



Response to Floods and Water Damage

For Libraries, Archives, Museums, and Other Repositories

Introduction:

Occurring in all fifty states, floods are one of the deadliest and most widespread forms of weather-related disasters. Knowledge and appropriate action can protect you before, during, and after a flood. Advance measures—including disaster plans, disaster drills, and building modifications—offer significant protections for staff, visitors, collections, and your building. Knowing how to respond during a flood, helps ensure your survival. Experience and knowledge of post-flood response techniques will keep you and your staff safe, as you salvage collections after a flood.

Your ability to take actions described in this guide will depend on putting plans, equipment, supplies, and people in place before emergency strikes. Experience in the Midwest floods of 1993 and 2008, and in hurricanes like Katrina, shows that preparedness can substantially reduce damage to buildings and collections, speed recovery, and help limit risks to staff and visitors.

Know your vulnerabilities. Be aware of flood risks to your building. Identify nearby bodies or sources of water like tidal rivers and coastlines, streams, underground water sources, swamps, culverts, dry streambeds, gullies, or simply low-lying ground. Find out if you live in a flood-prone area by talking with your local civil authorities or emergency management office, or by checking flood maps on the Websites of the [Federal Emergency Management Assistance \(FEMA\)](#)¹ and the [National Oceanographic and Atmospheric Administration \(NOAA\)](#).

If a Flood Threatens:

Know the difference between a flood watch and a flood warning. A flood *watch* is advance notice, announced when a threat is identified—often up to 36 hours before the event. A flood *warning* tells you to expect flooding within 24 hours. Floods may be fast, from dam failures, flashfloods, and tidal waves, or they may be slow, from storm surges in rivers or streams or levee breaks. Fast floods require fast evacuation, as they may sweep away bridges, structures, trees, vehicles, and people in a wall of rapidly moving contaminated water. More than half the nation's flood fatalities result from rapid flooding or from driving through floodwater, which can stall and float vehicles.

¹ See both the FEMA [Map Service Center \(MSC\)](#) and the [Flood Hazard Mapping \(FHM\)](#)



Flood Watch:

If you are in your repository when a flood watch is announced:

1. **Take it seriously.** Listen to local emergency broadcast system radio and/or a National Weather Service (weather band) radio at 162.475 MHz-FM. [NOAA Weather Radio](#) gives additional broadcast frequencies and transmitters.
2. **Ask local disaster planning experts for predictions.**
3. **Check the [NOAA](#)** or other weather websites for predictions of areas that may experience floods, flash floods, or severe thunderstorms within 24 hours.
4. **Touch base with your emergency response team** and ensure all know what to do in case of flooding.
5. **Listen for local audible emergency alarms and take precautionary steps.**

As you wait for flood updates:

1. **Unplug all non-essential electrical equipment and secure the building.**
2. **Check battery-powered equipment**, alternative power and communications systems, and emergency supplies.
3. **Place a handheld ax in the highest part of your building** to aid escape.
4. **Ensure that batteries on water alarms and flashlights are fresh and in place.**
5. **Place water alarms near all collection storage areas** on lower floors to provide early warnings in case of roof or window leaks, rising ground waters, or backed up drains.
6. **Collect clean water** in jugs for cleanup activities.
7. **Secure all loose objects outside**, preferably by bringing them into the building.
8. **Tape windows and then pad them** with bubble wrap before closing the storm shutters.
9. **Move emergency supplies** (i.e., plastic sheeting, first aid kits, blankets, food, ponchos, water, cell phones, flashlights) to upper level space with appropriate exit capabilities.
10. **Back up all computer files** on durable high-speed back-ups if time allows and place them in cabinets sealed with gaskets; if no other water-tight containers are available, use several layers of tightly sealed plastic bags.
11. **Fill evacuation vehicle gas tanks and move unnecessary vehicles** to high ground.
12. **Turn your HVAC on high** so the building will remain cool longer.
13. **If time allows, prepare to evacuate collections** either to a higher floor within the building or to an alternate location on high ground outside the flood plain. Use appropriate designated vehicles. **Note:** Be prepared to drive significantly inland to escape washed



out bridges and coastal flooding. While driving, notify authorities of any safety problems along the route. Don't spread rumors.

Flood warning:

In case of a flood warning, take the following actions:

1. **Staff and visitor safety are your top priority.** Close the repository to the public early. Assist disabled persons, non-essential staff, and visitors by sending them to safety using safe routes identified by emergency personnel. Check to see that all have actually left the building and parking lot.
2. **Ensure that all essential staff who are not evacuating immediately know where to go,** how to get to safety, and what they must do.
3. **Move designated high-risk materials, copies of key documentation, and copies of your emergency plan and contact directories to the upper floors** of the repository or collections storage building. If there is no time to move all collections to upper floors, move high priority items and all easily movable collection items to the highest-level location available within the room.
4. **Lock all cabinets and move equipment and collections away from windows.** Brace materials or tie them down.
5. **Move all collections and equipment** (if possible) out of basements and lower floors to upper floors and tie them down.
6. **Place plastic sheeting over all vulnerable collections and equipment** and tape in place if necessary.
7. **Close storm shutters.** If you lack storm shutters, tape or board up windows. Tape glass doors and mirrors. Use additional tape to attach plastic sheeting over the entire window well areas, attaching sheeting to the surrounding wall. Plastic sheeting provides a humidity barrier and added insulation, as well as protecting collections from broken window glass.
8. **Turn refrigerators and cold storage units to the coldest settings** and tape them shut as early as possible to increase residual cold to carry them through a power outage.
9. **Secure heavy screens over floor drains** to keep small items from washing away.
10. **Secure non-movable items** with strapping, bolts, or supports.
11. **Use dehumidifiers, sand bags, and sump pumps** as necessary in the fight to prevent rising ground waters from entering your building and excessive humidity from causing mold.
12. **Disconnect remaining inessential utilities.**
13. **Shut down all utilities, turn off electricity at the building's main circuit breaker, unplug all electrical equipment on lower floors, seal all doors and windows, and secure the building** if you are evacuating.
14. **Evacuate** if required to do so. **Note:** Flash floods require immediate evacuation.



15. **If you must shelter in place, move to a high floor** with an external exit such as a window with shutters controllable from the inside.

During a Flood:

If caught in your repository:

1. **Stay in the building and move to an upper floor if water is six inches or higher outside the building**, or a flash flood watch, tsunami watch or dam failure is announced.
2. **Go to one of the top floors**, taking flashlights or battery-powered camping lanterns (do not use candles, kerosene, oil, or gas lamps), emergency plan, drinking water, food, your cell phone, and a bright waterproof poncho or coat. Avoid spaces with no external hole or window, as you may need to be rescued from the space if waters rise too high. If no such space is available, take an ax with you.
3. **Contact authorities by cell phone** to alert them to your situation and request rescue.
4. **Shut off all building utilities** (i.e., gas and electricity). Stay away from electrical appliances and outlets, electrical circuits, gas lines, submerged appliances, and similar items.
5. Evacuate if you smell gas or discover leaking gas lines.
6. **Go onto the roof if rising water makes it necessary** as long as no thunderstorm is in progress.

If caught on the road (if you must try to walk or drive away from a flood):

1. **Plan your route before you start.** Avoid bridges; lowlands near rivers, creeks, gullies, and streams; and flood plains. Move inland, staying on high ground.
2. **Watch for flooding**, downed bridges, downed power lines, and low areas such as highway dips, where water may pool and pose threats.
3. **Go around standing water, not through it.** Just six inches of water will stall most cars and can sweep a strong person off their feet if the water is moving.
4. **Do not try to cross a stream or gully** either on foot or in a car.
5. **Watch for road or path damage**, as floodwaters may erode or destroy the road, leaving you stranded. Be aware that standing water may hide downed power lines, posing significant risks of electrocution if you enter the water.
6. **If your vehicle stalls, abandon it** immediately and seek higher ground. Some cars can be swept away by just a foot of rapidly moving water; most cars, trucks, and SUVs will float in two feet of moving water. Fifty percent of flood deaths occur when passengers remain in a vehicle that is swept away.
7. **If you must walk in flood waters, walk where the water is not moving.** Use a stick or pole to ensure that the ground ahead of you is firm. Move to higher ground that is firm (i.e., not a tree or shaky or loose structure likely to be washed away).



8. **Avoid flood debris areas.** They may pose health and safety risks due to biological contamination, hurt or frightened animals, or broken glass or power lines.
9. **Call for help immediately** if you are stranded. Explain where you are clearly and provide easily understandable landmarks. Many rescues don't occur because the trapped person can't clearly explain where they are.

After a Flood

For instructions on wet salvage of flooded collections see [Library of Congress Guidance on Emergency Drying Procedures for Water Damaged Collections](#).

First steps: after the flood, be prepared to:

1. **Put on personal protective clothing and equipment.**
2. **Assess the building and collections damage** once you are allowed back in the building. Check for damage to the structure that will require help or a building permit (i.e., damaged ceilings, floors, roofs, stairs, etc.). Discover what collections materials are swept away, wet, or have mold or other biological or chemical contamination.
3. **Document damage to the building and collections.** Take photographs and list specific locations. Key the images and lists to unique and easily understood room numbers and areas as you assess the building.
4. **Call on your disaster plan team**, management team, insurance agent, and approved contractors to provide help.
5. **Salvage and dry or freeze collections items in priority order within 48 hours**, starting with high priority items. Follow procedures in [Library of Congress Guidance on Emergency Drying Procedures for Water Damaged Collections](#) or other resources provided by authorities in conservation or preservation.
6. **If you can't do the salvage work yourself, call a salvage firm immediately.** See [Products and Services for Disaster Response](#) for representative vendors, and seek references for similar work, even in an emergency.
7. **Get moving air and light into damp or wet spaces** via cross ventilation, dehumidifiers, fans, and by opening windows and doors including interior doors. Lower humidity as fast as possible using dehumidifiers. See point 10 below.
8. **Obtain funding.** Ask for immediate financial assistance from a variety of sources (i.e., local foundations, insurance, FEMA, etc.). See [Foundation Grants for Preservation in Libraries, Archives, and Museums](#) for ideas.
9. **Hire professionals to help check safety** of water to drink, electrical and gas service restoration or appliance repairs, major debris removal, flood proofing, structural repairs, and equivalent activities.
10. **Remove water by commercially dehumidifying the building if necessary.** Get professional assistance in drying a waterlogged building. It is generally advised to pump out no more than 1/3 of water per day to avoid structural collapse, as water can weaken walls and floors. Allow a waterlogged building to settle gradually. Watch for structural damage such as sagging walls, floors, or ceilings, bouncy floors, or gaps in cracks in



foundations and elsewhere. Avoid areas with structural damage until they are stabilized by a professional.

11. **Prevent carbon monoxide risks**—do not use gas pumps or generators inside a building. Instead, position them outside, with exhausts facing away from the building safely away from air intake valves.
12. **Remove wet carpeting, ceiling tiles, wallpaper, and other damaged water-holding building elements.** Do not discard historic architectural elements if they must be removed. Store them securely for salvage and recovery.

Don't return to the building after evacuation until the following is done:

1. **Check the route to your building** to ensure bridges, roads, and other structures are safe and not on the verge of collapse. Check for floodwaters and collapsed power lines that pose travel risks.
2. **Get permission to enter the building** from appropriate authorities.
3. **Work with a trained structural engineer to determine that your buildings are safe** for reentry. Check for:
 - a. Animals, such as snakes or vermin that have entered the building
 - b. Asbestos fibers near damaged insulation or plumbing
 - c. Biological contamination such as bacteria from flood waters
 - d. Broken or leaking gas lines, and fumes that have collected due to a leak
 - e. Carbon monoxide from pumps or generators placed inside the building
 - f. Chemical contamination from cleaning chemicals, pesticides, and solvents
 - g. Collapsing ceilings or roofs
 - h. Electrocutation hazards (i.e., Flooded electrical circuit boxes, outlets, and appliances)
 - i. Floor or foundation damage
 - j. Leaking septic tanks, cesspools, pits, or leaching systems for biological waste
 - k. Molds and mildew
 - l. Pools of cool standing water (which can cause hypothermia if the water is less than 75°F)
 - m. Stairways or steps that have collapsed or been damaged
 - n. Submerged furnaces and appliances
 - o. Physical risks such as broken glass, loose nails, or jagged wood



4. **Set up an emergency salvage area with the essential tools** and features to meet OSHA, NIOSH, and other safety requirements (see [Warnings on the Hazards of Flood Clean-up Work](#)). These include:
 - a. Washing facilities with a clean water supply
 - b. A stable and sound structure with no sagging floors, stairs, ceiling, or walls
 - c. No uncovered gaps or holes in the floor (gaps larger than 4 feet require a guard, railings, or covers)
 - d. Ground fault circuit interrupters on all outlets used for power tools and tools within 10 feet of water
 - e. Handrails along each side of stairways with more than 4 steps and a rise greater than 30 inches
 - f. No unidentified substances contaminating the space (including garbage or toxic biological or chemical waste)²

5. **Use appropriate protective clothing and equipment and carry personal supplies,** including:
 - a. Antibiotic wipes to clean your hands and face (one use per wipe each, one person per use)
 - b. Boots with steel shanks and toes, plus rubber boots with hard soles, or waders
Note: working in water less than 75°F can result in hypothermia.
 - c. A coat appropriate for the weather to prevent hypothermia
 - d. Ear plugs or landscaper's ear muffs, if you are in an area where you must shout to be heard
 - e. Gloves, both nitrile and classic work gloves
 - f. Goggles or safety glasses with side shields
 - g. A hard hat that meets current American National Standards Institute (ANSI) Standards (currently Z89.1-2003, available from many vendors)
 - h. Heavy-duty long pants or coveralls
 - i. Insect repellent
 - j. Life vest if you are working near floodwaters
 - k. Long-sleeved shirt of tough water-resilient breathable material that is the correct weight for the weather

² These materials include animal and human waste, and may contain bodies, excrement, and other biological waste, including bird and vermin nests, used condoms, and needles; asbestos waste from insulation; ceiling, floor, wallboard and acoustic board, and tile; some geological specimens, such as talc; historic papier mache and plaster materials, including stage backdrops; roofing materials; spackle; wiring coatings and insulation; lead paint waste; moldy and mildewed items; and items contaminated by pesticides and chemicals.



- l. N95 respirator (charcoal-impregnated advised to minimize unpleasant odors) to cover your nose and mouth (see [Minnesota Department of Health](#))
 - m. Sun screen with an appropriate rating
 - n. Water (clean) in a container that is easy to access and clean
6. **Set clear and reasonable priorities, timelines, and goals for the flood recovery work:**
- a. Get help from trained workers. If no one on staff has the necessary training, hire a trained contractor.
 - b. Ensure workers have a safe, clean, and reasonable place to rest after work and at breaks and lunch times.
 - c. Set work priorities (i.e., remove top treasures first).
 - d. Set a reasonable timetable.
 - e. Realize that you may not be able to save everything.
 - f. Avoid disposing of collection items until they have been reviewed by a conservator and judged to be unsalvageable.
7. **Place human safety above all other priorities.** Prevent major risks during flood clean up and prevent breathing hazards, disease, and skin hazards from exposure to biological materials such as mold, chemicals, or other waste:
- a. Wear appropriate protective equipment.
 - b. Decontaminate equipment and clothing regularly by washing in warm soapy water.
 - c. Wash your hands thoroughly (avoid scrubbing or pressure that causes scratches or abrasions, or reddens skin).
 - d. Keep your hands away from your face, skin, clothing, and hair during work.
 - e. Regularly use antibiotic wipes to remove materials from your hands (one use per wipe each, one person per use).
 - f. Keep beverages, candy, chewing tobacco, food, gum, smoking equipment, and tobacco out of the work area.
 - g. Remove dirty gloves by rolling them away from your skin.
 - h. Treat all skin breaks immediately with soap and water followed by an antibiotic that will not wash off immediately, such as iodine.
 - i. Avoid dehydration and heat stress during warm months by breaking frequently and drinking clean cool water and sports drinks.
 - j. Prevent electrocution by having a trained electrician turn on the power.
 - k. Prevent exhaustion and accidents by reminding staff to lift with their legs, not their back and to get help for lifting—materials are much heavier when wet.



- l. Avoid hypothermia during cool months or when working in water that is less than 75°F by providing appropriate clothing and warming spaces for workers.
- m. Prevent physical trauma including falls through damaged floors or stairs, back injuries and strains from lifting, bruises from bumps or falling materials, and broken bones by vetting the space before entry and by training salvage workers.
- n. **Note:** Additional recommendations on [safety precautions for workers](#) in flood recovery can be found on the CDC website.

Before the Next Flood:

Identify and label your building and collections clearly. Teach your staff where the high priority items are located. Keep multiple marked up copies of your building plan, with the locations of your repository's crucial elements both on and off site, including:

1. Collections, with salvage priorities marked (i.e., list them in priority order)
2. Collections documentation
3. Emergency response equipment and supply caches including tape, sandbags, and plastic, as well as drinking water, flashlights, etc.
4. Evacuation routes that safely lead you away from likely-to-flood areas
5. Fire detectors, extinguishers, and suppression equipment
6. Utility (gas, water, power) shut-off valves and breaker boxes
7. HVAC equipment
8. Sump pumps and other water removal equipment such as wet vacuums
9. Security systems and their controls and back-up systems
10. Sprinkler system shut-off valve
11. Water detectors (alarms) for placement on all floors and near exits
12. Appliances with separate shut-off valves (water heaters, stoves, etc.)

Train staff in emergency preparedness. Teach staff how to:

1. Develop and practice your disaster plan
2. Develop and practice an evacuation using a clearly marked route to an emergency
3. Create an emergency assembly area that is outside the safety perimeter
4. Check the evacuation route and the emergency assembly area for potential hazards prior to evacuation such as avoiding elevators and windows
5. Hold an evacuation roll call



6. Use safety equipment, wear protective clothing, and undertake salvage
7. Report and handle medical emergencies
8. Handle hazardous materials as per OSHA standards
9. Protect their safety through necessary immunizations (e.g., up-to-date tetanus shots)
10. Notify their supervisors of any health-related issues, such as allergies, pregnancy, heart or lung disease, so that at-risk individuals are not used in emergency response work. **Note:** 8% of the public is sensitized to and at higher risk for mold reactions.

Manage emergency shut-down procedures. Teach staff how to:

1. Assess damage to the building (i.e., make a list of affected space; identify mold, insects, and vermin; identify missing materials; and report destruction or contamination of collections)
2. Close doors, windows, and blinds
3. Contact local authorities
4. Secure doors and key control to the extent possible
5. Shut down all air intake and air handling systems
6. Shut off water, electricity, and gas
7. Turn on security systems

Assemble emergency supplies and equipment.

1. Collections salvage supplies:

- | | |
|--------------------------------------------|-------------------------------------------------------|
| a. acetone | t. mops |
| b. bleaches | u. Mylar |
| c. blotting paper | v. paper towels |
| d. brooms | w. plastic sheeting |
| e. buckets | x. polyethylene bags and boxes |
| f. calcium chloride pellets | y. plastic milk crates or records cartons |
| g. cat litter made of clay | z. quaternary ammonia (also known as quats) |
| h. chemical dehumidifier packets for boats | aa. rags |
| i. disinfectants | bb. rope and twine |
| j. clothes pins | cc. scoops |
| k. dumpsters | dd. scouring powder |
| l. drying racks | ee. scrub brushes |
| m. dust pans | ff. shovels |
| n. ethanol | gg. sponges |
| o. fungicides | hh. towels |
| p. garbage bags | ii. wax paper |
| q. garbage cans | jj. window screening (clean and unruled or non-metal) |
| r. Japanese tissue paper | |
| s. masking tape | |



2. **Construction materials:**

- a. glue
- b. lumber
- c. nails
- d. paint
- e. plywood
- f. screws
- g. twine
- h. wire

3. **Documentation supplies** (for planning and insurance documentation):

- a. cameras and camera supplies (batteries, memory chips or film)
- b. paper
- c. pencils and Sharpie markers
- d. portable computer printer
- e. portable computers with the collections database
- f. tripods

4. **Emergency equipment:**

- a. air compressors
- b. batteries in large quantities and all necessary sizes
- c. blotters
- d. cellular phone and battery chargers
- e. clothes pins
- f. extension cords
- g. flashlights
- h. gloves, preferably nitrile
- i. goggles
- j. hoses
- k. knives
- l. ladders
- m. lanterns, preferably battery- and solar-powered lanterns
- n. portable lights
- o. portable tables
- p. pumps
- q. polyurethane ice chests
- r. radio, preferably a battery-powered weather-band radio
- s. rope and twine
- t. rubber waders
- u. sand bags
- v. pumps
- w. scissors
- x. shovels
- y. squeegees
- z. tools
- aa. tarps
- bb. tents
- cc. waterproof ponchos, preferably in a very bright color
- dd. weights, such as glass bricks
- ee. wet/dry vacuum cleaners

Note: Store copies of appropriate equipment manuals with equipment.

5. **Environmental equipment:**

- a. dataloggers or preservation environment monitors (PEMs)
- b. blast freezers
- c. dehumidifiers
- d. fans
- e. hygrometers
- f. space heaters

6. **First aid equipment:**

- a. antibiotic wipes
- b. blankets
- c. burn packs
- d. energy bars
- e. first aid kits—with ace bandages, iodine, bandages of all sizes, nitroglycerin, and a range of non-prescription medications such as aspirin, ibuprofen, antihistamine, etc.



- f. insect repellent
- g. rehydration salts (see, e.g., <http://rehydrate.org/ors/index.html>)
- h. resuscitator, stretcher
- i. snake bite kit
- j. sun screen
- k. 3-4 days of clean water. **Note:** You are unlikely to need to stockpile large quantities of perishable supplies. Instead, identify commercial suppliers and make arrangements for rapid delivery of items during an emergency.

7. **Hand tools:**

- a. axes
- b. block and tackle
- c. bolt cutters
- d. chain saws
- e. crowbars
- f. hammers
- g. pliers
- h. poles that may be used as prods
- i. ropes
- j. saws
- k. screwdrivers
- l. sledge hammers
- m. staple guns and staples
- n. tape measurers
- o. tin snips
- p. utility knives
- q. walking sticks
- r. wire cutters
- s. wood saws
- t. wrenches

Identify alternative work and storage spaces, if necessary, such as:

- 1. their location (name, address, and location on a map)
- 2. their cubic footage (amount of storage, drying, and horizontal work space)
- 3. equipment in the space (i.e., drying racks, areas for clothes lines, freezers)
- 4. type of space (logistics office, freezer space, storage, drying and cleaning mitigation space)
- 5. back-up power sources
- 6. environmental parameters (i.e., can the humidity be kept below 50%, can lights be kept on, can good air circulation be established, is there a space with separate air handling or a loading dock for mold mitigation work)
- 7. security provisions
- 8. local contact person's name and contact information

Set up and know your sources of help before a disaster. Set up and keep safe contact information, contract or cooperative agreement numbers or purchasing arrangements, and the contact person's name and back-up person for you:

- 1. architects
- 2. building contractors
- 3. carpenters
- 4. chemical testing laboratories
- 5. cleaning services
- 6. commercial cold storage vaults
- 7. computer data recovery services and repair services
- 8. conservation treatment services
- 9. dehumidification services
- 10. electricians
- 11. environmental control service
- 12. fumigation services
- 13. glaziers
- 14. HVAC service



15. mycologist or industrial hygienist and testing lab
16. photographic salvage and/or reprocessing service
17. plumbers
18. portable equipment suppliers
19. salvage services (see [Products and Services for Disaster Response](#))
20. scientific monitoring equipment suppliers
21. security service
22. special equipment suppliers for
23. transportation rental (including freezer trucks)

Take basic practical risk management steps:

1. **Have a structural architect check to ensure that your building is firmly attached to its foundation**, to reduce risks of being swept away in moderate flood waters.
2. **Check and perform preventive maintenance** for walls, windows, roofs, door seals, mortar, piping, sprinkler systems, gutters, window grouting, and other structural components.
3. **Ensure that the landscape drains away from the buildings.**
4. **Install “check” valves in building sewer traps** to keep flood water from backing up and turning your drains into fountains.
5. **Avoid placing large items such as sculptures, generators, or outbuildings near your repository** unless they are very firmly braced and bracketed to hold them in place in storms and floods. Under the power of a flood or high winds these items may become wrecking balls that cause substantial damage.
6. **Install sump pumps and back-up generators** above the ground level.
7. **Raise your electrical panel, furnace, water heater, and other utilities on elevated platforms** or above the basement level.
8. **Store all collections at least six inches above the floor on waterproof structures such as metal shelves or plastic pallets.**
9. **Install shatterproof glass and storm shutters** in vulnerable areas.
10. **Install water alarms** on all lower floors to provide early warnings.
11. **Select storage furniture that will not float, hold water, or drain poorly.** Avoid wood, which weighs a great deal when wet. The weight of many wet bookcases and their contents can collapse your floor by exceeding the floor loading capacity. Wood may swell and crush collections, and it floats.
12. **Select decorative materials that do not hold moisture or water.** Avoid wallpaper, wood furniture, and carpeting. Instead use paint, metal furniture, and tile.
13. **Select housing materials that are not problematic when wet.** Avoid acidic cardboard, which may stain paper and textiles when wet. Where possible choose preservation-quality polyethylene storage boxes, which won't collapse or spill contents if wet. Boxes with several small vents in their bottoms allow water to run out.
14. **Select labeling that does not vanish when wet.** Avoid using water-soluble markers and labels with water-soluble adhesives.



15. **Select fasteners that will not rust** (most staples and paper clips rust).
16. **Set up schedules for staff and guards to walk the repository regularly to catch leaks or water.**
17. **Landscape your facility so that ground slopes away from the repository,** encouraging water to run off. Consider placing a 6-foot border of rocks and pebbles around the building immediately next to your building to discourage water damage to your repository. Seek the assistance of a building engineer or preservation architect for ongoing problems with water intrusion or damp, or basement waterproofing.
18. **Add levees or floodwalls if your building is in a flood plain.**
19. **Train all staff in how to shut down the building safely.**