

## Entering and Cleaning Up Flooded Homes

### *Protect yourself and your family during cleanup*

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This NebGuide addresses safety and other considerations for entering, cleaning, and drying out flooded homes.

#### Safety

- **Be patient.** Do not return to your home until authorities have said it is safe to enter the area. It is imperative that emergency services can get to you in the event of an accident or other emergency.
- **Think safety.** Take precautions to keep you, your family, and the people who are helping you, safe. Floodwater and its residues are considered “grey” and “black” water and can contain toxic materials, bacteria, sewage, pesticides, etc. Mold and other harmful pollutants and particles also may be present.
- **Restrict children and pets.** Do not allow young children or pets to be present upon returning to the home or during cleanup. Ask someone to watch young children at a location away from the flooded area. Children should be kept away from any cleaning products being used, as well as floodwater and debris to ensure their safety.
- **Restrict those with physical vulnerabilities.** The elderly, children, and persons who are ill or have compromised immune systems should not be present during the cleanup.
- **Wear protective clothing.** Everyone re-entering or working in a flooded area should wear protective clothing. This includes long-sleeve shirts, long pants, rubber gloves that reach to the middle of the forearm, goggles, and heavy shoes with thick soles. Wear rubber boots over shoes. Wash and shower thoroughly and often during the cleanup process.
- **Take water.** Take water with you for drinking and cleaning purposes.
- **Protect your lungs.** Wear a respirator that can filter mold spores, dust, and other particles. At a minimum,

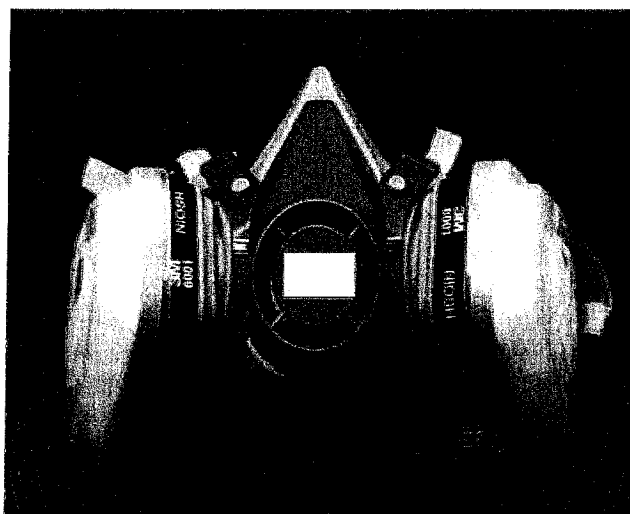


Figure 1. A half-face HEPA respirator protects lungs from airborne particles.

wear an N-95 air filter mask or N-100 with a nozzle on the front. A half-face respirator (*Figure 1*) made from plastic and/or rubber with HEPA (high-efficiency particulate air) cartridges that trap particles, mold spores, etc., will provide more protection. Any device must fit properly to be effective, so follow the manufacturer’s directions when using. Air filter masks and respirators can restrict the flow of air to the lungs, so take breaks often and rest.

- **Avoid physical strain.** Use caution and do not strain when lifting or moving heavy objects.

#### Be Aware of Potential Hazards Near a Damaged Home or Outbuildings

Many potential hazards may exist in and around a damaged home or outbuildings, including:

- **Gas and Electrical** — Make sure the gas and electrical services have been disconnected and cannot or will not be turned on until deemed safe. As an added precaution,

flip off the breaker at the meter pole or the breakers/fuses at electrical panels. **HOWEVER, DO NOT STEP OR STAND IN WATER WHEN TOUCHING ANY ELECTRICAL EQUIPMENT.** Homes should be inspected by an electrical inspector before the power company restores electricity. All water should be pumped out of the basement before attempting any work on electrical systems. *When electricity is restored*, use ground fault circuit interrupters on extension cords to help prevent accidents. **AGAIN, DO NOT STAND IN WATER OR ON DAMP SURFACES WHILE USING ANY ELECTRICAL APPLIANCE OR EQUIPMENT.**

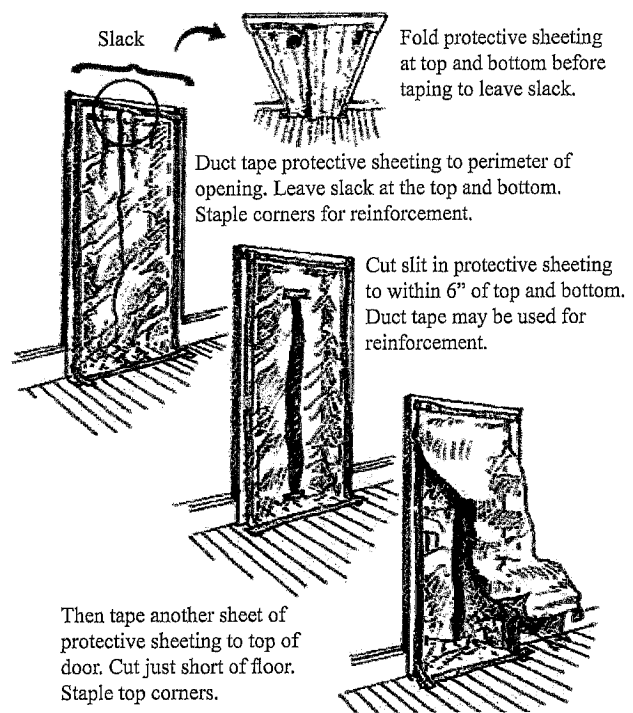
- **Water** — If your home is in a subdivision or town and water is running from broken pipes, shut off the water supply to the house. Usually, there is a valve at the meter or where the water supply line enters the house. If you cannot find this, contact the water supply company.
- **Structural Damage** — DO NOT enter a structure that appears unsafe. From the outside, look for slight shifts in foundations, sagging rooflines, or other indications of structural damage. To the extent that you are able, prevent further damage to the building. Consult with a building contractor or engineer if there are indications of damage.
- **Basements** — Arrange to have basements slowly pumped out — no more than 2 to 3 feet per day. Do not start pumping until you are certain the soil around the building is no longer saturated. If the basement begins to refill, wait a day or two before attempting to pump again. Water pressure may collapse walls as the basement is drained, unless it is pumped out slowly and water pressures allowed to equalize. Pump the water well away from the foundation to prevent re-saturating the soil near the home.
- **Supplemental Power** — If using portable generators, do not use them inside. Operate them outdoors at least 10 feet from windows, doors, and other openings; position so that fumes and exhaust do not flow back into the home or basement. Stop the engine and allow it to cool before refueling. Do not store gasoline or other fuels inside the home.

### Clean Up and Open Up

- **Prepare to file insurance claim.** Follow your insurance company's procedures for claiming losses. Take photos of the home and contents. Record losses and damages before starting to clean up and toss things out. Record the serial numbers of appliances or other equipment that are to be properly discarded. Keep receipts for purchases made to repair or replace items. This information may be needed for insurance claims and for documenting losses for other purposes, such as for possible tax deductions.
- **Save valuable items.** Salvage valuable items such as important documents and family treasures first.

Heirlooms and items of special value often can be saved by using specific treatments and procedures. For instance, paper records can be spread out and air dried, preferably on blotting paper out of direct sunlight. If items like photos and books cannot be dried within 48 hours, clean off the mud, place in double plastic bags and place in an operating freezer to be dealt with later. Contact area or state museums or search websites for information on how to handle other materials.

- **Seal doorways.** Seal off the flood-damaged areas of the home with 6 or 9 mil polyethylene sheets to reduce movement of mold spores, microorganisms, and other particles into the rest of the home. To maintain access through a doorway, cut two sheets of plastic about a foot longer than the door opening height, and each about as wide as the opening. Tape one sheet along each side and the top of the door opening so the sheets overlap. Attach another layer to reduce air and contaminant movement even more. Use weather stripping to increase the seal on any doors between contaminated areas and the rest of the home, or tape around the top, sides, and bottom of the door to seal (*Figure 2*). Consider closing off the air handling vents to the other areas of the home when removing mold, dirt, and dust to prevent their spread through the air handling system.
- **Clean up mud.** Remove mud, silt, and other deposits with a shovel or other tool best suited for the surface and area.
- **Have heating and cooling equipment inspected.** Arrange for a heating and cooling system professional



**Figure 2.** Use this system to reduce movement of mold spores, microorganisms, and other particles to the rest of the home. (Illustration by HUD)

to inspect your heating, ventilation and air conditioning equipment, and water heater, and to service them if they can be salvaged. If the air handling ducts have been in contact with flood waters, they should be discarded, or cleaned by a duct cleaning professional. Also ask them to check for mold and other deposits within the system. Fiberglass air handling ducts are generally discarded.

- **Inspect electrical boxes.** Check to be sure the electricity is turned off at the main electrical panel. Remove receptacle and switch cover to inspect electrical boxes. Any electrical equipment, wiring, switches, etc., that were submerged or contaminated by floodwaters need to be replaced by a licensed electrician. Check and follow local and state electrical codes. Do not turn on the power to a flooded structure until it has been inspected and determined safe by an electrical inspector.
- **Allow flooring to dry.** Remove baseboards, floor coverings, and floor boards to allow inner cavities to dry. Removing some of the floorboards can help prevent warping and buckling. Plywood flooring or underlayment needs to be examined for layers that might be separated or starting to separate. Similarly, oriented strand board (OSB) underlayment should be checked for warping and separation. Particle board underlayment likely will need to be replaced because of swelling and deterioration.
- **Check for mold.** Open up wall cavities if walls have gotten wet. Remove and throw out the wet or mold-covered wall board/drywall/paneling and fiberglass and cellulose insulation (*Figure 3*). Remove at least 24 inches above the flood water level as moisture can wick above the flood line and mold may be present. Often, plaster can be salvaged if dried out and it remains sound. To prevent the spread of contaminants, bag or wrap discarded materials in plastic and carry outside through the nearest door or window.
- **Discard mold-damaged items.** Floodwaters are contaminated, and mold growth may already be underway by the time water recedes. This makes cleaning absor-

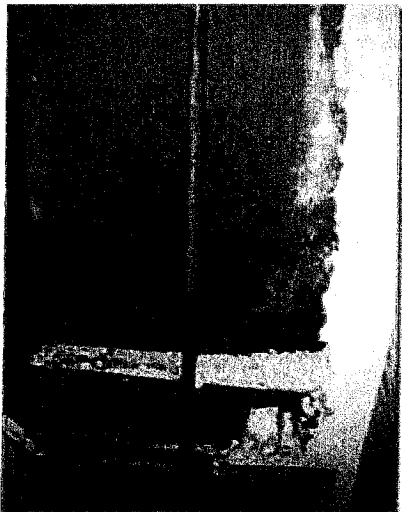


Figure 3. Mold growing inside a wall cavity on the back of drywall.

bent or porous materials nearly impossible. Ceiling tiles, rugs, carpets, pads, soft furnishings, mattresses, and any other absorbent or porous items that have been contaminated and have mold growing in and on them should be thrown away. Place items in plastic bags or wrap in plastic and remove through the nearest door or window. You can wash absorbent or porous items that appear to have no mold in or on them with clean water and the appropriate cleaner; however, make sure these items dry out completely within 48 hours (sooner if temperatures are warm); otherwise mold is likely to occur.

- **Professional mold clean up.** When mold is extensive or covers more than a 3 foot by 3 foot area, professional mold remediation is recommended.
- **Clean mold carefully.** Clean hard, nonporous materials and building components such as hard plastic, concrete, glass, metal, and solid wood using a nonphosphate, all-purpose detergent, such as Borax, and water. Re-clean several times and then rinse with clean water and allow to dry. Follow label directions on the detergent/cleaner. A residential pressure washer or a new garden sprayer may help make the job easier, but avoid getting spray in eyes and on skin due to contaminants. Cleaning must remove and not just kill the mold, because alive or dead, mold and mold spores can cause health problems. Follow the cleaning with a household disinfectant mixed according to directions and used with plenty of ventilation. Wear goggles, gloves, and protective clothing when cleaning and using disinfectants.
- **Use a brush.** Wooden floor joists and wall studs may be difficult to clean and disinfect. A bristle brush may aid in cleaning.
- **Disinfect.** Flood waters are classified as black and grey water, and a disinfectant (sodium hypochlorite-chlorine bleach, phenolic-phenol, pine-oil, or quaternary ammonium compounds) should be used **after** cleaning with a detergent and water to reduce contamination. **FOLLOW LABEL DIRECTIONS ON THE DISINFECTANT, AND USE PLENTY OF VENTILATION.** Disinfectants will help reduce microorganisms (bacteria, etc.) in contaminated areas.
- **Use caution when using disinfectants.** **DO NOT MIX A DISINFECTANT OR CLEANER WITH ANY OTHER PRODUCT. NEVER MIX CHLORINE BLEACH WITH AMMONIA OR VINEGAR, AS TOXIC GASSES ARE PRODUCED.** Use only the quantity recommended by the manufacturer — more is not better. Many disinfectants will need 15 to 20 minutes of wet contact time to be effective. Note that a solution of bleach and water can cause corrosion of electrical components and some metals.
- **Examine appliances.** While it may be possible to salvage household appliances, heaters, etc., it can be very difficult to dry and remove mud and silt from their

inner workings, so these items often must be discarded. If not discarded, have an appliance repair person inspect for safety and proper operation.

### Dry Out

- **Allow the building to dry out.** Open doors and windows. In high-moisture conditions, a heat source or some sort of mechanical drying equipment will be needed. Use fans, dehumidifiers, or nonaffected air conditioners to help in drying. Professional cleaning services have special equipment to aid in drying the home. Fans may disturb settled spores, other particles, and microorganisms. Using a fan in the window blowing to the outside can move the particles to the outdoors. Keeping humidity levels below 60 percent will help reduce mold growth. A hygrometer or relative humidity gauge will help to measure the humidity levels throughout the home. They may be available at some hardware and home stores, and lumber yards.
- **Again, be patient. DO NOT REPAIR AND COVER UP OR ENCLOSE WALLS, FLOORS, AND OTHER CAVITIES UNTIL ALL ARE COMPLETELY DRY.** Although wood and other items may feel dry to the touch, they often contain higher moisture levels than normal. Covering up and sealing the areas too soon can result in mold growth hidden inside walls and floor spaces. It may take weeks to several months for the home to thoroughly dry. An instrument, called a moisture meter, can be used to determine the moisture content of wood and other materials. Moisture meters can be purchased through some wholesale outlets carrying plumbing and other equipment, from woodworker's supply firms, or from sources found on the Internet. Wood should be dried to 15 percent or less. Securely tape a 3 foot by 3 foot piece of plastic to concrete floors. Wait several days, then remove the plastic. If there is moisture on the underneath side of the plastic, the concrete is not dry although it may feel dry, and additional time needs to be allowed before installing floor coverings.
- **Secure buildings.** You may need to secure the building from looters when you are not present. Valuables should be removed to a secure location if at all possible.

### Rest

- **Take care of yourself.** Disasters are highly stressful for all involved. Keep the family together for mutual support. Discuss problems with others — friends and neighbors can offer mutual support, too.

- **Rest often and eat well.** Set manageable goals. If problems seem overwhelming, seek professional help. Such feelings are common after disasters, and talking to a professional can help.

For more information about flooded homes and other flooding topics, go to the UNL Flood Resources website at [flood.unl.edu](http://flood.unl.edu). Other websites with flood-related information include:

- North Dakota State University Flood Information: [www.ag.ndsu.edu/flood](http://www.ag.ndsu.edu/flood)
- Extension Disaster Education Network: [eden.lsu.edu](http://eden.lsu.edu)
- eXtension: [www.extension.org/floods](http://www.extension.org/floods)
- Federal Emergency Management Association: [www.fema.gov](http://www.fema.gov)

### Summary

When entering and cleaning up a flooded home, personal safety should be the first consideration. Flood waters are generally contaminated, and protective clothing should be worn by everyone working in an area that has been flooded. Be cautious if mold is present and remove with safe practices. Reduce stress by getting plenty of rest, eating healthy, and setting manageable goals.

### Resources

- North Dakota State University — [www.ag.ndsu.edu/flood](http://www.ag.ndsu.edu/flood)
- Resources for Your Flooded Home, University of Missouri Extension — [extension.missouri.edu/p/MP904](http://extension.missouri.edu/p/MP904)
- Rehabbing Flooded Houses A Guide for Builders and Contractors, Prepared for HUD by Steven Winters Associates, Inc. — [www.huduser.org/portal/publications/destech/rehab\\_flood\\_houses.html](http://www.huduser.org/portal/publications/destech/rehab_flood_houses.html)

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