

flood



# Flood Preparedness and Response

## STRATEGIES FOR FAMILIES

**Floods are an inevitable and natural part of life in Wisconsin, especially for those who live along streams and rivers. Counties that border the Mississippi and the Wisconsin rivers are the most flood prone, but serious floods have occurred throughout the state. It is important to be prepared and know what to do before disaster strikes.**

### BE PREPARED

- ◆ *Find out if you live in a flood prone area.* If you are new to the area, ask your local public works or emergency government office about local flood history. Ask whether your property is above or below the flood stage water level.
- ◆ *If you live in a frequently flooded area, stockpile emergency building materials.* These include plywood, plastic sheeting, lumber, nails, hammer, saw, pry bar, shovels and sandbags.
- ◆ *Plan and practice an evacuation route.* Contact your local emergency government office or local American Red Cross chapter for a copy of the community flood evacuation plan. This plan should include information on the safest routes to shelters. Individuals living in flash flood areas should have several alternate routes to higher ground.
- ◆ *Have emergency supplies on hand.*
  - a) Flashlights and extra batteries
  - b) Portable battery-operated radio and extra batteries
  - c) First-aid kit and manual; essential medicines
  - d) Emergency food, water, cooking equipment, can opener
  - e) Cash and credit cards
- ◆ *Develop an emergency communication plan.* In case family members are separated during a disaster because of work or school, choose a long-distance relative or friend who can serve as the “family contact.” After a disaster, it is often easier to call long-distance than to place a local call. Make sure everyone in the family knows the name, address and phone number of the contact person.
- ◆ *Make sure that all family members know how to respond after a flood or flash flood.* Teach family members how to turn off gas, electricity and water; local authorities may request that you do so during a flood. Teach children how and when to call 911, police and fire, and which radio station to tune to for emergency information.
- ◆ *Keep the car fueled.* Stations may not be able to operate because of lack of electricity.
- ◆ *Learn about the National Flood Insurance Program.* Most Wisconsin communities participate in this program, which offers residents flood insurance. (See the fact sheet “Insurance Coverage and Making a Claim.”) Regular homeowner's insurance does not cover flood damage.

## AFTER A FLOOD

**Don't return home until authorities have indicated it is safe. When entering buildings, use extreme caution. Potential hazards include:**

◆ **Gas leaks.** Leave your home immediately and call the gas company if you smell the putrid odor of leaking gas. Lanterns, torches, electrical sparks and cigarettes could cause an explosive fire if there is a leak. Do not turn on any light switches.

◆ **Electrocution.** Wear rubber gloves and rubber-soled shoes to avoid electrocution. Do not turn on any lights or appliances if the house has been flooded. Turn off the electricity when checking electrical circuits and equipment or when checking a flooded basement.

◆ **Structural damage.** Watch for falling debris and the possibility of collapsing ceilings and basement walls.

◆ **Food and water.** Do not use water or eat food that has come in contact with floodwaters.

### **Additional resources:**

Your local emergency government office, the American Red Cross, your county Extension office, the Wisconsin Division of Emergency Government, the Federal Emergency Management Agency

### **Related publications:**

"Flood Awareness," Wisconsin Division of Emergency Government, 1991.

## DURING A FLOOD

- ◆ *Listen to the radio for further information.*
- ◆ *Fill bathtubs, sinks and jugs with clean water in case water becomes contaminated.*
- ◆ *Bring outdoor belongings, such as patio furniture, indoors.*
- ◆ *Move valuable household possessions to the upper floors or to safe ground if time permits.*
- ◆ *If you are instructed by authorities, turn off all utilities at the main power switch and close the main gas valve.*
- ◆ *Join with neighbors and volunteers to put sandbags or other protection in place. Stack sandbags away from the outside walls of houses to prevent floodwaters from entering.*
- ◆ *Do not attempt to walk through moving floodwaters. If they are moving fast enough, water one foot deep can sweep you off your feet.*
- ◆ *Do not attempt to drive over a flooded road. Turn around and go another way.*

## DURING AN EVACUATION

- ◆ *Listen to the radio for evacuation instructions. If advised to evacuate, do so immediately. Evacuation is much simpler and safer before floodwaters become too deep for ordinary vehicles to drive through.*
- ◆ *Follow recommended evacuation routes — shortcuts may be blocked.*

# Preparing to Evacuate Your Farm

## SAFETY MEASURES WHEN FLOODING IS EXPECTED

**If you live in an area prone to flooding or if flooding has been anticipated for some time, have an emergency plan for evacuation. It should include such considerations as family safety, equipment safety, livestock relocation and temporary milking facilities.**

**When flooding is hours or minutes away, keep your priorities straight. Ensure family safety first. Be certain you have enough time to get to higher ground before access is cut off. If you have time before receiving an evacuation order, a number of precautions may help you protect your property and livestock.**

### **Additional resources:**

Weather-reporting services, such as the National Weather Service, to predict the severity of flooding; your county agricultural agent; your local emergency government office; the American Red Cross; the Federal Emergency Management Agency

## LONG-RANGE PREPARATION

Take these precautions if flooding is common to your area or anticipated this season:

- ◆ Create an emergency plan of action, considering such things as areas of high ground for animal relocation, temporary milking facilities and approval to use them, equipment relocation and safe pesticide storage.
- ◆ Be sure cattle are properly immunized before being exposed to floodwaters.
- ◆ Arrange or be aware of standby services for emergency milk pick-up.
- ◆ Have a plan for moving grain out of reach of floodwaters.
- ◆ Provide riprap on banks of earthen manure storages where flowing water may erode berms.

## SHORT-TERM PREPARATION

If time is available, take the following precautions:

- ◆ Move machinery, feed, grain, pesticides and herbicides to a higher elevation. If you have a two-story barn, the upper level makes a good temporary storage facility.
- ◆ Open gates so livestock can escape high water.
- ◆ If water is rising, try to drive stock through water free of obstructions. Grazing animals swim well, but the greatest problem for them are fences and other obstacles. Long swims through calm water are safer than short swims through a swift current.
- ◆ Leave building doors and windows open at least 2 inches to equalize pressure and help prevent buildings from shifting.
- ◆ If possible, move motors and portable electric equipment to a dry location.
- ◆ Disconnect electric power to all buildings which may be flooded. If in doubt about how to disconnect power, call your utility company.
- ◆ Tie down lumber, logs, irrigation pipes, fuel tanks and other loose equipment or material. Secondary containment is another possibility for fuel tanks, as well as pesticide storage.
- ◆ To keep surface water out of your well, use materials such as heavy plastic and duct tape to seal the well cap and top of the well casing.

# Pesticide Storage Concerns During a Flood

## PREVENTION AND EMERGENCY RESPONSE

**Safe pesticide storage is of critical importance in both everyday and disaster situations. Not only can improperly stored pesticides pose significant hazards to humans, but they can do great harm to the environment, including surface water and groundwater contamination. Combined with floodwaters, pesticides can create a widespread health problem by threatening drinking supplies.**

**For all of these reasons, take preventive measures to minimize storage quantities and potential exposure to floodwaters. Take extra precautions if you live in a floodplain or expect flooding. If flooding of pesticides occurs, be sure you follow safe, legal methods for emergency response, containment and clean-up.**

### PREVENTION

- ◆ *Choose a safe location.* If at all possible, locate pesticides in an area where flooding is not likely. A good location will be downwind and downhill from sensitive areas, such as homes and play areas, ponds or streams.
- ◆ *Update your pesticide storage design.* Contact your local Extension agent or the Midwest Plan Service for modern pesticide storage plans. Safety is a major criterion in new designs, as well as efficiency for farmers. Features may include a mixing and loading pad, a drainage system to collect contaminated runoff, a worker safety area and a separate area for your personal protective clothing and equipment.
- ◆ *Keep pesticide storage to a minimum.* The fewer pesticides on site, the less you have to worry about. Consider the following:
  - a) Contract to have pesticides applied. This eliminates storage and most liability concerns.
  - b) Clean out existing inventories. If a pesticide is still registered for use, give it to a producer who can legally use it. If it is no longer registered, dispose of it at a county Agricultural Clean Sweep program.
  - c) Purchase only enough pesticide for a single season.
- ◆ *Take extra care with water-permeable containers.* Dry formulations packed in paper bags, fiber drums, cardboard boxes or similar containers should be stored on metal shelves. Do not store liquid pesticides on shelves above dry formulations.
- ◆ *If flooding is imminent, move pesticides (especially those in unsealed or water-permeable containers) to a higher storage location.* Use caution in moving containers — wear protective gear as necessary.
- ◆ *Develop an emergency response plan in case of a leak, spill or fire.* Because of hazardous substances on your farm, you may be required to develop a plan under the Superfund Amendments Reauthorization Act (SARA) Title III. SARA requires farmers who have any of 360 extremely hazardous substances at 500 pounds or the threshold planning quantity to alert the State Emergency Response Board (SERB) with a Planning Notification Fee Statement. An off-site plan identifying the substances and their location on the farm must be developed with final plan copies sent to the local fire department, your Local Emergency Planning Committee (LEPC) and SERB. Contact the Wisconsin Division of Emergency Government for more information.

## WATCH FOR PESTICIDE POISONING

**Be aware of any illness arising after handling pesticides or pesticide wastes. Acute symptoms of poisoning frequently include headache, nausea, diarrhea, visual disturbances, excessive salivation or sweating, difficulty in breathing, weakness, tremors or convulsions. Acute symptoms usually appear immediately or within a few hours after exposure. See a doctor immediately or contact your local poison control center if symptoms appear.**

### **Additional resources:**

Your local emergency government office, the Wisconsin Division of Emergency Government, your county agricultural agent

### **Related publications:**

UW-Extension publication "Pest Management Principles for the Private Applicator."

"SARA Fact Sheet for Farmers," available from the Wisconsin Division of Emergency Government.

## IF FLOODING HAS OCCURRED

If you suspect flooding of pesticide storage areas, use great caution in investigating the immediate area — floodwaters may be contaminated with pesticides. Wear appropriate protective clothing, particularly safety boots, to avoid exposure.

If a release of pesticides has occurred, you are required by the Wisconsin Spill Law to notify local and state authorities. Local authorities include your Local Emergency Planning Committee. You can meet state reporting requirements by calling the Wisconsin Division of Emergency Government Spill Hotline at (800) 943-0003. This hotline is available 24 hours a day, 7 days a week. The duty officer at the Spill Hotline or your LEPC can help you determine if federal notification is needed.

Emergency hotline personnel will gather information about the pesticide release and make response decisions. Emergency response professionals in your area will be notified to serve as the first responders to the flood site, as necessary. Some possible scenarios:

- ◆ *For minimal flooding or leakage from paper containers, officials may provide you with specific clean-up instructions.* For example, you may be asked to place the water-damaged pesticide into a secondary waste container and to dispose of it at the next Agricultural Clean Sweep event.
- ◆ *If moderate flooding has occurred, containment and clean-up may be feasible.* Area emergency response professionals may be sent to the site. Technical guidance from the DNR and the Wisconsin Department of Agriculture, Trade and Consumer Protection will be provided, as necessary.
- ◆ *If major flooding has already occurred, containment may be impossible and clean-up minimal.* Check your storage inventory to determine if product is missing. If so, inform your LEPC about types of pesticides and approximate amounts removed by floodwaters.

## CONTAIN THE AREA

Take steps to prevent further release of the pesticides if possible and feasible. Put smaller containers that are leaking into larger containers. Wear protective clothing and equipment so you do not needlessly expose yourself to the material in the process of stopping the spill.

At the same time the leak is being controlled, contain the spill material to the area; if possible, construct a dam to prevent the chemical from spreading.

# Building Dikes to Prevent Flooding

## HOW TO FILL AND POSITION SANDBAGS

**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, malfunctioning drainage systems or ice dams.**

**A 1- to 3-foot-high sandbag or earth dike offers protection from shallow flooding (water depth less than 3 feet). Contact a construction firm, lumberyard or your county emergency government office for information on where to obtain sandbags.**

### SITE SELECTION

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. Remove ice and snow, down to the bare ground if possible, from the strip of land you've selected.

### SANDBAG NEEDS

The number of bags required for 100 linear feet of dike is as follows:

- ◆ 800 bags for 1-foot-high dike
- ◆ 2,000 bags for 2-foot-high dike
- ◆ 3,400 bags for 3-foot-high dike

### FILLING AND POSITIONING SANDBAGS

See diagrams on the back side. If you are building the dike on a lawn you may omit the bonding trench shown in the diagram on Stacking 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 high. For example, if the height is 3 feet, make the base 9 feet.

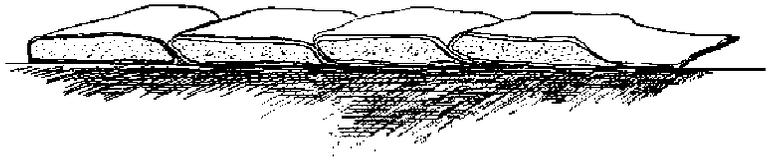
### SEALING THE DIKE

Seal the finished dike to increase its watertightness. To seal the dike:

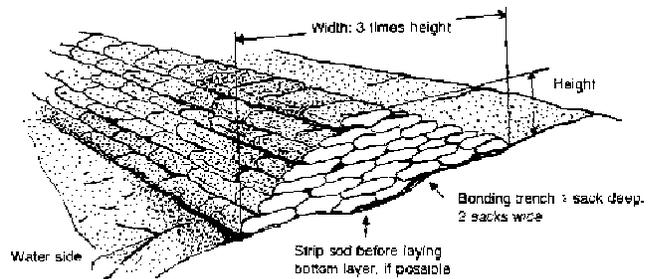
- ◆ Spread a layer of earth or sand 1 inch deep and about 1 foot wide along the bottom of the dike on the water side.
- ◆ Lay polyethylene plastic sheeting so the bottom edge extends 1 foot beyond the bottom edge of the dike over the loose dirt. The upper edge should extend over the top of the dike. This sheeting is available from construction supply firms, lumberyards and farm stores. It should be about 6 mils thick. It comes in 100-foot rolls and is 8 or 10 feet wide.

- ◆ Lay the plastic sheeting down very loosely. The pressure of the water will then make the plastic conform easily with the sandbag surface. If the plastic is stretched too tightly, the water force could 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.

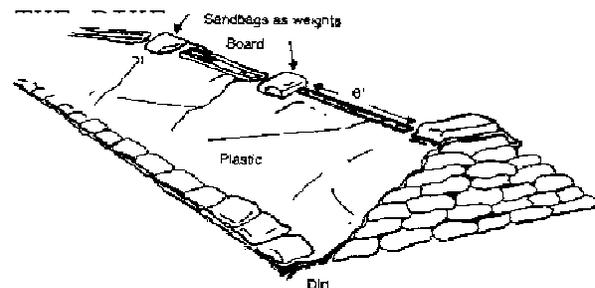
#### HOW TO FILL AND LAP SANDBAGS



#### STACKING SANDBAGS



#### SEALING



#### Additional resources:

Your local emergency government office, your county agricultural agent, the American Red Cross, the Federal Emergency Management Agency

# Protecting Livestock During a Flood

## GUIDELINES FOR SAFE SHELTER AND EVACUATION

**Unconfined livestock can usually take care of themselves during floods. Do not let them become trapped in low-lying pens. A number of safety precautions, as outlined at right, can be taken for animals housed in barns during a flood. Above all, be sure animals are evacuated before floodwaters enter barns and other enclosed livestock areas. Animals sometimes refuse to leave during a rapid rise of water and may drown.**

### KEEPING LIVESTOCK HIGH AND DRY

In broad, level flood plains where floodwaters are seldom deeper than 3 or 4 feet, you may need to construct mounds of soil on which livestock can stay until floodwaters recede. Try to locate the mounds where they will not be washed away by fast-flowing water.

### THINK ESSENTIALS, SAFETY IN BARN

- ◆ *Provide feed and water.* Water is essential. Thirsty animals will try to break out to get to floodwaters. If clean water is in short supply, limit feed intake.
- ◆ *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, since these parts can be dangerous.
- ◆ *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.
- ◆ *Be absolutely certain that herbicides, pesticides and treated seeds are not even remotely accessible to livestock,* and are stored where floodwater will not contaminate livestock feed or water.
- ◆ *Turn off electricity* at the main switch. Livestock could damage electric fixtures, causing fires or electrocutions.
- ◆ *If there is a possibility that dairy barns may become inundated, drive cattle out of the barn.* During rapid rise of water, cattle often refuse to leave the barn and may drown inside if the water rises high enough. For this reason, begin evacuation measures before a state of emergency.

### Additional resources:

Weather-reporting services, such as the National Weather Service, to predict the severity of flooding; your local emergency government office; your county agricultural agent

# Standby Electric Generators

## A SOURCE OF EMERGENCY POWER FOR FARMERS

**An emergency source of power is important for any farm with mechanically ventilated production facilities, bulk milk handling equipment, mechanical feeding equipment or facilities requiring constant and continuous heat (such as brooders). On such a farm, a standby electric generator is a good investment, possibly preventing costly losses during a power failure.**

**During disasters such as flood or tornado, relief agencies may provide generators to farmers on an emergency basis.**

### TYPES OF GENERATORS

Standby generators are either engine driven or tractor driven. Either type can be stationary or portable. Engine driven units can be either manual or automatic start. Gasoline-, LP gas- (bottled gas) and diesel-fueled engines are available.

Generators must provide the same type of power at the same voltage and frequency as that supplied by power lines. This is usually 120/240 volt, single phase, 60 cycle alternating current (AC). An air-cooled engine is often used for generators up to 15 kilowatts. A liquid-cooled engine is necessary for generators larger than 15 kilowatts. Engine capacity of 2 to 2 1/4 hp with the proper drive system must be available for each 1,000 watts of generator output.

### SIZE OF GENERATORS

A full-load system will handle the entire farmstead load. Automatic engine-powered, full-load systems will begin to furnish power immediately, or up to 30 seconds after power is off. Smaller and less expensive part-load systems may be enough to handle essential equipment during an emergency.

Power-take-off (PTO) generators are about half as costly as engine-operated units. Under a part-load system, only the most essential equipment is operated at one time. For most farms, this type of system is adequate, provided the generator is sized to start the largest motor. For example, the milk cooler or ventilation fan would need to be operated continuously, but the operation of the silo unloader and mechanical feeding system could be postponed until the milking chores are completed. PTO units can be mounted on a trailer.

### INSTALLATION

Wiring and equipment must be installed in accordance with the National Electrical Code, local ordinances and the requirements of your power supplier. It is essential that you have the proper equipment for disconnecting the generator from public utility lines. Most companies require the installation of a double-pole double-throw transfer switch or its equivalent for this purpose. Check with your electrician or power supply representative for installation, installation instructions and inspection.

## LOCATION AND SAFETY FEATURES

- ◆ Large engine generators should be located in a building, preferably a heated building.
- ◆ Inlet and outlet air ducts must be large enough to carry off excess heat. They should be open at least a half a square foot for each 1,000 watts of generator capacity.
- ◆ Combustion fumes must be carried outdoors safely. Exhaust pipes must be at least 6 inches from combustible material.

## OPERATION

An automatic standby unit should start automatically when power fails, and stop when power is restored. When using an engine-driven generator with a manual start, or when using a tractor driven unit, follow this procedure when power fails:

- ◆ Call your power supplier and advise them of the conditions.
- ◆ Turn off or disconnect all electrical equipment.
- ◆ Position the tractor or engine for belt of PTO drive.
- ◆ Start the unit and bring the generator up to proper speed (1,800 or 3,600 rps). Check on arrangement to carry off exhaust fumes. Be sure there is no danger of fire. The voltmeter will indicate when the generator is ready to carry the load.
- ◆ Put the transfer switch in the generator position.
- ◆ Start the largest electrical motor first, adding other loads when each is up to operating speed. Do not add too much too fast. If the generator cuts out for any reason, repeat the second, third and fourth steps above.
- ◆ Check the voltmeter frequently. If voltage falls below 200 volts for 240 volt service or below 100 volts for 120 volt service, reduce the load on the generator by turning off some electrical equipment.
- ◆ When commercial power is restored, put the transfer switch in normal power position. Then stop the standby unit.

### **Additional resources:**

Your county agricultural agent

### **Related publications:**

UW-Extension publications–

“Standby Electric Power Equipment for the Farm and Home,” (AF2273);

“Electrical Systems for Agricultural Buildings,” (checklist), (A8NE846);

“Electrical Systems for Agricultural Buildings,” (recommended practices), (A8NE845).

“Standby Power,” Illinois Farm Electrification Council, Fact Sheet #2.

## MAINTENANCE

- ◆ Keep the unit clean and in good running order at all times so it will be ready for immediate use. Dust and dirt accumulations on the motor can cause it to overheat when operated.
- ◆ Follow maintenance instructions in manufacturer's manual. A short operation at set intervals will keep the engine in good operating condition. Regularly scheduled warm-ups are necessary to keep a standby engine in working order.

# Avoiding Groundwater Damage to Homes

## REMEDIES FOR HOMEOWNERS

**Groundwater flooding can cause many problems for homeowners. Structural damage, sewer system back-ups and damaged appliances are three of the most distressing consequences. Fortunately, there are some remedies. They vary in scope, expense and results, just as homeowners vary in their expectations and resources.**

## CONSIDER YOUR RESOURCES

Sound advice should be your first priority when groundwater flooding is a problem. Expertise can come from a variety of sources.

- ◆ *Local resources* include your local emergency government office, building inspectors, insurance agents (if you have appropriate insurance), county Extension agents and the Home Builders Association. All have access to technical assistance, publications and possible sources of financial aid.
- ◆ *Financial assistance* may be available through your local emergency government office. This may also include temporary housing and crisis counseling.
  - a) Grants and low-interest loans may be available in cases of regional disasters.
  - b) Check with your insurance agent to determine whether your homeowner's insurance covers any of the damages. Groundwater, surface water and floodwater damages usually are not covered by homeowner's insurance. Your agent may have a rider available for groundwater flooding. Homes located in floodplains subject to surface water flooding are eligible for federal flood insurance.
- ◆ *Contractors* can help you determine the nature and extent of your damages and what remediation options are appropriate for your situation.
  - a) A waterproofing contractor may be able to correct the problem if you simply need to stop minor nuisance flooding.
  - b) A general contractor may be necessary if you have damages to your home and need more substantial repairs and corrective measures. General contractors can arrange for the services of various specialists. (See the fact sheet, "Hiring a Contractor After a Disaster," for more information.)

## YOUR OPTIONS

The severity and frequency of groundwater flooding will in part dictate the best solution. The following options parallel increasing severity of groundwater flooding:

- ◆ *Raising appliances, furniture and fixtures.* In cases where groundwater flooding is a minor nuisance that amounts to little more than wet walls and small streams across the basement floor to a drain, solutions may include:

- a) *Raising or blocking up appliances, furniture and other items that may be damaged by direct contact with the water for an extended time;*
- b) *Installing a false floor over the basement slab. This allows water to drain under the false floor to a drain or sump.*
- c) *Installing a surface drainage system around the perimeter of the basement floor. This method channels water from the walls to a drain or sump for removal.*

◆ *Relieving water pressure against walls and the floor.* Some form of drainage is necessary when cracks occur because of water pressure.

- a) If the basement or foundation does not already have drain tile installed, consider an excavation of the home exterior to allow for waterproofing of the walls and the installation of washed stone (gravel) and drain tile. Drain tile can divert water away from the house if there is a slope, or accommodate a sump pump system as noted below.
- b) Internal drainage is another option if excavation is not possible or convenient. Washed stone and drain tile are installed around the interior perimeter of the basement footing. This requires subfloor installation and trenching.
- c) Sump pumps are a necessary part of the internal drainage system unless the interior tile can be connected to exterior tile that will drain away from the house. Similarly, sump pumps may be a necessary part of external drain tile systems if water does not drain away from the house naturally.

#### **Additional resources:**

Your county Extension office, your local emergency government office, building inspectors, insurance agents (if you have appropriate insurance), the Home Builders Association, the Federal Emergency Management Agency

#### **Related publications:**

UW-Extension publications—

“Removing Ground Water From a Basement of an Existing Home,” December 1993;

“Hiring a Contractor After a Natural Disaster,” December 1993.

“Repairing Your Flooded Home,” the American Red Cross/Federal Emergency Management Agency, 1992.

“Retrofitting Flood-Prone Residential Structures,” Federal Emergency Management Agency, 1986.

◆ *Filling the basement.* This option can eliminate the groundwater problem, but the trade-off is the loss of a full basement. If the groundwater level in a basement is only 1 or 2 feet, one option is to pour a new floor in at a higher level, leaving a crawl space in the basement. The original floor needs to be broken first, so that water pressure can be relieved. Fill dirt is brought in and the new floor poured. Drainage under the new floor also is recommended. In more severe cases, the basement may have to be completely abandoned.

◆ *Rebuilding septic systems and wells.* If septic systems and wells have been compromised, the systems should be rebuilt following modern guidelines for high groundwater areas. There may be added expenses related to closing or removing portions of existing systems that have failed.

◆ *Raising or relocating the house.* This is the most expensive option. It is the best long-term solution when the building integrity is threatened and utilities must be shut off. In some cases, it may be the only reason-able option to avoid property damages and lower property values.

# Cleaning and Repairing Flooded Basements

## GETTING OUT WATER AND PREVENTING FUTURE PROBLEMS

**Before you enter a flooded basement, take time to:**

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

### PUMPING

For safety reasons, do not use an electric pump powered by your own electrical system. Instead, use a gas-powered pump or one connected to an outside line. Fire departments in some communities may help with pumping services.

More damage may be done by pumping flooded basements too soon or too quickly. 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 this kind of structural damage:

- ◆ Remove about a third of the water each day. Watch for signs of structural failing.
- ◆ If the outside water level rises again after the day's pumping, start at the new water line.
- ◆ Don't rush the pumping; the soil may be very slow to drain. Whatever is submerged in the basement will not be damaged further by delaying the pumping.

### CLEANING

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 a disinfecting solution of 1 cup chlorine bleach per gallon of water.

Oil stains caused by overturned or damaged oil tanks also may be a problem following basement flooding. Commercial products, available from fuel-oil suppliers, will help neutralize fuel oil. The products come 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, let it set, then sweep it up.

### INSPECTION AND REPAIR

Before beginning repairs, make a thorough inspection of supporting columns, beams, walls and floors. Unless you have structural expertise, hire a contractor to make a professional survey. (Consider joining with neighbors for a group-rate inspection.) Repairs may extend to the following:

- ◆ *Buckled walls.* Signs of buckling include horizontal cracking and areas that have moved out of vertical alignment. 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, the damaged parts should be rebuilt immediately. Pilasters (vertical reinforcements) may need to be constructed into walls over 15 feet long.
- ◆ *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.
- ◆ *Heaved floors* are those that have not returned to their original level or have cracked badly. The floor may have to be removed and a new floor constructed. If a floor is badly cracked, but has returned to its original level, a new floor may be placed over the old one. A vapor barrier should be added between the two floors. The new floor should be at least 2 inches thick.

In houses without basements, the area below the floor may be completely filled with mud. Shovel out the mud as soon as possible to avoid rotting joists or foundation wood.

***Additional resources:***

Your county family living agent, your local emergency government office, the American Red Cross, the Federal Emergency Management Agency

***Related publications:***

"Repairing Your Flooded Home," the American Red Cross/Federal Emergency

# Home Clean-Up and Sanitation

## SAFELY CLEANING A FLOOD-DAMAGED HOME

**Clean-up priorities will vary depending upon the kind and seriousness of damage to your home. But assuming major concerns such as structural safety, basement flooding, and electrical and water systems have been addressed, clean-up can begin inside.**

**Start cleaning your furnishings as soon as possible. Your aim should be to thoroughly dry and clean the house before trying to live in it or have permanent repairs made. Early efforts should include taking furniture, rugs, bedding and clothing outside to dry and prevent mildew.**

### SET PRIORITIES AND KEEP SAFETY IN MIND

As you begin clean-up, focus on accomplishing the most important tasks first. Resist over-exerting yourself.

- ◆ Give special attention to cleaning children's toys, cribs, playpens and play equipment. Boil any items a toddler or baby might put in his or her mouth. Discard stuffed toys, water-logged toys and non-cleanable items.
- ◆ Keep chemicals used for disinfecting and poisons used for insect and rodent control out of children's reach.
- ◆ Wear protective clothing on legs, arms, feet and hands while cleaning up debris.

### GENERAL RULES FOR CLEANING AND DISINFECTING

- ◆ Wash exposed skin frequently in purified water. Wear rubber gloves to protect against contamination and skin irritation.
- ◆ Try using a pump-up garden sprayer or hose to remove layers of mud from hard surfaces.
- ◆ Scrub with a household cleaner/detergent solution and a brush to remove remaining surface oil. Rinse with clean water.
- ◆ Wash with a disinfectant, such as chlorine bleach, pine oil or a phenolic product, such as Lysol. Remember, a product is considered to be a "disinfectant" only if it is labeled as such. Rinse well.
- ◆ Dry items thoroughly to prevent mildew growth.
- ◆ Sanitize dishes, cooking utensils and food preparation areas before using them (see fact sheet, "Disinfecting Dishes, Cookware and Utensils").

### REMOVING MOLD AND MILDEW

- ◆ Brush off mold and mildew growth on household items outdoors to prevent scattering of spores in the house.
- ◆ Vacuum floors, ceilings and walls to remove mildew. Then wash surfaces with a detergent/household cleaner and water solution.

- ◆ Wipe mildew-stained areas with a cloth dampened with a solution of 1 cup of chlorine bleach or rubbing or denatured alcohol to 1 gallon water. Pine-based or phenolic products also work well.

## PREVENTING MILDEW GROWTH

- ◆ Use an air conditioner, dehumidifier or heater, if available, to remove moisture. Use fans to circulate air and open all windows.
- ◆ Turn on electric lights in closets and leave doors open to dry the dampness and humidity.
- ◆ Spray with a fungicide or other mildew preventive product. Read and follow instructions and precautions on product label. Dry thoroughly.

### **Additional resources:**

Your county family living agent, your local emergency government office, the American Red Cross, the Federal Emergency Management Agency

### **Related publications:**

"Repairing Your Flooded Home," the American Red Cross/Federal Emergency Management Agency, 1992.

# Electrical Systems and Appliances

## GENERAL CLEAN-UP AND WHAT TO DO BEFORE THE ELECTRICIAN ARRIVES

**Restoring the electrical system and evaluating damage to appliances are high priorities after a flood. But before your electrical system is turned on, it should be thoroughly checked for short circuits by an electrician or other competent person. Ask your power supplier for advice and assistance.**

**Before entering your home after the flood, be sure that the electricity has been completely shut off. Appliances should not be operated until they have been thoroughly cleaned and reconditioned. Running equipment before it is properly cleaned could seriously damage it and may cause electrical shock.**

## ELECTRICAL CIRCUITS AND EQUIPMENT

Things to do before the electrician arrives:

- ◆ Have electricity shut off at both the meter and in the buildings. When touching switches, stand on a dry board and use a dry stick or rubber gloves to pull handles.
- ◆ Remove covers from all switches, convenience outlets, light outlets and junction boxes that have been under water.
- ◆ If a box is filled with mud, remove the screws that hold the receptacle or the switch in place. Pull receptacle, switch and wires out about two inches from box. Clean out all mud and dirt. Do not remove electrical connections. Leave boxes open for electrician.
- ◆ Remove all fuses and covers from entrance panel. Clean out all mud. Wires can be moved, but *do not disconnect*.

For some equipment, such as pumps, a temporary line can be installed by an electrician until the permanent wiring has a chance to dry.

## ELECTRICAL APPLIANCES

Here are some general rules to follow:

- ◆ *Television sets and radios.* Professional cleaning is recommended for these types of appliances. There is a danger of shock because certain internal parts can store electricity even when the appliance is unplugged. Check the back for a warning label. Get a cost estimate before repairs to see if the appliance is worth saving.
- ◆ *Motorized appliances.* These include the washing machine, dryer, dishwasher and vacuum cleaner. Professional cleaning of the motor and other parts is recommended. However, you can clean the exterior surfaces in the meantime.
  - a) Use a heavy-duty cleaner and hot water to remove stains and silt deposits. Follow up with a rinse solution of 2 tablespoons chlorine bleach to each quart of water.
  - b) When removing gritty deposits, rinse your cloth in water frequently to avoid scratching enamel or metal surfaces.
  - c) Clean and disinfect dishwashers, washing machines and dryers only with water that has been declared safe to drink.

- ◆ *Refrigerators, freezers and ovens.* These appliances may have foam insulation and sealed components that suffer little water damage. But since they hold food, they should be cleaned, disinfected and checked by a professional or replaced. If replacement is recommended, get the opinion in writing and discuss it with your insurance adjuster before money is spent for a new appliance.
- ◆ *Heating appliances.* Disconnect hot water heaters and remove all panels and any flood-soaked insulation. Have an electrician or professional repair person clean and restore the unit to working order.
- ◆ *Lights and lamps.* Remove fixtures that were submerged. Clean outlet boxes, sockets and wiring. Floor or table lamps should be completely disassembled and cleaned. Damaged cords and plugs should be replaced. Consider taking lamps to an appliance shop unless you are familiar with these repairs.

## GROUNDING

All metallic appliances that have been flooded should be properly grounded to prevent electric shock. Mud or dirt in a grounded outlet or adapter may prevent the grounding system from working, and you could be electrocuted. If you are unsure if your electrical system is properly grounded, call an electrician.

### **Additional resources:**

Your county family living agent, your local emergency government office, the American Red Cross, the Federal Emergency Management Agency

### **Related publications:**

"Repairing Your Flooded Home," the American Red Cross/Federal Emergency Management Agency, 1992.

# Restoring Heating Systems After a Flood

## ASSESSING DAMAGE AND GENERAL CLEAN-UP

**Any heating system exposed to flooding should be professionally inspected, cleaned and reconditioned before reuse. Floodwater may have damaged heating equipment and undermined chimneys. If chimney cracks or leaks go unrepaired, your family is at risk of fire or carbon-monoxide poisoning.**

**Ask the service person if there is anything you can do to help before his or her arrival. Usually this will include turning off fuel and power to flooded units as a safety measure, and removing mud and debris from the furnace housing and inside the chimney. Leave things like inspection of oil storage tanks and cleaning of motors, blowers and other flooded parts to the professional. Flood insurance and federal disaster assistance programs usually will help replace flooded gas and oil appliances, including furnaces.**

## OIL AND GAS SYSTEMS

In general, any flooded parts should be professionally inspected and cleaned before turning the system back on. Check your owner's manual if you are unfamiliar with the system.

- ◆ If your furnace was flooded to the level of the burners, turn off the valve on the pipe leading to it. If burners were hot when flooded, parts may have cracked.
- ◆ Modern furnaces also have an electrical switch for blowers. Turn this off as well if any furnace parts were flooded.

## OIL-BURNING SYSTEMS

- ◆ Have the storage tank inspected by an experienced person to make sure water and dirt have not entered.
- ◆ Have the electric motor, burners, blowers, fuel pump and gears cleaned and reconditioned by an expert. Flooded fuel filters should be replaced.
- ◆ Be certain that the fan motor, electric ignition systems and wiring are completely clean and dry before you turn on the electricity.
- ◆ If you have a hot water system, clean the fins on baseboard radiators. Clean any wall radiators.

## LIQUID PETROLEUM AND NATURAL GAS SYSTEMS

- ◆ Some natural gas systems may have a valve to the pilot gas line, in addition to the main fuel valve. Turn both off if this is the case.
- ◆ Have a service person:
  - a) Check to see if water leaked into the controls or pressure regulator.
  - b) Clean and recondition all flooded equipment, including burner elements, electric controls and regulators.
  - c) Replace severely flooded electric blower motors.
- ◆ If you smell natural gas — which has a distinctive, putrid odor — leave your home and contact your utility company or a service person. Do not use open flames in the area.

## ELECTRIC SYSTEM

Electric heating systems are part of electrical wiring system clean-up. Many local codes require that a licensed electrician do the work, or that a municipal inspector check the system before you turn the power back on.

If power isn't shut off to a flooded furnace system, shut the main switch off at the meter or remove the fuse to the furnace. (When touching switches, stand on a dry board and use rubber gloves or a dry stick to pull handles.)

Clean mud and debris from electric baseboard heating fixtures, being careful not to damage heating equipment. Have a professional handle cleaning and reconditioning of all working parts.

## CHIMNEYS

A cracked, clogged or leaky chimney can cause fires or carbon monoxide poisoning. Be sure you check your chimney for dirt, debris and leaks before lighting the furnace or a fire. If flood damage has occurred, have a mason do an inspection and make repairs.

- ◆ Most chimneys have a foundation in the ground. If the chimney looks like it has settled or tilted, examine the footing to see whether it has been undermined.
- ◆ Have the chimney rebuilt if it has settled badly or is broken where it passes through floors or roof.
- ◆ If mortar in the joints between bricks has disintegrated, have a mason rejoin the chimney with cement.

### **Additional resources:**

Your county family living agent, your local emergency government office, the American Red Cross, the Federal Emergency Management Agency

### **Related publications:**

"Repairing Your Flooded Home,"  
American Red Cross/Federal  
Emergency Management Agency, 1992.

Pamphlets on heating systems from  
your local utility company.

# Flood-Damaged Walls, Ceilings and Floors

## REMOVING MOISTURE, CLEANING AND REPAIRING

**Be prepared to let flood-damaged walls, ceilings and floors dry for several weeks. If restoration work is completed before proper drying, mold and mildew will continue to grow. The result may be structural damage to your home, the need to repaint walls or replace new wall coverings, and discomfort or illness to family members who have allergies.**

### GETTING THE MOISTURE OUT

Remove all water as soon as possible from your home. Also remove furnishings that are water soaked. Once water is removed, the next step is removing moisture that has been absorbed by wood, plaster and other materials.

If the weather permits, open doors and windows to remove moisture and odors. If the outside humidity becomes greater than inside, close things up; likewise, close up the house overnight if temperatures drop and moist air might otherwise be drawn indoors. 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, then remove.

Consider using dehumidifiers to speed up drying when outside humidity levels are high. If possible, rent commercial dehumidifiers, which remove three to four times more water than home models. When using dehumidifiers, shut windows and doors. If there is severe flooding in your home, consider hiring a contractor for water removal. Some companies can dry homes in less than a week with commercial dehumidifiers and air movers.

### WALLS and CEILINGS

Wash out mud, dirt and debris as soon as possible with a hose and mop cloth or sponge.

Start cleaning from the top floor or upper limit of flooding and work downward.

Remove wallboard, plaster and paneling to at least the flood level. Wallboard acts like a sponge when wet. If soaked by contaminated floodwater, it can be a permanent health hazard and should be removed. If most of the wallboard was soaked by clean rainwater, consider cutting a 4- to 12-inch-high section from the bottom and top of walls. This creates a “chimney effect” of air movement for faster drying. A reciprocating saw with a metal cutting blade works well, but use only the tip of the blade and watch out for pipes, ductwork and wiring.

Plaster usually does not need to be replaced, though it will take a very long time to dry.

Some paneling may be salvaged if allowed to dry slowly. You also should remove and dispose of any flood-damaged insulation, which will hold water for months after getting wet.

## REMOVING MILDEW

**To remove surface mildew on walls or ceilings, use a mildew surface cleaner (available at paint stores) or: scrub the mildew with household detergent, then scrub with a solution of one-quarter cup bleach to 1 quart water. Rinse well with clean water. Once fully dry, apply a coat of paint containing an anti-mildew agent.**

**To remove surface mildew on floors and woodwork, use a phosphate cleaning solution such as powdered automatic dishwashing detergent or trisodium phosphate (4 to 6 tablespoons to a gallon of water), available in hardware stores. Rinse with water, and when dry, apply a mildew-resistant finish.**

### Additional resources:

Your county family living agent, your local emergency government office, the American Red Cross, the Federal Emergency Management Agency

### Related publications:

"Repairing Your Flooded Home," American Red Cross/Federal Emergency Management Agency, 1992.

UW-Extension Publications—

"Removing Water From the Building Materials of a Water Damaged Home;"

"High Humidity After Water Damage and the Growth of Mildew and Mites."

To clean surfaces:

- ◆ Thoroughly wash and disinfect walls, ceilings, exposed wall cavities and studs.
- ◆ Use a good disinfectant to prevent mildew build-up. One cup of chlorine bleach mixed with a gallon of water works well. For a soapier cleaning solution, add a half cup of mild detergent. Wear rubber gloves.
- ◆ If walls have already dried, work from the floor to the ceiling to prevent streaking. (Dirty water splashed on dry walls may be absorbed and become almost impossible to remove.) Overlap sections, cleaning the ceiling last.

## FLOORS

Before the house has dried out, scrub floors and woodwork with a stiff brush, plenty of water, a detergent and disinfectant. Carpeting soaked by contaminated floodwater should be removed and discarded unless it can be sanitized at a commercial facility for a cost substantially less than replacement. Vinyl flooring and floor tile may need to be removed to allow drying of subfloor.

Wooden floors should be dried gradually. Sudden drying could cause cracking or splitting. Some restoration companies can accelerate drying time by forcing air through the fluted underside of hardwood floorboards.

## ONCE FLOORS HAVE DRIED

Assess whether your floors can be repaired, replaced or recovered. Consider your time and budget as you make any decisions. If hardwood floors are damaged beyond repair, you may want to forego the cost of replacement and instead cover them with carpeting, vinyl or linoleum. Or you might lay a new floor over the old, rather than replace it.

- ◆ Plywood subfloors may have delaminated (separated) from excessive moisture, causing buckling. Sections may have to be replaced or have new plywood nailed over them. Consult a contractor for this work.
- ◆ If buckling or warping has occurred, drive nails where the floor tends to lift or bulge. This will prevent further damage. Badly warped hardwood floors usually can't be repaired. Warped, wide pine board flooring, however, will often flatten out after it has thoroughly dried.
- ◆ Plane or sand floors level. Do not refinish until thoroughly dry.

# Drying and Repairing Walls

## REMEDIES FOR INTERIOR AND EXTERIOR SURFACES

**Walls must be dry from the inside out before restoration, repainting or recovering can begin. Even when walls feel dry to the touch, the material inside the wall may be wet. Drying the inside of the walls may take weeks or even months. The total drying time will depend partially on the amount of dry air that can circulate through the studding and different wall materials.**

**Plaster and paneling can often be saved, but you still need to get air circulating in the wall cavities to dry the studs and sills. Wallboard soaked by dirty floodwater will need to be replaced. If the wallboard was damaged by clean rainwater, consider cutting a 4- to 12-inch-high section from the bottom and top of walls. This will create a “chimney effect” to speed up drying time. A reciprocating saw with a metal cutting blade works well for this task, but use only the tip of the blade and watch out for pipes, ductwork and wiring.**

## GUIDELINES FOR WALL COVERINGS AND INSULATION

- ◆ Remove drywall, laminated paneling and plaster at least to the flood level. Warping above the water level often occurs with drywall and paneling, so more may need to be removed.
- ◆ Plaster walls can sometimes be adequately drained by removing the baseboard and breaking out plaster and lath at the bottom of the wall. Later the baseboard can cover the opening.
- ◆ Some paneling may be salvaged if allowed to dry slowly. Remove the baseboard from paneled walls and pry off the individual sheets. Prop them against the wall to dry. Don't allow them to dry in sunlight, which may cause warping.
- ◆ Remove vinyl-covered wallpaper. It will restrict drying within flood-damaged walls.
- ◆ Water-soaked insulation should be removed and replaced. It can hold water for months, causing odor and decay problems. While wet it has little insulation value.
- ◆ Consider wainscoting as a restoration option if flooding is no higher than 3 feet above the floor.

## PATCHING PLASTER

Do not attempt to repair plaster until walls and inner walls (studding and insulation) are completely dry. If walls were flooded extensively, you may need to wait four to six weeks, or even several months, before attempting repairs.

Drywall compound is the preferred method for patching plaster. It comes in a variety of types with different drying times, shrinkage characteristics and consistencies. Read labels to select the type you need.

## REPAIRING EXTERIOR SIDING

- ◆ Dry wall cavities from the inside if possible. (See previous section.)
- ◆ Remove small section of siding to check conditions on the reverse side. If crevasses are filled with silt, remove siding to water level and clean. Silt left in crevasses will trap moisture, causing mold, decay and peeling paint.

- ◆ Check for cracked or warped siding. If only a few boards are warped or cracked, replace them individually.

## CHECKING SHEATHING

Sheathing is the material between studding and finish siding. Depending upon the type of sheathing, replacement may or may not be necessary.

- ◆ Wooden boards should dry slowly and some will warp. Re-nail warped areas after they dry. Replace those that are too badly warped to salvage.
- ◆ Sheathing board is usually absorbent and difficult to dry. Replace any that is disintegrating or separating.
- ◆ Plywood will probably separate and must be replaced. Marine plywood will not warp or separate, but is generally considered too expensive to use in residential construction unless the building is subject to frequent flooding.

### **Additional resources:**

Your county family living agent, your local emergency government office, the American Red Cross, the Federal Emergency Management Agency

### **Related publications:**

"Removing Water From the Building Materials of a Water-Damaged Home," University of Wisconsin-Extension, Madison, 1994.

"Repairing Your Flooded Home," American Red Cross/Federal Emergency Management Agency, 1992.

TIPS on Repairing or Rebuilding Your Disaster-Damaged Home, FEMA, 1981.

# Assessing and Repairing Leaky Roofs

## SAFELY FIXING A WATERY PROBLEM

**You may be anxious to stop a roof from leaking, but don't risk serious injury trying to inspect or repair it. First, try binoculars for a closer view. Next, check the attic for a drip trail. Leaks are rarely located directly above the water spot on the ceiling. When you find a leak in the attic, push a nail, straw or wire through it to help you or a repair person locate it outside.**

**If rain continues to be a problem and a repair person is unavailable, follow the directions at right for temporary relief. But be sure that only a physically able person gets on the roof for these emergency measures. Unsteadiness on the ladder or roof can lead to severe injuries.**

### **Additional resources:**

Your county family living agent, your local emergency government office, the American Red Cross, the Federal Emergency Management Agency

### **Related publications:**

"Repairing Your Flooded Home," American Red Cross/Federal Emergency Management Agency, 1992.

## TEMPORARY REPAIRS

Cover holes in the roof, walls or windows with boards, tarps or plastic sheeting. Nail down plastic sheets or trash bags with strips of wood and secure them with duct tape. If the holes are large, you may need to support the plastic in the center to keep it from ripping from the weight of the rain.

If sections of the roof or floors are sagging, have a contractor or other knowledgeable person brace weak areas. Improper bracing may increase damage and the chance of injury, so do not attempt this work unless you are experienced in structural repairs.

## CAUSES OF LEAKS

Storm and wind damage are responsible for some roof problems. Others are caused by defective materials, faulty construction or gradual deterioration. Here are some common causes of leaks:

- ◆ *Defective flashing.* Flashing is the sheet metal used in waterproofing roof valleys, hips and the angle between a chimney and a roof. Wet spots near a chimney or outside wall may mean the leak is caused by defective flashing, narrow flashing or loose mortar joints. Look for corroded, loose or displaced flashing on sloping roof valleys and at junctions of dormers and roof.
- ◆ *Clogged downspouts or eaves.* Check for choked downspouts. Accumulated water or snow on the roof above the flashing may cause a leak. Ice accumulations on eaves sometimes form ridges, which cause melting snow to back up under the shingles.
- ◆ *Cracks and deterioration.* Roofing (especially wood or composition shingles) usually deteriorates first on southern exposures. Check southern slopes for cracking or deterioration.
- ◆ *Holes.* Missing shingles or holes in the roofing may be causing wet spots. To find holes, check for a drip trail or spot of light coming through in the attic. Stick a nail, straw or wire 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. Unless you are experienced, hire a professional roofer for this work. Missing shingles should be replaced, holes repaired and cracks filled. Whatever method is used, avoid walking on patched sections.

# Cleaning Flood-Soiled Clothing and Bedding

## WHAT TO SALVAGE AND HOW TO CLEAN IT

**Unfortunately, cleaning your flood-soiled clothing and bedding is not the same as doing the usual family wash. Items need to be sanitized as you wash them. And your washing machine may be flood-damaged, making machine washing out of the question until you can get to a laundromat or friend's house. Nevertheless, you can help prevent mildew damage to clothes and bedding by sorting and drying items as soon as possible.**

**Even if your washing machine was not flooded, avoid using it until you know that the water is safe enough to drink and that your sewer line works. Before you wash clothes in the machine, run it through one full cycle. Be sure to use hot water and a disinfectant or sanitizer, such as chlorine bleach.**

### CLOTHING

When cleaning flood-damaged clothing:

- ◆ Separate wet items as soon as possible to keep clothing colors from running together. Sort out clothing that should be drycleaned.
- ◆ Take clothes and linens outdoors and shake out dried mud or dirt. Hose off extremely muddy items to avoid clogging your drain when you wash. If you don't have access to water, simply dry things out.
- ◆ If possible, soak badly soiled items overnight in cold water and detergent. Wring out and air dry if you're unable to machine wash right away.
- ◆ Check the labels on clothes and linens, and wash them in detergent and warm water if possible. Adding chlorine bleach to the wash cycle will remove most mildew and will sanitize the clothing. Because bleach fades some fabrics and damages others, use other sanitizers, such as pine oil cleaners, as necessary.
- ◆ If an item is still stained after washing, rewash before drying. Drying may make some stains more difficult to remove.
- ◆ Items to be drycleaned should be air-dried and taken to a cleaner as soon as possible.

Furs and leathers are usually worth the cost of professional cleaning. If you want to clean leather yourself, wash the mud off and dry the leather slowly. Keep it away from heat or sunlight while drying.

### BEDDING

Bedding should be hung out to dry as soon as possible. Once dry, brush off excess soil and dirt. Pillows, while washable, usually should be discarded if soaked with contaminated floodwater.

- ◆ *Sheets and pillow cases.* Put sheets and pillow cases through two complete washing cycles. Use diluted liquid chlorine bleach to help kill germs. Follow your usual drying procedure.
- ◆ *Blankets.* Put washable blankets (acrylic, cotton) through two complete washing cycles. Air dry or use an automatic dryer at proper temperature settings. Put wool blankets through a drycleaning process either at a commercial coin-operated facility or drycleaning plant. Shrinkage and the difficulty of thorough cleaning make wool blankets troublesome to wash.
- ◆ *Quilts and comforters.* Wash or dryclean depending on fiber content of the bedding. Usually, it is best to wash cotton quilts.

## MATTRESSES

As a general rule, inexpensive mattresses are not worth the expense of professional sanitizing and reconditioning. They should be discarded.

- ◆ In some cases, a good inner spring mattress may be worth the cost of reconditioning. Get an estimate from commercial facilities.
- ◆ If the outside of the mattress is only slightly damp, brush off surface soil and wipe with a cloth wrung out of a solution of one cup denatured or rubbing alcohol and one cup water.

### **Additional resources:**

Your county family living agent, your local emergency government office, the American Red Cross, the Federal Emergency Management Agency

### **Related publications:**

"Repairing Your Flooded Home,"  
American Red Cross/Federal  
Emergency Management Agency, 1992.

# Cleaning Flood-Damaged Carpets and Rugs

WHEN TO DISCARD, CLEAN OR CALL A PROFESSIONAL

**When faced with flood-damaged carpeting and rugs, your options will depend on the source of flooding. If floodwater consisted of clean basement seepage or lawn runoff into a sub-basement, drying and cleaning is an easy decision. But if sewage-contaminated floodwater has covered your carpeting, you probably will need to discard it for health safety reasons. You can assume the water and the carpet contain infectious organisms. Throw rugs can usually be saved.**

## **Additional resources:**

Your county family living agent, your local emergency government office, the American Red Cross, the Federal Emergency Management Agency

## **Related publications:**

"Repairing Your Flooded Home," American Red Cross/Federal Emergency Management Agency, 1992.

## GENERAL RULES

- ◆ Wall-to-wall carpeting, most large area rugs and any rug with foam backing should be discarded if flooded with contaminated water. Except for valuable rugs, the time and expense of professional cleaning generally is not worth the effort or the health risk.
- ◆ If you are determined to salvage carpeting soaked with contaminated water, consult a professional cleaning company that services carpets at its own cleaning and drying facilities. A steam cleaning (hot-water extraction) method is preferable.
- ◆ A wall-to-wall carpet soaked by clean rainwater can be salvaged. Have it professionally cleaned or clean it using the directions below.
- ◆ Throw rugs usually can be cleaned adequately in a washing machine.

## CLEANING RAIN-SOAKED CARPETS

Cleaning basement carpeting indoors is not a good idea in summer because you are adding even more moisture to an already wet area. If the carpeting is installed with tack strips you may be able to remove it, have it cleaned and reinstalled. Padding is nearly impossible to clean so it should be replaced.

If you can't remove the carpeting, dry it as quickly as possible to minimize growth of mildew. If possible, use a wet/dry vacuum system. A dehumidifier can help remove moisture from the air. Keep windows closed when using a dehumidifier.

- ◆ When the carpet is thoroughly dry, vacuum the area.
- ◆ Shampoo and repeat the drying process. Keep in mind that most modern carpeting is made of nylon and should not be treated with bleach.
- ◆ Vacuum again.
- ◆ You can reduce a musty smell with the following process:
  - a) Sprinkle baking soda over the carpet, working it in with a broom or sponge mop.
  - b) Leave the baking soda treatment on overnight.
  - c) Vacuum the baking soda out. Vacuum twice, moving back and forth in a different direction the second time.

# Flood-Damaged Furniture and Appliances

## DECIDING WHAT TO SALVAGE AND TIPS ON RECONDITIONING

**Evaluating appliance damage is a high priority after a flood. Have a service person check flooded appliances before you attempt operation or invest a lot of time in clean-up.**

**Deciding which furniture to save may be a more personal issue, especially if you have antiques and other pieces with sentimental value. Keep in mind that you don't need to repair all pieces of salvageable furniture immediately. You can clean, dry and store them in a warm, well-ventilated place until you have time to deal with them.**

### APPLIANCES

Before entering a home after a flood, be sure that the electricity to the dwelling has been completely shut off. (See the fact sheet, "Electrical Systems and Appliances.") Appliances should not be operated until they have been checked by service personnel.

Here are some things that may need to be done:

- ◆ Electrical motors may need to be reconditioned or replaced.
- ◆ Wiring and fixtures need to be checked and cleaned. They may also need replacement.
- ◆ Before cleaning and sanitizing an appliance, be sure the motor is in safe working order. It may not be worth the time to clean up the unit.
- ◆ A rust inhibitor may need to be applied to all metal parts. Even though an appliance may not have been submerged, rust can develop from dampness in the air.

### REFRIGERATORS AND FREEZERS

Sanitize the refrigerator or freezer if water has seeped in. Be sure the motor and freezing unit are in safe working order and insulation is not wet. Wet insulation means replacement may be necessary.

- ◆ Remove and wash all shelves, crispers and ice trays. Wash thoroughly with water and detergent. Rinse with a disinfectant solution.
- ◆ Wash the interior of the refrigerator, including the door and door gasket, with hot water and baking soda. Rinse with a disinfectant solution.
- ◆ Leave the door open for about 15 minutes to allow free air circulation.
- ◆ If odor remains, place several pieces of activated charcoal in an open metal container, or use a commercial refrigerator deodorizer.
- ◆ Wash the outside with a mild detergent and hot water.

### LAUNDRY EQUIPMENT

After washers and dryers have been reconditioned, sanitize them as follows:

- ◆ Pour a disinfectant (chlorine, pine oil or phenolic) into the empty washing machine. Then complete a 15-minute cycle at the “hot” water setting.
- ◆ Unplug the dryer and wipe the drum and door with a cloth dipped in disinfectant solution. Rinse with a cloth dipped in clear water.
- ◆ Leave the dryer door open until all parts are thoroughly dry — preferably overnight.

## FURNITURE

Before starting to salvage damaged furniture, decide which pieces are worth restoring. Such decisions should be based on: the extent of damage, cost of the article, sentimental value and cost of restoration. Antiques are probably worth the time, effort and expense of restoration. Unless damage is severe, you may be able to clean and refinish antiques at home.

- ◆ Don't try to force open swollen wooden doors and drawers. Instead, take off the back of the piece of furniture to let the air circulate. You probably will be able to open the drawers after they dry.
- ◆ Solid wood furniture can usually be restored, unless damage is severe. It probably will need to be cleaned, dried and reglued. Wood alcohol or turpentine applied with a cottonball may remove white mildew spots on wood. Cream wood restorers with lanolin will help restore good wooden furniture parts.
- ◆ Wood veneered furniture is usually not worth the cost and effort of repair, unless it is very valuable. If veneer is loose in just a few places, you may be able to glue it adequately.
- ◆ Upholstered furniture soaks up contaminants from floodwaters and should be cleaned only by a professional. Get a cost estimate to see if furniture is worth saving. Usually, flood-soaked upholstered pieces should be thrown away unless they are antiques or quite valuable.

### **Additional resources:**

Your county family living agent, your local emergency government office, the American Red Cross, the Federal Emergency Management Agency

### **Related publications:**

“Repairing Your Flooded Home,”  
American Red Cross/Federal  
Emergency Management Agency, 1992.

# Caring for Important Papers

## STEPS TO TAKE BEFORE AND AFTER A FLOOD

**Valuable papers and records should be given maximum protection from any disaster. Water- and fire-resistant file cabinets are available for storing some records at home. A commercial storage area, such as a safe-deposit box, will assure protection from theft and physical damage.**

**Consider making copies of your valuable papers for selected professionals, family members or friends, to assure their prompt availability when needed. Lists of all such documents and the location of each should be stored in more than one place.**

**If important documents or books have been damaged by floodwater, follow the instructions outlined here for drying. However, it is a good idea to photocopy any important papers as a precautionary measure. Even if papers appear to have dried successfully, they may disintegrate rapidly because of substances in the floodwater.**

## KEEP AN UP-TO-DATE HOUSEHOLD INVENTORY

An inventory of household items and other property is especially valuable in case of a disaster. When making the inventory, do not overlook items kept in cabinets, closets, the freezer, garage and yard. Consider making a video of your inventory and property; at minimum, take some photographs. An accurate inventory will help determine if you have enough insurance to cover the contents of your home. Whenever possible, record the date of purchase and purchase price of items. Keep the inventory current.

## PAPERS TO BE STORED IN THE HOME

Keep the following papers stored at home in a water-proof, fire-proof, locked box:

- ◆ Family advisors' names and addresses
- ◆ Educational, employment and health records
- ◆ Copies of birth and marriage certificates, insurance policies
- ◆ Driver license numbers, income tax returns, current bank balances, loan payment books
- ◆ Guarantees and warranties, appliance manuals, rental property records
- ◆ Household inventory, safe-deposit records, one copy of a list of valuable papers and their locations

## PAPERS TO BE STORED IN A SAFE-DEPOSIT BOX

Keep the following papers stored in a safe-deposit box, especially during a disaster:

- ◆ Property records, deeds, titles and/or leases
- ◆ Copies of wills (his and hers); birth, death and marriage certificates; divorce decrees; adoption or custody papers; citizenship papers; passports; military service records
- ◆ Stocks records, bond certificates, contracts (including promissory notes), supporting documents of years of large transactions, unusual losses or deductions
- ◆ List of insurance policies, automobile bills of sale and titles, social security cards

- ◆ Government savings bonds, religious records, retirement papers, copyrights and patents
- ◆ Household inventory, one copy of a list of valuable papers and their locations

## DRYING PAPERS AND BOOKS

Dry papers and books slowly for best results. Photocopy valuable papers as a precautionary measure because flood-damage may cause rapid deterioration. If you don't have the time to clean and dry them immediately, consider putting them in the freezer to prevent mildewing. Place wax paper between layers of paper bundles or books so they can be separated easily when removed.

- ◆ Wipe book covers with a solution of one part rubbing or denatured alcohol and one part water.
- ◆ Place books on end with leaves separated. When partially dry, pile and press books to keep pages from crumpling. Alternate drying and pressing until books are thoroughly dry. This helps prevent mildew. Use a fan to hasten drying.
- ◆ If papers and books are very damp, sprinkle pages with corn starch or talcum powder to absorb moisture. Leave powder for several hours, then brush it off.
- ◆ For valuable books that are nearly dry, consider pressing the pages with an electric iron set on low. This is a tedious process, but may be worth the effort. Separate the pages to prevent musty odors.
- ◆ Some chemicals help stop mold growth. Contact your county Extension office for recommendations on use.
- ◆ When books are thoroughly dry, close them and use C-clamps to help them retain their shape. Wipe vinyl and leather book covers with a light coating of petroleum jelly or leather or vinyl dressing.

### **Additional resources:**

Your county family living agent

### **Related publications:**

"Repairing Your Flooded Home," the American Red Cross/Federal Emergency Management Agency, 1992.

# Salvaging Food After a Flood

## SAFETY MEASURES IN THE KITCHEN AND GARDEN

**Food that has come in contact with floodwaters is generally unsafe to eat. Floodwaters usually carry a high load of bacteria and filth with them, and may contain oil or chemical wastes as well. With the exception of canned foods and some produce, most food touched by floodwaters should be discarded.**

**The safety of garden produce depends upon the type of flooding and type of produce. Follow the guidelines at right, which also cover refrigeration and freezer concerns when the power is out. And remember: When in doubt, throw it out.**

### FLOODED ITEMS TO DISCARD

- ◆ Fresh produce, meat, poultry, fish and eggs.
- ◆ Opened containers and packages.
- ◆ Submerged, unopened glass jars that have cardboard lid liners, such as mayonnaise or salad dressing.
- ◆ Submerged, unopened, home-canned jars with broken seals. To check seal, remove ring and test the flat lid with fingertips. If the lid lifts off easily, discard the food.
- ◆ All food in cardboard boxes, paper, foil, cellophane or cloth.
- ◆ Spices, seasonings and extracts, flour, sugar and other staples in canisters.
- ◆ Cans that are dented, leaking, bulging or rusted.

### FLOODED ITEMS TO SAVE

Some fruits, vegetables, and unopened canned goods and glass jars of food can be salvaged. Sanitizing, and in some cases, cooking is necessary for safe use.

- ◆ To sanitize cans and glass jars of food:
  - a) Mark contents on can or jar lid with indelible ink.
  - b) Remove labels. Paper can harbor dangerous bacteria.
  - c) Wash jars and cans in a strong detergent solution with a scrub brush.
  - d) Immerse containers for 10 minutes in a solution of 2 tablespoons chlorine bleach per gallon of room temperature water.
  - e) Allow containers to air dry before opening.
- ◆ Citrus fruits should be washed, sanitized with a light bleach solution (see above) and peeled before eating.
- ◆ Potatoes, carrots, apples and other firm fruits should be sanitized, peeled, if possible, and cooked before eating. Do not eat raw fruit or vegetables, even if they have been sanitized.

### WHAT ABOUT THE GARDEN?

Some garden produce may be salvaged. Sanitizing, peeling and cooking is recommended. Follow these guidelines:

## PREVENTION IS THE KEY

If it's not too late, prevent floodwater from coming into contact with food by:

- ◆ Raising refrigerators and freezers by placing cement blocks under their corners.
- ◆ Moving food from low cabinets.
- ◆ Moving canned goods and other food stored in the basement to the upstairs.

- ◆ If the floodwater contained waste from septic tanks, sewage lagoons or a pasture, your garden will take about a month to become clean. Don't eat or preserve food during this time.
- ◆ Ask if your local health department will test the garden soil for harmful bacteria. It may be able to determine whether immature root crops are safe.
- ◆ Discard leafy greens such as lettuce, spinach and cabbage, as well as soft berries. These are highly susceptible to bacterial contamination. Silt and other contaminants may be difficult to remove from them.
- ◆ Wash beans, peas, tomatoes, peppers and summer squash in water. Then soak in a weak chlorine solution of 2 tablespoons chlorine bleach to a gallon of water. Peel and cook them thoroughly before eating.
- ◆ For underground vegetables such as carrots and potatoes, wash in water and sanitize as above. 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 if possible.

## REFRIGERATION AND FREEZER CONCERNS

If the electricity is off to the refrigerator or freezer, follow these guidelines:

- ◆ Discard refrigerated meats, seafood, milk, soft cheese, eggs, prepared foods and cookie doughs if they have been kept above 40 degrees F. for over two hours. Also discard thawed items that have warmed above 40 degrees F., with the exception of breads and plain cakes.
- ◆ Discard any refrigerated items that turn moldy or have an unusual odor or appearance.
- ◆ Refreeze partially or completely frozen foods.
- ◆ Cold but fully thawed, uncooked meat, fish or poultry should be checked for off-odor. If there is none, cook and eat or cook and refreeze.
- ◆ Discard combination dishes such as stews, casseroles and meat pies if they are thawed.
- ◆ Refreeze thawed (but cold) juices, baked goods and dairy items such as cream, cheese and butter.
- ◆ Do not refreeze thawed vegetables unless ice crystals remain. Cook and use them if there are no off-odors.

### Additional resources:

Your county family living agent, your local emergency government office, the American Red Cross, the Federal Emergency Management Agency

### Related publications:

"Repairing Your Flooded Home," the American Red Cross/Federal Emergency Management Agency, 1992.

UW-Extension Publications—

"Management of Food for Emergencies," (B3045);

"Quick Consumer Guide to Safe Food Handling," (BG248);

"When the Home Freezer Stops," (B2837);

"Keeping Food Safe," (B3474).

# Disinfecting Dishes, Cookware and Utensils

## SAFETY GUIDELINES AFTER A DISASTER

### DISASSEMBLE, WASH AND DISINFECT

**During a disaster such as a flood, tornado or fire, kitchen items easily can become contaminated. Floodwaters may contain silt, raw sewage, oil or chemical wastes, while fires may leave residues from toxic fumes or fire-fighting chemicals. Before using any item that has come in contact with these substances, follow the guidelines at right.**

Take apart any item that can be cleaned in pieces. If possible, remove handles from pots. If you have a dishwasher and the hot water temperature is at least 140 degrees F., use a long wash cycle and heated drying cycle to clean and disinfect dishwasher-safe items. Regarding other items, or all items if you don't have a dishwasher, follow these steps:

- ◆ Wash all items in a strong detergent solution. Use a brush to remove dirt. Rinse in hot water.
- ◆ Immerse glass, porcelain, china, plastic dinnerware and enamelware for 10 minutes in a disinfecting solution of 2 tablespoons of chlorine bleach per gallon of hot water.
- ◆ Disinfect silverware, metal utensils, and pots and pans by boiling in water for 10 minutes. Chlorine bleach should not be used in this case because it reacts with many metals and causes them to darken.
- ◆ Air-dry dishes. Do not use a towel.
- ◆ Discard and replace soft, porous plastic or wood items saturated by floodwater, since they cannot be sanitized. These include baby bottles, nipples and pacifiers.
- ◆ If cupboards and counters come in contact with floodwater, clean and rinse them with a chlorine bleach solution before storing dishes.

#### **Additional resources:**

Your county family living agent, the American Red Cross, the Federal Emergency Management Agency

#### **Related publications:**

"Repairing Your Flooded Home,"  
American Red Cross/Federal  
Emergency Management Agency, 1992.

# Flooded Private Sewage Systems

## SAFETY, SANITATION AND CLEAN-UP CONCERNS

**Flooding of a private sewage system can be a hazardous situation for homeowners. It may lead to a back-up of sewage in the home, contaminated drinking water and lack of sanitation until the system is fixed. While you don't have control over rainfall or flooding in your area, you can prepare for high water problems and respond appropriately to emergency flooding.**

### HOW PROBLEMS OCCUR

When flooding or saturated soil conditions persist, a private sewage system cannot function properly.

Soil treatment systems for wastewater rely on aerobic (with oxygen) regions to reduce the amounts of chemicals and living organisms (viruses, bacteria and protozoa). When the soil is saturated or flooded, those hazardous materials can enter the groundwater and your drinking water supply.

### PREPARING FOR FLOODING

If you are prepared when flooding occurs, your family can be safe and your system should survive. To prepare for a flood you should:

- ◆ *Make sure all septic tanks are full of liquid.* The high-water season is not the time to have tanks pumped; empty tanks are buoyant and may “pop” out of the ground during flooding.
- ◆ *Plug floor drains, if necessary, to keep sewage from backing up into the basement.* Floodwaters may still enter the basement through cracks and seams, however.

### DURING A FLOOD

- ◆ *Discontinue use of your private sewage system.* Use portable toilets, if possible, or use any large container with a tight-fitting lid for a temporary toilet. Line the container with a plastic bag. After each use, add chlorine bleach or disinfectant to stop odor and kill germs. If necessary, bury wastes on high ground far away from your well.
- ◆ *Remember that a well may become contaminated during a flood.* Therefore, **DO NOT DRINK THE WATER.** Drink bottled water, or disinfect water before drinking. Contact your local health department for disinfection instructions.
- ◆ *Do not bathe or swim in floodwater.* It may contain harmful organisms.
- ◆ *Shut off power to a sewage lift pump if you have one in the house or in a pump chamber (mound, in-ground pressure, at-grade systems).*

## AFTER THE FLOOD

- ◆ *Do not use the sewage system until water in the disposal field is lower than the water level around the house.*
- ◆ *If you suspect damage to your septic tank, have it professionally inspected and serviced. Signs of damage include settling or inability to accept water. Most septic tanks are not damaged by a flood since they are below ground and completely covered. However, sometimes septic tanks or pump chambers become filled with silt and debris, and must be professionally cleaned. If tile lines in the disposal field are filled with silt, a new system may have to be installed in new trenches. Because septic tanks may contain dangerous gases, only trained specialists should clean or repair them. Wisconsin code requires licensed plumbers for any repairs.*
- ◆ *Discard any items that are damaged by contaminated water and cannot be steam cleaned or adequately cleaned and disinfected.*
- ◆ *Do not pump water out of basements too quickly. Exterior water pressure could collapse the walls.*
- ◆ *If sewage has backed up into the basement, clean the area and disinfect the floor with a chlorine solution of one-half cup of chlorine bleach to 1 gallon of water.*
- ◆ *Contact the county health department or county Extension office to obtain a drinking water test kit. (See the fact sheet “Water Contamination in Private Wells.”) Do not drink the water until it has been tested and is safe.*

### **Additional resources:**

Your county family living agent, your county code administrator, your local health department, the Wisconsin Bureau of Building Water Systems, Department of Industry, Labor and Human Relations.

### **Related publications:**

UW-Extension publication “Care and Maintenance of Residential Septic Systems,” (B3583).

# Controlling Insects After Flooding

## HOW TO MINIMIZE MOSQUITO, FLY AND OTHER INSECT PROBLEMS

### ELIMINATE BREEDING SPOTS

**After a flood, mosquitoes, flies and other insects may be more abundant than usual, posing potential health problems. Filth and debris left by the storm create excellent breeding conditions for houseflies and mosquitoes, some of which may be capable of spreading typhoid, dysentery and encephalitis. The key to controlling insects is removal of their breeding places—any standing water, especially stagnant water. In warm weather this should be done immediately after you return to the premises.**

- ◆ Empty water from barrels, old tires, cans and other vessels. In addition to being a breeding place for insects, this water may be polluted by floodwaters. Check clogged gutters and flat roofs that have poor drainage. Make sure cisterns, cesspools, septic tanks, fire barrels and rain barrels are covered tightly.
- ◆ Drain ponds, pools or any standing water in which mosquitoes may breed.
- ◆ If drainage is impossible, treat water puddles still standing after a week with larvicide as recommended by a county Extension agent.
- ◆ Dispose of refuse. Bury animal carcasses as soon as possible. Remove garbage at least once every week. Be sure garbage cans have tightly fitting lids. When using manure and garbage as a fertilizer, spread it thinly so it will dry quickly and not support fly development.

### MAKE REPAIRS

Patch screens and other places where mosquitoes may enter buildings.

### SPRAYS AND REPELLENTS

Use a household spray or an aerosol bomb to kill mosquitoes, flies or other insects that get into buildings. Spray shrubbery and shaded areas of buildings to kill adult insects. Contact your county Extension agent for specific recommendations.

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

#### **Additional resources:**

Your county agricultural agent

# Rodent and Snake Control After a Flood

## SAFETY PRECAUTIONS AND ELIMINATION

**Following floods, rats and other rodents may move into buildings to escape floodwaters. Snakes are often forced into places where they are not usually found. Upon re-entering flooded homes or buildings, you will need to be wary of these possibilities. Rats can carry disease and parasites, while snakes may be poisonous or at least frightening. Neither pose serious problems in Wisconsin, but the chance of an incident increases after a disaster.**

### WHERE THE RATS ARE

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, drawers, mattresses, appliances, upholstered furniture, stacks of clothes or paper, dark corners, attics and basements.
- ◆ Be extremely careful when approaching rats. They may be aggressive.

### CONTROLLING RATS

If rats continue to be a problem after floodwaters recede, contact your county Extension agent or professional pest control operator for advice. If you proceed on your own be extremely careful with any rodenticide or trap. To minimize rat problems:

- ◆ Remove trash piles and piles of damaged furniture or equipment. Store materials on platforms or shelves 12 to 18 inches above the ground.
- ◆ Remove food sources. Store food supplies in rat-proof bins or containers. Suspend garbage containers from trees or posts. Remove animal carcasses, as they may attract rats.
- ◆ If you are bitten by a rat, wash the wound with soap and water and see a doctor immediately. Rats may carry diseases and at the least, rat bites can cause infection. If the rat is captured or killed, health authorities may wish to check it for rabies or other diseases. When picking up a carcass, use the inside of a plastic bag to avoid touching it. Double-seal it in plastic and freeze until further notice.

### INSPECTING FOR SNAKES

It is important to know what poisonous snakes may be common to your area. Only two poisonous snakes exist in Wisconsin: the timber rattlesnake and the massasauga rattlesnake. Both species are restricted to the southwest quarter of the state. The massasauga is an endangered species and is rarely encountered. Non-poisonous snakes, however, are common and may bite.

Remember that all snakes are beneficial to the ecosystem and should not be killed indiscriminately — poisonous snakes included. But follow these precautions upon entering a flooded structure or area:

- ◆ Be alert for snakes in unusual places. They may be found in or around homes, barns, outbuildings, driftwood, levees, dikes, dams, stalled automobiles, piles of debris, building materials, trash or any type of rubble or shelter.
- ◆ Keep a heavy stick or long-handled tool handy. After dark, carry a strong light.
- ◆ Before beginning rescue or clean-up operations, search the premises thoroughly for snakes. Wear heavy leather or rubber high-top boots, and heavy gloves. Use rakes, pry bars or other long-handled tools when removing debris. Never expose your hands, feet or other parts of your body where a snake might be.
- ◆ Explain to children the dangers of snakes during storm or flood conditions and the precautions they should follow. Do not allow children to play around debris.
- ◆ If you kill a poisonous snake, use a stick, rake or other long-handled tool to carry it away for disposal.
- ◆ If you realize you are near a snake, remain still—sudden movements may cause the snake to strike. If the snake doesn't move away from you after a few minutes, slowly back away from it.
- ◆ If someone is bitten by a poisonous snake, call a doctor immediately. If bitten by a non-poisonous snake, clean the wound and watch for signs of infection.

## CONTROLLING SNAKES

To minimize chances of finding snakes indoors, block openings where they might enter buildings. Snakes can pass through extremely small openings and usually enter near or below ground level. Some other suggestions:

- ◆ Be sure doors, windows and screens fit tightly.
- ◆ Search walls and floors for holes or crevices. Inspect the masonry of foundations, fireplaces and chimneys. Then plug or cement these openings.
- ◆ Plug spaces around pipes that go through outside walls.
- ◆ Fasten galvanized screen over drains or ventilators, or over large areas of loose construction.

### **Additional resources:**

Your county agricultural agent

### **Related publications:**

UW-Extension Publications—

“Snakes of Wisconsin,” (G3139);

“The Raccoon,” (G3304);

“Skunks: How to Deal With Them,” (G3273);

“Meadow Mouse Control,” (A2148);

“Tree Squirrels in Wisconsin: Benefits and Problems,” (G3522).

# Salvaging Stored Wet Feed and Grain

## DRYING, MARKETING AND SAFE FEEDING

**Time is of the essence in salvaging wet feed and grain. Both will begin to heat and mold very quickly, leading to spoilage as well as the possibility of spontaneous combustion. As soon as possible, you should remove dry portions of grain and store them separately. Dry bales of hay should be removed and restacked in a dry location, since capillary action will draw water up into the stack.**

**Wet feeds should be presumed harmful to animals until tested. They may contain contaminants from floodwaters, as well as mold spores which sometimes produce dangerous toxins.**

### USE DRYER IF POSSIBLE

If part of a grain bin has been flooded, remove dry grain *from the top* using a vacuator or any other means. Use one of the following methods for handling wet grain:

- ◆ Get the wet grain to a dryer quickly, if possible. This is the surest way to save wet grain.
- ◆ If the grain depth can be kept below 6 feet, use a natural-air bin drying system with a perforated floor and a high-capacity drying fan. Supplemental heat should only be used during periods of high humidity. Do not raise the air temperature more than 10 or 15 degrees F.
- ◆ If a dryer is not available, spread the grain in as dry a place as possible. Don't pile it any higher than 6 inches. Stir it daily to prevent overheating and to speed drying. Watch for and remove molded grains.
- ◆ Wet grain can be ensiled if it is intended for feed and the moisture content ranges between 25 and 35 percent. If using a conventional silo, see your county agricultural agent about treating the grain with propionic acid to prevent mold.

### DRY AND SHELL WET EAR CORN

Separate dry corn from wet and store it on high ground. If the ground is wet, first cover the area with plastic or building paper. Handle wet ear corn as follows:

- ◆ Dry the corn if facilities and equipment are available. Remove corn from crib, since mud and debris washed into the crib may make drying difficult or impossible. Then place the ear corn over a drying tunnel and force air through the corn with a fan.
- ◆ Shell the corn if shelling equipment is available.

### GUARD AGAINST HAY FIRES

Flooded hay should be disposed of or used on fields as a fertilizer. It is probably unsafe for animals and not worth the time and expense of drying. Because of hay's tendency to heat and mold quickly, it should be spread out to aerate as soon as possible and turned often. Hay bales that are 30 to 40 percent wet pose the greatest risk of fire. Check hay storage often for pungent odors, hot damp areas on the stack, emission of water vapors and other signs of heating.

## REPLACING HAY WITH GRAIN

**If you must replace conventional roughage feeds with grain because of flooding, consider fibrous grains such as oats, barley, ground ear corn or one of the high-fiber byproducts such as brewers grains, corn gluten feed or soy hulls.**

**Continue to feed hay or straw unless you have had experience with high grain feeding. You must maintain a minimum amount of forage in cattle diets. Check with your nutritionist or county agricultural agent for guidelines. Spread any major changes in a feeding program over a period of several days. Observe animals carefully during the transition.**

- ◆ To check a stack's temperature for fire risk, drive a sharp pointed pipe into the hay, lower a thermometer inside the pipe, and leave it there for about 20 minutes. At 150 degrees F., the hay is approaching the danger zone. At 170 degrees F., hot spots or fire pockets are possible. Have the fire department on standby.

## FIND A LOCAL MARKET

If it is not possible to dry grain artificially, try to find a local market for it. Usable flood-damaged grain must be sold at a salvage price, possibly to a large livestock feeder who can use it before it spoils. Grain should be kept in airtight storage to prevent spoilage.

## SEED GRAIN AND SILAGE OFTEN A LOSS

Wet seed grain probably will not be suitable for seed, as wetness causes the seed to germinate. Subsequent drying would stop germination and likely kill the seed or reduce its viability. Do not feed seed grain to livestock, since it may contain toxic additives.

Flooded silage likewise will be a loss. Its waterlogged state will hurt feed value, as will any contaminants from the water. Like hay, it might be spread on fields as a fertilizer.

## SAFETY WITH WATER-DAMAGED FEEDS

- ◆ *Testing.* Do not feed flood-damaged grains until they are tested for *mycotoxins*, toxic substances produced by fungi. Ask your county Extension agent for locations of testing laboratories. Even if the feed is deemed safe to use, watch animals carefully for signs of illness.
- ◆ *Nutritive value.* Mixed feeds, grains and roughages which have heated or spoiled will have little nutritive value for livestock, depending on the extent of the damage.
- ◆ *Safety.* Do not feed heated, molded or sour feeds, or moldy legume hays (such as alfalfa or clover) to any livestock. Reduced performance, sickness, abortion or death may occur.

### Additional resources:

Consult your veterinarian or county agricultural agent before using flood-damaged feeds.

# Maintaining Livestock Health After a Flood

## ISSUES OF DISEASE CONTROL AND SANITATION

**If your fields or farm buildings have been flooded, take special precautions against flood-related accidents or diseases in poultry and livestock. Give animals extra care, particularly if they have been stranded by floodwater, and have been off regular feeding schedules. Keep fields clear of harmful debris, and clean buildings as soon as possible. In addition, watch for signs of flood-related diseases, such as lameness, fever, difficulty breathing, muscle contractions or swelling of shoulder, chest, back, neck or throat. Be prepared to contact a veterinarian if you spot trouble.**

### DISEASE CONTROL

Following a flood there may be danger of infectious diseases in livestock, but unless serious outbreaks of infection have occurred recently, the situation should not be alarming. Observe these precautions:

- ◆ Where large numbers of animals are assembled, watch for any indication of infectious diseases such as pneumonia, foot rot or leptospirosis. These diseases are more likely to occur where cattle are crowded on wet ground and where horn flies and houseflies are abundant.
- ◆ Promptly report any sign of disease to a local, state or federal veterinarian.
- ◆ Contact a veterinarian about vaccinating animals for immunity from flood-related diseases such as anthrax, blackleg and swine erysipelas.

### FEED AND WATER

- ◆ Provide clean, uncontaminated water.
- ◆ Inspect feeds such as corn, wheat and hay. Do not feed flood-damaged or moldy hay unless it has been tested for mycotoxins, toxic substances produced by fungi.
- ◆ Do not use any feed or forage that may have been contaminated by chemicals or pesticides.

### PASTURELAND

- ◆ Standing water may have ruined some pastures. Lack of adequate forage could force animals to eat poisonous plants. Remove fallen wild cherry limbs from pastures to prevent livestock poisoning.
- ◆ Before restocking flooded pastures, remove debris, especially along fence lines and in corners. Livestock could be injured from pieces of barbed wire, sharp metal and trash.

### PROTECTING DAIRY COWS

- ◆ Try to milk at regular times. It is better to lose the milk from one milking than to stress high producing cows.
- ◆ If you must use a neighbor's milking parlor, try to keep the two herds separate.

- ◆ If feed supplies are limited, give the largest portion of available feed to the highest producing cows and those recently fresh. This may be a good time to cull the herd.
- ◆ Clean and sanitize milking parlor, dairy barn and equipment before returning to normal use.
- ◆ Watch for signs of mastitis, which is likely to flare up if milking methods, time and equipment have been changed.

## SANITATION

- ◆ Clean out hog houses, barns and chicken houses. Spray buildings with a good disinfectant before animals occupy them again. Air buildings thoroughly to dry them out.
- ◆ Remove debris from dairy barns. Scrub and disinfect walls, ceilings, floors, stanchions and other equipment.
- ◆ Scrub the milk house and equipment with detergent and hot water. Sanitize equipment, walls, ceilings and floors with dairy sanitizer equipment.
- ◆ Dispose of animal carcasses promptly. If there is no rendering company operating nearby, burn or bury carcasses deeply in a place approved by your local soil conservation office.

## INSECTS

Mosquitoes and other pests may be abundant after a flood. They not only annoy animals, but some species carry disease. Spray animals with an insect repellent as recommended by your county agricultural agent.

### **Additional resources:**

Your county agricultural agent, your  
local veterinarian

# Flooded Farm Vehicles and Equipment

## TIPS ON CLEANING AND RECONDITIONING

**Try to clean tractors, trucks and farm equipment as soon as possible. Delay will make dirt and silt harder to remove and may cause considerable rusting and corrosion. If you use farm vehicles and equipment before proper reconditioning, you may seriously damage them.**

**Have your dealer or another expert recondition engines. They need to be completely disassembled for cleaning and reconditioning. Do not try to move or start an engine that has been submerged until it has been cleaned and reconditioned, since dirt will damage bearings and precision parts. If the tractor was submerged only to the platform, you will need to service only the wheel bearings and moving parts that were under water.**

### EMERGENCY CLEANING

If you must use the tractor or engine immediately, or if you think the cost of professional reconditioning is not worthwhile, use the following procedure. *This procedure isn't thorough enough to prevent possible damage or need for overhaul in the future.*

- ◆ Clean exterior thoroughly with a hose. Scrub greasy deposits with solvent.
- ◆ Remove spark plugs or fuel injectors, air cleaner, intake manifold and carburetor. Clean these parts thoroughly with solvent.
- ◆ Drain the crankcase. Flush the crankcase with oil and refill with clean oil. Also disconnect fuel lines, blowing them out with compressed air.
- ◆ Crank the engine slowly with spark plugs or fuel injectors removed to force water out of cylinders. Squirt light lubricating oil into each cylinder and let it stand for about five minutes. Then crank the engine slowly to lubricate cylinder walls and rings.
- ◆ Replace all filters — engine, fuel, hydraulic.
- ◆ Completely flush out the fuel system — tank, pump, lines — with #1 diesel fuel. Be extremely careful to avoid fire danger.
- ◆ Replace starter and generator. Have an expert service them.
- ◆ Drain and flush the transmission and final drive with solvent. Refill with new, clean oil.

### WHEEL BEARINGS, COOLING SYSTEMS AND BATTERIES

- ◆ Remove and clean unsealed wheel and track bearings with solvent. Lubricate and replace the bearings. Factory-sealed bearings should not need cleaning if the seal is unbroken.
- ◆ Flush the cooling systems with fresh water, and clean the radiator fins.
- ◆ Replace the battery, if necessary. If it was submerged, it will probably need to be replaced.

## STARTING AND INITIAL OPERATION

- ◆ Examine the machine and turn it over by hand after you have cleaned and replaced all parts. If it turns freely, it is probably ready for operation. Turn on the engine and operate the machine at low speed until you are sure all parts are working smoothly.
- ◆ If there is a substantial amount of dirt in the crankcase, transmission or gear train, change the oil and oil filter after operating the machine for a few hours. Using fresh lubricant is cheaper than paying for additional repairs.

## ADDITIONAL STEPS FOR TRUCKS AND CARS

- ◆ Remove inside door panels. Clean and lubricate latches and window raising mechanisms.
- ◆ Remove seats and floor mats. Brush and vacuum thoroughly. Clean washable surfaces with soap and water. Use rug or upholstery shampoo on non-washable areas. Dry thoroughly.
- ◆ Disassemble leaf springs. Clean or replace spring pads if necessary.
- ◆ Have brakes and steering mechanism checked before you drive the vehicle.

## RECONDITIONING FARM IMPLEMENTS

Follow applicable steps above, and clean rest of machine as follows:

- ◆ *Chains.* Soak chains in solvent for several hours, then remove chains and allow solvent to drain out of them. Soak chains for several hours in light oil, then drain off excess oil and replace chains on machine.
- ◆ *Gears and sprockets.* Clean exposed gears and sprockets with cleaning solvent. Coat gears with light oil.
- ◆ *Gear cases.* Inspect enclosed gear cases for water or grit. Water may be present below the oil. If you find water or grit, or if you are in doubt, drain the case, flush it with solvent and refill with clean oil.
- ◆ *Belts.* Examine all belts for tears or cracks. Repair or replace them as necessary.
- ◆ *Cutting parts.* Remove knives and cutter bars from mowers and combines. Clean and dry them. Coat cutter parts with light oil and reassemble. Inspect the insides of combines and remove accumulated dirt, chaff, debris or water.
- ◆ *Soil-working tools.* Clean dirt and rust from surfaces of soil-working tools such as mold boards, discs and cultivator shovels. Coat these tools with rust preventive grease or used crankcase oil.

### **Additional resources:**

Your county agricultural agent

# Tips for Handling Flooded Soils

## CLEAN-UP, SOIL TESTING AND COVER CROPS

### GENERAL GUIDELINES

**If sediment came from fertile fields of your upstream neighbors, the fertility status of the field will probably be unchanged or higher than before the flood. If heavy sedimentation occurs, these soils should be tested to determine nutrient status. Take soil samples at a 6- to 8-inch depth in at least 15 locations per field. Each soil sample should represent 20 acres or less. Areas with significant differences in textures should be sampled separately.**

**Sand deposits may have to be removed or spread over other areas and mixed with the more productive soil beneath. Sand deposits on top of silty or clay-type soils deeper than 4 inches may decrease potential crop yields. Determine the location, depth and amount of coverage of sand. Call your county Extension agent for further guidelines.**

- ◆ Open all drainage ditches.
- ◆ Remove debris from fields and pastures. Look carefully for partially hidden objects that could injure livestock or damage machinery. Check hedge and fence rows carefully.
- ◆ To prevent severe soil compacting, avoid running trucks and heavy farm equipment over wet soils. Most soils are not dry enough for traffic or cultivation until the top 5 or 6 inches crumble, rather than slick over or pack.
- ◆ Encourage the growth of cover crops such as rye or wheat. Any type of plant growth is effective in drying waterlogged soils.
- ◆ It is usually not necessary to remove silt deposits. After soils are dry enough to work, level and mix silt deposits into original topsoil, if practical.
- ◆ Apply animal manure and incorporate into soil. Check with your county Extension agent for recommended application rates.
- ◆ The fertility level of flooded soils will probably change over a period of time. Do not guess at requirements. Take soil samples to determine new fertility levels. Follow recommendations. Allow for nutrients supplied by applied animal manures. When sampling silted fields, make sure the samples represent the soil mix that will exist after deposited silt is mixed with the original topsoil.
- ◆ Avoid deep tillage or subsoiling unless advised by an agronomist. Deep tillage or subsoiling is rarely beneficial and could be harmful.

#### **Additional resources:**

Your county agricultural agent, Soil Conservation Service

#### **Related publications:**

UW-Extension Publications—

“Management of Wisconsin Soils,” (A3588);

“Sampling Soils for Testing,” (A2100).

# Salvaging Crops After Flooding

## RECOVERY OF ALFALFA, IRRIGATED PASTURES AND HAY

**Many factors affect the extent of crop damage after a flood. Seasonal temperatures can be a major factor. A July flood, for example, is often much worse for crop survival than a spring flood. The warmer mid-summer weather increases the rate of damage and death to submerged plants. During spring flooding, temperatures are colder and plants can survive longer under water.**

**Plants that encounter flash-flooding along creeks where the water rises and recedes quickly are most likely to survive. They will experience less oxygen depletion than submerged plants. Other factors for survival include water movement and plant height. Standing water is more harmful than moving water. Plants with some leaves protruding from the water are more likely to live.**

**Restoration of alfalfa, irrigated pastures, perennials and hay will depend heavily on all of these factors. But it also depends on the steps you take toward recovery.**

### ALFALFA

Alfalfa can withstand submersion for a limited time, depending on its stage of growth. Dormant plants may withstand submersion for as long as seven to 10 days. Growing plants can usually withstand submersion for less than three to four days without damage.

Alfalfa can recover from moderate silt deposits. Silt deposits of over 2 to 3 inches will weaken the stand, and you may need to regrade and re-establish in places.

Limit reseeding of established fields to silted patches within the field. If the entire field is silted, rework and reseed the field. Where alfalfa stand is over two years old, overseed with temporary crop and reseed alfalfa at least one month after having reworked the field.

You can reseed small areas with fast-growing grasses. This will help provide forage until the entire field can be reworked. In old fields, seeding to annual crops such as ryegrass will provide some hay and also will help control weeds.

### IRRIGATED PASTURES

You probably can restore irrigated pastures without serious production losses if silt deposits are not over 2 inches and erosion is minimal.

Recovery usually depends on the type of legume. Alfalfa probably will recover from moderate silting better than white clover varieties. White clover will not survive silting that covers the ends of the growing stems or stolons. Ladino clover, however, will fill in stands from a few surviving plants if the area is not too large.

Grasses such as ryegrass, orchardgrass, fescue and meadow foxtail will probably grow through a moderate silt deposit, and can stand several days of flooding without injury. Tall fescue will tolerate more water than ryegrass or orchardgrass. Meadow foxtail and reed canary grass can stand longer submersion than other perennial grasses.

Subsurface water saturating the root zone of deep-rooted crops such as alfalfa can damage the plant as much as surface water. To take care of excess soil moisture, open drainage ditches as soon as possible.

## OVERLY MATURE PERENNIALS

Some overly mature alfalfa or clover grass can be partially salvaged by mixing with less mature forage and ensiling the crop. Although nutritional value will be low, this is a fast method of removing the crop to ensure a good second cutting.

Ensile perennials in either conventional upright or temporary trench silos. To make a trench silo:

- ◆ Locate the trench where drainage is good.
- ◆ Design the trench for efficient feeding. A long, narrow, deep trench results in less feeding loss than a wide, shallow trench.

To make the silage:

- ◆ Direct cut or wilt to 65 to 70 percent moisture.
- ◆ Chop fine.
- ◆ Pack thoroughly.
- ◆ If available, add 100 to 200 pounds of corn and cob chop per ton of ensiled nutrients. This will improve fermentation, quality and palatability.

## HAY

To minimize damage to flooded hay crops:

- ◆ Remove old growth from fields that have not been harvested. This will encourage a good aftermath crop.
- ◆ Make this crop into hay or silage.
- ◆ If crop is silt-damaged, chop it uniformly back onto the field. Then topdress immediately with fertilizer. You also may want to apply nitrogen to stimulate legumes as well as grasses. Check with an agronomist for recommended application rates.
- ◆ On fields harvested just prior to the flood, make crop into hay or silage. Then topdress field with fertilizer. Check with your county agricultural agent for specific recommendations.
- ◆ If growth is short or yellow, topdress immediately.

### **Additional resources:**

Your county agricultural agent

Information from: University of Wisconsin Cooperative Extension, University of Missouri Extension, Pennsylvania State University Cooperative Extension Service

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# Weed Management After a Flood

## STRATEGIES FOR THIS YEAR AND NEXT

**Floods can affect weeds both the year they occur and in subsequent years. The biggest impact in the flood year will be the reduced competitive ability of the crop. Weeds will take advantage of the stunted or killed crops and grow to maturity.**

**In the year after a flood, new weed problems will be likely. Some of the weeds carried into the field by floodwaters may not have germinated in time to be noticed during the previous growing season. Mechanical and chemical methods need to be considered in both the flood year and subsequent years to manage weeds. A bioassay test—in which seeds are planted in flooded and non-flooded soil samples—can be helpful to determine if soils are safe for intended crops.**

### IF THE CROP RECOVERS

If the crop recovers after the flood, make an effort to reduce the impact of weed competition. This may not be practical if fields are too wet to enter for mechanical or chemical weeding.

- ◆ Check fields regularly to monitor crop and weed development. Take note of weed species. Are there any new species? This may happen if weed seeds were carried into the field by floodwater. Make a field map of these weed locations and use it to plan next year's weed management program.
- ◆ Consider whether herbicides can be safely applied. Most labels clearly specify the maximum growth stage of the crop at which the product can be used. Applications following a mid-season flood are very likely beyond this “window” of application timing. Most labels also caution against using herbicides if the crop is under any stress. Thus, the feasibility of herbicide use the same year as a flood occurs is limited.
- ◆ If herbicide use is feasible but conditions are extremely wet, consider using a commercial sprayer equipped with flotation tires.

### WHEN CROPS ARE DAMAGED

Flooding usually kills the crop or at least injures it so severely that it will not be worth harvesting. If this is the case, try to prevent weeds from going to seed through the use of mowing, tillage or chemical application.

- ◆ As mentioned above, take note of any new weed species that are present. Make a field map of the weeds to plan next year's weed control program.
- ◆ Mowing will allow some weeds to survive but may hasten drying of the soil more than using herbicides. Mowing is also an option if the soil is too wet to be tilled.
- ◆ Mechanically tilling the soil, if it is dry enough, will destroy weeds. It will also aerate the soil more than either mowing or spraying.
- ◆ Applying non-selective, non-residual herbicides may be a good option if the soil is too wet to work mechanically.
- ◆ Repeat either mowing, tillage or chemical application if another generation of weeds emerges that will have time to produce seed.

## THE YEAR AFTER THE FLOOD

### FINAL DECISIONS

**Should you allow even more time than product labels specify before planting rotation crops? Probably not if you have used DNAs (as noted in chart), but it's difficult to say for other chemicals. Consider whether floodwaters brought in untreated soil from other fields. Also consider whether runoff removed a significant part of the applied product. When in doubt, use the bioassay test described at right or send a soil sample to a commercial lab for chemical analysis. In some cases it may be appropriate to allow an extra week or two beyond the normal plant-back interval and deep till the field to dilute any remaining residues.**

**Once the field has been planted, monitor it carefully for possible weed problems. If weed densities approach the economic threshold, use the appropriate mechanical or chemical measures to control them.**

Be alert for new weed problems the year after the flood. Some weeds may have germinated after you made an assessment of weeds during the flood year. Others may have remained dormant until this season. The flood may also have deposited soil that is different in texture, pH and organic matter content. These factors may influence herbicide performance and crop safety. Take soil samples and base herbicide selection and rates on current soil characteristics.

The “new soil” may have herbicide residues from the previous season's application. These levels are unlikely to affect this year's crop, but it would be wise to do a simple bioassay test to determine if planned crops are feasible in the flood-deposited soil. To carry out a bioassay test:

- ◆ Take several soil samples from the flooded field (1 quart per sample) and plant three or four seeds of the planned crop in each one.
- ◆ Collect soil samples from a known herbicide-free site to use as a standard and likewise plant three or four seeds of the planned crop.
- ◆ Grow the seedlings for two to four weeks.
- ◆ If plants in the flooded soil are normal and appear to grow as well as those in the herbicide-free soil, indications are strong that it is safe to plant your crop.
- ◆ If crop growth in the flooded soil is abnormal, have an agricultural professional determine if the symptoms are related to possible herbicide residues in the soil or to other causes, such as nutrient deficiencies or diseases.

## A CLOSER LOOK AT HERBICIDES

Herbicides decompose in the soil by microbial action. This breakdown is slowed under flooded (anaerobic) conditions. Soil temperatures also are cooler under flooded and wet soil conditions, slowing both microbial and chemical degradation. Thus, the potential for herbicide carryover that would injure the subsequent crop may increase after flooding. A summary of possible effects of flooding on herbicide breakdown is given below:

<u>Product or Chemical Family</u>	<u>Degradation Under Anaerobic Conditions</u>
Triazines (atrazine, Bladex, Sencor)	slower
Thiocarbamates (Eradicane, Sutan+)	slower
DNAs (Treflan, Prowl)	faster
Acetanilides (Lasso, Dual, Frontier)	can degrade anaerobically
Substituted ureas (Lorox)	unknown
Roundup	can degrade anaerobically
Accent and Beacon	unknown
Hoelon	much slower
Poast, Fusilade, Assure	unknown

### Additional resources:

Your county agricultural agent

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