Floods

Floods

Floods are the most common and widespread of all natural hazards. Some floods develop over a period of days, but flash floods can result in raging waters in just a few minutes. Even very small creeks, gullies, culverts, dry streambeds or low-lying ground that may appear harmless in dry weather can flood. Wherever you live, be aware of potential flooding hazards. If you live in a low-lying area, near water or downstream from a dam, you must be prepared for floods. In addition to the information provided here, also refer to the General Family Preparedness section.

Preparing for Floods and Flash Floods

Some simple advance preparation will help you be ready for possible floods in your area.

1. Know the flood warning system in your community and be sure your family knows the warning. Instruct family members in emergency procedures during a flood warning.

   If you live in an area subject to frequent or sudden floods, especially flash floods, you may wish to have family flood drills. Assign each family member an emergency task such as gathering emergency supplies, turning off utilities, or listening to the radio for instructions.

2. Flood proof your buildings.

   Install check valves in sewer traps to prevent water from backing up in sewer drains.

   Seal cracks in walls and floors with hydraulic cement.

   Place heavy screens over lower windows to prevent breakage from floating objects.

3. Be ready to protect appliances from minor flooding. Put a half-block of cement under each corner of refrigerators, freezers, washing machines and dryers. Use bricks or boards if you don't have cement blocks.

4. Identify fire hazards.

   During a flood, fire danger is increased. In addition, fire departments may be unable to get to fires through high water. Watch for these fire hazards on your property:
   - Broken or leaking gas lines
   - flooded electrical circuits,
   - submerged furnaces or electrical appliances
   - flammable or explosive materials coming from upstream.

5. Before floodwaters crest, turn off the main power switch if you think the electrical circuits are going to be under water.

   Never Touch The Switch While You Are Wet Or Standing In Water. Do not turn the electrical system back on until it has been inspected by an electrician.

6. Know what a river height forecast means for your property especially how far your property is above or below expected flood levels.

7. Know where to go in case of flooding. Remember that you must seek higher ground as quickly as possible, on foot if necessary.

8. If you are camping, know how far your campsite is above nearby waterways.

   Know how to seek higher ground.
   Stay out of unknown water paths such as dry creeks or river beds.
   If advised to leave the area, do so immediately.

9. Refer to the General Family Preparedness section for additional steps to take.

Building Dikes To Prevent Minor Surface Flooding

Standing water from melting snow or heavy rains can flood basements and damage yards, wells, feed supplies, machinery and other property. Flooding is more apt to occur in areas with poor surface drainage systems or ice dams.

A 1- to 3-foot high sandbag earth dike offers protection from shallow flooding (water depth less than 3 feet). Contact a construction firm, lumber yard or Civil Defense officials for information on where to buy sandbags in the area.

A sandbag dike can be constructed as follows:

1. Select the site for the dike, making the best use of natural land features to keep it as short and low as possible. Avoid trees or other obstructions which would weaken the structure. Do not build the dike against a basement wall. Leave about 8 feet of space to maneuver between the dike and buildings.

2. Remove ice and snow (down to the bare ground if possible) from a strip of land about 8 feet wide.

3. Fill and lap sandbags.

   Fill bags approximately half full of clay, silt or sand. Do not tie.

   Alternate direction of bags with bottom layer lengthwise of dike. Lap unfilled portion under next bag.

   Tamp thoroughly in place. Build the dike three times as wide as it is high.

4. Seal the finished dike to increase its water tightness. To seal the dike:

   Spread a layer of earth or sand 1 inch deep and about 1 foot wide along the bottom of the dike on the water side.

   Lay polyethylene plastic sheeting so that the bottom edge extends 1 foot beyond the bottom edge of the dike over the loose dirt. The upper edge should extend over the top of the dike. (This plastic sheeting, available from construction supply firms, comes in 100-foot rolls and is 8 or 10 feet wide.)

   Lay the plastic sheeting down very loosely so that the pressure of the water will make the plastic conform easily with the sandbag surface. If the plastic is stretched too lightly, the water force can puncture it.

   Place a row of tightly fitting sandbags on the bottom edge of the plastic to form a watertight seal along the water side.

   Place sandbags at about 6-foot intervals to hold down the top edge of the plastic. Place boards or dirt between these sandbags to prevent winds from disturbing the plastic. As you work, avoid puncturing the plastic with sharp objects or by walking on it.

Preventing Leaks in Basements

Quick thaws or heavy rains can mean damp or flooded basements. Leaks in basements may be caused by cracked walls, improper grading, water in window wells or water pressure under floors.

Cracks

Watertight concrete is important to prevent water seepage in the basement. Fill cracks when the soil is dry, so cracks will be dry. It is best to fill cracks when there is no artificial heat in the basement so thin layers of mortar can cure.

1. Wide cracks (" inch or more). Shape the crack like a V with a star drill or cold chisel.

   Fill with mortar.

   Chisel out the sides of the crack to make a V opening about 1 inch deep and 1 inch wide at the surface.

   Coat the crack with a creamy mixture of cement and water.

   With a trowel immediately fill the opening with a 1:2 mixture of cement and sand mortar (one amount of cement to two amounts of sand mortar). Or use a chemically treated cement available at hardware or building supply stores.

2. Hairline cracks. Fill the cracks with a cement base paint. With a scrub brush apply a cement wash of Portland cement and water. Or check for other leak-stopping materials at your local lumberyard or hardware store.

3. The ground around foundations should slope away from the house at a rate of at least 6 inches in 10 feet. You should regrade by cutting and filling if you notice water standing along foundations, or if the surrounding ground is flat or slopes toward the house.

4. Carry roof water away from the building by eave gutters and downspouts. Water from downspouts should be carried about 3 feet away from the foundation wall.

   Use a splash block, down spouting or tile drain.

   Do not direct water from the down spouting into the drain around the footing.

Window Wells

1. Check window wells to be sure that surrounding ground ends a few inches below the top of the well.

2. To prevent water seeping down the outer surface and under the well, compact several inches of dirt around the well.

3. If there is tile around basement footing, dig a post hole inside the well to this tile. Fill with clean gravel.

4. If there is no tile around footing, improve drainage by laying drain tile from the bottom of the window well to a lower point in the yard.

Basement Floors

Water pressure under concrete basement floors may cause them to leak or buckle. To relieve this pressure:

1. Build a sump so water can run into it and be pumped out.

2. If there is a layer of clean gravel under the floor, drill a hole in the side of a floor drain. This will allow water to flow through the gravel to the drain, and will relieve the pressure under the floor.

3. Leaks sometimes can be diverted through concrete lined channels below or above floor level. Make a channel by chipping away floor and smoothing it with mortar, or by building a ditch above floor level. Carry the channel around the wall to a floor drain.

Cleaning Up After a Flood Setting Priorities

Priorities will vary with the kind and seriousness of damage. Buildings may not be habitable during repair.

1. Examine building structure. Check foundations for settling, cracking or undermining. Examine walls, floors, doors and windows to determine what repairs are necessary. You may want to repair only temporarily until extensive work can be done.

2. If basement is flooded, start pumping the water in stages. Pump about one- third of the water each day.

3. Get the electrical system in operation. If the switch box is in a flooded basement, do not turn electricity back on until water has been pumped out. Take electrical appliances to a serviceman as soon as possible.

4. Get the water system in operation. Disinfect wells and water system.

5. Shovel out mud and silt before it dries.

6.Before they dry, wash down flooded walls and floors with a hose. Start at upper limit of flooding and work downward.

7. Scrub and disinfect walls and floors.

8. Start the heating system if possible to speed up drying. Before operating it, the heating system may need to be cleaned, dried and reconditioned. Make sure chimneys are clean before starting system.

9. Dry out walls and floors. If necessary for proper drying, strip walls open up to water level. Drill holes in exterior siding. Complete drying may take months.

10.Repair buckled walls and floors.

11.Clean and dry household items, furniture, carpets, clothing, dishes and bedding. Disinfect when necessary.

12.Treat items for mildew as needed.

13.Care for damaged trees, shrubs and lawn.

14.Repaint, repair, refinish as necessary.

Salvaging Sewing Machines and Sergers

Most damage to flooded sewing machines and sergers is caused by rust. Even if the machine was not submerged, check for rust caused by general dampness. Rust develops quickly on highly polished, machined or plated surfaces.

1. If the equipment was submerged, the machine (head and controls) or the serger should be serviced by a dealer or professional sewing machine/serger repair person within 10 days if possible.

2. Try to prevent as much damage as possible by drying equipment quickly.

    Use a hand-held hair dryer to help dry interior parts.

    Dry attachments with a soft cloth or a hair dryer.

    Rinse attachments and removable metal parts in dry cleaning solvent or a light machine oil. Oil replaces water and protects the metal.

3. Oil interior parts to protect them. Put a few drops of machine oil on each moving part and operate the sewing machine or serger by hand for several minutes to distribute oil.

    If the equipment has been submerged, do not use the motor and controls to operate the equipment until they have been inspected by a dealer or a repair person.

4. If the sewing machine, serger or attachments have already begun to rust, follow preventive measures as above. Then rub rusted parts with very fine steel wool and reapply a coating of oil.

5. If the equipment cannot be serviced within 2 weeks, be sure a light film of oil remains on the parts.

    Store equipment in a large plastic bag until serviced to protect other surfaces from leaking oil.

    Place a chemical dehumidifier in the bag with the machine to absorb any residual moisture.

6. If equipment and controls were not submerged, professional servicing may not be necessary. Follow rust prevention measures for metal parts and then operate the equipment with the motor.

    If the equipment works properly, remove excess oil from attachments and other removable parts with a soft cloth. To remove excess oil from interior metal parts and thread-handling mechanisms sew/serge through scrap fabrics until no more oil is absorbed into fabric.

Cleaning Flood-soiled Pillows and Mattresses

Mattresses

1. A good innerspring mattress should be sent to a commercial renovating company. Renovation is too difficult to do at home. Ask about the cost of the work. It may be less expensive to buy a good reconditioned or new mattress.

2.If a mattress must be used temporarily, scrape off surface dirt and expose mattress to sunlight to dry as much as possible. Cover mattress with a rubber or plastic sheet or mattress cover before using it.

3. If you decide to keep a flood-soiled mattress, it should be sterilized.

This must be done at a sterilizing plant such as a mattress company or a state hospital.

Ask your local public health department or county Extension agent for information on mattress sterilizing plants in your area.

Have mattresses as dry as possible before taking them to a sterilizing plant. Use crop drying fans or household fans to speed up the drying process.

Feather Pillows

1. For feather pillows, if ticking is in good condition and does not contain red or yellow stains, wash feather and ticking together.

Brush off surface dirt.

Wash in machine or by hand in warm (not hot) suds 15 to 20 minutes. Use a disinfectant, following product directions for use. If using an automatic washer, wash no more than two pillows at one time.

If washing by hand, rinse at least three times in clear warm water.

Spin off water or squeeze out as much water as possible. Do not put pillows through a wringer.

Dry in an automatic dryer at moderate heat setting. Put several bath towels in the dryer with the pillow to speed up drying. Allow about 2 hours. Or dry pillows in a warm room on a sweater drying rack with a fan on them. Shake and turn pillows occasionally to fluff feathers and hasten drying. Or hang pillows on a clothesline by two corners. Change position end to end and shake occasionally to fluff feathers and speed drying.

2. If ticking is not in good condition or is stained with red or yellow mud, wash feathers and ticking separately.

Find or make a bag of light weight, firmly woven fabric such as muslin. The bag should be two to three times larger than the ticking.

Open one edge of the ticking.

Pin the open edges of the ticking and the bag together. Shake feathers from ticking into bag.

Sew seam in bag to close it.

Wash and dry the bag of feathers, following directions for washing feathers and ticking together.

Wash the ticking, using a disinfectant in the first wash. Follow product directions for use. Repeat washing until stains have been removed. Difficult red and yellow stains may need to be bleached or treated with rust remover. Avoid drying the ticking with heat until all stains have been removed.

Transfer clean feathers to clean ticking, using the same method as for emptying the ticking. Sew seam in ticking to close it.

Feathers will slide into the ticking more easily if ticking has been starched and ironed.

3. If pillows have been badly soaked with flood water, it may not be possible to remove all objectionable odors.

Polyester Fiberfill Pillows

1. Brush off surface dirt.

2. Wash in machine on gentle cycle or by hand in warm (not hot) suds, using disinfectant. Follow product directions for use. If washing by hand, flush water through the pillow by compressing it. Do not wring or twist. Repeat if all stains are not removed.

3. If washing by hand, rinse three times in clear, warm water.

4. Spin off water or press out as much water as possible by hand.

5.Follow directions for drying given for feather pillows.

Foam Rubber or Urethane Pillows

1. Brush off surface dirt.

2. Follow manufacturer's directions if available. Otherwise, wash in machine on gentle cycle or by hand in warm (not hot) suds, using a disinfectant. Follow product directions for use. If washing by hand, use a bathtub or large sink. Wash by pushing down on the pillow, releasing and pushing down again. Rinse the same way. Do not wring or twist.

3. Rinse well with lukewarm water.

4. Gently squeeze or spin out excess water. Blot with towels.

5. Dry away from heat or sunlight. Pillows may be tumbled in an automatic dryer on "air only" setting. Do not use heat. Or air dry on a flat surface, turning regularly. Pillows may dry very slowly in the air.

Cleaning Flood-soiled Blankets, Quilts, Comforters, Linens

Wash only one blanket, quilt or comforter at a time. Shake and brush to remove surface dirt. Follow manufacturer's laundering directions if available. Otherwise follow the directions below.

Wool Blankets, Quilts and Comforters

1. Soak for 15 to 20 minutes in lukewarm water. Use a bathtub or large sink. Turn two or three times during soak period. Drain off water. Several soak periods maybe needed if the blanket is very soiled.

2. Wash in lukewarm water with mild detergent and disinfectant appropriate for fiber content. Follow product directions for use. Immerse blanket and work suds through gently, using as little agitation as possible. If necessary, repeat washing procedure.

3. Rinse in clear water three or four times.

4. Gently squeeze out water. Hang blanket over two or more clotheslines. Let blanket droop between lines to distribute weight evenly. Or use automatic dryer set on low heat or air only. Remove blanket from dryer while it is still damp and hang over clotheslines to finish drying. Gently stretch blanket into shape as it dries.

5. Brush blanket on both sides to raise nap. Steam press binding, using a synthetic setting. Quilts and comforters do not need brushing or pressing.

Cotton and Synthetic Blankets (Not Electric)

1. Machine wash on gentle cycle in warm (not hot) water with detergent and disinfectant. Follow product directions for use. Repeat if necessary.

Use bleach or rust remover to remove red or yellow stains. Test before use because some bleaches and rust removers may remove or change the colors.

2. Dry in automatic dryer on moderate heat. Add several towels to speed drying. Or air dry on a clothesline.

3. Press binding if needed.

Electric Blankets

1. Avoid twisting, crimping and wringing the wiring.

2. Machine wash on gentle in warm (not hot) water no more than 5 minutes. Dissolve detergent in wash water before putting blanket in machine. Disinfect, following product directions. Do not use chlorine bleach as the disinfectant.

Evenly distribute the blanket in the machine. Use cold rinse. Do not put blanket through a wringer.

3. Machine dry by preheating dryer at a moderate or warm setting. Add the blanket and allow it to tumble for 10 minutes.

Remove blanket while still damp and hang over two or more clotheslines to finish drying. Straighten and shape blanket as it dries.

4.If washing by hand, follow directions for wool blankets. Electric mattress pad and foot-warmer pads may be washed like electric blankets.

Sheets, Towels, Linens

1. Brush and shake off as much loose dirt as possible.

2. Soak or rinse mud-stained fabric in cool water in washing machine to remove some of the soil.

3. Wash in warm suds and disinfectant several times if necessary. Follow product label directions for use. Do not use hot water or dry with heat until all stains have been removed.

4. If stains remain after several washings, bleach with sodium perborate or chlorine bleach. Rust remover may remove red or yellow stains. Test bleaches and rust removers before use because they may remove or change the colors.

Restoring Electrical Service After a Flood

CAUTION: Wear rubber gloves and rubber soled boots for all work with electrical circuits. Rubber is an insulator and will help protect you from shocks.

After a flood, your electrical system should be thoroughly checked and repaired by an electrician. If such service is unavailable and you need to do your own repairing, proceed as follows:

1. Turn power off.

   Disconnect the main electrical power switch and other switches controlling pumps or outbuildings. If your main switch is located in the basement, be sure all flood water has been pumped out before you attempt any work on the electrical system.

   Stand on a dry board when touching any switches and use a dry stick or wear rubber gloves to pull handles.

   Remove all branch circuit fuses or place circuit breakers in off position to ensure that power is off.

   Disconnect all plug-in equipment and turn off the switch at each piece of permanently connected equipment. Unscrew all light bulbs.

2. Clean and dry the system.

   If flood water covered your first floor, electrical outlets and switches are probably wet. They must be dried before service can be restored. Remove the covers from switches, convenience outlets and other electrical connections.

   Pull receptacles, switches and wires about 2 inches out from their boxes. Do not disconnect the wires.

   Clean out mud and dirt with clean water. Allow wires and connections to dry.

   Use extreme caution in cleaning mud and dirt from the main entrance box. Because the power line enters here, this is the most hazardous part of the electrical system to work on. Assume the sewer line is hot even if a test shows power is off. Never hose out a hot switchbox. Wear rubber gloves and rubber soled shoes. Do not touch anything wet or stand in water while working on the box.

   In an emergency, pull the electrical meter from its base to disconnect the power. Notify the electric company that you broke the seal, lock or tag.

   Allow electrical wires and connectors to dry completely. This may take days depending on how wet the system is and if any heat is available.

3. Check the system for electrical shorts.

   While standing on a dry board or ladder and wearing rubber gloves and rubber soled shoes, check the main switch box to be sure all fuses are removed.

Close the main switch and look for sparks or smoking wires. These indicate shorted switch connections. If you see evidence of such shorts, carefully try to correct the problem. You may need a new switch.

If the switch is in working order, open the switch and insert a fuse in one branch circuit.

Close the switch to check for shorts in that branch circuit.

If the fuse doesn't blow immediately, wait at least 15 minutes to check for slower electrical leaks. Smoking wires and sparks in the circuit also indicate trouble and you should carefully inspect all parts of the branch circuit you are checking.

If there are any signs of smoking or heating, if the fuse blows, or circuit breaker trips, remove all fuses and open the main switch. You may need to do additional cleaning or drying, or you may possibly need to replace circuit parts. Repeat steps for each of the other circuits one at a time.

After you have checked all the circuits and found them in good condition, once again remove all fuses and open the main switch. Replace wires for electrical receptacles, switches and light outlets in junction boxes. Replace covers.

Then check each branch circuit again by replacing one fuse at a time and closing the main switch.

If everything is okay, close the main switch.

4. For 24 hours be careful when using receptacles and switches. There may be slow leaks which could cause shocks. Do not plug in electrical appliances that have been flooded until they have been reconditioned.

5. If some circuits are faulty, use only the undamaged circuits. Do not overload undamaged circuits with too many lights or appliances until normal capacity is restored.

6. Some newer homes may have a ground fault circuit interruption system with their circuit breaker. This will probably need to be replaced.

Flooded Gardens

1. If flood waters have covered a garden, some produce will be unsafe to eat. The safety of unharvested fruits and vegetables will depend on:

Kind of produce

Maturity of produce at the time of flooding

Time of year flooding occurred

Severity of flooding (depth of water and silt)

Duration of flooding

Bacterial content of floodwater

Likelihood of contamination from sewage or other bacterial contaminants

2. In general, fruits and vegetables which were immature at the time of flooding should be safe to eat by the time they are ready to harvest. For additional safety, disinfect produce and cook it before eating.

3. Unless flooding was light and there is no danger of bacterial contamination from floodwater, do not use fruits and vegetables that were ready for harvest at the time of flooding unless they are disinfected, peeled and thoroughly cooked. Some fruits and vegetables are more susceptible than others to bacterial contamination.

Leafy vegetables such as lettuce, cabbage, mustard, kale, collards, spinach, swiss chard, celery, and fleshy vegetables and berry fruits such as tomatoes, summer squash, strawberries and peppers are highly susceptible to bacterial contamination.

Silt and other contaminants may be imbedded in the leaves, petioles, stems or other natural openings of fleshy structures and can be difficult to remove.

Root, bulb and tuber crops such as beets, carrots, radishes, turnips, onions and potatoes are less susceptible to bacterial contamination. Disinfect these vegetables, peel and cook them thoroughly before eating.

Produce with a protected fruit or impervious outer skin such as peas, melons, eggplant, sweet corn or winter squash should be washed and disinfected before the outer shell skin or husk is removed. Then shell, peel or husk the produce and cook it if possible.

4. Thoroughly wash and disinfect any produce before eating.

Wash in a strong detergent solution with a scrub brush. Remove all silt.

Immerse produce for 15 to 20 minutes in a chlorine solution. Household bleaches contain from 2 to 6 percent chlorine. The amount of bleach to add to water depends on the percentage chlorine it contains:

2 percent 3/4 tablespoon/quart; 4 percent 1 teaspoon/quart; 6 percent 1/2 teaspoon/quart).

Rinse thoroughly with safe drinking water.

Peel if possible and cook thoroughly before eating.

Refer any specific questions to health authorities or your county Extension agent.

Checking Flood-damaged Buildings

1. Use extreme caution when entering any damaged building.

2. If you must enter at night, carry a flashlight or other light.

3. If gas lines are broken, turn off gas at the meter or tank.

4. Do not smoke or use any open flame.

5. Watch for loose plaster and ceilings that could fall.

6. Open as many doors and windows as possible to remove moisture, odors and flammable or toxic gases. If windows are stuck tight, take off window strips and remove entire sash. If doors are stuck, drive out door hinge pins with a screwdriver and hammer, and remove doors.

7. If you are not qualified to judge the stability of a foundation, hire a contractor to make this inspection.

A neighborhood might join together in hiring a contractor for this work.

8. Examine foundations and supports for undermining. If walls or foundations have settled or cracked, uncover footings and raise, reinforce or brace any settled sections.

Be extremely careful when uncovering footings, because of the possibility of cavernous washouts.

9. If underlying material has been washed away, fill spaces to within 12 inches of the footing with gravel or crushed rock.

Fill the remaining space with concrete reinforced with steel rods.

10. Check piers for settling or shifting.

11. If the building has shifted or the floors have settled badly, it may be necessary to install temporary bracing until extensive work can be done.

12. Drain any crawl spaces which contain water.

13. Wash out mud, dirt and debris as soon as possible with a hose and mop, cloth or sponge. Clean walls and floors before silt or mud dries.

14. Start cleaning from the top floor or upper limit of flooding and work downward toward the first floor or basement.

15. Check walls with a level or plumb bob.

16. Brace walls where necessary.

17. Check mudsills, plates, soles and anchorage. Replace or repair where necessary, using redwood, cedar or treated lumber.

18. To speed up drying of flooded studding and insulation, remove all siding strips or plaster from upper and lower parts of the walls. Do not repaint walls until they are completely dry.

This may take several months. Flooded insulation may be ruined.

19. Remove loose plaster. After house is completely dry, repair damaged plaster on walls and ceilings. Badly damaged plaster walls can be resurfaced with gypsum board or plywood.

20.Flooded wooden floors will dry out slowly. Don't build fires to speed up their drying, as this could cause cracking or splitting from uneven drying. However, if the central heating system is operating, keep the temperature of the house at 60ø to 70øF to hasten drying without causing additional problems.

21.To prevent further buckling and warping, drive nails where the floor tends to lift or bulge.

22.After floors are completely dry, plane or sand them level.

23.If floors are too badly damaged to be refinished, lay a new floor over the old, or cover with carpet, vinyl or linoleum.

24.If a concrete floor is badly damaged, break it up and install a new floor.

> If damage is minor, patch with a rich mixture of concrete containing no coarse gravel aggregate.

25.Use plastic sheeting or roll roofing for temporary repair on solid deck roofs covered with asphalt shingles, wood shingles or roll roofing.

26.Use knife consistency patching compounds to repair minor leaks.

27.You probably will have to replace damaged metal roofing on spaced roof decks.

Cleaning and Repairing Flooded Basements

Before you enter a flooded basement:

1. Turn off the electricity, preferably at the meter.

2. Check outside cellar walls for possible cave-ins, evidence of structural damage or other hazards.

3. Turn off gas or fuel service valves.

4. Open doors and windows or use blowers to force fresh air into the basement.

5. Do not use an electric pump powered by your own electrical system. Use a gas-powered pump or one connected to an outside line. Fire departments in some communities may help with such services.

> More damage may be done by pumping water from the basement too soon or too quickly, than from letting the floodwater remain. Water in the basement helps brace the walls against the extra pressure of water-logged soil outside.
>
> If water is pumped out too soon, walls may be pushed in or floors pushed up.
>
> To help prevent such structural damage, pump the water from the basement in stages. Remove about one-third of the water each day. Watch walls for signs of failing. If the outside water level rises again after the day's pumping, start with a new water line. The soil may be very slow to drain, but do not hurry the pumping. Whatever is submerged in the flooded basement will not be damaged further. By delaying the pumping, serious structural damage may be prevented.

6. After water has been pumped from the basement, shovel out the mud and debris while it is still moist. Hose down walls to remove as much silt as possible before it dries. Floors and walls may need sanitizing, particularly if sewage has entered the basement. Scrub walls and floors with one of these sanitizing solutions:

> Chloride of lime (25 percent available chlorine). Dissolve a 12-ounce can in 2 gallons of water.
>
> High test hypochlorate (65 percent available chlorine) Stir 5 ounces into 2 gallons of water.

7. Oil stains in basements caused by overturned or damaged oil tanks may be a problem following flooding. Commercial products (such as Neutrodal) will help neutralize fuel oil.

> Products are available in powder form or an aerosol spray for hard-to-reach places.
>
> To remove oil stains and destroy odor, wipe up excess oil, shake or spray product on the spot according to manufacturer's directions, and let it set.

8. Check supporting columns, beams, walls and floors. Structural damage to flooded basements usually includes buckled walls, settled walls or heaved floors.

9. Buckled walls are evidenced by horizontal cracking and walls moving out of plumb. When this condition is minor, you need not repair the wall immediately. However, any noticeably buckled wall will eventually collapse from normal ground pressures and seasonal temperature changes.

When buckling has seriously weakened the wall, rebuild the damaged parts immediately. Build pilaster into walls over 15 feet long for reinforcement. Pilaster spacing should be 12 to 15 feet.

10. Settled walls and footings are indicated by vertical cracks either in small areas or throughout the structure. Repairs are difficult without special equipment. Contact a reliable contractor for this work.

11.Heaved floors are those that have not returned to their original level, or have cracked badly. You may need to construct a new floor:

Remove old, broken concrete.

Place 6 inches of gravel fill on the basement floor surface.

Cover area with a polyethylene vapor barrier.

Lay a 4-inch concrete floor with water proof expansion joints between the floor and the walls. The floor should be reinforced with steel.

Welded wire reinforcement placed at mid-height in the slab is minimum reinforcement.

12. If a floor is badly cracked, but has returned to its original level, and if there is sufficient headroom, place a new floor over the old one. Add a vapor barrier between the two floors. The new floor should be at least 2 inches thick.

13.In houses without basements, the area below the floor may be completely filled with mud. Remove the mud as soon as possible to avoid rotting joists or foundation wood. Jack up the house, if necessary, to make sure all mud is removed.

Finding and Repairing Leaks in Roofs

Causes of Leaks

Defective flashing. Wet spots near a chimney or outside wall may mean the leak is caused by defective flashing, narrow flashing or loose mortar joints.

On sloping roof valleys and at junctions of dormers and roof, look for corroded, loose or displaced flashing. Defective flashing often occurs around dormers and plumbing vent pipes.

Clogged downspouts or eaves. Check for choked downspouts on flat roofs. Accumulated water or snow on the roof above the flashing may cause a leak. Ice accumulations on eaves can form ridges that cause melting snow under the eaves to back up.

Cracks and deterioration. Roofing (especially wood or composition shingles) usually deteriorates first on southern exposures. Check southern slopes for cracking or deterioration.

Holes. Wet spots on plain roofs usually are caused by missing shingles or holes in the roofing. To find holes, look for light coming through places in unsealed attics. Stick a straw through the hole to mark the spot on the outside.

Repairing Leaks

Methods of repair will depend on the kind of roofing and the nature and extent of the leak.

1. Replace missing shingles with similar shingles or pieces of rust-resistant metal. (In an emergency you can use metal cut from a tin can.)

    Paint the metal on both sides and slip it under the upper layer of shingles. Be careful not to dislodge or loosen sound shingles.

    Cut out old nails with a long thin cold chisel.

    Cover exposed nails with roofer's cement.

2. Patch small holes with metal screws. Use neoprene washers in low places.

3. Repair large holes by replacing metal sheets or patching with a heavy cloth or canvas and elastic roofer's cement. Apply cement carefully over the patch to prevent canvas from sagging into the hole.

4. To repair cracks in the roof:

    Place heavy cloth or light canvas over the cracked area, extending the cloth approximately 6 inches beyond the cracked area.

    Use a roofing brush to smooth out cloth, and brush on two thin coats of roof coating. Keep cloth smooth while brushing.

Controlling Rodents After Floods

1. Rats and other rodents often move into buildings to escape flood waters. Rats can carry disease and small vermin. They should be eliminated as soon as possible.

2. Because of the danger of rat infestation, use caution when entering flooded buildings.

Carry a solid club and a flashlight.

Inspect likely hiding places for rats. Check closets, furniture, drawers, mattresses, stacks of clothes or paper, appliances, upholstered furniture, dark corners, attics and basements.

Be extremely careful when approaching rats. A starving rat can be dangerous.

3. Eliminate rat populations by poisoning rats that can't be destroyed by clubbing or trapping. Use rat control measures as recommended by your county Extension agent. Be extremely careful when using rat poison or bait, especially if there are children in the house.

4. After infestation has been controlled, clean up rat harboring places. (Rats may move into buildings when their hiding places are removed.) Remove trash piles and piles of damaged furniture or equipment. Store materials on platforms or shelves 1 to 18 inches above the ground.

5. Remove food sources. Store food supplies in rat-proof bins or containers. Suspend garbage containers from trees or posts. Remove animal carcasses which may attract rats. Do not leave scraps of food around.

6. Maintain several permanent rat bait stations in strategic locations, even after rat infestation has been controlled. This should eliminate rats that can migrate from neighboring areas, and will help prevent another infestation. Inspect baits frequently and replace them with fresh material whenever necessary.

7. If you are bitten by a rat, take the rat to your local health authorities or a veterinarian. The animal should be checked for rabies.

Controlling Insects After Floods

1. Eliminate breeding spots.

   Empty water from barrels, old tires, cans and other vessels. (This water may be polluted by floodwaters and may be a health hazard, in addition to being a breeding place for insects.) Also, check clogged gutters and flat roofs which have poor drainage. Make sure cisterns, cesspools, septic tanks, fire barrels and rain barrels are covered tightly.

   Whenever possible, drain ponds, pools or any standing water in which mosquitoes may breed.

   Dispose of refuse. Bury animal carcasses as soon as possible. Bury or burn garbage at least once every week. Be sure garbage cans have tightly fitting lids. When using manure and garbage as fertilizer, spread it thinly so it will dry quickly and not support fly development. Clean up debris. In some climates, scorpions may seek refuge in and around buildings during flood conditions. During the day they hide beneath loose stones, loose bark of fallen trees, boards, piles of lumber, and within walls of buildings.

2. Patch screens and other places where mosquitoes may enter buildings. Paint screens with an insecticide solution recommended by your county Extension agent.

3. Use a household spray or an aerosol bomb to kill mosquitoes, flies or other insects that get into buildings. Do not apply oil-based sprays to flowers or ornamental plants. Spray shrubbery and shaded areas of buildings to kill adult insects. Contact your county Extension agent for specific recommendations.

4. If possible, keep small children indoors, especially in the evening. Persons who must go outside at dusk should use a repellent on exposed parts of the body and clothing.

Special Considerations for Agricultural Producers

In addition to the precautions and responses covered in the previous pages, the agricultural producer will want to consider the following measures.

Preparing For a Flood or Flash Flood on Your Farm or Ranch

1. If you graze livestock in areas subject to flash flooding, consider using the area for larger animals. Pigs and calves are less likely to survive a flood than larger animals.

2. Leave animals an exit route to higher ground when possible. Animals will not always use an exit wisely.

3. If heavy rains are expected, pen animals on high ground at night.

Protecting Livestock During a Flood

Livestock that are not in a confined area usually can take care of themselves during floods. Do not let them become trapped in low-lying pens.

In broad, level flood plains where flood waters are seldom deeper than 3 or 4 feet, construct mounds of soil on which livestock can stay until flood waters recede. Or carry bales of hay for hogs to climb on. Try to locate these mounds where they will not be washed away by fast flowing water.

1. Provide feed and water. Water is essential. Thirsty animals will try to break out to get to flood waters. If water is in short supply, limit feed intake.

2. If animals are housed with machinery, fasten bales of straw in front of sharp edges and protruding parts such as cutter bars or crank handles.

    Do not use hay because animals will eat it. Try to cover wooden paddle wheels on combines or choppers because these parts can be dangerous if partially broken.

3. Block off narrow passageways where animals would be unable to turn around. A few heavy animals in a narrow dead end can be dangerous both to themselves and the building.

4. Be absolutely sure that herbicides, pesticides and treated seeds are not even remotely accessible to livestock and are stored where flood water will not contaminate livestock feed or water.

5. Turn off electricity at the main switch. Livestock could damage electric fixtures, causing fires or electrocutions.

6. If there is a possibility that dairy barns may become inundated, drive cattle out of the barn. During a rapid rise of water, cattle often refuse to leave the barn and may drown if the water rises high enough.

Preparing to Evacuate Your Farm

Ensure family safety first. See the General Family Preparedness section for more information on evacuation procedures. Be certain you have enough time to get to higher ground before access is cut off. If you have time before you receive an evacuation order, the following precautions may help you protect your farm buildings, livestock and equipment from flood damage:

1. Move machinery, feed, grain, pesticides and herbicides to higher elevations.

2. Construct mounds of soil for livestock, or open gates so livestock can escape high water.

Small numbers of hogs can sometimes be saved by bringing them bales of hay to climb on.

3. Animals swim well. The greatest problem for grazing animals will be fences and other obstacles. Try to drive stock through water free of obstructions.

Long swims through calm water are safer than short swims through a swift current.

4. Leave building doors and windows open at least 2 inches to equalize water pressure and help prevent buildings from shifting.

5. If possible, move motors and portable electric equipment to a dry location.

6. Disconnect electric power to all buildings which may be flooded. Call your utility company if in doubt about how to disconnect power electric.

7. Dairymen who anticipate extensive flooding should:

Check with a veterinarian to be sure cattle are properly immunized before being exposed to flood waters.

Check with the Department of Health concerning approval of temporary milking facilities.

Try to obtain standby equipment or services for emergency milk pickup.

When possible, move grain out of reach of flood water.

8. Tie down lumber, logs, irrigation pipes, fuel tanks and other loose equipment or material.

9. Prepare immovable power units and machinery for flooding.

Seal radiator openings (tighten caps and plug overflow).

Remove air cleaners and carburetors; seal openings. Use material strong enough to withstand water pressure.

Fill oil reservoirs. Plug breather pipes and openings.

Fill bearings with fresh lubricant.

Protect open gears, sprockets, pulleys and wearing and cutting edges of machinery with lubricant or rust inhibitor.

Drape polyethylene sheeting over bell ends of motor. Tie securely with cord on cylindrical part of motor housing, or fasten with a strong rubber band.

Safety Rules for Farm Clean-up

1. Delay permanent repairs until buildings are thoroughly dry.

2. Spread wet feeds to dry. Avoid feeding wet feeds to livestock unless absolutely necessary.

3. To avoid a fire hazard, move wet hay outside and spread it out to dry.

4. Move livestock to unflooded pastures to prevent disease.

5. Get rid of pests such as rodents, snakes and insects.

6. Promptly dispose of animal carcasses.

7. Disassemble, clean, dry and lubricate farm machinery. Do not start motors or engines until they are cleaned and reconditioned.

8. Clear and open drains, ditches, channels, small streams and tile-drain outlets. Drain floodwater, if possible, from fields.

9. Plug breaks in dikes; use temporary structures to stop breaks and prevent further high water.

10. Clear debris, especially barbed wire and other materials which could be dangerous to livestock, from lots and fields.

11. Avoid overexertion and strain in lifting and moving heavy objects or loads.

12. When using kerosene, keep away from heat, sparks and open flame.

Information in this document was compiled by the Texas Agricultural Extension Service and Hazard Reduction and Recovery Center