- Foods for infants, elderly persons or persons on special diets
- Comfort/stress foods—cookies, hard candy, sweetened cereals, lollipops, instant coffee, tea bags

~

*First Aid Kit*

Assemble a first aid kit for your home and one for each car. A first aid kit* should include:

- Sterile adhesive bandages in assorted sizes
- 2-inch sterile gauze pads (4-6)
- 4-inch sterile gauze pads (4-6)
- Hypoallergenic adhesive tape
- Triangular bandages (3)
- 2-inch sterile roller bandages (3 rolls)
- 3-inch sterile roller bandages (3 rolls)
- Scissors
- Tweezers

*To Prepare Your Kit (Continued)*

*First Aid Kit*
*(Continued)*

- Needle
- Moistened towelettes
- Antiseptic
- Thermometer
- Tongue blades (2)
- Tube of petroleum jelly or other lubricant
- Assorted sizes of safety pins
- Cleaning agent/soap
- Latex gloves (2 pair)
- Sunscreen

*Nonprescription Drugs*

- Aspirin or nonaspirin pain reliever
- Anti-diarrhea medication
- Antacid (for stomach upset)
- Syrup of Ipecac (used to induce vomiting if advised by the Poison Control Center)
- Laxative
- Activated charcoal (used if advised by the Poison Control Center)

~

*Tools And Supplies*

- Mess kits, or paper cups, plates and plastic utensils*
- Emergency preparedness manual*
- Battery-operated radio and extra batteries*
- Flashlight and extra batteries*
- Cash or traveler's checks, change*
- Nonelectric can opener, utility knife*
- Fire extinguisher: small canister, ABC type
- Tube tent
- Pliers
- Tape

*To Prepare Your Kit (Continued)*

*Tools And Supplies*
*(Continued)*

- Compass
- Matches in a waterproof container
- Aluminum foil
- Plastic storage containers
- Signal flare
- Paper, pencil
- Needles, thread
- Medicine dropper
- Shut-off wrench, to turn off household gas and water
- Whistle
- Plastic sheeting
- Map of the area (for locating shelters)

*Sanitation*

- Toilet paper, towelettes*
- Soap, liquid detergent*
- Feminine supplies*
- Personal hygiene items*
- Plastic garbage bags, ties (for personal sanitation uses)
- Plastic bucket with tight lid
- Disinfectant
- Household chlorine bleach

~

*Clothing And Bedding*

*Include at least one complete change of clothing and footwear per person.

- Sturdy shoes or work boots*
- Rain gear*
- Blankets or sleeping bags*
- Hat and gloves
- Thermal underwear
- Sunglasses

~

*To Prepare Your Kit (Continued)*

*Special Items*

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

*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*—games and books

- *Important Family Documents*—Keep these records in a waterproof, portable container.
- Will, insurance policies, contracts, deeds, stocks and bonds
- Passports, social security cards, immunization records
- Bank account numbers
- Credit card account numbers and companies
- Inventory of valuable household goods, important telephone numbers
- Family records (birth, marriage, death certificates)

## *Creating A Family Disaster Plan*

### *Exit Drills In The Home*

**To get started . . .**

- Contact your local emergency management office and your local American Red Cross chapter.
  - Find out which disasters are most likely to happen in your community.
  - Ask how you would be warned.
  - Find out how to prepare for each type of disaster.
- Meet with your family.
  - Discuss the types of disasters that could occur.
  - Explain how to prepare and respond.
  - Discuss what to do if advised to evacuate.
  - Practice what you have discussed.
- Plan how your family will stay in contact if separated by disaster.
  - Pick two meeting places:
    - A location a safe distance from your home in case of fire.
    - A place outside your neighborhood in case you can't return home.

*Exit Drills In The Home (Continued)*

- Choose an out-of-state friend as a "check-in contact" for everyone to call.

- Complete the following steps.
  - Post emergency telephone numbers by every phone.
  - Show responsible family members how and when to shut off water, gas, and electricity at main switches.
  - Install a smoke detector on each level of your home, especially near bedrooms; test them monthly and change the batteries two times each year. (Change batteries when you change your clocks in the spring and fall.)

- Contact your local fire department to learn about home fire hazards.
  - Learn first aid and CPR. Contact your local American Red Cross chapter for information and training.

- Meet with your neighbors.
  - Plan how the neighborhood could work together after a disaster. Know your neighbors' skills (medical, technical).
  - Consider how you could help neighbors who have special needs, such as elderly or disabled persons.
  - Make plans for child care in case parents can't get home.

## *Evacuation Planning*

Develop an escape plan that provides for escape from every room. As part of your escape plan:

- Consider the needs of children and physically challenged individuals.
- Inform all family members or office coworkers of the plan.
- Run practice escape drills.

An example of an escape plan is shown in the figure below.

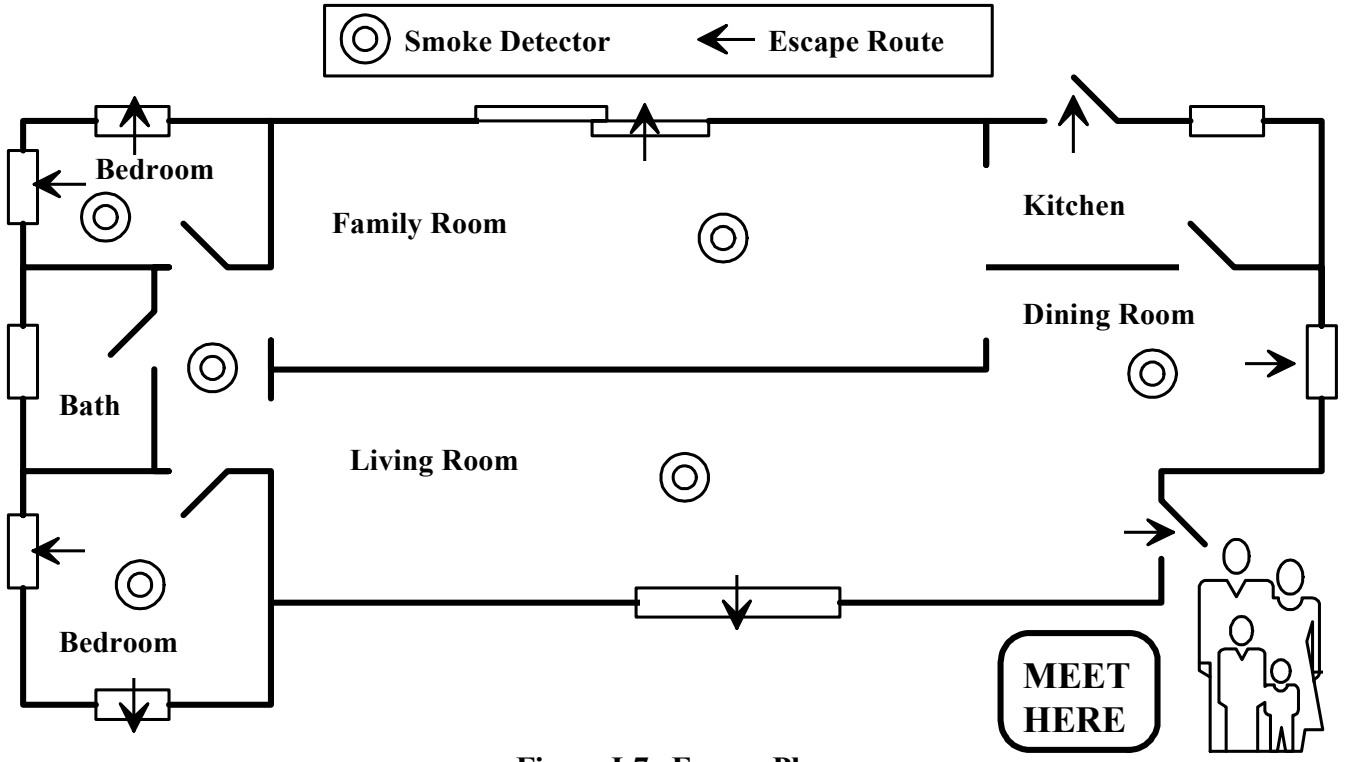
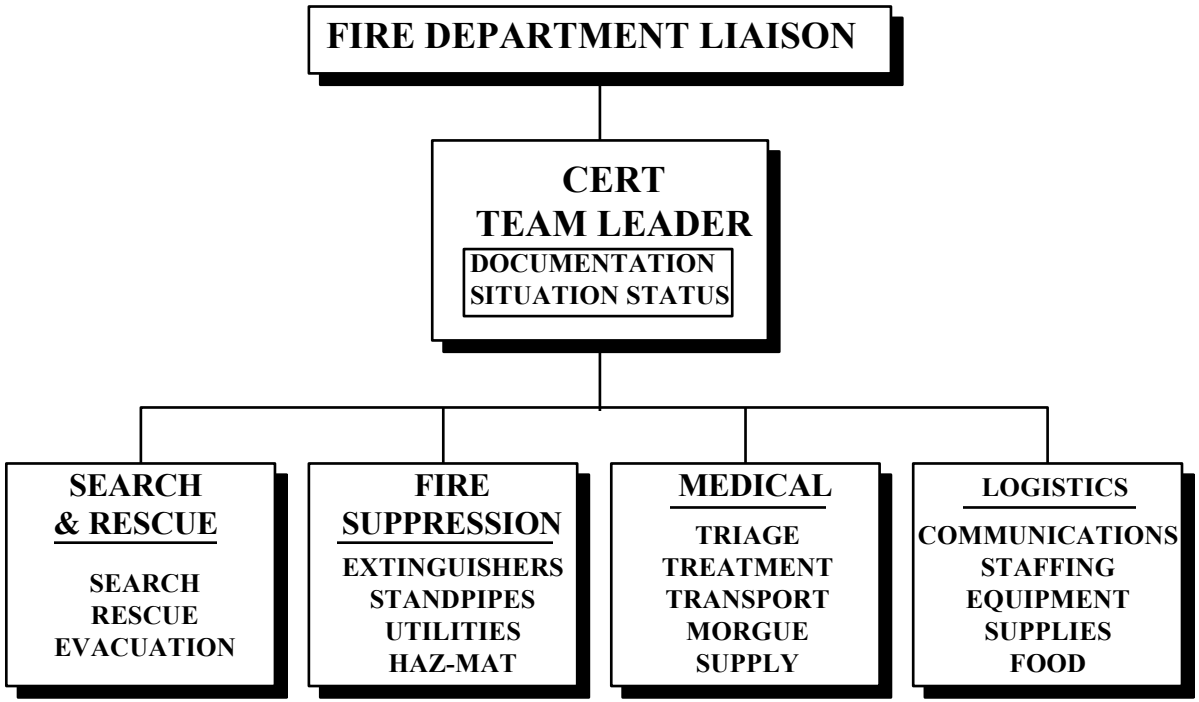



**Figure I-7. Escape Plan**

## *Community Preparations*

The community can also prepare by establishing Community Emergency Response Teams to respond in the period immediately after a disaster. CERTs assist existing response teams and assume the same functions as response personnel. The CERT organizational structure is shown in Figure I-8.




The CERT organization should start with a Fire Department Liaison, then add a CERT Team Leader and Search and Rescue personnel. Also necessary are Fire Suppression and Medical supplies, and Logistics coordinators.

**Figure I-8. CERT Organization**

There are checklists (starting on page I-51) following this chapter that will help you plan and organize your CERT, and assemble the equipment and supplies your team will need.

## *Protection For Disaster Workers*

People who volunteer their services during a disaster are generally protected by Federal, State, and/or local laws. Most states have "Good Samaritan" laws that protect people who provide emergency care *in a prudent and reasonable manner* to ill or injured persons. Other city, county, or State laws may also apply. Your instructor will provide information about laws that apply in your area. Record the key points below for future reference.

| Applicable Laws | Key Points |
|---|---|
| | |

## *Summary*

CERTs are among a variety of agencies and personnel that cooperate to provide assistance in the aftermath of an emergency or disaster. The keys to a CERT's effectiveness are in:

- Familiarity with the type of event and the types of damage that are most likely to result.
- Adequate preparation for the event and its aftermath.
- Proper training in the functional areas to which CERTs are assigned, including:
  - Fire suppression.
  - Light search and rescue.
  - Disaster medical operations.
  - Logistics.

Given these three keys, CERTs can be an invaluable asset to immediate response efforts.

### *Assignment*

Before the next session:

1. Read and familiarize yourself with Chapter II: Disaster Fire Suppression.
2. Bring a pair of leather gloves and a pair of safety goggles.
3. Begin food and water storage for at least 72 hours for yourself and your family.
4. Establish an out-of-state emergency contact. This is the person you will contact in the event of a disaster in your area, to report your status. Others can then contact that person to check on your status. Be sure to let family and friends know who your contact person is.

## *Assignment (Continued)*

5. Locate the utility shut-offs in your home.

6. Wear appropriate clothes (no shorts, no open-toed shoes), because you will practice putting out a small fire with an extinguisher.

## *Additional Reading*

The references below are available if you would like to know more about the information in this chapter.

Emergency Food and Water Supplies. Federal Emergency Management Agency, Washington, DC: 1993.

Filderman, Lynne D., Natural Hazards Risk Profile: Hurricanes, Floods, Tornadoes, Lightning, Earthquakes. American National Red Cross, Washington, DC: 1991.

Flood. Federal Emergency Management Agency, National Oceanic and Atmospheric Administration, and American Red Cross, Washington, DC: 1992.

Ludlum, David M. The Audubon Society Field Guide to North American Weather. A. A. Knopf, New York, NY: 1992.

Natural Hazards Risk Profile. American Red Cross, Washington, DC: 1991.

Reader's Digest Action Guide: What To Do in an Emergency. Reader's Digest Association, Pleasantville, NY: 1988.

Talking Points for Disaster Education Presentations. American Red Cross, Washington, DC: 1991.

Williams, Jack. The Weather Book: An Easy-To-Understand Guide to the USA's Weather. Vintage Books, New York, NY: 1992.

## *Additional Reading (Continued)*

In addition, the following pamphlets are available through the Federal Emergency Management Agency (L code), the American Red Cross (ARC code), and the National Weather Service (PA code).

Emergency Preparedness Catalog (L-164)

Emergency Preparedness Checklist (L-154)

Your Family Disaster Supplies Kit (L-189/ARC 4463)

Your Family Disaster Plan (L-191/ARC 4466)

* Are You Ready for a Hurricane? (ARC 4454)
* Are You Ready for an Earthquake? (ARC 4455)
* Are You Ready for a Fire? (ARC 4456)
* Are You Ready for a Tornado? (ARC 4457)
* Are You Ready for a Flood? (ARC 4458)
* Are You Ready for a Winter Storm? (ARC 4464)
* Are You Ready for a Thunderstorm? (ARC 5009)

Winter Storms: The Deceptive Killer (PA 91002/ARC 4467)

Flash Floods and Floods: The Awesome Power (PA 92050/ARC 4493)

Tornadoes: Nature's Most Violent Storm (PA 92052/ARC 5002)

* Available in English and Spanish

# Additional Materials
# Chapter I

## *Community Emergency Response Team Checklist*

**INSTRUCTIONS:** Use the list below when planning and organizing a CERT. Keep this page in the front of the CERT plan of operation.

| ***Personal Preparedness*** | *If Completed Check* | *Date Checked* |
|---|---|---|

- Food
- Water
- Out-of-State Phone Contact
- Mitigation Measures
  - Water heater
  - Utilities
  - Cabinets, etc.
  - Other: _____

## *Community Emergency Response Team Checklist* *(Continued)*

| ***Team Organization*** | *If Completed Check* | *Date Checked* |
|---|---|---|

- Leadership
  - Team leader
  - Group leaders
- Membership
  - Roster
  - Phone list
  - Skills inventory
- Communications
  - Telephone tree
  - Newsletter
  - Amateur radio
  - Runners

## *Community Emergency Response Team Checklist (Continued)*

| ***Team Organization*** *(Continued)* | *If Completed Check* | *Date Checked* |
|---|---|---|

- Resources and Locations
  - Personnel
  - Equipment
  - Supplies
  - Response kits
- Area Surveys
  - Evacuation plans
  - Staging area
  - Casualty collection points
  - Specific hazard areas
  - Area maps
- Response Plan
  - Response criteria
  - Communications/notifications
  - Staging area/command post

## *Community Emergency Response Team Checklist (Continued)*

| ***Team Organization*** *(Continued)* | *If Completed Check* | *Date Checked* |
|---|---|---|

- Teamwork

  - Meetings
  - Drills and exercises
  - Training

    - First aid
    - CPR
    - Other: _____

## *Recommended CERT Equipment And Supplies*

The following equipment and supplies are recommended as a minimum supply cache for all CERT teams. The equipment and supplies should be maintained at or near the team staging area.

| *Equipment/Supply* | *Date Obtained* | *Quantity* | *Date Checked* |
|---|---|---|---|

- Nylon/canvas bag with shoulder strap
- Water (two canteens/bottles per Search and Rescue team)
- Dehydrated foods
- Water purification tablets
- Work gloves (leather)
- Goggles
- Dust masks
- Flashlight or miner's lamp
- Batteries and extra bulbs
- Secondary flashlight or light sticks

## ***Recommended CERT Equipment And Supplies*** *(Continued)*

| *Equipment/Supply* | *Date Obtained* | *Quantity* | *Date Checked* |
|---|---|---|---|

- Utility knife
- Note pads
- Markers:
  - Thin-point
  - Thick-point
- Pens
- Duct tape
- Masking tape (2-inch)
- Scissors
- Crescent wrench
- First aid pouch containing:
  - 4 x 4 gauze dressings (6)
  - Abdominal pads (4)
  - Triangular bandages (4)
  - Band-Aids
  - Roller bandage