

2.6

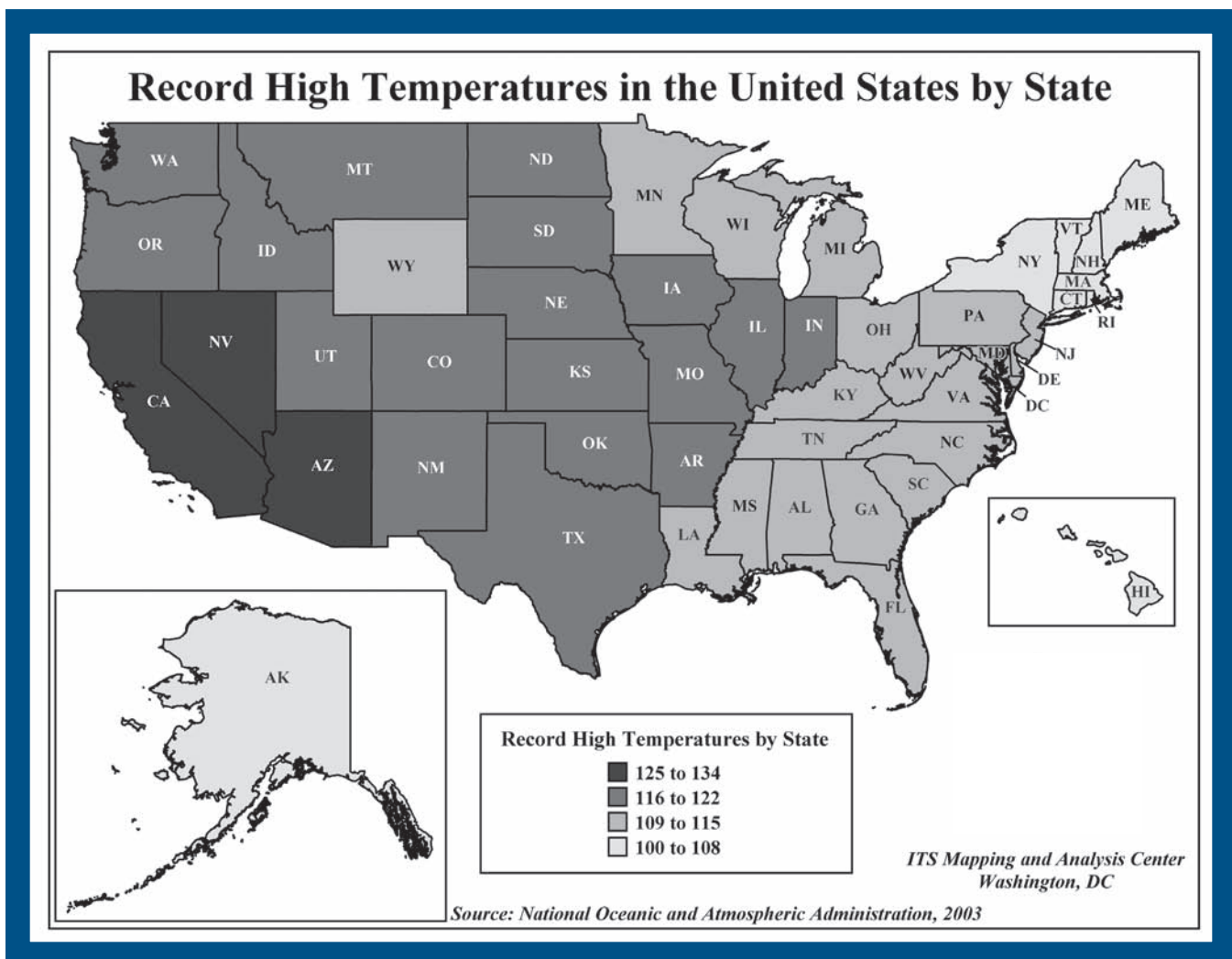
# Extreme Heat



Heat kills by pushing the human body beyond its limits. In extreme heat and high humidity, evaporation is slowed and the body must work extra hard to maintain a normal temperature.

Most heat disorders occur because the victim has been overexposed to heat or has over-exercised for his or her age and physical condition. Older adults, young children, and those who are sick or overweight are more likely to succumb to extreme heat.

Conditions that can induce heat-related illnesses include stagnant atmospheric conditions and poor air quality. Consequently, people living in urban areas may be at greater risk from the effects of a prolonged heat wave than those living in rural areas. Also, asphalt and concrete store heat longer and gradually release heat at night, which can produce higher nighttime temperatures known as the “urban heat island effect.”



### Know the Terms

Familiarize yourself with these terms to help identify an extreme heat hazard:

#### Heat Wave

Prolonged period of excessive heat, often combined with excessive humidity.

#### Heat Index

A number in degrees Fahrenheit (F) that tells how hot it feels when relative humidity is added to the air temperature. Exposure to full sunshine can increase the heat index by 15 degrees.

#### Heat Cramps

Muscular pains and spasms due to heavy exertion. Although heat cramps are the least severe, they are often the first signal that the body is having trouble with the heat.

#### Heat Exhaustion

Typically occurs when people exercise heavily or work in a hot, humid place where body fluids are lost through heavy sweating. Blood flow to the skin increases, causing blood flow to decrease to the vital organs. This results in a form of mild shock. If not treated, the victim's condition will worsen. Body temperature will keep rising and the victim may suffer heat stroke.

#### Heat Stroke

A life-threatening condition. The victim's temperature control system, which produces sweating to cool the body, stops working. The body temperature can rise so high that brain damage and death may result if the body is not cooled quickly.

#### Sun Stroke

Another term for heat stroke.

## Take Protective Measures

To prepare for extreme heat, you should:

- Install window air conditioners snugly; insulate if necessary.
- Check air-conditioning ducts for proper insulation.
- Install temporary window reflectors (for use between windows and drapes), such as aluminum foil-covered cardboard, to reflect heat back outside.
- Weather-strip doors and sills to keep cool air in.

**Before Extreme Heat**

- Cover windows that receive morning or afternoon sun with drapes, shades, awnings, or louvers. (Outdoor awnings or louvers can reduce the heat that enters a home by up to 80 percent.)
- Keep storm windows up all year.

---

### During a Heat Emergency

The following are guidelines for what you should do if the weather is extremely hot:

- Stay indoors as much as possible and limit exposure to the sun.
- Stay on the lowest floor out of the sunshine if air conditioning is not available.
- Consider spending the warmest part of the day in public buildings such as libraries, schools, movie theaters, shopping malls, and other community facilities. Circulating air can cool the body by increasing the perspiration rate of evaporation.
- Eat well-balanced, light, and regular meals. Avoid using salt tablets unless directed to do so by a physician.
- Drink plenty of water. Persons who have epilepsy or heart, kidney, or liver disease; are on fluid-restricted diets; or have a problem with fluid retention should consult a doctor before increasing liquid intake.
- Limit intake of alcoholic beverages.
- Dress in loose-fitting, lightweight, and light-colored clothes that cover as much skin as possible.
- Protect face and head by wearing a wide-brimmed hat.
- Check on family, friends, and neighbors who do not have air conditioning and who spend much of their time alone.
- Never leave children or pets alone in closed vehicles.
- Avoid strenuous work during the warmest part of the day. Use a buddy system when working in extreme heat, and take frequent breaks.



### First Aid for Heat-Induced Illnesses

Extreme heat brings with it the possibility of heat-induced illnesses. The following table lists these illnesses, their symptoms, and the first aid treatment.

Condition	Symptoms	First Aid
Sunburn	Skin redness and pain, possible swelling, blisters, fever, headaches	<ul style="list-style-type: none"> <li>Take a shower using soap to remove oils that may block pores, preventing the body from cooling naturally.</li> <li>Apply dry, sterile dressings to any blisters, and get medical attention.</li> </ul>
Heat Cramps	Painful spasms, usually in leg and abdominal muscles; heavy sweating	<ul style="list-style-type: none"> <li>Get the victim to a cooler location.</li> <li>Lightly stretch and gently massage affected muscles to relieve spasms.</li> <li>Give sips of up to a half glass of cool water every 15 minutes. (Do not give liquids with caffeine or alcohol.)</li> <li>Discontinue liquids, if victim is nauseated.</li> </ul>
Heat Exhaustion	Heavy sweating but skin may be cool, pale, or flushed. Weak pulse. Normal body temperature is possible, but temperature will likely rise. Fainting or dizziness, nausea, vomiting, exhaustion, and headaches are possible.	<ul style="list-style-type: none"> <li>Get victim to lie down in a cool place.</li> <li>Loosen or remove clothing.</li> <li>Apply cool, wet cloths.</li> <li>Fan or move victim to air-conditioned place.</li> <li>Give sips of water if victim is conscious.</li> <li>Be sure water is consumed slowly.</li> <li>Give half glass of cool water every 15 minutes.</li> <li>Discontinue water if victim is nauseated.</li> <li>Seek immediate medical attention if vomiting occurs.</li> </ul>
Heat Stroke (a severe medical emergency)	High body temperature (105+); hot, red, dry skin; rapid, weak pulse; and rapid, shallow breathing. Victim will probably not sweat unless victim was sweating from recent strenuous activity. Possible unconsciousness.	<ul style="list-style-type: none"> <li>Call 9-1-1 or emergency medical services, or get the victim to a hospital immediately. <b>Delay can be fatal.</b></li> <li>Move victim to a cooler environment.</li> <li>Remove clothing.</li> <li>Try a cool bath, sponging, or wet sheet to reduce body temperature.</li> <li>Watch for breathing problems.</li> <li>Use extreme caution.</li> <li>Use fans and air conditioners.</li> </ul>

### Additional Information

An emergency water shortage can be caused by prolonged drought, poor water supply management, or contamination of a surface water supply source or aquifer.

Drought can affect vast territorial regions and large population numbers. Drought also creates environmental conditions that increase the risk of other hazards such as fire, flash flood, and possible landslides and debris flow.

Conserving water means more water available for critical needs for everyone. Appendix A contains detailed suggestions for conserving water both indoors and outdoors. Make these practices a part of your daily life and help preserve this essential resource.

### After Extreme Heat

Follow the instructions for recovering from a disaster in Part 5.



## Knowledge Check

You and a friend have been outdoors in the sun for some time. Shortly after coming inside, your friend complains of nausea and headache but tells you not to worry as it is probably a food allergy.

What would you advise him or her to do?

Answer: Seek immediate medical attention and discontinue intake of water.

## For More Information

---

If you require more information about any of these topics, the following resource may be helpful.

---

### National Weather Service

*Heat Wave: A Major Summer Killer.* An online brochure describing the heat index, heat disorders, and heat wave safety tips. Available online at: [www.nws.noaa.gov/om/brochures/heat\\_wave.htm](http://www.nws.noaa.gov/om/brochures/heat_wave.htm)

### Publications



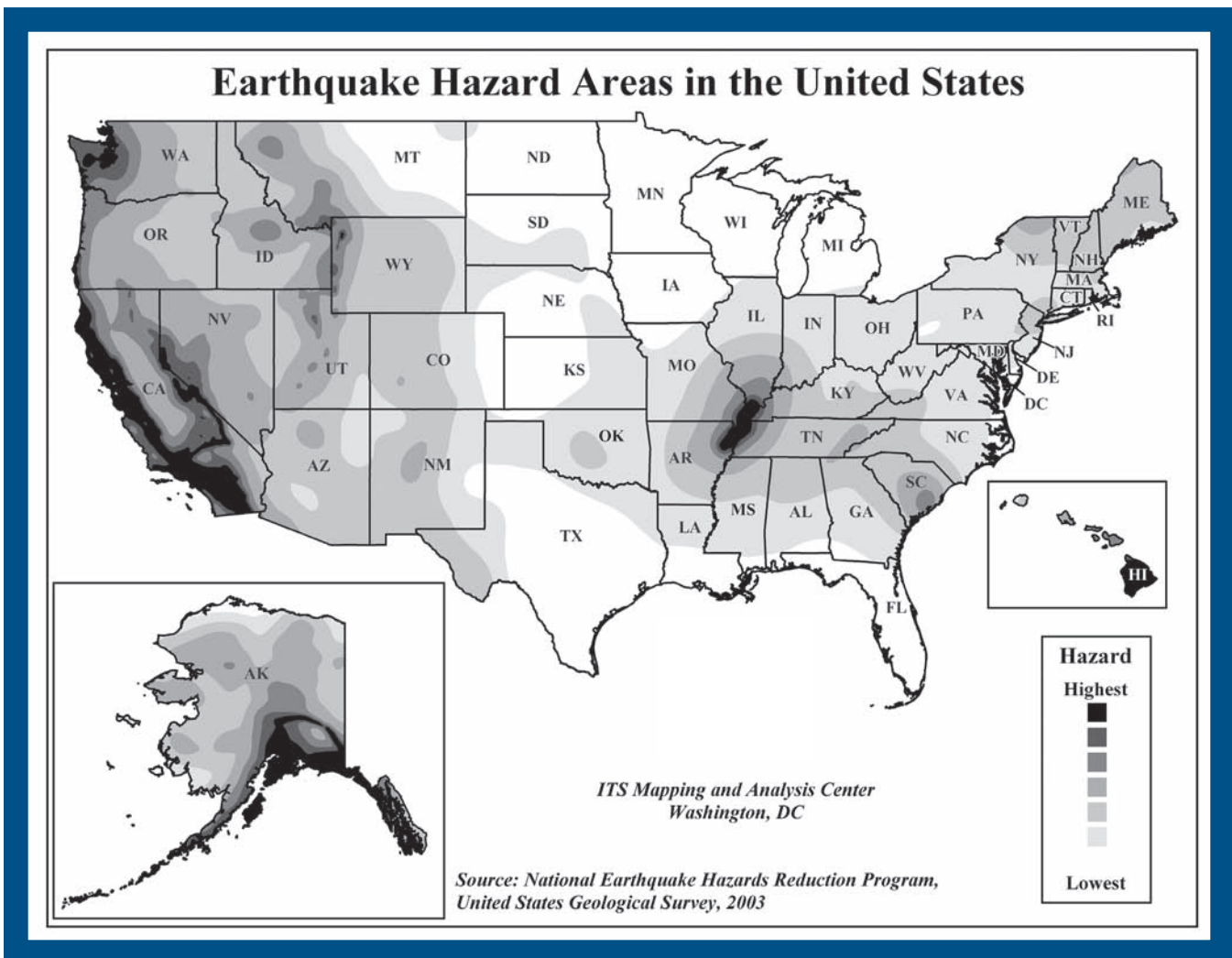


2.7

# Earthquakes



One of the most frightening and destructive phenomena of nature is a severe earthquake and its terrible aftereffects. An earthquake is a sudden movement of the earth, caused by the abrupt release of strain that has accumulated over a long time. For hundreds of millions of years, the forces of plate tectonics have shaped the earth, as the huge plates that form the earth's surface slowly move over, under, and past each other. Sometimes, the movement is gradual. At other times, the plates are locked together, unable to release the accumulating energy. When the accumulated energy grows strong enough, the plates break free. If the earthquake occurs in a populated area, it may cause many deaths and injuries and extensive property damage.



### Know the Terms

Familiarize yourself with these terms to help identify an earthquake hazard:

#### Earthquake

A sudden slipping or movement of a portion of the earth's crust, accompanied and followed by a series of vibrations.

#### Aftershock

An earthquake of similar or lesser intensity that follows the main earthquake.

#### Fault

The fracture across which displacement has occurred during an earthquake. The slippage may range from less than an inch to more than 10 yards in a severe earthquake.

#### Epicenter

The place on the earth's surface directly above the point on the fault where the earthquake rupture began. Once fault slippage begins, it expands along the fault during the earthquake and can extend hundreds of miles before stopping.

#### Seismic Waves

Vibrations that travel outward from the earthquake fault at speeds of several miles per second. Although fault slippage directly under a structure can cause considerable damage, the vibrations of seismic waves cause most of the destruction during earthquakes.

#### Magnitude

The amount of energy released during an earthquake, which is computed from the amplitude of the seismic waves. A magnitude of 7.0 on the Richter Scale indicates an extremely strong earthquake. Each whole number on the scale represents an increase of about 30 times more energy released than the previous whole number represents. Therefore, an earthquake measuring 6.0 is about 30 times more powerful than one measuring 5.0.

## Take Protective Measures

The following are things you can do to protect yourself, your family, and your property in the event of an earthquake:

### Before an Earthquake

- Repair defective electrical wiring, leaky gas lines, and inflexible utility connections. Get appropriate professional help. Do not work with gas or electrical lines yourself.

- Bolt down and secure to the wall studs your water heater, refrigerator, furnace, and gas appliances. If recommended by your gas company, have an automatic gas shut-off valve installed that is triggered by strong vibrations.
- Place large or heavy objects on lower shelves. Fasten shelves, mirrors, and large picture frames to walls. Brace high and top-heavy objects.
- Store bottled foods, glass, china, and other breakables on low shelves or in cabinets that fasten shut.
- Anchor overhead lighting fixtures.
- Be sure the residence is firmly anchored to its foundation.
- Install flexible pipe fittings to avoid gas or water leaks. Flexible fittings are more resistant to breakage.
- Locate safe spots in each room under a sturdy table or against an inside wall. Reinforce this information by moving to these places during each drill.
- Hold earthquake drills with your family members: Drop, cover, and hold on!

### During an Earthquake

Minimize your movements during an earthquake to a few steps to a nearby safe place. Stay indoors until the shaking has stopped and you are sure exiting is safe.

If you are:	Then:
Indoors	<ul style="list-style-type: none"> <li>• Take cover under a sturdy desk, table, or bench or against an inside wall, and hold on. If there isn't a table or desk near you, cover your face and head with your arms and crouch in an inside corner of the building.</li> <li>• Stay away from glass, windows, outside doors and walls, and anything that could fall, such as lighting fixtures or furniture.</li> <li>• Stay in bed—if you are there when the earthquake strikes—hold on and protect your head with a pillow, unless you are under a heavy light fixture that could fall. In that case, move to the nearest safe place.</li> <li>• Use a doorway for shelter only if it is in close proximity to you and if you know it is a strongly supported, load-bearing doorway.</li> <li>• Stay inside until the shaking stops and it is safe to go outside. Most injuries during earthquakes occur when people are hit by falling objects when entering into or exiting from buildings.</li> <li>• Be aware that the electricity may go out or the sprinkler systems or fire alarms may turn on.</li> <li>• DO NOT use the elevators.</li> </ul>
Outdoors	<ul style="list-style-type: none"> <li>• Stay there.</li> <li>• Move away from buildings, streetlights, and utility wires.</li> </ul>

If you are:	Then:
In a moving vehicle	<ul style="list-style-type: none"> <li>• Stop as quickly as safety permits and stay in the vehicle. Avoid stopping near or under buildings, trees, overpasses, and utility wires.</li> <li>• Proceed cautiously once the earthquake has stopped, watching for road and bridge damage.</li> </ul>
Trapped under debris	<ul style="list-style-type: none"> <li>• Do not light a match.</li> <li>• Do not move about or kick up dust.</li> <li>• Cover your mouth with a handkerchief or clothing.</li> <li>• Tap on a pipe or wall so rescuers can locate you. Use a whistle if one is available. Shout only as a last resort—shouting can cause you to inhale dangerous amounts of dust.</li> </ul>

- Be prepared for aftershocks. These secondary shockwaves are usually less violent than the main quake but can be strong enough to do additional damage to weakened structures.
- Open cabinets cautiously. Beware of objects that can fall off shelves.
- Stay away from damaged areas unless your assistance has been specifically requested by police, fire, or relief organizations.
- Be aware of possible tsunamis if you live in coastal areas. These are also known as seismic sea waves (mistakenly called “tidal waves”). When local authorities issue a tsunami warning, assume that a series of dangerous waves is on the way. Stay away from the beach.

### After an Earthquake



## Knowledge Check

Check your knowledge about what to do during an earthquake. For each question, choose answer A or B and circle the correct response. When you have finished, check your responses using the answer key below.

What action should you take during an earthquake? The answer varies by where you are when an earthquake strikes. For each situation, pick the best course of action from the choices given.

1. At home	A. Stay inside B. Go out to the street
2. In bed	A. Stand by a window to see what is happening B. Stay in bed and protect your head with a pillow
3. In any building	A. Stand in a doorway B. Crouch in an inside corner away from the exterior wall
4. On the upper floor of an apartment building	A. Take the elevator to the ground floor as quickly as possible B. Stay in an interior room under a desk or table
5. Outdoors	A. Run into the nearest building B. Stay outside away from buildings
6. Driving a car	A. Stop the car in an open area B. Stop the car under an overpass

Answer key  
1. A 2. B 3. B 4. B 5. B 6. A

## For More Information

If you require more information about any of these topics, the following are resources that may be helpful.

*Avoiding Earthquake Damage: A Checklist for Homeowners.* Safety tips for before, during, and after an earthquake

*Preparedness in High-Rise Buildings.* FEMA-76. Earthquake safety tips for high-rise dwellers

*Learning to Live in Earthquake Country: Preparedness in Apartments and Mobile Homes.* L-143. Safety tips on earthquake preparation for residents of apartments and mobile homes

*Family Earthquake Safety Home Hazard Hunt and Drill.* FEMA-113. How to identify home hazards; how to conduct earthquake drills

*Earthquake Preparedness: What Every Childcare Provider Should Know.* FEMA 240. Publication for teachers and for presentation to children. Available online at [www.fema.gov/kids/tch\\_eq.htm](http://www.fema.gov/kids/tch_eq.htm)

FEMA Publications







2.8

# Volcanoes

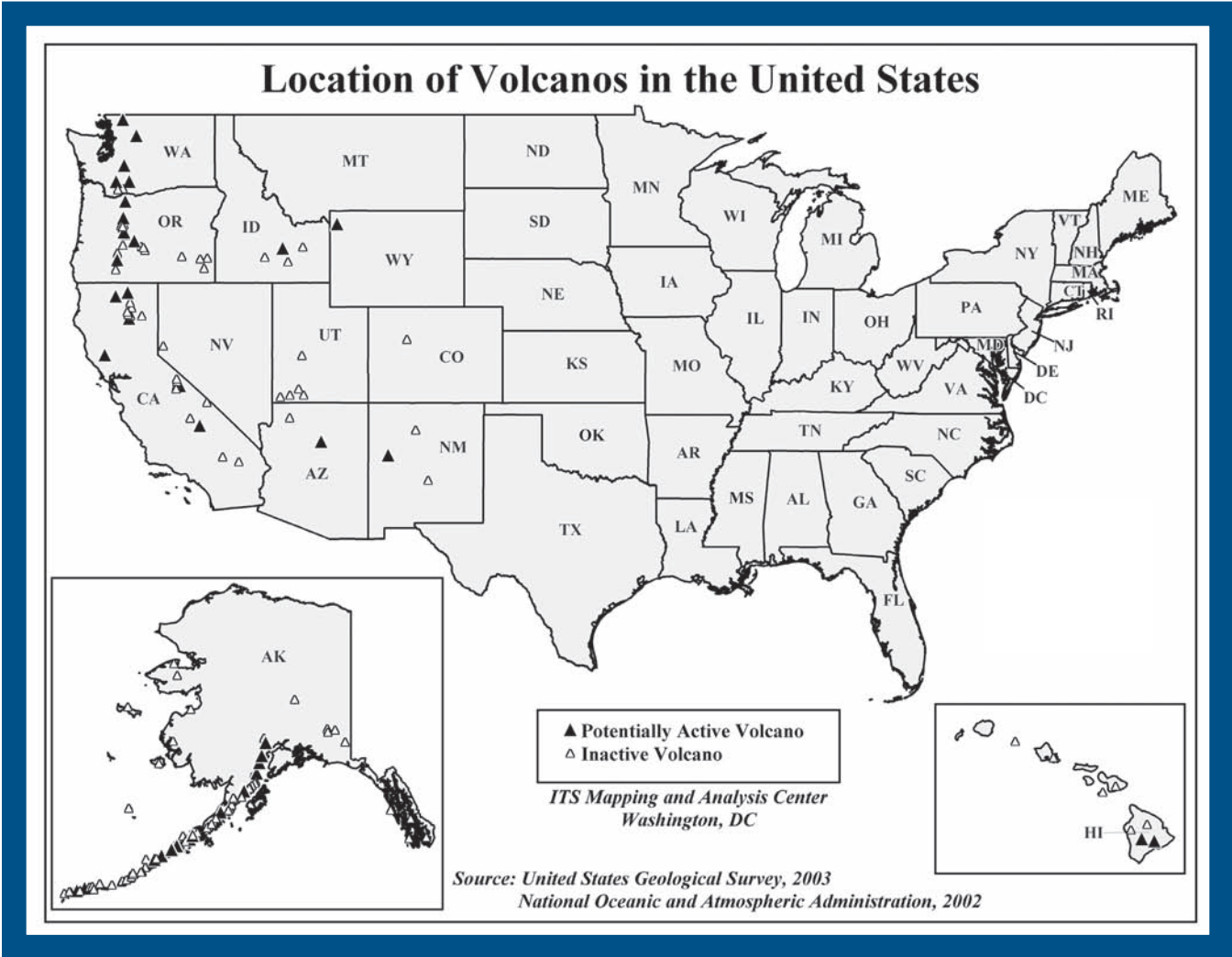


A volcano is a vent through which molten rock escapes to the earth's surface. When pressure from gases within the molten rock becomes too great, an eruption occurs. Eruptions can be quiet or explosive. There may be lava flows, flattened landscapes, poisonous gases, and flying rock and ash.

Because of their intense heat, lava flows are great fire hazards. Lava flows destroy everything in their path, but most move slowly enough that people can move out of the way.

Fresh volcanic ash, made of pulverized rock, can be abrasive, acidic, gritty, gassy, and odorous. While not immediately dangerous to most adults, the acidic gas and ash can cause lung damage to small infants, to older adults, and to those suffering from severe respiratory illnesses. Volcanic ash also can damage machinery, including engines and electrical equipment. Ash accumulations mixed with water become heavy and can collapse roofs.

Volcanic eruptions can be accompanied by other natural hazards, including earthquakes, mudflows and flash floods, rock falls and landslides, acid rain, fire, and (under special conditions) tsunamis. Active volcanoes in the U.S. are found mainly in Hawaii, Alaska, and the Pacific Northwest.



## Take Protective Measures

- Add a pair of goggles and a disposable breathing mask for each member of the family to your disaster supplies kit.
- Stay away from active volcano sites.

### Before a Volcanic Eruption

The following are guidelines for what to do if a volcano erupts in your area:

- Evacuate immediately from the volcano area to avoid flying debris, hot gases, lateral blast, and lava flow.
- Be aware of mudflows. The danger from a mudflow increases near stream channels and with prolonged heavy rains. Mudflows can move faster than you can walk or run. Look upstream before crossing a bridge, and do not cross the bridge if mudflow is approaching.
- Avoid river valleys and low-lying areas.

### During a Volcanic Eruption

#### Protection from Falling Ash

- Wear long-sleeved shirts and long pants.
- Use goggles and wear eyeglasses instead of contact lenses.
- Use a dust mask or hold a damp cloth over your face to help with breathing.
- Stay away from areas downwind from the volcano to avoid volcanic ash.
- Stay indoors until the ash has settled unless there is danger of the roof collapsing.
- Close doors, windows, and all ventilation in the house (chimney vents, furnaces, air conditioners, fans, and other vents).
- Clear heavy ash from flat or low-pitched roofs and rain gutters.
- Avoid running car or truck engines. Driving can stir up volcanic ash that can clog engines, damage moving parts, and stall vehicles.
- Avoid driving in heavy ash fall unless absolutely required. If you have to drive, keep speed down to 35 MPH or slower.



**After a Volcanic Eruption**

Follow the instructions for recovering from a disaster in Part 5.

**Knowledge Check**

Read the scenario and answer the question. Check your responses with the answer key below.

**Scenario**

About an hour after the eruption of Mount St. Helens, ash began to fall in Yakima, a city in eastern Washington. The ash fall was so extensive and it became so dark that lights were turned on all day. It took 10 weeks to haul away the ash from Yakima's streets, sidewalks, and roofs.

Assume you were a resident of Yakima during this time. What would you need to protect yourself when going outside?

**For More Information**

If you require more information about any of these topics, the following are resources that may be helpful.

**Publications****National Weather Service**

*Heat Wave: A Major Summer Killer.* An online brochure describing the heat index, heat disorders, and heat wave safety tips. Available online at: [www.nws.noaa.gov/om/brochures/heat\\_wave.htm](http://www.nws.noaa.gov/om/brochures/heat_wave.htm)

**U.S. Geological Survey**

*Volcano Hazards Program.* Website with volcano activity updates, feature stories, information about volcano hazards, and resources. Available online at: <http://volcanoes.usgs.gov>

Answer key  
possible

1. Face masks 2. Goggles 3. Eyeglasses instead of contact lenses 4. Clothing to cover as much of the body as possible

2.9

# Landslides and Debris Flow (Mudslide)

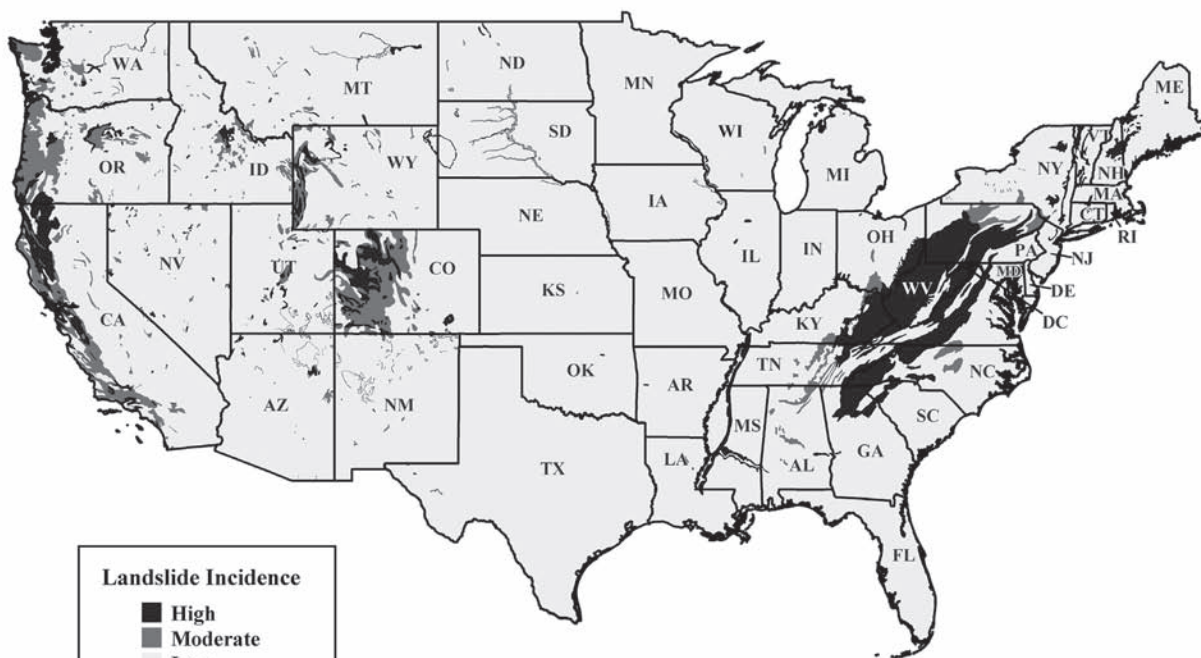


Landslides occur in all U.S. states and territories. In a landslide, masses of rock, earth, or debris move down a slope. Landslides may be small or large, slow or rapid. They are activated by storms, earthquakes, volcanic eruptions, fires, and human modification of land.

Debris and mud flows are rivers of rock, earth, and other debris saturated with water. They develop when water rapidly accumulates in the ground, during heavy rainfall or rapid snowmelt, changing the earth into a flowing river of mud or “slurry.” They flow can rapidly, striking with little or no warning at avalanche speeds. They also can travel several miles from their source, growing in size as they pick up trees, boulders, cars, and other materials.

Landslide problems can be caused by land mismanagement, particularly in mountain, canyon, and coastal regions. Land-use zoning, professional inspections, and proper design can minimize many landslide, mudflow, and debris flow problems.

## Landslide Overview Map of the Continental United States



Note: There was no data provided for Alaska and Hawaii.

ITS Mapping and Analysis Center  
Washington, DC

Source: United States Geological Survey, data based on most current available

## Take Protective Measures

### Before a Landslide or Debris Flow

The following are steps you can take to protect yourself from the effects of a landslide or debris flow:

- Do not build near steep slopes, close to mountain edges, near drainage ways, or natural erosion valleys.
- Get a ground assessment of your property.
- Consult an appropriate professional expert for advice on corrective measures.
- Minimize home hazards by having flexible pipe fittings installed to avoid gas or water leaks, as flexible fittings are more resistant to breakage (only the gas company or professionals should install gas fittings).

### Recognize Landslide Warning Signs

- Changes occur in your landscape such as patterns of storm-water drainage on slopes (especially the places where runoff water converges) land movement, small slides, flows, or progressively leaning trees.
- Doors or windows stick or jam for the first time.
- New cracks appear in plaster, tile, brick, or foundations.
- Outside walls, walks, or stairs begin pulling away from the building.
- Slowly developing, widening cracks appear on the ground or on paved areas such as streets or driveways.
- Underground utility lines break.
- Bulging ground appears at the base of a slope.
- Water breaks through the ground surface in new locations.
- Fences, retaining walls, utility poles, or trees tilt or move.
- A faint rumbling sound that increases in volume is noticeable as the landslide nears.
- The ground slopes downward in one direction and may begin shifting in that direction under your feet.
- Unusual sounds, such as trees cracking or boulders knocking together, might indicate moving debris.
- Collapsed pavement, mud, fallen rocks, and other indications of possible debris flow can be seen when driving (embankments along roadsides are particularly susceptible to landslides).

---

### During a Landslide or Debris Flow

The following are guidelines for what you should do if a landslide or debris flow occurs:

- Move away from the path of a landslide or debris flow as quickly as possible.
- Curl into a tight ball and protect your head if escape is not possible.

---

### After a Landslide or Debris Flow

The following are guidelines for the period following a landslide:

- Stay away from the slide area. There may be danger of additional slides.
- Check for injured and trapped persons near the slide, without entering the direct slide area. Direct rescuers to their locations.
- Watch for associated dangers such as broken electrical, water, gas, and sewage lines and damaged roadways and railways.
- Replant damaged ground as soon as possible since erosion caused by loss of ground cover can lead to flash flooding and additional landslides in the near future.
- Seek advice from a geotechnical expert for evaluating landslide hazards or designing corrective techniques to reduce landslide risk.
- Follow the instructions for returning home in Part 5.





## Knowledge Check

Review the following information and answer the questions. Check your responses with the answer key below.

Landslides occur in all 50 states—it is estimated that they cause between 25 and 50 deaths each year in the U.S. and thousands more in vulnerable areas around the globe. The number of landslides in the United States is expected to increase.

1. What might account for the projected increase in landslides?
2. What can you do to help reverse the upward trend?

1. Mounting pressure for approving the development of lands subject to landslides and earth failures has increased development in these unsafe areas.

2. Work with others in the community to enact and enforce regulations that prohibit building near areas subject to landslides and mudslides. In areas where the hazard exists and development has already occurred, work to promote protective measures such as encouraging homeowners to get a professional ground assessment of their property and educating residents about the warning signs.

Answer Key



2.10

# Tsunamis



Tsunamis (pronounced soo-ná-mees), also known as seismic sea waves (mistakenly called “tidal waves”), are a series of enormous waves created by an underwater disturbance such as an earthquake, landslide, volcanic eruption, or meteorite. A tsunami can move hundreds of miles per hour in the open ocean and smash into land with waves as high as 100 feet or more.

From the area where the tsunami originates, waves travel outward in all directions. Once the wave approaches the shore, it builds in height. The topography of the coastline and the ocean floor will influence the size of the wave. There may be more than one wave and the succeeding one may be larger than the one before. That is why a small tsunami at one beach can be a giant wave a few miles away.

All tsunamis are potentially dangerous, even though they may not damage every coastline they strike. A tsunami can strike anywhere along most of the U.S. coastline. The most destructive tsunamis have occurred along the coasts of California, Oregon, Washington, Alaska, and Hawaii.

Earthquake-induced movement of the ocean floor most often generates tsunamis. If a major earthquake or landslide occurs close to shore, the first wave in a series could reach the beach in a few minutes, even before a warning is issued. Areas are at greater risk if they are less than 25 feet above sea level and within a mile of the shoreline. Drowning is the most common cause of death associated with a tsunami. Tsunami waves and the receding water are very destructive to structures in the run-up zone. Other hazards include flooding, contamination of drinking water, and fires from gas lines or ruptured tanks.

### Know the Terms

Familiarize yourself with these terms to help identify a tsunami hazard:

#### Advisory

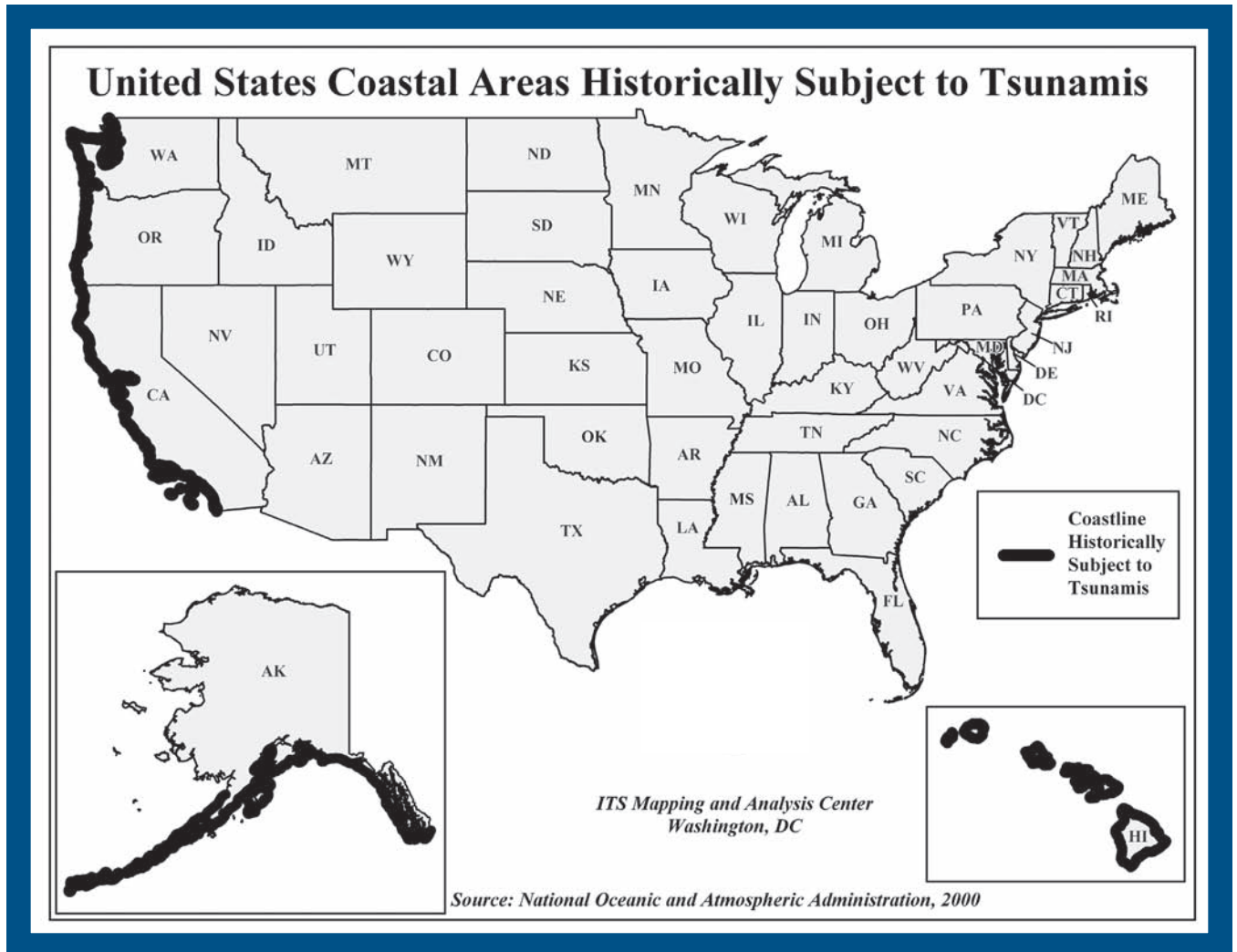
An earthquake has occurred in the Pacific basin, which might generate a tsunami.

#### Watch

A tsunami was or may have been generated, but is at least two hours travel time to the area in Watch status.

#### Warning

A tsunami was, or may have been generated, which could cause damage; therefore, people in the warned area are strongly advised to evacuate.



## Take Protective Measures

The following are guidelines for what you should do if a tsunami is likely in your area:

- Turn on your radio to learn if there is a tsunami warning if an earthquake occurs and you are in a coastal area.
- Move inland to higher ground immediately and stay there.

### During a Tsunami



If there is noticeable recession in water away from the shoreline this is nature's tsunami warning and it should be heeded. You should move away immediately.

## After a Tsunami

The following are guidelines for the period following a tsunami:

- Stay away from flooded and damaged areas until officials say it is safe to return.
- Stay away from debris in the water; it may pose a safety hazard to boats and people.



### *Save Yourself—Not Your Possessions*

Like everyone else in Maullin, Chile, Ramon Atala survived the 1960 Chile earthquake. However, he lost his life trying to save something from the tsunami that followed.

Mr. Atala was Maullin's most prosperous merchant. Outside of town, he owned a barn and a plantation of Monterey pine. In town, he owned a pier and at least one large building and also had private quarters in a waterfront warehouse.

Mr. Atala entered this warehouse between the first and second wave of the tsunami that struck Maullin. The warehouse was washed away and his body was never found.

It is unclear what he was trying to save. What is clear is that no possession is worth your life and that it is important to get to higher ground away from the coast and stay there until it is safe to return.

2.11

# Fires



Each year, more than 4,000 Americans die and more than 25,000 are injured in fires, many of which could be prevented. Direct property loss due to fires is estimated at \$8.6 billion annually.

To protect yourself, it is important to understand the basic characteristics of fire. Fire spreads quickly; there is no time to gather valuables or make a phone call. In just two minutes, a fire can become life-threatening. In five minutes, a residence can be engulfed in flames.

Heat and smoke from fire can be more dangerous than the flames. Inhaling the super-hot air can sear your lungs. Fire produces poisonous gases that make you disoriented and drowsy. Instead of being awakened by a fire, you may fall into a deeper sleep. Asphyxiation is the leading cause of fire deaths, exceeding burns by a three-to-one ratio.



## Take Protective Measures

### Before a Fire

#### Smoke Alarms

- Install smoke alarms. Properly working smoke alarms decrease your chances of dying in a fire by half.
- Place smoke alarms on every level of your residence. Place them outside bedrooms on the ceiling or high on the wall (4 to 12 inches from ceiling), at the top of open stairways, or at the bottom of enclosed stairs and near (but not in) the kitchen.
- Test and clean smoke alarms once a month and replace batteries at least once a year. Replace smoke alarms once every 10 years.

#### Escaping the Fire

- Review escape routes with your family. Practice escaping from each room.
- Make sure windows are not nailed or painted shut. Make sure security gratings on windows have a fire safety opening feature so they can be easily opened from the inside.



- Consider escape ladders if your residence has more than one level, and ensure that burglar bars and other antitheft mechanisms that block outside window entry are easily opened from the inside.
- Teach family members to stay low to the floor (where the air is safer in a fire) when escaping from a fire.
- Clean out storage areas. Do not let trash, such as old newspapers and magazines, accumulate.

### Flammable Items

- Never use gasoline, benzine, naphtha, or similar flammable liquids indoors.
- Store flammable liquids in approved containers in well-ventilated storage areas.
- Never smoke near flammable liquids.
- Discard all rags or materials that have been soaked in flammable liquids after you have used them. Safely discard them outdoors in a metal container.
- Insulate chimneys and place spark arresters on top. The chimney should be at least three feet higher than the roof. Remove branches hanging above and around the chimney.

### Heating Sources

- Be careful when using alternative heating sources.
- Check with your local fire department on the legality of using kerosene heaters in your community. Be sure to fill kerosene heaters outside, and be sure they have cooled.
- Place heaters at least three feet away from flammable materials. Make sure the floor and nearby walls are properly insulated.
- Use only the type of fuel designated for your unit and follow manufacturer's instructions.
- Store ashes in a metal container outside and away from your residence.
- Keep open flames away from walls, furniture, drapery, and flammable items.
- Keep a screen in front of the fireplace.
- Have heating units inspected and cleaned annually by a certified specialist.

### Matches and Smoking

- Keep matches and lighters up high, away from children, and, if possible, in a locked cabinet.
- Never smoke in bed or when drowsy or medicated. Provide smokers with deep, sturdy ashtrays. Douse cigarette and cigar butts with water before disposal.

### Electrical Wiring

- Have the electrical wiring in your residence checked by an electrician.
- Inspect extension cords for frayed or exposed wires or loose plugs.
- Make sure outlets have cover plates and no exposed wiring.
- Make sure wiring does not run under rugs, over nails, or across high-traffic areas.
- Do not overload extension cords or outlets. If you need to plug in two or three appliances, get a UL-approved unit with built-in circuit breakers to prevent sparks and short circuits.
- Make sure insulation does not touch bare electrical wiring.

### Other

- Sleep with your door closed.
- Install A-B-C-type fire extinguishers in your residence and teach family members how to use them.
- Consider installing an automatic fire sprinkler system in your residence.
- Ask your local fire department to inspect your residence for fire safety and prevention.

### During a Fire

If your clothes catch on fire, you should:

- **Stop, drop, and roll**—until the fire is extinguished. Running only makes the fire burn **faster**.

To escape a fire, you should:

- **Check closed doors for heat before you open them.** If you are escaping through a closed door, use the back of your hand to feel the top of the door, the doorknob, and the crack between the door and door frame before you open it. Never use the palm of your hand or fingers to test for heat—burning those areas could impair your ability to escape a fire (i.e., ladders and crawling).

Hot Door	Cool Door
Do not open. Escape through a window. If you cannot escape, hang a white or light-colored sheet outside the window, alerting fire fighters to your presence.	Open slowly and ensure fire and/or smoke is not blocking your escape route. If your escape route is blocked, shut the door immediately and use an alternate escape route, such as a window. If clear, leave immediately through the door and close it behind you. Be prepared to crawl. Smoke and heat rise. The air is clearer and cooler near the floor.

- Crawl low under any smoke to your exit—heavy smoke and poisonous gases collect first along the ceiling.
- Close doors behind you as you escape to delay the spread of the fire.
- Stay out once you are safely out. Do not reenter. Call 9-1-1.



The following are guidelines for different circumstances in the period following a fire:

#### After a Fire

- If you are with burn victims, or are a burn victim yourself, call 9-1-1; cool and cover burns to reduce chance of further injury or infection.
- If you detect heat or smoke when entering a damaged building, evacuate immediately.
- If you are a tenant, contact the landlord.
- If you have a safe or strong box, do not try to open it. It can hold intense heat for several hours. If the door is opened before the box has cooled, the contents could burst into flames.
- If you must leave your home because a building inspector says the building is unsafe, ask someone you trust to watch the property during your absence.
- Follow the instructions for recovering from a disaster in Part 5.

## Knowledge Check

Answer each question and check your responses using the answer key below.

1. You need to escape a fire through a closed door. What, if anything, should you do before opening the door?
2. What should you do if your clothes are on fire?
3. What actions should be taken for burn victims?
4. To reduce heating costs, you installed a wood-burning stove. What can you do to reduce the risk of fire from this heating source?
5. To escape in thick smoke, what should you do?

- Answer key
1. Check the door for heat with the back of your hand
  2. Stop, drop, and roll
  3. Call 9-1-1 and cool and cover burns
  4. Have the stove cleaned and inspected by a certified specialist
  5. Crawl close to the floor

## For More Information

---

If you require more information about any of these topics, the following are resources that may be helpful.

---

*After the Fire: Returning to Normal.* FA 046. This 16-page booklet provides information about recovering from a fire, including what to do during the first 24 hours, insurance considerations, valuing your property, replacement of valuable documents, salvage hints, fire department operations, and more. Available online at [www.usfa.fema.gov/public/hfs/pubs/atf/after.shtm](http://www.usfa.fema.gov/public/hfs/pubs/atf/after.shtm)

*Protecting Your Family From Fire.* FA 130. This pamphlet was written to provide the information you need to decide what you must do to protect your family from fire. Topics include children, sleepwear, older adults, smoke detectors, escape plans, and residential sprinklers. Available online at [www.usfa.fema.gov/public/hfs/pubs/hfs\\_pubs2.shtm](http://www.usfa.fema.gov/public/hfs/pubs/hfs_pubs2.shtm)

*Fire Risks for the Hard of Hearing.* FA 202; *Fire Risks for the Older Adult.* FA 203; *Fire Risks for the Mobility Impaired.* FA 204; *Fire Risks for the Blind or Visually Impaired.* FA 205  
These reports address preparation for fire risks for populations with special challenges. All are available online at [www.usfa.fema.gov/fire-service/education/education-pubs.shtm](http://www.usfa.fema.gov/fire-service/education/education-pubs.shtm)

FEMA Publications

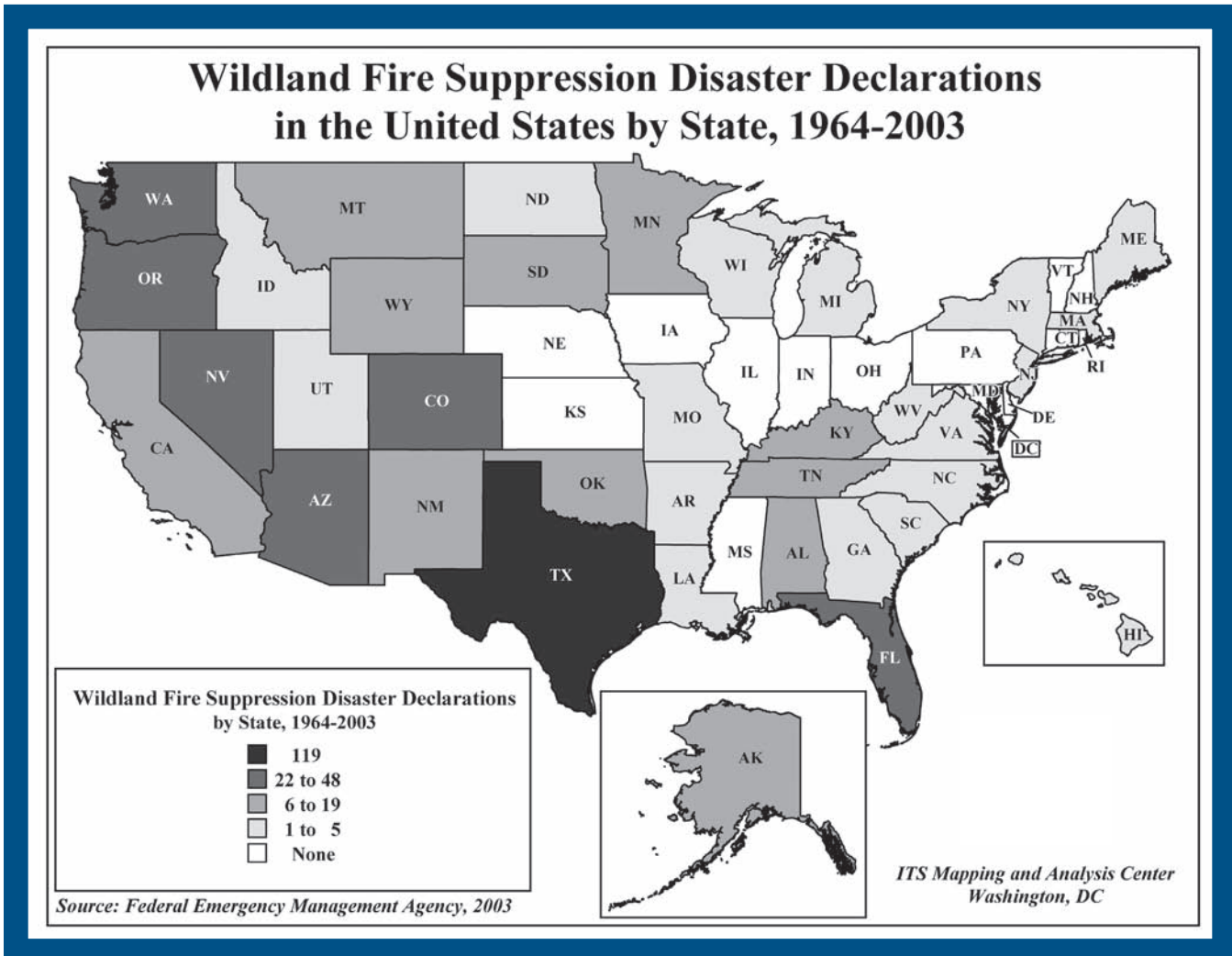


2.12

# Wildfires



If you live on a remote hillside or in a valley, prairie, or forest where flammable vegetation is abundant, your residence could be vulnerable to wildfires. These fires are usually triggered by lightning or accidents. Wildfires spread quickly, igniting brush, trees, and homes.



## Take Protective Measures

### Before a Wildfire

To prepare for wildfires, you should:

- Mark the entrance to your property with address signs that are clearly visible from the road.
- Keep lawns trimmed, leaves raked, and the roof and rain gutters free from debris such as dead limbs and leaves.
- Stack firewood at least 30 feet away from your residence.



- Store flammable materials, liquids, and solvents in metal containers outside your residence at least 30 feet away from structures and wooden fences.
- Create defensible space by thinning trees and brush within 30 feet around your residence. Beyond 30 feet, remove dead wood, debris, and low tree branches.
- Landscape your property with fire resistant plants and vegetation to prevent fire from spreading quickly. For example, hardwood trees are more fire-resistant than pine, evergreen, eucalyptus, or fir trees.
- Make sure water sources, such as hydrants, ponds, swimming pools, and wells, are accessible to the fire department.
- Use fire resistant, protective roofing and materials like stone, brick, and metal to protect your residence. Avoid using wood materials. They offer the least fire protection.
- Cover all exterior vents, attics, and eaves with metal mesh screens no larger than 6 millimeters or 1/4 inch to prevent debris from collecting and to help keep sparks out.
- Install multi-pane windows, tempered safety glass, or fireproof shutters to protect large windows from radiant heat.
- Use fire-resistant draperies for added window protection.
- Have chimneys, wood stoves, and all home heating systems inspected and cleaned annually by a certified specialist.
- Insulate chimneys and place spark arresters on top. The chimney should be at least 3 feet above the roof.
- Remove branches hanging above and around the chimney.

### Follow Local Burning Laws

Before burning debris in a wooded area, make sure you notify local authorities, obtain a burning permit, and follow these guidelines:

- Use an approved incinerator with a safety lid or covering with holes no larger than 3/4 inch.
- Create at least a 10-foot clearing around the incinerator before burning debris.
- Have a fire extinguisher or garden hose on hand when burning debris.



---

## During a Wildfire

If a wildfire threatens your home and time permits, take the following precautions:

- Shut off gas at the meter. Only a qualified professional can safely turn the gas back on.
- Seal attic and ground vents with pre-cut plywood or commercial seals.
- Turn off propane tanks.
- Place combustible patio furniture inside.
- Connect garden hose to outside taps. Place lawn sprinklers on the roof and near above-ground fuel tanks. Wet the roof.
- Wet or remove shrubs within 15 feet of your residence.
- Gather fire tools such as a rake, axe, handsaw or chainsaw, bucket, and shovel.
- Back your car into the garage or park it in an open space facing the direction of escape. Shut doors and roll up windows. Leave the key in the ignition and the car doors unlocked. Close garage windows and doors, but leave them unlocked. Disconnect automatic garage door openers.
- Open fireplace damper. Close fireplace screens.
- Close windows, vents, doors, blinds or noncombustible window coverings, and heavy drapes. Remove flammable drapes and curtains.
- Move flammable furniture into the center of the residence away from windows and sliding-glass doors.
- Close all interior doors and windows to prevent drafts.
- Place valuables that will not be damaged by water in a pool or pond.

If advised to evacuate, do so immediately. Choose a route away from the fire hazard. Watch for changes in the speed and direction of the fire and smoke.

---

## After a Wildfire

Follow the instructions for recovering from a disaster in Part 5.

---

## For More Information

If you require more information about any of these topics, the following resource may be helpful.

---

## FEMA Publications

*Wildfire: Are You Prepared?* L-203. Wildfire safety tips, preparedness, and mitigation techniques.