



Coping with Landslides and Debris Flows (Mudslides)

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
- ◆ Alternate freezing or thawing
- ◆ Steepening of slopes by erosion or human modification

Debris flows (mudslides) 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 can flow 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. In areas burned by forest and brush fires, a lower threshold of precipitation may initiate landslides. Land-use zoning, professional inspections, and proper design can minimize many landslide and debris flow problems.

How Can I Protect Myself from a Landslide or Debris Flow?

Before a Landslide or Debris Flow

Protect yourself:

- ◆ Do not build near steep slopes, close to mountain edges, near drainage ways, or natural erosion valleys.
- ◆ Get a geologic hazard assessment of your property.
- ◆ Contact local officials, state geological surveys or departments of natural resources, and university departments of geology. Landslides occur where they have before, and in identifiable hazard locations. Ask for information on landslides in your area, specific information on areas vulnerable to landslides, and request a professional referral for an appropriate hazard assessment of your property, and corrective measures you can take, if necessary.
- ◆ If you are at risk from a landslide talk to your insurance agent. Debris flow may be covered by flood insurance policies from the National Flood Insurance Program (NFIP).
- ◆ Minimize home hazards:
 - Have 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).
 - Plant ground cover on slopes and build retaining walls.

- o In mudslide areas, build channels or deflection walls to direct the flow around buildings.
- o Remember: If you build walls to divert debris flow and the flow lands on a neighbor's property, you may be liable for damages.

Recognize Landslide and Debris Flow 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

What you should do if a landslide or debris flow occurs:

- ◆ **Stay alert and awake.** Many debris-flow fatalities occur when people are sleeping. Listen to a NOAA Weather Radio or portable, battery-powered radio or television for warnings of intense rainfall. Be aware that intense, short bursts of rain may be particularly dangerous, especially after longer periods of heavy rainfall and damp weather.
- ◆ **If you are in areas susceptible to landslides and/or debris flows, consider leaving if it is safe to do so.** Remember that driving during an intense storm can be hazardous. If you remain at home, move to a second story if possible. Staying out of the path of a landslide, mudslide or debris flow saves lives.
- ◆ **Listen for any unusual sounds that might indicate moving debris, such as trees cracking or boulders knocking together.** A trickle of flowing or falling mud or debris may precede larger landslides. Moving debris can flow quickly and sometimes without warning.
- ◆ **If you are near a stream or channel, be alert for any sudden increase or decrease in water flow and for a change from clear to muddy water.** Such changes may indicate landslide activity upstream, so be prepared to move quickly. Don't delay! Save yourself, not your belongings.
- ◆ **Be especially alert when driving.** Embankments along roadsides are particularly susceptible to landslides. Watch the road for collapsed pavement, mud, fallen rocks, and other indications of possible debris flows.

What to Do if You Suspect Imminent Landslide or Debris Flow Danger

- ◆ **Contact your local fire, police, or public works department.** Local officials are the best persons able to assess potential danger.
- ◆ **Inform affected neighbors.** Your neighbors may not be aware of potential hazards. Advising them of a potential threat may help save lives. Help neighbors who may need assistance to evacuate.
- ◆ **Evacuate.** Getting out of the path of a landslide or debris flow is your best protection.
- ◆ **Curl into a tight ball and protect your head if escape is not possible.**

After a Landslide or Debris Flow

Follow these guidelines for the period following a landslide or debris flow:

- ◆ **Stay away from the slide area.** There may be danger of additional slides.
- ◆ **Listen to local radio or television stations for the latest emergency information.**
- ◆ **Watch for flooding, which may occur after a landslide or debris flow.** Floods sometimes follow landslides and debris flows because they may both be started by the same event.
- ◆ **Check for injured and trapped persons near the slide, without entering the direct slide area.** Direct rescuers to their locations.
- ◆ **Help a neighbor who may require special assistance**—infants, elderly people, and people with disabilities. Elderly people and people with disabilities may require additional assistance. People who care for them or who have large families may need additional assistance in emergency situations.

- ◆ **Look for and report broken utility lines and damaged roadways and railroads to appropriate authorities.** Reporting potential hazards will get the utilities turned off as quickly as possible, preventing further hazard and injury.
- ◆ **Check the building foundation, chimney, and surrounding land for damage.** Damage to foundations, chimneys, or surrounding land may help you assess the safety of the area.
- ◆ **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.** A professional will be able to advise you of the best ways to prevent or reduce landslide risk, without creating further hazard.

Recovering from a Landslide or Debris Flow

In the aftermath of a landslide or debris flow, there will probably be many pressing issues to take care of, but it is essential that your first priority be your own safety and that of your loved ones. If you are in need of emergency services (shelter, clothing, food, money, etc.) contact one of the emergency hotlines listed in the “Emergency Resources” section at the end of this guide.

In addition, safeguard yourself and your loved ones by taking the following tips into consideration:

- ◆ Listen to a portable radio for information on shelters, helpful resources and safety advisories.
- ◆ Stay out of and away from damaged buildings. If you had to evacuate, return home only when authorities say it is safe.

- ◆ If you have children or grandchildren with you, make sure they are constantly supervised.
- ◆ Be alert for potential hazards. Take extreme care when moving in an area damaged by a landslide or debris flow.
- ◆ Cooperate with authorities. Whether you're asked to relinquish telephone lines, keep off emergency roads or given other directions, do your best to comply.
- ◆ Use caution when traveling. Landslides and debris flows can create weakened roads or bridges, and broken or downed live power lines.
- ◆ Be cautious with food. When electricity is out, refrigerated foods can spoil quickly; throw out any food that is questionable. Frozen foods will typically last in a closed freezer for several days.
- ◆ Be cautious with drinking water. Radio reports will typically notify residents if tap water is safe to drink. Try to drink bottled water until you know for sure. On average, you need one gallon of water per family member per day. (*Tip*—You can obtain safe water by melting ice cubes.)

Disaster Relief

In the aftermath of a landslide or debris flow, it is essential that your first priority be your own safety and that of your loved ones. If you are in need of emergency services (shelter, clothing, food, money, etc.) contact one of the emergency hotlines listed in the "Emergency Resources" section at the end of this guide.

Caring for Yourself

Disasters such as a landslide or debris flow can result in extreme emotions including stress, helplessness, fear, irritability, anger and depression. You may also suffer from nightmares, shock, loss of appetite and the inability to concentrate. All of these reactions and feelings are normal; but if you do not address them, you can jeopardize your health. If you or a loved one are unable to cope, do not hesitate to get help. Many temporary shelters offer free counseling services to victims, or referrals to professionals who can provide further assistance.

In addition, consider the following tips:

- ◆ Have realistic expectations and goals, and be patient with yourself.
- ◆ Reach out to supportive friends and family for comfort and guidance.
- ◆ Give yourself plenty of time to recover and rest.
- ◆ Try to maintain a nutritious diet to keep your energy up.
- ◆ Focus on your breathing—deep, slow breaths will help calm you.
- ◆ Join a support group. You can find support groups through your doctor, listed in your local newspaper or through local Red Cross chapters.
- ◆ If you work, ask your employer if it offers an EAP (Employee Assistance Program). An EAP counselor can provide counseling on a wide range of issues, including stress, anxiety, dealing with a tragedy and more.

Helping Children Cope

Natural disasters are stressful for everyone, but children may need extra help coping. A child's reaction will vary depending on his or her personality and age. Infants may become more irritable or fearful. Toddlers and preschoolers will probably feel frightened, insecure or helpless, and may display regressive behavior such as clinginess or separation anxiety. School-aged children may become preoccupied or fearful and experience stress-related physical symptoms such as headaches or stomachaches. Preteens and teenagers may feel invincible; display reckless behavior; withdraw; or become hostile. Since children do not have the same coping skills as adults, they will need your love, support, guidance and reassurance.

The following tips may help you help children affected by a landslide or debris flow:

- ◆ Answer any questions with simple, honest, accurate answers. If you don't know the answer, say you will try to find out.
- ◆ Talk about your own fears and stresses so children understand, but do not unnecessarily scare them with too many details.
- ◆ Don't make false promises; instead, set realistic goals.
- ◆ Make time for children and pay extra attention to their needs.
- ◆ If you are in a shelter, reassure children that your situation is temporary.
- ◆ Encourage your children to play (in safe areas).
- ◆ Maintain regular routines if at all possible. For example, even in a shelter, you can still have a bedtime routine such as reading or story-telling before children go to sleep.

What to Do if Your Home Is Damaged or Destroyed

When assessing the damage to your home, use extreme caution. Watch for hidden dangers: flooded areas, falling structures, sharp metal, fires and other potential hazards.

The following tips may help:

- ◆ If you smell gas or hear a blowing or hissing noise, you may have a gas leak. In this case, open a window and quickly leave. Turn off the gas at the outside main valve, if possible, and call the gas company from a neighbor's telephone or a pay phone. *Note*—If you turn off the gas, it must be turned back on by a professional.
- ◆ Clean up spilled medicines, bleaches, gasoline or other flammable liquids immediately.
- ◆ If you see sparks or broken or frayed wires, or if you smell hot insulation, call an electrician. You may need to turn off the electricity at the main fuse box or circuit breaker; however, if there is a lot of water on the ground, this may be hazardous, so have an electrician do it for you.
- ◆ If you suspect sewage lines are damaged, avoid using toilets and call a plumber. If water pipes are damaged, contact the water company and avoid using water from the tap.
- ◆ Consider hiring a reliable contractor—but beware of frauds who prey on disaster victims. Your best bet is to get a reference from friends, neighbors or co-workers who have had improvement work done. Get written estimates from several firms. Ask for explanations for price variations. Don't automatically choose the lowest bidder. Be sure to get a signed contract from any contractor you agree to work with.

If Your Home Is Damaged

- ◆ Take pictures of the damage—both to the house and your possessions for insurance purposes.
- ◆ Make temporary repairs to prevent further damage from rain, wind or looting. If windows are broken, nail boards or staple-gun heavy plastic or tarps in their place.
- ◆ Keep all repair receipts for your insurance agent.

Home Owner's and Renter's Insurance

If you have insurance, make a detailed list of the damages and contact your insurance representative as soon as possible. If you aren't able to call from home, tell your agent where you can be reached—and try to be patient. Where there is extensive and widespread damage, insurance representatives usually handle claims on an as-needed basis, beginning with the most serious situations.

Property insurance typically protects against the financial loss due to damages incurred to real and/or personal property, but policies vary, and many have exclusions. For example, many policies do not cover damage caused by flooding, unless you have purchased additional flood coverage. Therefore, read your policy carefully and contact your agent with specific questions about coverage or the claims process.

Helpful Resources

Federal Emergency Management Agency (FEMA)

800-621-FEMA (800-621-3362)

www.fema.gov

Red Cross Hotline

800-REDCROSS (800-733-2767)

www.redcross.org

The Salvation Army

615 Slaters Lane

P.O. Box 269

Alexandria, VA 22313

703-684-5500

www.salvationarmyusa.org

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