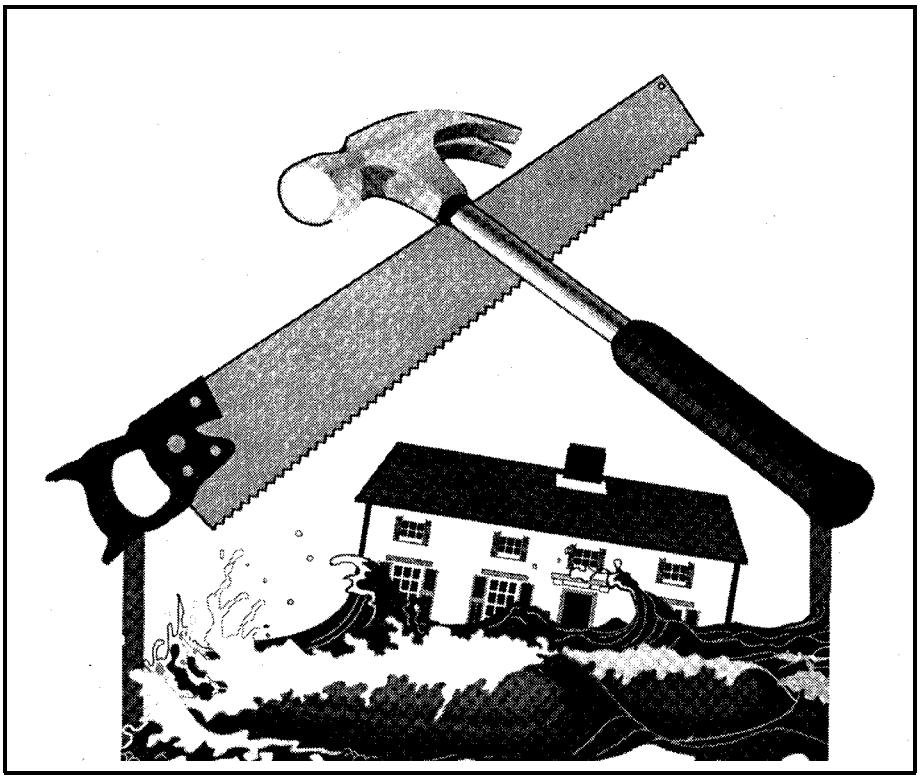
AFTER THE FLOOD



REHABILITATING HISTORIC RESOURCES

Madelyn Foard
Georgia Department of Natural Resources
Historic Preservation Division
500 The Healey Building
57 Forsyth Street, N.W.
Atlanta, Georgia 30303
(404) 656-2840

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Special recognition and acknowledgements are due to several people, without whom this publication would not have been completed. Especially deserving is Kathryn Coggeshall, for her suggestions, support and assistance. Thanks also to Richard Cloues, Mary Ann Eaddy, Mark Edwards, Carole Griffith, Larry Leake, Karen Luehrs, Michael Miller and Carole Moore for their timely review and technical comments, which strengthened this publication. Appreciation is due to the American Red Cross for permission to use its Flood Recovery publication and to the National Trust for Historic Preservation for permission to use its Information Book No. 82, and the funding that made this publication a reality.

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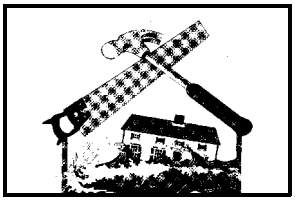
PROLOGUE

This information has been compiled from a wide variety of sources and is intended to serve as a guide towards rehabilitating your historic structure to a usable condition after a flood or other water-related damage has occurred. This publication is the result of the experiences of the Georgia Historic Preservation Division after Tropical Storm Alberto raged across southwest Georgia in July and August of 1994, wreaking havoc upon fifty-five counties and devastating the communities in its path. The goal of this publication is to help you feel more confident about making the many decisions which may face you as you rehabilitate your historic property. Detailed suggestions for both short and long term solutions for rehabilitating flood damaged property or preventing potential damage are incorporated in this publication.

The Historic Preservation Division received emergency funding through the President's Discretionary Fund in the form of a grant program administered by the National Park Service of the Department of the Interior. These funds were used primarily to provide emergency relief to historic structures, assess archaeological impacts and provide technical assistance to the owners and operators of historic resources. The Historic Preservation Division of the Georgia Department of Natural Resources serves as the State Historic Preservation Office. Working with the U.S. Department of the Interior and local communities, the Historic Preservation Division carries out the mandates of the National Historic Preservation Act of 1966, as amended and works to preserve the historical, architectural and archaeological resources of Georgia.

The Historic Preservation Division's mission is to promote the preservation and use of historic places for a better Georgia. Our vision is that Georgia will be a better place tomorrow than it is today, providing quality communities in which to live, work, learn and recreate. Historic places will be widely valued as irreplaceable resources that contribute to our heritage, our economy, our neighborhoods, and our sense of who we are as Georgians. Communities and the State will plan for growth and change that respect and include our historic places. Communities will possess the knowledge, the legal and financial tools, and the authority to decide how preservation and new development will relate to one another. There will still be distinctions between city and suburbs, developing areas and countryside. All Georgians will possess a greater understanding and appreciation of our shared heritage in all its variations. People and organizations throughout Georgia will work in partnership to preserve and use historic places. Georgia's communities, economy, environment, and people will be better because of the preservation of historic resources.



INTRODUCTION

If you are reading this, chances are that you live and/or work in an area which is prone to flooding. And, if it's happened once, flooding is likely to recur. There are two key elements to ameliorating flood and water damage: **Recovery** and **Retrofitting**. Recovery refers to the clean-up of your structure after the damage is done. Retrofitting refers to preventive measures which can help minimize the damage next time. Both aspects are fundamental to flood and water damage rehabilitation. For historic structures and landscapes, water damage is especially harmful because it weakens the infrastructure and threatens its continued occupancy.

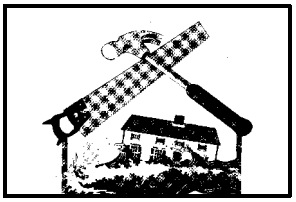
Returning to a flooded or otherwise water-damaged historic structure after being evacuated has been compared to moving into a historic structure which has never been restored. Most buildings will sustain some type of damage, but little of that damage will be irreparable. Falling trees may have torn out power lines and landed on buildings, however most damage will be limit to roofs, flooring, walls, doors, and windows.

It is important to remember a few key points:

- **The owner, not the contractor or architect, should be the individual making important rehabilitation decisions.** Ask for advice and opinions, but make decisions yourself.

- **Almost anything can be rehabilitated**, so keep any pieces and fragments of architectural detailing you find.

- **Take your time making final decisions, even about crucial repair work.** There are effective temporary repair measures that you can take immediately which will last for at least 6 months. This should be enough time to decide what needs to be done and to avoid paying the excessive repair costs emergencies tend to cause, as well as give you time to locate a reputable and experienced contractor.



WHAT TO DO IN PREPARATION

Once you have heard that storm surge, torrential rain, hurricane or flood is coming, there are several things you can do in the remaining time. These measures will make a tremendous difference in your recovery efforts.

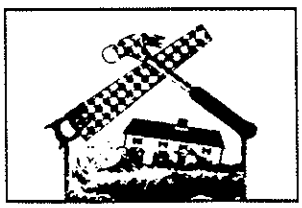
1. **Plan on leaving** - and as soon as possible. People die in floods, storms, and hurricanes. Pack the essentials and set a deadline of evacuating. Then use your remaining time to address the following steps.

2. **Open up the ground floor** if your building is on a beach or near a large body of water. Remove doors from hinges and raise double-hung windows. Other types of windows may be removable from their tracks with wrenches and pliers. Any object or feature of a building that presents an obstacle to the free flow of water creates an opportunity for the surge of rising water to cause more extensive damage to the structure.

3. **Tie the structure firmly to its foundation.** Many buildings on islands and beaches have been lost because they have only been "toenailed" (that is, attached by nails and/or screws at an angle through posts to a metal or wooden "plate" set in concrete) to the pilings that act as the foundations. Such buildings should have thick, plate-steel straps designed and bolted to the piles and frames of the building. Conventional foundations may require additional securing from anchor bolts or other systems.

   Take the time to protect your landscape! Tie down garden structures such as arbors, benches and the like. Remove lightweight statuary, pots and urns. Tie open gates, cover garden pools and flower beds with tarps to reduce debris collection and settlement. Secure anything which might float away or damage the structure's exterior.

4. If your building is not near the ocean or a lake, **board up**



windows and doors. Plywood is cheaper than new windows and interior finishes. Power screwdrivers simplify the installation and removal of plywood.

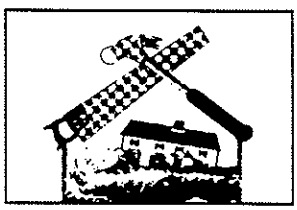
5. **Take precious and irreplaceable items with you.** Photographs, business records, personal documents, medical and tax files, and personal possessions are things which you cannot replace later.

6. **Shut off utilities.** Turn off water, gas and power systems even if you are certain that the utility companies have done so. Once the flood recedes, broken water and gas lines often continue to leak residuals for days. Shut off the water and gas at the main valves, usually located where the lines enter the building. Throw the main to terminate electrical service, the first device after the meter. Sometimes this is a fuse box with a handle, a block of fuses that is pulled out, or a main circuit-breaker switch. If you are in doubt, remove all fuses or turn all circuit breakers to the off position.

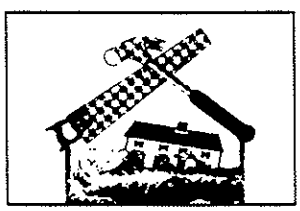
7. Before you leave, **take pictures one last time**. Photograph interior details, such as cornice boards and trim, chandeliers and wainscotting. Photograph architectural details inside and out. Take close-ups of masonry and stucco, and any other feature which may weather the inundation poorly.

   Naturally, it is best to create an accurate inventory of your structure in less stressful times. However, if you have not taken steps to do so yet, now is an essential time to take this step. Later, these photographs will be invaluable as you rehabilitate your structure. The pictures will be indispensable for relocating displaced features, when it will be hard to recall every detail. Be certain to have extra film, too, because you will need to photograph everything again when you return.

8. **Remove non-structural elements**, such as decorative lathing, which can impede the water's flow. Damage is worsened if



items are improperly stored, not raised off the floor, or unsecured objects left open on shelves or cabinets. **Move furniture and appliances** (yes, even the refrigerator, dryer, washer, freezer, stove, or whatever) to the second floor or attic to protect them and to clear the floor. These items will become water-born projectiles, causing significant structural damage. If large objects cannot be moved upstairs, try to make sure you secure them so that they will not become floating battering rams and damage walls, cabinets and doors. **Remove floor coverings, drapes, and wall hangings.** Flood waters will contaminate them and require their replacement. Insurance payments will not always be enough to replace everything!



CHECKLIST

THINGS TO DO PRIOR TO EVACUATION

- ☐ Gather necessary emergency supplies:
  - ▫Clothing and personal belongings.
  - ▫Towels and linens.
  - ▫Medications, food and water supplies.
  - ▫Battery-operated radio.
  - ▫Spare batteries.
  - ▫Portable telephone.
  - ▫Flashlight.
  - ▫Fire Extinguisher.
  - ▫First aid kit.

- ☐ Collect important papers and valuables to take.

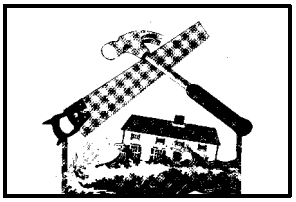
- ☐ Move furniture and appliances to a higher level.

- ☐ Securely anchor interior and exterior items to prevent their becoming floating battering rams.

- ☐ Take photographs and write a description of the building's interior and exterior features.

- ☐ Shut off all utilities.

- ☐ Go to higher ground as soon as possible! If you cannot leave due to rising waters, move to the highest spot in the building, near a window or opening so rescue workers can reach you.



PREPARING FOR CLEANING-UP AFTERWARDS

Flood waters contain hazards, large and small. Flood waters often displace snakes and other creatures from their usual habitats along creeks and river bottoms. Before beginning any work, you should make a thorough walk-through of the structure, carefully checking in all closets, corners, cabinets, attic spaces, drawers and similar locations animals, insects and snakes. Flood waters also carry harmful bacteria and contaminants within the water itself. Be careful in your clean-up efforts to avoid inhaling or swallowing this water.

A. PRECAUTIONS

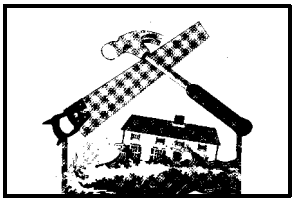
1. **Get a tetanus shot** before beginning clean-up efforts.

2. **Wear protective clothing! Don't forget to use a dust mask.**

3. **If there is standing water next to your building, do not go in!** You will be unaware if there is serious damage to the foundation. Wait for the water to subside. Examine for cracks in the foundation, missing supports for beams or steps missing.

4. **Before entering the building, make sure that all the electrical power has been turned off.** If power is still being provided to the area, turn the main breaker in the electrical panel to **OFF**. Additionally, if **sagging trees or power lines are visible, do not enter**. Call the proper officials.

5. **Turn off the gas.** Gas appliances and pipes may have moved or broken during the flood. Water and mud may have extinguished the pilot light. **If you suspect a leak or smell gas, leave immediately!** In most standard installations, the following information is accurate. However, for your structure there could be a difference, so proceed with caution. Typically, there is a valve next to the gas meter. If the valve is parallel to the pipe, the gas is on. In the off position, the valve should be perpendicular to the pipe. If you have a fuel or propane tank, even one underground, it may have become dislodged. Turn the valve on the tank off.



6. **Do not use appliances until they have been cleaned and their controls and elements have been checked by a professional.** Most appliances have electric motors mounted close to the ground, which can become easily contaminated during a flood.

B. SUPPLIES

1. Immediately prior to returning to your property, you will need the following supplies :

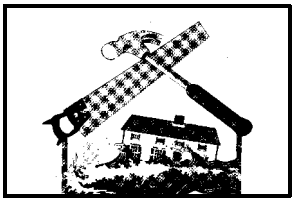
- ☐ Flashlight.
- ☐ First aid kit.
- ☐ Battery-operated radio.
- ☐ Waterproof boots or waders.
- ☐ Safety clothing, such as hard hat and gloves.
- ☐ Boots or shoes with hard soles.
- ☐ Dust mask.
- ☐ Camera or video camera and paper to record damage.
- ☐ Tools: crowbar, hammer, saw, pliers, crescent wrench.
- ☐ Drinking water.
- ☐ Trash bags.
- ☐ A wooden stick sturdy enough for moving electrical wires, checking the "soundness" of boards, turning things over, moving items, etc.
- ☐ Cleaning supplies: paper towels, buckets, bleach, sponges, mops, rags, hose, clean water.

Many of these supplies will be made available to you via the American Red Cross relief centers.

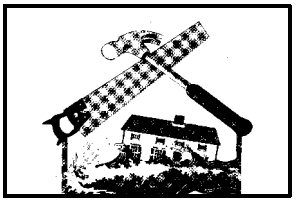
2. **Always wear goggles, masks and gloves to prevent direct contact with flood water.**

3. **Check throughout the building in closets, drawers, nooks and crannies for small animals, insects, or reptiles displaced by the floodwater.**

4. **If there is water in your basement, do not be in a great hurry to pump it out.**



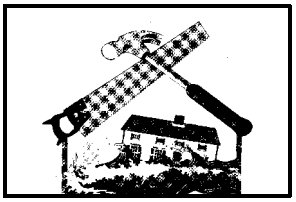
Ground water outside is putting pressure on the walls as the flood water in the basement is doing the same inside. Pumping too quickly will destroy the balance of pressure, resulting in floor and wall cracks and possible collapse. Begin pumping only when the flood waters covering the ground are gone. Then pump about two or three feet and mark the water line. Wait over night. Check the marked water line in the morning and if the water is covering it, it is too early to pump. Wait in twenty-four hour intervals and begin the pump-mark-and-check cycle again. When the water stops going back up, continue pumping as described above.



CHECKLIST

THINGS TO DO WHEN YOU RETURN

- ☐ If standing water remains outside the structure, DO NOT ENTER.
- ☐ Thoroughly check for damage to the foundation before entering.
- ☐ Call the utility companies to determine if overall power is available. Turn your utilities off. Report any downed lines.
- ☐ Look for potential falling hazards from trees and power lines.
- ☐ Always wear boots, gloves, goggles and mask.
- ☐ Open all doors, windows, and closets to begin drying-out. Do not use heater or air conditioners to dry-out.
- ☐ Check all drawers, closets, attics, basements, crawl spaces, and cabinets for animals or insects which may have been displaced.
- ☐ Remove all sodden materials, mud and debris. Wash the entire building, starting at the top and working down to the bottom.
- ☐ Save any architectural details or features you find.
- ☐ Take photographs and write a description of the building's current conditions before, during and after basic clean-up efforts.
- ☐ Locate agencies which can provide assistance.
- ☐ Complete a damage assessment form, create a recovery plan, determine character-defining elements, and assess your building's architectural style before you being rehabilitation efforts.



C. BASIC CLEAN-UP INFORMATION

The critical factor in determining the extent of damage sustained by various elements of a building is the amount of time it was exposed to water. If the exposure time was short, with proper steps almost all elements are reclaimable. However, if water has been in a structure for more than a few hours, the damage will be much more extensive. Under these circumstances, sheetrock and insulation have been contaminated by floodwater and must be removed to prevent further damage to the entire structure. The following steps can be taken to promote the essential circulation of air, which is the cornerstone to recovery.

1. **Completely open up the building**. Open all windows, doors, closets, cabinets and drawers. At night, when the temperature drops and the humidity outside is greater than it is inside, close the building up.

2. **Throw away saturated objects** like carpets, carpet pads, mattresses and other upholstered items.

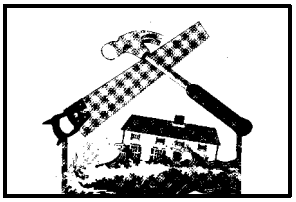
3. **Use fans and dehumidifiers. Do not use central air and heat to force the natural drying process.** Also, flood debris and mud may be lodged in the duct work. Remove grates and registers, hose out and wash with a disinfectant. Consider calling a professional.

4. **Use desiccants (drying agents) to soak up moisture**. Materials such as cat litter with clay, chemical packs for drying out boats and closets or calcium chloride placed in pillow cases or nylon stockings will absorb moisture. Be careful; calcium chloride can burn the skin.

5. **Wash all surfaces.** Hose down walls, including light sockets and electrical boxes (**BE CERTAIN THE POWER IS OFF**), floors, closets, cabinets and counter space. Mix household bleach (5:1) with water as a disinfectant to eliminate mildew and mold and prevent new growth.

6. Call a contractor. Look in the yellow pages under "Fire and Water Damage Restoration."

Drying out your building may take several weeks. If severe water damage has occurred, test masonry and interior wood framing with a moisture meter. This device is available at most home-supply stores.

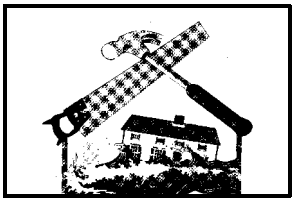


DAMAGE ASSESSMENT

Before you begin anything else, you need to determine the extent of the damage. The overall, as well as the specific condition, of the structure should be considered. As tempting as it is to begin cleaning-up in earnest, take the time to assess the condition your building. Once you have done so, establish a plan on recovering your building. Only then should you proceed with the salvage operations for all aspects of your belongings. Structural soundness, leaking roofs, leaning or separating chimneys, broken windows, damaged walls, and sagging ceilings need to be evaluated. The accurate recording of damage will be essential to your salvage operations. Use the enclosed forms to document the following kinds of questions:

- ☐ How much damage has occurred?
- ☐ What kind of damage has taken place?
- ☐ Where is the damage located?
- ☐ How much of the building has been damaged?
- ☐ What types of features (i.e., doors, chimney, foundation, etc.) has been damaged and by what (i.e., erosion of pier by water, sheetrock absorbed water, windows broken by force of water, etc.)
- ☐ Is there a visible hazard on the exterior jeopardizing initial start-up?
- ☐ Is there a visible potential hazard on the interior?

After you have completed a damage assessment, prepare a written recovery plan. Many of the measures which are essential for promoting drying-in and drying-out are steps which even the most "un-handy" person can undertake. Refer to these sections before contacting a contractor. But first, you should take the steps necessary to determine your building's character-defining elements and its architectural style. You will need to provide any potential contractor with as much information as possible about your structure.



DAMAGE ASSESSMENT FORM

BUILDING NAME_____
STREET ADDRESS_____
CITY, COUNTY, STATE_____

PROPERTY OWNER_____

TELEPHONE_____
CONSTRUCTION DATE_____

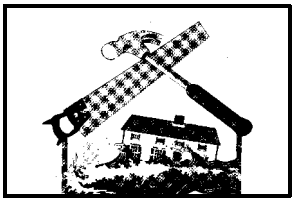
USE OF BUILDING_____

EXTERIOR POTENTIAL HAZARDS

OBJECTS	CLEAR HAZARD	NOT APPARENT	UNKNOWN	COMMENTS
PARAPET/CORNICE				
ORNAMENTATION				
CHIMNEY(S)				
FLOORS				
ROOF STRUCTURE				
EQUIPMENT				
TREES				
POWER LINES				
OTHER				

BUILDING DESCRIPTION

NUMBER OF STORIES_____



BASEMENT_____

ROOF_____

OTHER_____

BUILDING MATERIALS

FOUNDATION _____

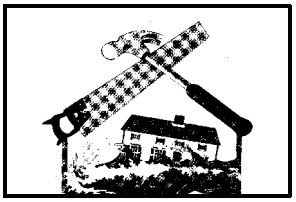
EXTERIOR WALLS _____

ROOF

INTERIOR WALLS _____

FLOORS _____

CEILINGS _____



OTHER _____

_____

_____

EXTERIOR DAMAGE OBSERVATIONS:

Location Comments

Exterior Walls _____

_____

_____

Frame (General Conditions) _____

_____

_____

Frame Members _____

_____

_____

Roof Coverings _____

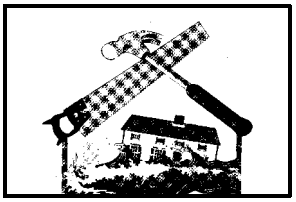
_____

_____

Roof Framing _____

_____

_____



Chimney(s) _____

Gutters/Downspouts _____

INTERIOR DAMAGE OBSERVATIONS:

Load Bearing/Shear Walls _____

Partitions(Non-bearing) _____

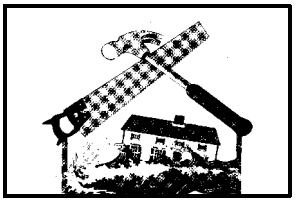
Ceilings _____

Wallcovering _____

Floor(s) _____

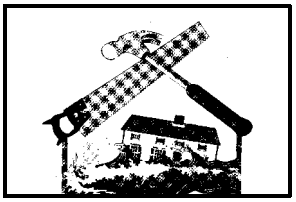
Stair(s) _____

Glass _____



Equipment

Utilities



CHARACTER-DEFINING ELEMENTS

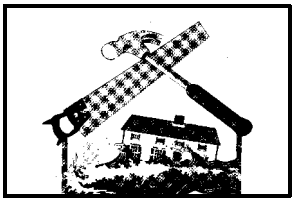
Prior to rehabilitating a flood-damaged historic structure, identify its **character-defining elements**. Use this information to guide your rehabilitation decisions. Character-defining elements are the visual or tangible aspects of a building, related to its type, style, construction methods, or materials. They contribute to the building's architectural or historical significance. Identifying character-defining elements is crucial, as many aspects of a building's character might otherwise be altered and/or diminished irreversibly.

The identification of character-defining elements can be done in a three-step process. This task is well worth the time it takes to complete. The information you can will be useful to help you decide what steps to take in your recovery efforts.

First, study the building's exterior and its site as a whole. Be sure to observe the building and its site as a whole; this may require some distance, perhaps from across the street or from the adjoining lots. Note the features which catch your eye and those which provide visual interest. Walk around the site and note essential features. Character-defining elements can include setting, overall form, massing, shape, roof and roof features (lines, cupolas, chimneys, etc.), projections or recesses (bay windows, porches), openings for windows and doors, and materials.

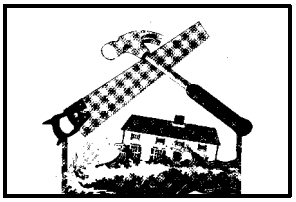
Second, examine the building's exterior at a close range (arm's length) and evaluate the surface qualities of the materials, such as color, texture, or craftsmanship. Surface materials, finishes and textures are a crucial yet fragile element of a building's character. These details can be lost or damaged by inappropriate treatment such as repointing with the wrong color of mortar, using abrasive cleaners, sandblasting or rotary sanding, or painting of previously un-painted masonry. Examine the features which you noticed as you studied the building as a whole, looking for details of features and material components.

Third, focus on the interior character of the building. It will take more time but is just as important as the exterior. Walk slowly through the building one room at a time. Take note of the overall pattern of the floorplan. Is it symmetrical or asymmetrical? Are the rooms all similar or do they vary in size and shape? Is the purpose of the room apparent from its location or size? The shapes of spaces or the flow of spaces are often defining aspects of a building's character. Architectural linkages, such as archways between rooms or repeated motifs, are often vital to continuity or visual impact. Finishes and features such as woodwork or other ornamental



elements are also important factors in determining interior character.

Additional information on this topic is available in the National Park Service's Preservation Brief series, and is distributed by the Historic Preservation Division. Call (404)656-2840 to request a copy of brief #17.



CHARACTER-DEFINING ELEMENTS FORM

Use separate pieces of paper to respond to the questions in each of the steps below. Answer in as much detail as possible.

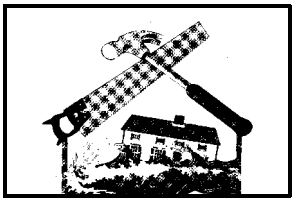
STEP ONE

1. Overall Shape

- ☐ Look at the overall shape of the building. What gives the building its identity? Does the overall shape display its historic function?
- ☐ Is the building tall, slender and narrow or is it low, stocky and flat, symmetrical or asymmetrical? Does it have a tower?
- ☐ How many stories does it have? Does it have simple lines or is it complicated with wings of various heights?
- ☐ Is one side of the structure less important that the other sides, or one section obviously more important and impressive than others? Why? How can you tell?

2. Roof and Roof Features

- ☐ Whether highly or slightly visible, how does the roof contribute to the architectural identity of the building?
- ☐ Does the roof have any features which are stand out in its profile against the sky or general background, such as cupolas, multiple chimneys, cresting, weathervanes or dormers?
- ☐ What materials have been used? What colors have been used? What is the design or pattern of roofing materials? Do the materials and their colors, patterns or design make the pitch or shape of the roof more or less apparent?



3. Openings

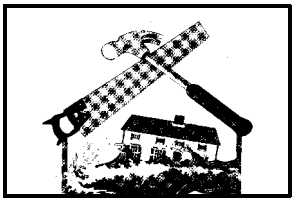
- ☐ Do the openings in the walls for windows, doors, balconies, or other features have a pattern or a symmetry? Or are they irregularly arranged?
- ☐ What is the obvious relationship between the size of the openings and the wall space between the openings, such as the width of windows and the space between windows?
- ☐ Are any of the openings accentuated by size or architectural detail?
- ☐ Do the windows have unusual shapes or patterns to the glass? Or does the style of the windows supplement the architectural features?
- ☐ Are the windows openings so plain that adding shutters or gingerbread trim would dramatically alter the original character?
- ☐ Are the front windows more important than side windows? If so, why?
- ☐ Are there walls with no windows at all? Does the lack of windows contribute to the character of the building?

4. Projections

- ☐ Does the building have porches, cornices, balconies or bay windows?
- ☐ Does the building have turrets, wide eaves, chimneys, or projecting elements?

5. Trim

- ☐ How does the trim around doors and windows add to the building's character?
- ☐ How does trim around the roof line, walls, or projections add to the building's character, especially because of its color, pattern, form, or decoration?



6. Secondary Features

- ☐ Does the building have shutters, railings, or decorative gables?
- ☐ If yes, how much does this add to the building's character? Does the color, pattern or decoration of these items add to the building's character?

7. Materials

- ☐ As observed from a distance, do the materials or combination of materials add to the overall character of the structure?
- ☐ Does the color or patterning or sequencing of materials influence the overall character of the structure?

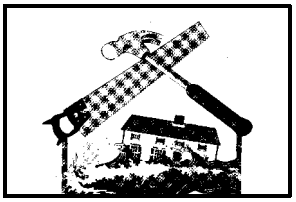
8. Setting

- ☐ What aspects of the overall setting add to the visual character of the structure? Is it the landscaping? Topography? Lot size and shape?
- ☐ Are there walkways, terracing, fences, landscaping or other aspects which add to the setting's character?
- ☐ If located in a city, does the alignment of the streets and adjacent sidewalks create the main focal point?
- ☐ How important are outbuildings and landscaping to the structure's character?

STEP TWO

1. Materials at Close Range

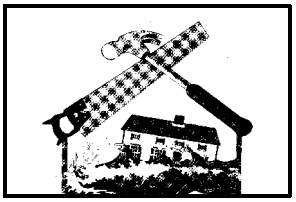
- ☐ What materials have been used in the construction of the structure?
- ☐ How has the choice of materials added to the character of the building?
- ☐ Are any materials used in combination for the contrast they provide, such as combinations of brick and stone, several kinds of stone, or dressed stones for lintels and rough stones for walls?
- ☐ What are the characteristics of the materials which have been used?
- ☐ What are the colors of the materials, and do the color combinations add to the structure's character?
- ☐ Do the materials have a surface texture that contributes to the building's



character?

2. Craft Details

- ☐ Describe the details of the construction methods and techniques. Generally, any type of craft details contributes to the character of a structure because it is indicative of the methods used in the construction, including the tools and processes involved. All of these details are apparent at close range.
- ☐ If the walls are brick, is there high quality brickwork with narrow mortar joints? Do the walls show carefully joined vertical joints and recessed horizontal joints? Or are the bricks of irregular shape, color, and texture, perhaps indicating that they were hand-made?
- ☐ If the walls are of stone, is there hand-tooled or patterned stone-work?
- ☐ If the walls are of shingles, is the shinglework laid up in patterns? Does it retain evidence of the circular saw marks? Can the grain of the wood be seen through the stain?
- ☐ If the walls are of siding, are there hand-split or hand-dressed clapboards, or machine-beveled siding? Has the wood been rusticated to look like stone?
- ☐ If the walls are of stucco, is it smooth or patterned? Is it finished to resemble stone? Does it have any designs?



STEP THREE

1. Interior Spaces

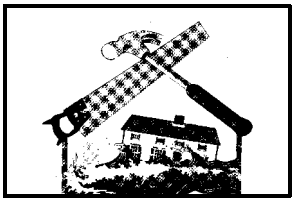
- ☐ How do individual rooms or spaces add to the character or significance of the building because of their size, height, proportion, configuration, or function? An example might be the center hallway in a house, a courtroom, a ballroom or a lobby.

2. Related Spaces and Sequence of Spaces

- ☐ Are there connecting rooms which are physically or visually related by large doorways, open archways or the interior spaces identified in the step mentioned above?
- ☐ Are any spaces arranged so that they are perceived or regarded as continuations of other spaces? How?
- ☐ Does the sequence of the spaces have an importance? An example might be the progression from the entry way to the lobby to the stairway and to the upper balcony in a theater, or in a residence, the ordering of spaces from the entrance to the hallway to the parlor.

3. Interior Features

- ☐ What interior features help define the character of the building? How?
- ☐ Are there repetitions of features which visually tie rooms, spaces or the entire structure together, either as a continued theme or style? Items to consider are arched openings, cornices, inglenooks, ceiling medallions, doorways, light fixtures, balconies, balustrades and stairways, fireplaces and mantels, windows, panelling, trim, wainscotting, hardware, teller cages, courtroom bars, waiting room benches, or church pews.



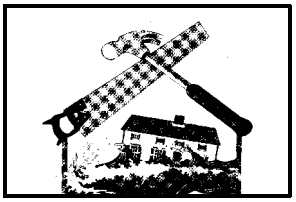
4. Surface Finishes and Materials

- ☐ How do the surface materials and finishes affect the design, color, or texture of the interior?
- ☐ Does the simplicity of any of the materials or finishes define an essential character for the interior, such as hard, bright, shiny wall surfaces of metal, glass or plaster?
- ☐ Are there any special or unusual finishes or materials which are important to the historic character, such as pressed metal ceilings, marbleized surfaces, checkerboard marble floors, or polychrome painted surfaces?

5. Exposed Structure

- ☐ Are there spaces or rooms in which exposed structural elements which define the interior character, such as exposed beams, posts or trussels, such as in a factory, church or shed?
- ☐ Are there areas with decorative, non-structural ceiling beams such as in bungalows?

This character-defining elements form is based on the Architectural Character Checklist/Questionnaire developed by Lee Nelson, FAIA. More information is available from the Historic Preservation Division. Call (404)656-2840 to obtain a copy.

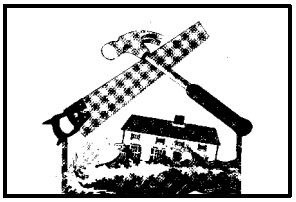


ARCHITECTURAL STYLES AND TYPES

A building's **architectural style** is determined by its overall form and ornamentation. **Ornamentation** is the decoration put on or into a building in an arranged or systematic pattern. **Form** is the massing, scale, proportion, and symmetry or asymmetry of a building, and the interaction of its parts such as height, depth and width or solids and voids. Construction techniques and materials and floor plan and interior layout also have a role in the definition of architectural style. Architectural styles are identified as "high style," meaning that all the elements defining a particular style are present, "vernacular interpretation," meaning that many but not all stylistic elements are present and "elements of a style," meaning that a few elements are found. In Georgia, architectural style is usually a matter of ornament applied to underlying form. There are 34 major styles of historic structures in Georgia:

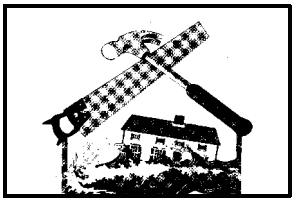
Academic Gothic ("Collegiate") Revival
Art Deco
Beaux Arts Classicism
Chicago School
Colonial Revival
Craftsman
Dutch Colonial Revival
Early Classical Revival
English Vernacular Revival
Exotic Revival
International
Federal
Federal Revival
Folk Victorian
French Vernacular Revival
Georgian
Gothic Revival
Greek Revival
High Victorian Eclectic
High Victorian Gothic
Italianate
Italian Renaissance Revival
Mediterranean Revival
Moderne
Neoclassical Revival
Prairie
Queen Anne
Richardson Romanesque
Romanesque Revival
Second Empire
Shingle
Spanish Colonial Revival
Stick
Stripped Classical

In addition to architectural style, many structures can be categorized by **type**, such as "shotgun." Type refers to the overall form, or outline, of the main part of the building, as well as the interior's general layout. Within types are differences which can be compared and contrasted for various elements or traits. The easiest way to determine type is to consider only



the original core of the building and to use this equation: **Plan + Height = Type**. Additions and embellishments are important only when they result in the alteration from one type to another. Type and style of building are often confused as the same thing, but they are not. Another way to understand the difference between the two terms is that style refers to the external decoration or ornamentation of a structure and type refers to the simple, unadorned form and original interior layout.

Additional information on architectural styles and building types is available from the Historic Preservation Division. Call (404) 656-2840 for assistance.



DRYING-IN THE EXTERIOR

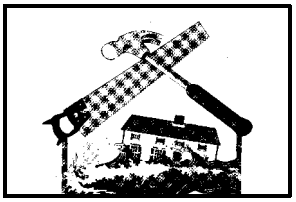
Drying-in is a term referring to the steps taken to secure the exterior of a building damaged by water. Usually, these steps are temporary in nature. Temporary steps are often advisable when damage is significant, or when you are in an area where supplies may be limited and skilled contractors are in high demand. The first goal of drying-in is to make a temporary repair that will last for at least 6 months. The second goal is to provide the time for the owner to determine precisely what work really needs to be done. As a result of taking these measures, the owner can avoid paying premium repair prices during the immediate frenzy of arranging for clean-up and rehabilitation. These measures are usually simple, but are often complicated by the scarcity of supplies (like plywood, generators, and roofing felt) and the high demand for contractors experienced in historic buildings who work at reasonable rates.

A. ROOFS

Drape large tarps over the roof ridge to make an instant, weather-tight roof "patch". Securely fasten the edges, or they can pull loose or rip if allowed to flap freely in the wind. Agricultural supply houses generally stock the large tarps that are best for this purpose. Large holes or missing sections of the roof will need to be connected with lumber. Be certain to run such supports vertically so that water cannot build up in pockets on the tarp, and then drip through a hole that might develop under the stress.

Replace missing roof sheathing or decking with exterior-grade plywood of the same thickness. If any rafters have been damaged or if there are indications of other structural damage, consult with an architect experienced in dealing with historic structures. Refer to the checklist on hiring a contractor first.

If the sheathing material is in good shape but shingles or other roofing material itself is missing, cover the area with 30- to 90- pound asphalt impregnated roofing felt. Use felting nails (they have a square washer at the head) to nail it along the seams every six inches. Avoid lighter-weight felts, such as 15-pound felt, because they quickly deteriorate. Heavier-weight felts are strong and enduring. 90-pound felt can last up to two years without a finished roof on top. If the only 90-pound felt available is roll roofing with colored mineral on one side,



install it with the mineral face against the sheathing so it can be roofed over. This heavy felt is a good base for permanent wood and asphalt shingle and slate roofs, but it would need to be stripped prior to installing a metal roof.

Don't walk on a slate roof; slates crack easily. Also, the storm may have jarred them loose, and you could fall.

Additional information on this topic is available in the National Park Service's Preservation Brief series, distributed by the Historic Preservation Division. Call (404)656-2840 to request a copy of briefs #4, 29 and 30.

B. FOUNDATIONS

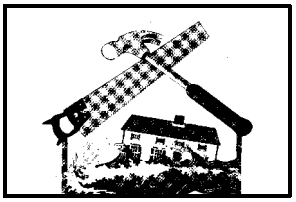
If your building is on brick piers or blocks, be certain to check that flood waters have not destroyed mortar joints or undermined the foundation. First, visually inspect the foundations. Be certain that the mortar between bricks and blocks has not been washed out or damaged. If the foundation or pier is structurally sound but a large amount of mortar has been damaged or lost, the mortar can be replaced without dismantling the foundation. Pour loose mortar into joints to fill voids in the remaining mortar. This will reinforce the overall structural integrity of the foundation. If a significant amount of mortar needs to be replaced, it is recommended that you contact a professional to determine the extent of damage to footings, piers, or foundations.

Additional information on this topic is available in the National Park Service's Preservation Brief series, distributed by the Historic Preservation Division. Call (404)656-2840 to request a copy of briefs #2 and 15.

C. EXTERIOR WALLS

If your building is wood-sided, consider removing some boards to help promote air circulation.

If your building is brick with a water-resistant sheathing, it will usually be undamaged if the weep holes (the slots near the bottom of the brick) are open, allowing any water trapped inside to drain and promoting air circulation. It is important to dry the cavity between the brick and the sheathing. All perimeter vents should be opened to



encourage cross-ventilation. It is essential to thoroughly dry out the floor joist from the underside and the topside, in order to minimize the amount of damage to the floor joist as well as the sub-flooring.

Begin this drying-in as quickly as possible. The natural movement of air can be supplemented with fans, but do not use heaters or air conditioners. Keep the building well-ventilated until the interior is dry. The length of time will vary depending on the extent of saturation. You should test with a moisture meter, which can be purchased at a paint, hardware or home supply store.

D. OTHER EXTERIOR FEATURES

Tie up loose or damaged gutters and downspouts to help carry water away from the structure.

Cover broken doors and windows with lightweight plywood (exterior grade, 3/8" is usually suitable) or tarps.

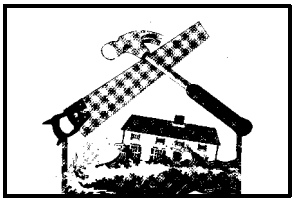
Fallen trees must be removed before even temporary repairs can begin. First study the tree to see if it can be re-set in its original location. If the tree can be saved, you may need some professional advice on how to provide it temporary support while the ground dries out. You also will need to know how to care for it properly following the trauma of the storm, as the storm has stressed the underground water system. The tree may be "drowning" in its own root-bed without proper care.

If you have not used a chainsaw before, do not go get one just yet. Seek out assistance from an experienced neighbor and learn the correct method of using it.

Presume all power and utility lines are "live." Even if the main system is off-line, emergency generators may be providing service temporarily.

Save any architectural feature or detail you find, even if it is not yours. Clearly it belongs to someone, who, no doubt, will be grateful to have it returned.

DRYING-OUT THE INTERIOR



Drying-out refers to the process of circulating air around and through the interior of a structure so that it can dry out thoroughly and evenly.

A. ATTICS

Start at the top of your building, in your attic, as you initiate the clean-up process. Starting at the top will mean you only have to clean-up the lower floors once; otherwise, as water drains you will have to clean them another time. Be certain to open any windows or ventilators to promote the circulation of fresh air. If there is an attic fan, turn it on! It will help to circulate the air through the entire building. If the insulation is wet, remove it immediately. It will hold the water against the wood structure and promote dry-rot.

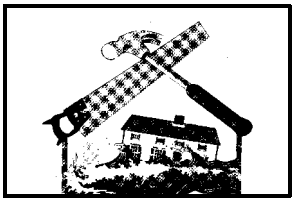
If the attic contains any wet items, especially anything heavy like trunks and books, move them to a dry location on a different level. The weight of water-soaked boxes can cause cracking in the plaster ceilings in the floors below. Also, as water evaporates, it will add to the moisture level in the building and keep it high, retarding the drying-out process in general.

Water which has entered through your attic will find its own route down through the rest of your building, along the lowest points. Water may drain through old ceiling cracks or drip from ceiling fixtures. The dark, foul water that comes out of the ceiling typically will indicate a large leak in the roof. This water has picked up all the dirt collected inside walls and floors. Poke a few holes in obviously wet areas to allow the water to drain into buckets below. This will save you time and effort as you make your repairs.

B. CEILINGS

Inspect your ceilings carefully. Wet plaster and sheetrock are very heavy and can be a hazard. If they are **sagging**, you can help them by **draining trapped water**. In order to do this effectively, follow these steps:

1. Hammer a finishing nail into the end of a broom-handle.
2. Start at one edge of the sag. Poke a hole at the edge of the sag to allow water to drain. Do not start at the center of the sag, or the ceiling is liable



to collapse. Also, stand away from the sagging area, not under it. Otherwise draining water will run into your face. Do not get close to electrical fixtures with your stick.

3. After water has drained from that hole, make another hole a little closer to the sag. Continue making drain holes until you reach the lowest point.
4. Once the ceiling is drained, plan on removing it, especially if it has been in direct contact with the floodwater. Clean rainwater will not have contaminated the plaster or "sheetrock," so in that case it might be salvageable.
5. Do this in every room with a sagging ceiling.

Although the standing flood waters may not have reached the ceiling, it may be damaged from the humidity or from absorbing moisture as it was soaked up through walls. Moisture will cause **swelling**, which may make it **pull away from the ceiling frame**. Check the ceiling by pressing up on it. If nailheads appear, then you have damage which will need to be repaired. At the least, renailing and refinishing will be required. If the situation is extreme, most likely you will need to replace the ceiling.

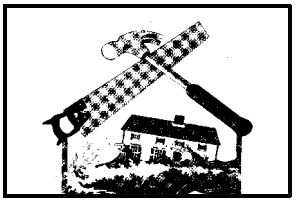
Check for **loose plaster** in ceilings. Either remove it or secure it in place with screws and plaster washers. Large loose areas can be temporarily propped in place with sheets of plywood held in place by 2 x 4s. Screw a T-shaped end on a 2 x 4 slightly longer than the ceiling height and shove the "T" against the plywood.

A **puffy white residue** that appears at the edge of plaster cracks indicates that the water has dissolved the gypsum in the plaster and re-deposited it elsewhere. The cracks will have to be cut out and re-plastered.

Decorative plaster mouldings are frequently attached with plaster of paris, which is water soluble. These may begin to fall or sag. Remove loose pieces, mark them and save for reinstallation. **Ceiling medallions** can be held in place with a fabric sling attached to the ceiling. Once dry, they can be re-secured with an acrylic glue.

Additional information on this topic is available in the National Park Service's Preservation Brief series, distributed by the Historic Preservation Division. Call (404)656-2840 to request a copy of briefs #21, 23 and 34.

C. INTERIOR WALLS



1. INSULATION

Remove baseboard to check for **wet insulation**. If the insulation is wet, remove it and dispose of it properly. After being wet, most insulation is ineffective, especially if it is vermiculite, rock wool, mineral fiber, blown-in fiberglass or cellulose. These fibers tend to fall and compress under their own weight. Also, wet insulation will continue to hold moisture for a long time and will create high moisture conditions which will damage metal, masonry, and wood. Additionally, the presence of this moisture will make it harder to dry out your building.

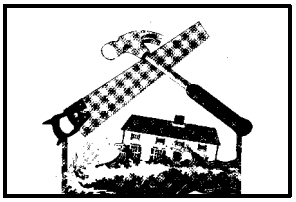
If your building is **insulated** with **styrene or urethane board**, which is **non-absorbent**, this material may be left in place even after prolonged contact with water. However, leaving this kind of "closed-cell" insulation in place will retard the drying-out process and possibly promote either wood rot or other problems for wood which has been saturated.

2. SHEETROCK

Drain water inside the walls by taking off the baseboard and making holes with an awl or knife 2" above the floorline. If large amounts of water drain out, make the holes larger with a saw or drill. This will encourage the water to drain more freely. Holes should be spaced 16" - 24" apart. Be careful to avoid electrical wiring.

Many structures have interior walls made of wood studs and sheetrock (gypsum board). If the sheetrock has been exposed to water for less than two hours, it probably will not be damaged extensively and can be repaired with a minimum of effort. Remove any sheetrock between the floor to at least one foot above the **high-water line** (that is, the obvious line staining your walls showing how far the water rose). If the sheetrock was in contact with floodwater for longer than two hours, it will require complete replacement. This is a result of its absorbent nature; it will have "wicked up" a considerable amount of contaminating water which will create serious problems during your repair efforts.

It is essential that you **allow the framing time to dry thoroughly** before installing new insulation and new sheetrock. It is advisable to use a moisture meter to accurately detect the framing's dryness. Studs may feel and appear dry on the outside and



remain wet in the middle. Adding new materials too quickly will result in the need to replace those new items within a short time period, perhaps as little as 6 months.

3. PLASTER

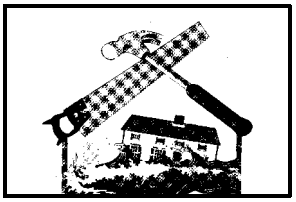
If your walls are **plaster**, it is advisable that you first **drain water held behind the walls**. Remove the baseboard, then drill a hole several inches above the floor. Avoid using electric drills, as you run the risk of being shocked; cordless or hand drills are recommended. Space the holes 16" - 24" apart. Do not use a hammer and chisel combination because the plaster could shatter. If your plaster is in good condition, the holes you make can be filled quickly once the interior wall cavity is dry. Be certain to make holes in both sides of any interior walls to allow for cross-ventilation.

Walls which did not come in direct contact with the floodwater still may have problems due to the high humidity level. **Mold and mildew can be removed** by scrubbing with a weak bleach-and-water solution.

Newly peeling paint (not old, hard flakes which have been there already) indicates that water is trapped underneath. Scrape away any soft and/or "bubbled" paint to speed the drying process. If the paint is historic, it may well be a **lead-based paint**. If so, remove it carefully and dispose of the paint properly. Do not repaint until the wall and its frame have dried thoroughly and the interior humidity level is normal again. If you paint too soon, the paint may discolor or fail.

Peeling wallpaper or fabric wallcoverings that is not stained may be possible to re-use later. However, FEMA cautions that paste or glue for wallpaper or wallcoverings might encourage the growth of molds, bacteria and other contaminants. The decision to retain it should be include an analysis of its replacement or reproduction costs, the amount of water damage and climate controls to prevent the future growth and spread of contaminants, bacteria and mold. If you determine that you can re-use the same paper or covering, remember to wait for the wall to dry thoroughly before re-attaching the wallpaper.

A moisture meter is useful for determining the "dryness" of the wall; this can be purchased from a hardware or home-supply store. Drying time will vary depending on the amount of water that entered your building, the removal of water-



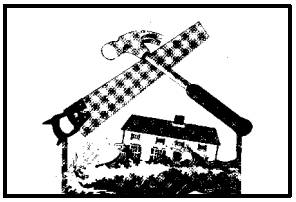
logged items, the amount of air circulation and cross-ventilation, ground-water levels and weather conditions during the drying-out period. Do not be surprised if drying-out takes weeks, perhaps months.

Additional information on this topic is available in the National Park Service's Preservation Brief series, distributed by the Historic Preservation Division. Call (404)656-2840 to request a copy of briefs #21, 23 and 34.

4. WOOD AND VINYL PANELING

If your wall has **vinyl paneling** or a **vinyl laminate**, remove whatever got wet and discard it. This material cannot be salvaged. Once the framing is dry, install new wall covering.

If your walls are **wood-paneled**, remove the baseboard first. Then, carefully pry the lower edge of each panel away from the frame so that it can drain and dry. Later, you can nail them back into place after the studs and the panels themselves have dried out.

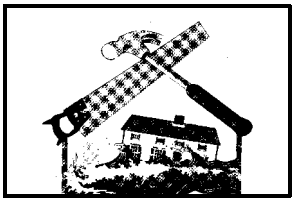


5. CONCRETE BLOCKS, STONE AND BRICK

If your walls are **concrete blocks**, you have little to worry about regarding draining. The floodwater will drain of its own accord. Also, it will not damage the concrete in the same way that it does plaster, wood paneling, or sheetrock. If your blocks have been sealed with a paint, waterproof coating, or water repellant coating, you may have a problem with **spalling.** Spalling is the chipping or breaking of the block or brick as a result of the soluble salts (naturally present in the concrete or brick) dissolving and being carried to the surface as the water evaporates but due to sealants or paints the salts are trapped by the sealant, then crystalize and expand, and through internal pressure cause the block or brick to flake. This process usually takes time to develop; salt deposits may not cause visible damage for years. It is important to encourage the drying of the building materials prior to winter freezes, as the trapped moisture will expand while freezing and thawing, causing **freeze-thaw spalling**.

Unpainted or unsealed stone or brick walls usually withstand flooding well. Water will be absorbed to an extent, depending on the porous nature of the material involved. As the water recedes, it will drain naturally. In the course of the natural drying process, soluble salts naturally present within the materials may dissolve and be carried to the surface, where it will dry as a white powder. This powder, called **efflorescence**, usually washes away easily. If it is stubborn, you can add detergent to the water and, if necessary, use brushes. On its own, the powder is harmless.

Additional information on this topic is available in the National Park Service's Preservation Brief series, distributed by the Historic Preservation Division. Call (404)656-2840 to request a copy of brief #1. Also refer to "Treatment of Flood-Damaged Older and Historic Buildings," Information Booklet No. 82 by the National Trust for Historic Preservation, incorporated into this publication.



D. WINDOWS

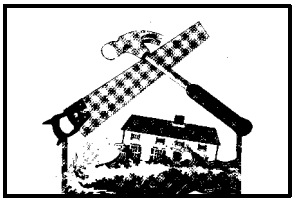
Open the windows in all rooms, even if there is no evidence of moisture retention. A window fan will help draw fresh air through the building, helping to dry out between interior and exterior walls. **Air circulation is the solution to completely drying out, and this process should not be forced by heaters or air conditioners.** Remember that **if you force your building, or even one room in your building, to dry too quickly, structural damage will happen.**

If windows are swollen shut, do not force them open. Exercise care and common sense in order to open windows that are swollen. Depending on the type of windows you have, free them up without damaging their structure if possible. If a window simply cannot be opened due to excessive moisture, use dehumidifiers and fans to help reduce the humidity level and try again in regular periods. The effectiveness of drying-out the house will depend on the amount of air circulation you are able to create.

Additional information on this topic is available in the National Park Service's Preservation Brief series, distributed by the Historic Preservation Division. Also the National Park Service's Preservation Tech Notes # 9 and 10 contain details on window repairs, based on case studies. Call (404)656-2840 to request a copy of briefs #9 and 13 and notes #9 and 10.

E. DOORS, CABINETS AND TRIM

Most **doors, cabinets and trim are constructed of wood** and absorb water during flooding. These items will swell and may become unusable. Without proper care, they can be destroyed in an attempt to save them. **Solid wood doors** should be tended carefully, so that they are re-usable after drying-out. These doors must be removed from their hinges and laid flat across sawhorses or some other props which will allow good air circulation. Wooden trim also must be removed and allowed to dry thoroughly. When they are dry, some shrinkage is possible. **Hollow core doors** often fall apart, becoming unglued and completely useless if saturated. Many **cabinets made of plywood or particle board** will delaminate and fall apart in time. The effects of delamination generally do not appear for several days.



F. FLOORS AND FLOOR COVERINGS

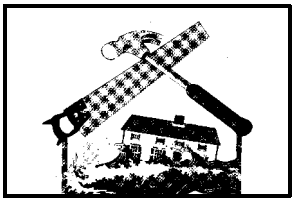
Remove **wet carpet, carpet pads** and furniture to the outside of the building as quickly as possible. Saturated fabrics contain high amounts of bacteria carried by the flood waters, and these bacteria are health hazards. Additionally, as these large items dry, water vapor in the building adds to its already high moisture level. Drying out will be quicker if there is less vapor to remove.

Floor coverings like **linoleum, vinyl, vinyl asbestos and vinyl composition tile** may come unglued and may also tend to curl along the edge. Usually these floor coverings need to be removed and replaced. Use care when walking on them as they are extremely slippery while wet.

Ceramic and clay tiles are more resistant and are more likely to survive the flooding unharmed. Unfortunately, the sub-flooring to which these tiles are attached may not dry out properly, causing buckling and cracking and the subsequent need to replace the tiles. Also, the mortar and the sub-flooring may be contaminated by floodwater, depending on how long the floor was submerged.

Wood flooring and sub-flooring are usually the most damaged by floods because they are porous and absorb water, then swell. If wood floors are covered in mud, wash them with fresh water. Then apply paper towels to absorb any salt water. Newspaper is not recommended because ink can be transferred to the flooring. Because floorboards may warp as the wood begins to dry, it is recommended that the nails, screws or tacks holding them in place be removed to allow for movement. Often, as floorboards dry completely they return to the original shape. Floorboards may take several months before they are ready for re-finishing. A moisture meter will be helpful to assist in the determination of whether the wood is completely dry. Do not resurface until you can be certain of its dryness, as many finishes fail or discolor if applied to damp wood. Wet wood is soft, so protect it from foot traffic, especially high-heels, which can damage it irreparably.

Do not use heating, air conditioning, or other means of forced-air drying of wooden floors. This can cause permanent damage. If the top dries at a faster rate than the bottom, the floorboards will "cup" (turn up in a pronounced manner). It is advisable to remove some of the boards to promote improved air circulation. Also, if the boards



have begun to warp, remove them and place them in a well-ventilated area where they can dry flat. Do not re-attach warped or warping boards.

Also, any material that contains one percent or more of asbestos fibers must, by federal and state laws, be removed and disposed of in a manner that complies with requirements established by the Environmental Protection Act (EPA), Occupational Safety and Hazard Act (OSHA) and Georgia Environmental Protection Act (GEPA). Skilled professionals should be contracted to do this work. Failure to follow the regulations, even in ignorance, can result in large penalties.

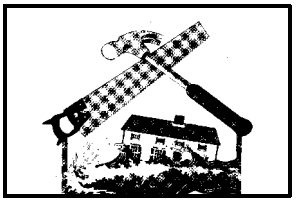
G. CRAWL SPACES

One of the most important places to check for displaced animals, insects, reptiles and other flood debris is the crawl spaces. Do not forget to check the crawl space for **flood-soaked insulation** between floor joists. Remove it and dispose of it properly. **Open any vents** which may have been closed prior to the flood, and make sure that air can circulate properly underneath the building. This will aid in the evaporation. If **air ducts** are located underneath the building, check them for water. Any water in them can breed mold, mildew and corrode the blower motor. Also, the ventilation system can become contaminated with microbes and other bacteria, creating a perfect environment for disease and its distribution throughout the structure. To prevent this, either remove small sections of the duct system or drill small holes in a low spot to drain the water. Holes can be patched later with a piece of sheet metal and duct tape or large sheetmetal screws.

H. UTILITY SYSTEMS

Be certain to check electrical outlets and panel boxes. If these have been flooded, the receptacles and breakers will need to be replaced. Have a professional check out your electrical system thoroughly, especially if the high water line indicates that the water was above the outlets. **Short circuiting can be caused by silt collecting in the outlets.**

Water can collect in gas lines, causing pilot lights to go out or burn irregularly. Gas can leak if there is a damaged thermal coupling, a faulty valve or stress to the gas line



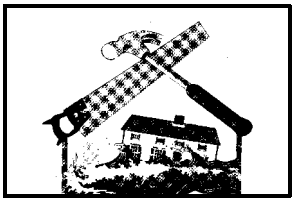
itself as a result of shifting under pressure of the waters. Gas hook-ups should be checked. The gas itself should be tested for possible contamination or mixing with other chemicals. If the gas is no longer "clean," using your system can damage appliances and result in additional repair costs.

Additional steps and precautions to take regarding your electrical system, proper repair and restoring power can be found in the American Red Cross booklet "Repairing Your Flooded Home" included in this publication.

I. LANDSCAPES

Remember, historic resources include the landscape as well! While they have received less scrutiny than architectural styles or forms, landscape features are significant resources and worthy of preservation. Historic landscapes typically involve four major features: gardens, yards, grounds and surroundings. Four major variables influence landscapes:

- the site itself, including its shape, size, topography, orientation, hydrology, soil(s) and vegetation.
- current landscape trends, fashions, conventions or styles.
- the capabilities and the goals of the designer(s); perhaps sections were developed over a period of years or for specific needs. Also, it is possible that more than one designer was involved over the course of time.
- the availability of materials, time, labor and money.



At least ten major forms of historic landscapes exist:

Craftsman landscaping.
Downingesque landscaping.
Horticultural landscaping.
Landscape revivals during le Fin de la Siecle.
Landscape of play.
Landscape of work.
New South landscaping.
Ornamental yards.
Suburban landscaping.

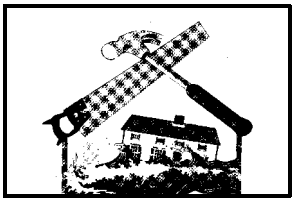
During the flood, sewage, fuel oils, petroleum products and other contaminants may have damaged landscape features. These substances will provide their own kind of clean-up problems. However, another serious threat from any of these displaced materials is that it will definitely contaminate the surface soils. If any of these substances has spilled, cautiously remove the layers of surface soil before the water table drops substantially, drawing the contaminants deep into the ground. Dispose of this material according to requirements for toxic materials.

Once you have cleaned the soil itself, you need to clean your landscape. Wash all trees, shrubs, plantings, garden pools, structures, fences and gates, and any statuary. Remove debris and silt. Cut and remove broken limbs.

Inspect all trees and shrubs. Those which have been uprooted can be successfully re-planted if you use caution and follow proper procedures. Damage may not be evident for several months. Contact such experts as landscape architects, landscape gardeners, county extension agents and horticulturists for important guidance in rehabilitating your plants, shrubs and trees.

Other features in your landscape might include metal fencing and sculptures. Such items will need appropriate attention as well. Start by washing with clean water, using a gentle cleanser if necessary. Further steps for care can include: repeat cleanings, use of soft brushes, gentle pressure cleaning and application of protective coatings.

Saturated soils tend to compact and compress. Be careful in your rehabilitation efforts that heavy equipment does not further damage the landscape. Too much weight will compress the wet soil even more. Be sure to contact landscape gardeners/nurseries



for information and techniques on aeration and other methods of lightening the soil. Too much compression will strangle the roots of trees and shrubs.

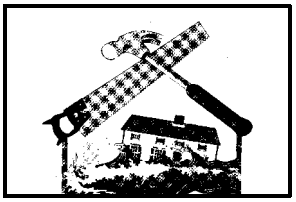
Additional information on this topic is available in the National Park Service's Preservation Brief series, distributed by the Historic Preservation Division. Also the National Park Service's Preservation Tech Notes # 1 contain details on bronze sculpture, based on case studies. Call (404)656-2840 to request a copy of briefs #27 and 36 and notes #1.

J. OTHER FEATURES

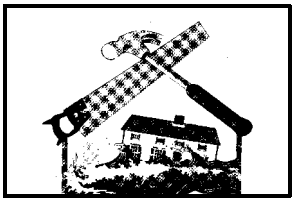
The above information by no means encompasses the many features of your historic building or site. More information is available regarding:

- ☐ Terra cotta.
- ☐ Stucco.
- ☐ Historic Storefronts.
- ☐ Vitrolite and Carrara Glass.
- ☐ Steel Windows.
- ☐ Ornamental Plaster.
- ☐ Barns.
- ☐ Signs.
- ☐ Log Structures.
- ☐ Architectural Cast Iron.
- ☐ Clay Tile Roofs.
- ☐ Slate Roofs.
- ☐ Stained and Leaded Glass.
- ☐ Applied Decoration.
- ☐ Stamped Metal Exterior Siding.
- ☐ Bronze Sculptures.

Also, other information is available regarding the use of substitute materials and replacing in-kind. Much of this technical information has been collected by the National Park Service, and is distributed by the Historic Preservation Division. It is available to you on request. Please refer to the appendices for a listing of the National Park Service Preservation Brief Series and Tech Notes Series; you may call (404) 656-2840 for single copies, free of charge. Also, an order form has been included in the appendices for your



convenience. Refer to the appendices.



HIRING A CONTRACTOR OR ARCHITECT

It will probably be necessary to hire a contractor and/or an architect in your rehabilitation efforts. This step represents your determination to provide the best possible maintenance and care for your structure. Many tasks, such as repointing and masonry repairs and electrical work, can be performed by dependable, established local contractors who have good reputations and skills, even if they have limited experience in working with older and historic buildings. Architects often have little or no training or experience in rehabilitation projects, either. Talk with several contractors and architects about the project. Have them all visit your site and provide estimates on the job, the required materials and the time involved; be sure and let them know that you are accepting bids from different sources. Both architects and contractors should provide references and be willing to discuss the job without pressuring you to sign a contract.

Remember that poorly done work or improperly done work results in more than dissatisfaction, it can damage the structure as well and create the need to re-do the repair work itself. The following advice can be of great benefit to you and your satisfaction regarding the rehabilitation of your structure.

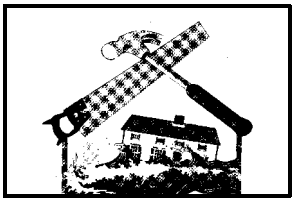
- ☐ Check on the reputation of the contractors and the architects you are considering. Ask the Better Business Bureau, building trades council or home builders association about them. If there are any unanswered complaints, you will be told.

- ☐ Ask for proof of insurance, especially disability and workman's compensation insurance. Otherwise, you might be liable for any injury associated with your building.

- ☐ Require a list of references from both contractors and architects. Once you have the lists, call the clients and ask if they are satisfied; ask if you can see the work.

- ☐ Be careful if someone offers you a "special deal" or claims to lower the price in return for using your building as a model.

- ☐ Ask for written estimates, then carefully study it to make sure that it reflects everything you expect in the project.



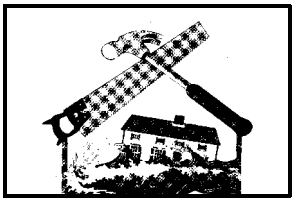
- ☐ Expect to make a down payment of about 30% of the total cost. A payment schedule should be agreed to in advance of signing a contract.

- ☐ If you are being pressured, do not sign a contract. Also remember that federal law allows a three day "cooling-off" period for any unsolicited sale greater than $25. If you have signed a contract under such conditions and you want to cancel it within three days, send written cancellation notice via registered or certified mail, with a signed receipt requested.

- ☐ Have a written contract. Check it before you sign! It should state all the work to be done, the costs, a payment schedule and details regarding guarantees. Be certain you get a copy of it.

- ☐ When the job is completed, do not sign off or write the final check until you have inspected the work and agreed that you are satisfied. Do not be pressured to sign if you are not totally satisfied. Do not pay cash on the spot, especially if you are being pressured to do so.

- ☐ If you have problems with your contractor or architect, contact the state or local consumer protection office for advice.



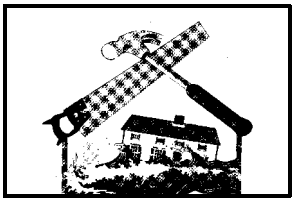
RETROFITTING

Retrofitting refers to preventive measures which can help minimize the damage next time it floods. Floods can be classified in two main types: riverine and coastal. These flood types have different characteristics and tend to cause different types of damage. Riverine flooding usually is the result of torrential or prolonged downpours in upstream, inland watersheds. Coastal flooding is typically the end result of hurricanes. Flood waters are driven by high winds, creating a storm surge. The surge and the velocity action of the waves cause more severe flood damage.

To determine the best preventive measures to help you minimize damage the next time it floods, start by determining the type of flooding your building is most likely to receive. Other flood characteristics need to be considered as well: depth, frequency, soil condition, type of construction, condition of structure and local building restrictions. **If the water did not reach your place last time, do not assume your structure is safe from future flooding.** It is recommended that you consult with local officials to learn more about the kind of flooding and flood damage which has occurred in your area. County extension agents, Regional Development Offices and Federal Emergency Management Agency(FEMA) representatives can provide you with details and data regarding your questions. You will need technical advice from the Historic Preservation Division and from the FEMA before you determine which method or methods best suit the needs and the characteristics of your structure.

It is far better to be prepared, to have planned ahead for future inundations than to expect that flooding will not affect your building. It is commonly misunderstood that a **100-year flood** happens only once every hundred years or so. Rather, this term is a statistical tool to estimate the risk of certain flood levels. A 100-year flood means that a flood level has a one-percent chance of being equalled or exceeded in any given year. It is also known as the base flood elevation, or the elevation above mean sea level.

For historic property owners, there are different retrofitting methods to be considered. Naturally, it is recommended that you first contact the Historic Preservation Division for advice and recommendations regarding the impact retrofitting will have on your structure. Then contact FEMA for technical manuals, suggestions and assistance. Be certain to tell FEMA that your structure is an historic one and give details regarding its age, construction materials and construction techniques. The kinds of methods which you should consider are unobtrusive and compatible with your structure's overall architectural style and type and character-defining elements. These methods include:



- Wet flood-proofing.
- Dry flood-proofing.
- Closures.
- Levees and Floodwalls.
- Elevation.
- Relocation.

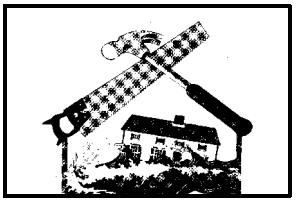
Wet flood-proofing means adjusting a structure or its uses in such a way that future floods will have only minimal impact. The waters are not prevented from entering the structure, as the floodwater helps to counteract the pressure of water on the outside of the structure. Areas which are wet flood-proofed should contain lightweight furnishings that can be quickly removed once an evacuation notice is issued or, conversely, very heavy objects such as furnaces and water heaters, which are securely anchored to prevent them from floating.

Dry flood-proofing, or watertight flood-proofing, is the complete sealing of a structure so that water cannot enter. Dry flood-proofing can be used only on buildings which are structurally sound, constructed of concrete block or brick veneer on wood frame, and subject to flood waters three feet or less. The successful application of sealants requires careful consultation with a structural engineer.

Closures act as shields to cover an opening and prevent the entry of water. They can be permanent or temporary and can be of various materials, shapes or sizes. Closures are a limited option, requiring that the situation will provide sufficient time and warning to properly install them. They are most effective when there are a limited number of openings to cover.

Levees and floodwalls can be used to protect almost any kind of resource. Check local building codes, soil types, zoning restrictions, and property covenants before contracting for this type of protection. Sometimes floodwalls can be constructed to complement the architectural style and the overall appearance of a structure. Floodwall design is dependent on the type of flooding you experience, as water velocity and pressure can create tremendous pressure on this type of structure. Fast-moving waters can erode the footing and cause it to fail, and professional assistance is recommended in order to determine whether the wall will cause flooding of adjacent property or obstruct the floodway itself. Levees are usually less expensive due to the type of materials used, but levees also require considerable property space to construct correctly. Seepage is another drawback to this solution.

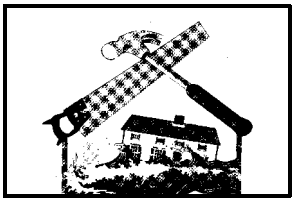
Elevation is the process of raising the entire structure on its existing site to a level above the known flood hazard. If done properly, elevation effectively puts the structure and its contents



out of harm's way and means that almost no other steps are required in response to flooding. The velocity of flood waters does need to be considered, along with soil type and the possibility of soil erosion undermining a foundation to the point of collapse. There are many facets of this equation which need to be evaluated. Elevation presents other considerations, including overall visual impact.

Relocation means moving a structure out of the floodplain entirely. This is the most reliable of retrofitting choices in terms of being our of the path of floodwaters, but it is not always the most logical or the best choice for a structure. Structural condition and construction methods are important factors to be considered. Usually this extreme measure is only advisable when it is the only way for a resource to survive.

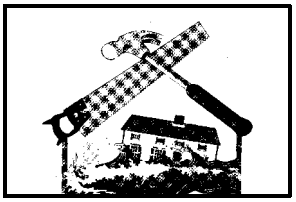
A considerable amount of information and technical material has been prepared regarding retrofitting methods and techniques, some of which have been listed in the reference section. FEMA is the distributor and the producer of most of these manuals. If you have decided to retrofit your structure, contact FEMA representatives and the Historic Preservation Division to request an on-site inspection and evaluation of your property.



CONCLUSION

The Historic Preservation Division distributed the $2.45 million emergency relief funds for historic preservation in a broad manner, with the intent of focusing the greatest amount in the rehabilitation of historic properties. Funding efforts have shown that historic preservation can be an effective part of disaster recovery in both the short and long term. Activities funded through the disaster relief grant include:

- 68 projects directly affecting and rehabilitating over 100 resources:
  - private residences.
  - private businesses.
  - non-profit organizations.
  - cemetery
  - public buildings, including 2 courthouses and 2 jails.
  - 3 block grants, to 2 historic downtown central business districts.
  - predevelopment and feasibility studies.
- 2 archaeological projects:
  - Assessment of damage to known sites in the fifty-five flooded counties.
  - Development of a pilot program to encourage archaeological site stewardship, and to foster a partnership between the state and private individuals who own lands encompassing known but undeveloped sites along the Flint River.
- 2 architects to assist in professional oversight of projects.
- 3 workshops:
  - "Your Town After the Flood," co-sponsored with the National Trust for Historic Preservation.
  - "Wind and Water Workshop," led by John Leeke, Preservation Consultant.
  - "Economic Benefits of Historic Preservation," in association with both the Middle Flint and the Southwest Georgia Regional Development Centers.
- video documenting flood recovery efforts and impact of preservation in rural areas.
- funds to the Georgia Trust for preservation planner.
- 3 staff members to administer the program.



GLOSSARY

Architectural style is determined by a building's overall form and ornamentation. Construction techniques and materials and floor plan and interior layout also have a role in the definition of architectural style.

Character-defining elements are the visual or tangible aspects of a building, related to its type, style, construction methods, or materials. To help you determine the character-defining elements of your building, use the character-defining forms included in this publication.

Coastal flooding is typically the end result of hurricanes. Flood waters are driven by high winds, creating a storm surge. The surge and the velocity action of the waves cause more severe flood damage.

Damage assessment is perhaps the most critical part of properly rehabilitating a historic resource. The overall, as well as the specific condition, of the structure should be considered. Structural soundness, leaking roofs, leaning or separating chimneys, broken windows, damaged walls, and sagging ceilings need to be evaluated.
Desiccants are drying agents which soak up moisture, like clay cat litter, chemical packs for drying out boats and closets or calcium chloride.

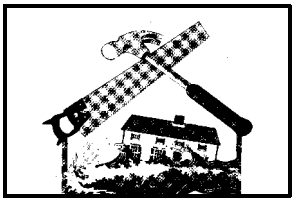
Dry flood-proofing, or watertight flood-proofing, is the complete sealing of a structure so that water cannot enter.

Drying-in refers to the steps taken to secure the exterior of a building damaged by water. These measures are usually simple, but are often complicated by the scarcity of supplies (like plywood, generators, and roofing felt) and the high demand for contractors experienced in historic buildings who work at reasonable rates.

Drying-out refers to the process of circulating air around and through the interior of a structure so that it can dry out thoroughly and evenly.

Elevation is the process of raising the entire structure on its existing site to a level above the known flood hazard.

Form is the massing, scale, proportion, and symmetry or asymmetry of a building, and the



interaction of its parts such as height, depth and width or solids and voids.

One-hundred year flood is a statistical tool to estimate the risk of certain flood levels. Known also as the base flood elevation, it means that a specific flood level has a one-percent chance of being equalled or exceeded in any given year.

Ornamentation is the decoration put on or into a building in an arranged or systematic pattern.

Recovery refers to the clean-up of your structure after the damage is done.

Recovery plan refers to the written strategy you intend to use after a disaster has struck. Use completed damage assessment forms, character-defining forms, architectural style and form as the basis for this detailed strategy to guide you through the frustrating and tiresome processes of drying-in and drying-out.

Relocation means moving a structure out of the floodplain entirely.

Retrofitting refers to preventive measures which can help minimize the damage next time floodwaters threaten your structure.

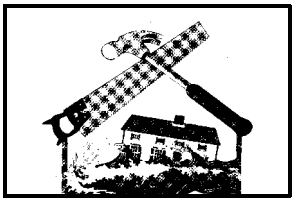
Riverine flooding usually is the result of torrential or prolonged downpours in upstream, inland watersheds.

Spalling is the chipping or breaking of the block or brick as a result of the soluble salts (naturally present in the concrete or brick) dissolving and being carried to the surface as the water evaporates but due to sealants or paints the salts are trapped by the sealant, then crystalize and expand, and through internal pressure cause the block or brick to flake.

Toenailing refers to the process of a structure being attached by nails and/or screws at an angle through posts to a metal or wooden "plate" set in concrete; the pilings act as the foundations.

Type refers to the overall form, or outline, of the main part of the building, as well as the interior's general layout. The easiest way to determine type is to

Wet flood-proofing means adjusting a structure or its uses in such a way that future floods will have only minimal impact.



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Curtis, John Obed. "Moving Historic Buildings," U.S. Department of the Interior, Heritage Conservation and Recreation Service, Technical Preservation Services Division, Washington, D. C. 1979.

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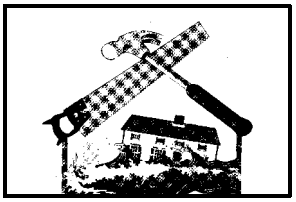


RESOURCES

In addition to disaster relief agencies which can assist in providing immediate, personal aid during a crisis, there are public, private and non-profit agencies which can provide information and help regarding the preservation of historic resources.

The **National Trust for Historic Preservation** is a Congressionally chartered, non-profit organization. The National Trust provides technical assistance, grant programs, publications, workshops and initiatives such as the rural preservation program. The Southern Regional office is located in Charleston, South Carolina, phone **(803) 722-8552**.

As previously mentioned, Georgia's state historic preservation office is the Georgia Department of Natural Resources' **Historic Preservation Division (HPD)**. The main number is **(404) 656-2840**.

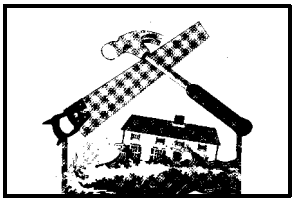
The **Georgia Trust for Historic Preservation** is the largest non-profit statewide organization in the country. It offers a diverse array of services and works closely with HPD. The Trust is a strong advocate of the benefits of historic preservation, offers design assistance to the Main Street program, and provides a variety of educational and informational programs. It has been an active supporter of flood recovery programs in the wake of Tropical Storm Alberto. Its main number is **(404) 881-9980.**

The **Department of Industry, Tourism and Trade** is the state agency that administers the **Georgia Main Street Program**. Main Street combines economic development with historic preservation, encouraging the adaptive re-use of existing structures. This broad approach to downtown revitalization focuses on smaller communities; its goal is to foster economic growth without sacrificing the qualities that make a town distinctive. The main number is **(404) 656-3545.**

The following public agencies and non-profit organizations are involved in promoting community development, of which preservation is a vital component:

- Georgia Municipal Association . . . . . (404)688-0472
- Association County Commissioners of Georgia . . . . . (404)522-5022
- Georgia Downtown Development Association . . . . . (770)386-6458

The **Certified Local Government program** (CLG) is mandated by the National Historic



Preservation Act, and is recognized as an important technique for local governments to use in their preservation activities. By strengthening a community's preservation program and its link with the State Historic Preservation Office, the CLG program enhances the local government's role in preservation. Any city, town, or county which has enacted a historic preservation ordinance, enforces it through a local preservation commission, and has met requirements outlined in the Procedures for Georgia's Certified Local Government Program, is eligible to become a CLG. For more information on the CLG program, contact **Pratt Cassity**, at the address listed below.

University of Georgia
609 Caldwell Hall
Athens, Georgia 30602
(706) 542-4731

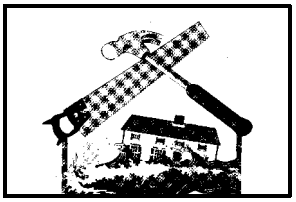
On a local level, Georgia has fifteen Regional Development Centers which house Historic Preservation Planning Programs. Contact names and addresses are listed below.

ALTAMAHA/GEORGIA SOUTHERN:
Ms. Robin S. Nail
P.O. Box 459
Baxley, Georgia 31513
Phone: 912/367-3648 Fax: 912/367-3640

CENTRAL SAVANNAH RIVER:
Ms. Anne S. Floyd
P.O. Box 2800
Augusta, Georgia 30914
Phone: 706/737-1823 Fax: 706/737-1823

CHATTAHOOCHEE-FLINT:
Ms. Lynne Miller
P.O. Box 1600
Franklin, Georgia 30217
Phone: 706/675-6721 Fax: 706/675-0448

COASTAL GEORGIA
Ms. Ellen Andrews
P.O. Box 1917



Brunswick, Georgia 31521
Phone: 912/264-7363 Fax: 912/262-2313

COOSA VALLEY
Mr. Dan H. Latham, Jr.
P.O. Box 1793
Rome, Georgia 30163-1001
Phone: 706/295-6485 Fax: 706/295-6665

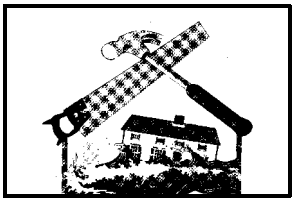
GEORGIA MOUNTAINS
Ms. Jorene Martin
P.O. Box 1720
Gainesville, Georgia 30503
Phone: 404/536-3431 Fax: 404/531-5696

LOWER CHATTAHOOCHEE
Mr. Brandon Brazil
1428 2nd Street, P.O. Box 1908
Columbus, Georgia 31902
Phone: 706/649-7468 Fax: 706/649-1214

MIDDLE FLINT
Ms. Stella Gray Bryant
228 West Lamar Street
Americus, Georgia 31709
Phone: 912/928-4120 Fax: 912/928-0177

MIDDLE GEORGIA
Ms. Adrian Wood
175-C Emery Highway
Macon, Georgia 31201
Phone: 912/751-6160 Fax: 912/751-6517

NORTH GEORGIA
Mr. Kevin McAuliff
503 West Waugh Street
Dalton, Georgia 30720
Phone: 706/272-2300 Fax: 706/2253

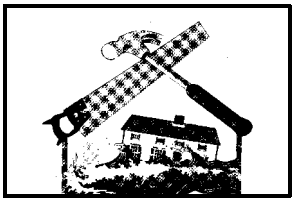


NORTHEAST GEORGIA
Mr. Burke Walker
305 Research Drive
Athens, Georgia 30610
Phone: 706/369-5650 Fax: 706/369-5792

SOUTH GEORGIA
Mr. James Horton
327 W. Savannah Avenue
Valdosta, Georgia 31603
Phone: 912/333-5277 Fax: 912/333-5312

SOUTHEAST GEORGIA
Mr. Michael Jacobs
3395 Harris Road
Waycross, Georgia 31503
Phone: 912/285-6097 Fax: 912/285-6126

SOUTHWEST GEORGIA
Mr. Paul Forgey
P.O. Box 346
Camilla, Georgia 31730
Phone: 912/336-5616 Fax: 912/430-4337



NATIONAL PARK SERVICE PRESERVATION BRIEF SERIES

Single copies are available, free of charge, from the Historic Preservation Division, Georgia Department of Natural Resources. Please mark the publication(s) you are interested in obtaining.

___ #1: The Cleaning & Waterproof Coating of Masonry Buildings.

___ #2: Repointing Mortar Joints in Historic Brick Buildings.

___ #3: Conserving Energy in Historic Buildings.

___ #4: Roofing for Historic Buildings.

___ #6: Dangers of Abrasive Cleaning to Historic Buildings.

___ #7: The Preservation of Historic Glazed Architectural Terra-Cotta.

___ #8: Aluminum & Vinyl Siding on Historic Buildings: The Appropriateness of Substitute Materials for Resurfacing Historic Wood Frame Buildings.

___ #9: The Repair of Historic Wooden Windows.

___ #10: Exterior Paint Problems on Historic Woodwork.

___ #11: Rehabilitating Historic Storefronts.

___ #12: The Preservation of Historic Pigmented Structural Glass (Vitrolite & Carrara Glass).

___ #13: The Repair & Thermal Upgrading of Historic Steel Windows.

___ #14: New Exterior Additions to Historic Buildings: Preservation Concerns.

___ #15: Preservation of Historic Concrete: Problems & General Approaches.

___ #16: The Use of Substitute Materials on Historic Building Exteriors.

___ #17: Architectural Character: Identifying the Visual Aspects of Historic Buildings as an Aid to Preserving Their Character.

___ #18: Rehabilitating Interiors in Historic Buildings.

___ #19: The Repair & Replacement of Historic Wooden Shingle Roofs.

___ #20: The Preservation of Historic Barns.

___ #21: Repairing Historic Flat Plaster - Walls & Ceilings.

___ #22: The Preservation & Repair of Historic Stucco.

___ #23: Preserving Historic Ornamental Plaster.

___ #24: Heating, Ventilating & Cooling Historic Buildings: Problems & Recommended Approaches.

___ #25: The Preservation of Historic Signs.

___ #26: The Preservation & Repair of Historic Log Buildings.

___ #27: The Maintenance & Repair of Architectural Cast Iron.

___ #28: Painting Historic Interiors.

___ #29: The Repair, Replacement, & Maintenance of Historic Slate Roofs.

___ #30: The Preservation & Repair of Historic Clay Tile Roofs.

___ #31: Mothballing Historic Buildings.

___ #32: Making Historic Properties Accessible.

___ #33: The Preservation & Repair of Historic Stained and Leaded Glass.

___ #34: Applied Decoration for Historic Interiors, Preserving Composition Ornament

___ #35: Understanding Old Buildings: The Process of Architectural Investigation

___ #36: Protecting Cultural Landscapes: Planning, Treatment and Management of Historic Landscapes

Name:_____

Address:_____

City, State, Zip:_____

Return to: Georgia Dept. of Natural Resources, Historic Preservation Division, 205 Butler Street, Suite 1462, Atlanta, Georgia 30334.

THE SECRETARY OF THE INTERIOR'S STANDARDS FOR REHABILITATION

Standard 1: A property shall be used for its historic purpose or be placed in a new use that requires minimal change to the defining characteristics of the building and its site and environment.

Standard 2: The historic character of a property shall be retained and preserved. The removal of historic materials or alteration of features and spaces that characterize a property shall be avoided.

Standard 3: Each property shall be recognized as a physical record of its time, place, and use. Changes that create a false sense of historical development, such as adding conjectural features or architectural elements from other buildings, shall not be undertaken.

Standard 4: Most properties change over time; those changes that have acquired historic significance in their own right shall be retained and preserved.

Standard 5: Distinctive features, finishes, and construction techniques or examples of craftsmanship that characterize a property shall be preserved.

Standard 6: Deteriorated historic features shall be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature shall match the old in design, color, texture, and other visual qualities and, where possible, materials. Replacement of missing features shall be substantiated by documentary, physical, or pictorial evidence.

Standard 7: Chemical or physical treatments, such as sandblasting, that cause damage to historic materials shall not be used. The surface cleaning of structures, if appropriate, shall be undertaken using the gentlest means possible.

Standard 8: Significant archeological resources affected by a project shall be protected and preserved. If such resources must be disturbed, mitigation measures shall be undertaken.

Standard 9: New additions, exterior alterations, or related new construction shall not destroy historic materials that characterize the property. The new work shall be differentiated from the old and shall be compatible with the massing, size, scale, and architectural features to protect the historic integrity of the property and its environment.

Standard 10: New additions and adjacent or related new construction shall be undertaken in such a manner that if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.

The Secretary of the Interior's Standards for Rehabilitation

and Guidelines for Rehabilitating Historic Buildings

U.S. Department of the Interior
National Park Service
Preservation Assistance Division
Washington, D.C.

For sale by the Superintendent of Documents, U.S. Government Printing Office
Washington, D.C. 20402

The Secretary of the Interior's Standards for Historic Preservation Projects with Guidelines for Applying the Standards were initially written in 1976 by W. Brown Morton III and Gary L. Hume. The Guidelines for Rehabilitating Historic Buildings were revised and expanded in 1983 by Gary L. Hume and Kay D. Weeks. The Standards for Rehabilitation were revised in 1990 following a public commenting period. It should be noted that the minor revisions to the Standards for Rehabilitation will not affect their application so that a project which was previously acceptable would continue to be acceptable.

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INTRODUCTION

The Secretary of the Interior is responsible for establishing standards for all program under Departmental authority and for advising Federal agencies on the preservation of historic properties listed or eligible for listing in the National Register of Historic Places. In partial fulfillment of this responsibility, the Secretary of the Interior's Standards for Historic Preservation Projects have been developed to guide work undertaken on historic buildings—there are separate standards for acquisition, protection, stabilization, preservation, rehabilitation, restoration, and reconstruction. **The Standards for Rehabilitation** (codified in 36 CFR 67) comprise that section of the overall preservation project standards and addresses the most prevalent treatment. "Rehabilitation" is defined as "the process of returning a property to a state of utility, through repair or alteration, which makes possible an efficient contemporary use while preserving those portions and features of the property which are significant to its historic, architectural, and cultural values."

Initially developed by the Secretary of the Interior to determine the appropriateness of proposed project work on registered properties within the Historic Preservation Fund grant-in-aid program, the **Standards for Rehabilitation** have been widely used over the years—particularly to determine if a rehabilitation qualifies as a Certified Rehabilitation for Federal tax purposes. In addition, the Standards have guided Federal agencies in carrying out their historic preservation responsibilities for properties in Federal ownership or control; and State and local officials in reviewing both Federal and nonfederal rehabilitation proposals. They have also been adopted by historic district and planning commissions across the country.

The intent of the Standards is to assist the long-term preservation of a property's significance through the preservation of historic materials and features. The Standards pertain to historic buildings of all materials, construction types, sizes, and occupancy and encompass the exterior and interior of the buildings. They also encompass related landscape features and the building's site and environment, as well as attached, adjacent, or related new construction. To be certified for Federal tax purposes, a rehabilitation project must be determined by the Secretary to be consistent with the historic character of the structure(s), and where applicable, the district in which it is located.

THE SECRETARY OF THE INTERIOR'S STANDARDS FOR REHABILITATION

The following Standards are to be applied to specific rehabilitation projects in a reasonable manner, taking into consideration economic and technical feasibility.

(1) A property shall be used for its historic purpose or be placed in a new use that requires minimal change to the defining characteristics of the building and its site and environment.

(2) The historic character of a property shall be retained and preserved. The removal of historic materials or alteration of features and spaces that characterize a property shall be avoided.

(3) Each property shall be recognized as a physical record of its time, place, and use. Changes that create a false sense of historical development, such as adding conjectural features or architectural elements from other buildings, shall not be undertaken.

(4) Most properties change over time; those changes that have acquired historic significance in their own right shall be retained and preserved.

(5) Distinctive features, finishes, and construction techniques or examples of craftsmanship that characterize a historic property shall be preserved.

(6) Deteriorated historic features shall be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature shall match the old in design, color, texture, and other visual qualities and, where possible, materials. Replacement of missing features shall be substantiated by documentary, physical, or pictorial evidence.

(7) Chemical or physical treatments, such as sandblasting, that cause damage to historic materials shall not be used. The surface cleaning of structures, if appropriate, shall be undertaken using the gentlest means possible.

(8) Significant archeological resources affected by a project shall be protected and preserved. If such resources must be disturbed, mitigation measures shall be undertaken.

(9) New additions, exterior alterations, or related new construction shall not destroy historic materials that characterize the property. The new work shall be differentiated from the old and shall be compatible with the massing, size, scale, and architectural features to protect the historic integrity of the property and its environment.

(10) New additions and adjacent or related new construction shall be undertaken in such a manner that if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.

As stated in the definition, the treatment "rehabilitation" assumes that at least some repair or alteration of the historic building will be needed in order to provide for an efficient contemporary use; however, these repairs and alteration must not damage or destroy materials, features or finishes that are important in defining the building's historic character. For example, certain treatments—if improperly applied—may cause or accelerate physical deterioration of historic building. This can include using improper repointing or exterior masonry cleaning techniques, or introducing insulation that damages historic fabric. In almost all of these situations, use of these materials and treatments will result in a project that does not meet the Standards. Similarly, exterior additions that duplicate the form, material, and detailing of the structure to the extent that they compromise the historic character of the structure will fail to meet the Standards.

Technical Guidance Publications

The National Park Service, U.S. Department of the Interior, conducts a variety of activities to guide Federal agencies, States, and the general public in historic preservation project work. In addition to establishing standards and guidelines, the Service develops, publishes, and distributes technical information on appropriate preservation treatments, including Preservation Briefs, case studies, and Preservation Tech Notes.

A Catalog of Historic Preservation Publications with stock numbers, prices, and ordering information may be obtained by writing: Preservation Assistance Division, Technical Preservation Services, P.O. Box 37127, Washington, D.C. 20013-7127.

GUIDELINES FOR REHABILITATING HISTORIC BUILDINGS

The Guidelines were initially developed in 1977 to help property owners, developers, and Federal managers apply the Secretary of the Interior's "Standards for Rehabilitation" during the project planning stage by providing general design and technical recommendations. Unlike the Standards, the Guidelines are *not* codified as program requirements. Together with the "Standards for Rehabilitation" they provide a model process for owners, developers, and Federal agency managers to follow.

It should be noted at the outset that the Guidelines are intended to assist in applying the Standards to projects generally; consequently, they are not meant to give case-specific advice or address exceptions or rare instances. For example, they cannot tell an owner or developer which features of their own historic building are important in defining the historic character and must be preserved—although examples are provided in each section—or which features could be altered, if necessary, for the new use. This kind of careful case-by-case decisionmaking is best accomplished by seeking assistance from qualified historic preservation professionals in the planning stage of the project. Such professionals include architects, architectural historians, historians, archeologists, and others who are skilled in the preservation, rehabilitation, and restoration of historic properties.

The Guidelines pertain to historic buildings of all sizes, materials, occupancy, and construction types; and apply to interior and exterior work as well as new exterior additions. Those approaches, treatments, and techniques that are consistent with the Secretary of the Interior's "Standards for Rehabilitation" are listed in the "**Recommended**" column on the left; those approaches, treatments, and techniques which could adversely affect a building's historic character are listed in the "**Not Recommended**" column on the right.

To provide clear and consistent guidance for owners, developers, and federal agency managers to follow, the "Recommended" courses of action in each section are listed in order of historic preservation concerns so that a rehabilitation project may be successfully planned and completed—one that, first, assures the preservation of a building's important or "character-defining" architectural materials and features and, second, makes possible an efficient contemporary use. Rehabilitation guidance in each section begins with protection and maintenance, that work which should be maximized in every project to enhance overall preservation goals. Next, where some deterioration is present, repair of the building's historic materials and features is recommended. Finally, when deterioration is so extensive that repair is not possible, the most problematic area of work is considered: replacement of historic materials and features with new materials.

To further guide the owner and developer in planning a successful rehabilitation project, those complex design issues dealing with new use requirements such as alterations and additions are highlighted at the end of each section to underscore the need for particular sensitivity in these areas.

Identify, Retain, and Preserve

The guidance that is basic to the treatment of all historic buildings—***identifying, retaining, and preserving*** the form and detailing of those architectural materials and features that are important in *defining the historic character*—is always listed first in the "Recommended" column. The parallel "Not Recommended" column lists the types of actions that are most apt to cause the diminution or even loss of the building's historic character. It should be remembered, however, that such loss of character is just as often caused by the cumulative effect of a series of actions that would seem to be minor interventions. Thus, the guidance in *all* of the "Not Recommended" columns must be viewed in that larger context, e.g., for the total impact on a historic building.

Protect and Maintain

After identifying those materials and features that are important and must be retained in the process of rehabilitation work, then ***protecting and maintaining*** them are addressed. Protection generally involves the least degree of intervention and is preparatory to other work. For example, protection includes the maintenance of historic material through treatments such as rust removal, caulking, limited paint removal, and re-application of protective coatings; the cyclical cleaning of roof gutter systems; or installation of fencing, protective plywood, alarm systems and other temporary protective measures. Although a historic building will usually require more extensive work, an overall evaluation of its physical condition should always begin at this level.

Repair

Next, when the physical condition of character-defining materials and features warrants additional work ***repairing*** is recommended. Guidance for the repair of historic materials such as masonry, wood, and architectural metals again begins with the least degree of intervention possible such as patching, piecing-in, splicing, consolidating, or otherwise reinforcing or upgrading them according to recognized preservation methods. Repairing also includes the limited replacement in kind—or with compatible substitute material—of extensively deteriorated or missing *parts* of features when there are surviving prototypes (for example, brackets, dentils, steps, plaster, or portions of slate or tile roofing). Although using the same kind of material is always the preferred option, substitute material is acceptable if the form and design as well as the substitute material itself convey the visual appearance of the remaining parts of the feature and finish.

Replace

Following repair in the hierarchy, guidance is provided for ***replacing*** an entire character-defining feature with new material because the level of deterioration or damage of materials precludes repair (for example, an exterior cornice; an interior staircase; or a complete porch or storefront). If the essential form and detailing are still evident so that the physical evidence can be used to re-establish the feature as an integral part of the rehabilitation project, then its replacement is appropriate. Like the guidance for repair, the preferred option is always replacement of the entire feature in kind, that is, with the same material. Because this approach may not always be technically or economically feasible, provisions are made to consider the use of a compatible substitute material.

It should be noted that, while the National Park Service guidelines recommend the replacement of an entire character-defining feature under certain well-defined circumstances, they *never* recommend removal and replacement with new material of a feature that—although damaged or deteriorated—could reasonably be repaired and thus preserved.

Design for Missing Historic Features

When an entire interior or exterior feature is missing (for example, an entrance, or cast iron facade; or a principal staircase), it no longer plays a role in physically defining the historic character of the building unless it can be accurately recovered in form and detailing through the proc-

ess of carefully documenting the historical appearance. Where an important architectural feature is missing, its recovery is always recommended in the guidelines as the *first* or preferred, course of action. Thus, if adequate historical, pictorial, and physical documentation exists so that the feature may be accurately reproduced, and if it is desireable to re-establish the feature as part of the building's historical appearance, then designing and constructing a new feature based on such information is appropriate. However, a *second* acceptable option for the replacement feature is a new design that is compatible with the remaining character-defining features of the historic building. The new design should always take into account the size, scale, and material of the historic building itself and, most importantly, should be clearly differentiated so that a false historical appearance is not created.

Alterations/Additions to Historic Buildings

Some exterior and interior alterations to the historic building are generally needed to assure its continued use, but it is most important that such alterations do not radically change, obscure, or destroy character-defining spaces, materials, features, or finishes. Alterations may include providing additional parking space on an existing historic building site; cutting new entrances or windows on secondary elevations; inserting an additional floor; installing an entirely new mechanical system; or creating an atrium or light well. Alteration may also include the selective removal of buildings or other features of the environment or building site that are intrusive and therefore detract from the overall historic character.

The construction of an exterior addition to a historic building may seem to be essential for the new use, but it is emphasized in the guidelines that such new additions should be avoided, if possible, and considered *only* after it is determined that those needs cannot be met by altering secondary, i.e., non character-defining interior spaces. If, after a thorough evaluation of interior solutions, an exterior addition is still judged to be the only viable alternative, it should be designed and constructed to be clearly differentiated from the historic building and so that the character-defining features are not radically changed, obscured, damaged, or destroyed.

Additions to historic buildings are referenced within specific sections of the guidelines such as Site, Roof, Structural Systems, etc., but are also considered in more detail in a separate section, NEW ADDITIONS TO HISTORIC BUILDINGS.

Health and Safety Code Requirements; Energy Retrofitting

These sections of the rehabilitation guidance address work done to meet health and safety code requirements (for example, providing barrier-free access to historic buildings); or retrofitting measures to conserve energy (for example, installing solar collectors in an unobtrusive location on the site). Although this work is quite often an important aspect of rehabilitation projects, it is usually not part of the overall process of protecting or repairing character-defining features; rather, such work is assessed for its potential negative impact on the building's historic character. For this reason, particular care must be taken not to radically change, obscure, damage, or destroy character-defining materials or features in the process of rehabilitation work to meet code and energy requirements.

Specific information on rehabilitation and preservation technology may be obtained by writing to the National Park Service, at the addresses listed below:

Preservation Assistance Division
National Park Service
P.O. Box 37127
Washington, D.C. 20013-7127

National Historic Preservation
Programs
Western Regional Office
National Park Service
450 Golden Gate Ave.
Box 36063
San Francisco, CA 94102

Division of Cultural Resources
Rocky Mountain Regional Office
National Park Service
655 Parfet St.
P.O. Box 25287
Denver, CO 80225

Preservation Services Division
Southeast Regional Office
National Park Service
75 Spring St. SW., Room 1140
Atlanta, GA 30303

Office of Cultural Programs
Mid-Atlantic Regional Office
National Park Service
Second and Chestnut Streets
Philadelphia, PA 19106

Cultural Resources Division
Alaska Regional Office
National Park Service
2525 Gambell St.
Anchorage, AK 99503

BUILDING EXTERIOR

Masonry: Brick, stone, terra cotta, concrete, adobe, stucco and mortar

Masonry features (such as brick cornices and door pediments, stone window architraves, terra cotta brackets and railings) as well as masonry surfaces (modelling, tooling, bonding patterns, joint size, and color) may be important in defining the historic character of the building. It should be noted that while masonry is among the most durable of historic building materials, it is also the most susceptible to damage by improper maintenance or repair techniques and by harsh or abrasive cleaning methods. Most preservation guidance on masonry thus focuses on such concerns as cleaning and the process of repointing.

Recommended	*Not Recommended*
Identifying, retaining, and preserving masonry features that are important in defining the overall historic character of the building such as walls, brackets, railings, cornices, window architraves, door pediments, steps, and columns; and joint and unit size, tooling and bonding patterns, coatings, and color.	Removing or radically changing masonry features which are important in defining the overall historic character of the building so that, as a result, the character is diminished.
	Replacing or rebuilding a major portion of exterior masonry walls that could be repaired so that, as a result, the building is no longer historic and is essentially new construction.
	Applying paint or other coatings such as stucco to masonry that has been historically unpainted or uncoated to create a new appearance.
	Removing paint from historically painted masonry.
	Radically changing the type of paint or coating or its color.
Protecting and maintaining masonry by providing proper drainage so that water does not stand on flat, horizontal surfaces or accumulate in curved decorative features.	Failing to evaluate and treat the various causes of mortar joint deterioration such as leaking roofs or gutters, differential settlement of the building, capillary action, or extreme weather exposure.
Cleaning masonry only when necessary to halt deterioration or remove heavy soiling.	Cleaning masonry surfaces when they are not heavily soiled to create a new appearance, thus needlessly introducing chemicals or moisture into historic materials.
Carrying out masonry surface cleaning tests after it has been determined that such cleaning is necessary. Tests should be observed over a sufficient period of time so that both the immediate effects and the long range effects are known to enable selection of the gentlest method possible.	Cleaning masonry surfaces without testing or without sufficient time for the testing results to be of value.
Cleaning masonry surfaces with the gentlest method possible, such as low pressure water and detergents, using natural bristle brushes.	Sandblasting brick or stone surfaces using dry or wet grit or other abrasives. These methods of cleaning permanently erode the surface of the material and accelerate deterioration.
	Using a cleaning method that involves water or liquid chemical solutions when there is any possibility of freezing temperatures.
	Cleaning with chemical products that will damage masonry, such as using acid on limestone or marble, or leaving chemicals on masonry surfaces.
	Applying high pressure water cleaning methods that will damage historic masonry and the mortar joints.
Inspecting painted masonry surfaces to determine whether repainting is necessary.	Removing paint that is firmly adhering to, and thus protecting, masonry surfaces.
Removing damaged or deteriorated paint only to the next sound layer using the gentlest method possible (e.g., handscraping) prior to repainting.	Using methods of removing paint which are destructive to masonry, such as sandblasting, application of caustic solutions, or high pressure waterblasting.
Applying compatible paint coating systems following proper surface preparation.	Failing to follow manufacturers' product and application instructions when repainting masonry.
Repainting with colors that are historically appropriate to the building and district.	Using new paint colors that are inappropriate to the historic building and district.

Recommended	*Not Recommended*
Evaluating the overall condition of the masonry to determine whether more than protection and maintenance are required, that is, if repairs to the masonry features will be necessary.	Failing to undertake adequate measures to assure the preservation of masonry features.
Repairing masonry walls and other masonry features by repointing the mortar joints where there is evidence of deterioration such as disintegrating mortar, cracks in mortar joints, loose bricks, damp walls, or damaged plasterwork.	Removing nondeteriorated mortar from sound joints, then repointing the entire building to achieve a uniform appearance.
Removing deteriorated mortar by carefully hand-raking the joints to avoid damaging the masonry.	Using electric saws and hammers rather than hand tools to remove deteriorated mortar from joints prior to repointing.
Duplicating old mortar in strength, composition, color, and texture.	Repointing with mortar of high portland cement content (unless it is the content of the historic mortar). This can often create a bond that is stronger than the historic material and can cause damage as a result of the differing coefficient of expansion and the differing porosity of the material and the mortar.
	Repointing with a synthetic caulking compound.
	Using a "scrub" coating technique to repoint instead of traditional repointing methods.
Duplicating old mortar joints in width and in joint profile.	Changing the width or joint profile when repointing.
Repairing stucco by removing the damaged material and patching with new stucco that duplicates the old in strength, composition, color, and texture.	Removing sound stucco; or repairing with new stucco that is stronger than the historic material or does not convey the same visual appearance.
Using mud plaster as a surface coating over unfired, unstabilized adobe because the mud plaster will bond to the adobe.	Applying cement stucco to unfired, unstabilized adobe. Because the cement stucco will not bond properly, moisture can become entrapped between materials, resulting in accelerated deterioration of the adobe.
Repairing masonry features by patching, piecing-in, or consolidating the masonry using recognized preservation methods. Repair may also include the limited replacement in kind—or with compatible substitute material—of those extensively deteriorated or missing parts of masonry features when there are surviving prototypes such as terra-cotta brackets or stone balusters.	**Replacing** an entire masonry feature such as a cornice or balustrade when repair of the masonry and limited replacement of deteriorated or missing parts are appropriate.
	Using a substitute material for the replacement part that does not convey the visual appearance of the surviving parts of the masonry feature or that is physically or chemically incompatible.
Applying new or non-historic surface treatments such as water-repellent coatings to masonry only after repointing and only if masonry repairs have failed to arrest water penetration problems.	Applying waterproof, water-repellent, or non-historic coatings such as stucco to masonry as a substitute for repointing and masonry repairs. Coatings are frequently unnecessary, expensive, and may change the appearance of historic masonry as well as accelerate its deterioration.
Replacing in kind an entire masonry feature that is too deteriorated to repair—if the overall form and detailing are still evident—using the physical evidence to guide the new work. Examples can include large sections of a wall, a cornice, balustrade, column, or stairway. If using the same kind of material is not technically or economically feasible, then a compatible substitute material may be considered.	Removing a masonry feature that is unrepairable and not replacing it; or replacing it with a new feature that does not convey the same visual appearance.

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Design for Missing Historic Features

Designing and installing a new masonry feature such as steps or a door pediment when the historic feature is completely missing. It may be an accurate restoration using historical, pictorial, and physical documentation; or be a new design that is compatible with the size, scale, material, and color of the historic building.	Creating a false historical appearance because the replaced masonry feature is based on insufficient historical, pictorial, and physical documentation.
	Introducing a new masonry feature that is incompatible in size, scale, material and color.

Wood: Clapboard, weatherboard, shingles, and other wooden siding and decorative elements	Because it can be easily shaped by sawing, planing, carving, and gouging, wood is the most commonly used material for architectural features such as clapboards, cornices, brackets, entablatures, shutters, columns and balustrades. These wooden features—both functional and decorative—may be important in defining the historic character of the building and thus their retention, protection, and repair are of particular importance in rehabilitation projects.

Recommended	*Not Recommended*
Identifying, retaining, and preserving wood features that are important in defining the overall historic character of the building such as siding, cornices, brackets, window architraves, and doorway pediments; and their paints, finishes, and colors.	Removing or radically changing wood features which are important in defining the overall historic character of the building so that, as a result, the character is diminished.
	Removing a major portion of the historic wood from a facade instead of repairing or replacing only the deteriorated wood, then reconstructing the facade with new material in order to achieve a uniform or "improved" appearance.
	Radically changing the type of finish or its color or accent scheme so that the historic character of the exterior is diminished.
	Stripping historically painted surfaces to bare wood, then applying clear finishes or stains in order to create a "natural look."
	Stripping paint or varnish to bare wood rather than repairing or reapplying a special finish, i.e., a grained finish to an exterior wood feature such as a front door.
Protecting and maintaining wood features by providing proper drainage so that water is not allowed to stand on flat, horizontal surfaces or accumulate in decorative features.	Failing to identify, evaluate, and treat the causes of wood deterioration, including faulty flashing, leaking gutters, cracks and holes in siding, deteriorated caulking in joints and seams, plant material growing too close to wood surfaces, or insect or fungus infestation.
Applying chemical preservatives to wood features such as beam ends or outriggers that are exposed to decay hazards and are traditionally unpainted.	Using chemical preservatives such as creosote which can change the appearance of wood features unless they were used historically.
Retaining coatings such as paint that help protect the wood from moisture and ultraviolet light. Paint removal should be considered only where there is paint surface deterioration and as part of an overall maintenance program which involves repainting or applying other appropriate protective coatings.	Stripping paint or other coatings to reveal bare wood, thus exposing historically coated surfaces to the effects of accelerated weathering.
Inspecting painted wood surfaces to determine whether repainting is necessary or if cleaning is all that is required.	Removing paint that is firmly adhering to, and thus, protecting wood surfaces.
Removing damaged or deteriorated paint to the next sound layer using the gentlest method possible (handscraping and handsanding), then repainting.	Using destructive paint removal methods such as a propane or butane torches, sandblasting or waterblasting. These methods can irreversibly damage historic woodwork.
Using with care electric hot-air guns on decorative wood features and electric heat plates on flat wood surfaces when paint is so deteriorated that total removal is necessary prior to repainting.	Using thermal devices improperly so that the historic woodwork is scorched.
Using chemical strippers primarily to supplement other methods such as handscraping, handsanding and the above-recommended thermal devices. Detachable wooden elements such as shutters, doors, and columns may—with the proper safeguards—be chemically dip-stripped.	Failing to neutralize the wood thoroughly after using chemicals so that new paint does not adhere.
	Allowing detachable wood features to soak too long in a caustic solution so that the wood grain is raised and the surface roughened.
Applying compatible paint coating systems following proper surface preparation.	Failing to follow manufacturers' product and application instructions when repainting exterior woodwork.
Repainting with colors that are appropriate to the historic building and district.	Using new colors that are inappropriate to the historic building or district.

Recommended	Not Recommended
Evaluating the overall condition of the wood to determine whether more than protection and maintenance are required, that is, if repairs to wood features will be necessary.	Failing to undertake adequate measures to assure the preservation of wood features.
Repairing wood features by patching, piecing-in, consolidating, or otherwise reinforcing the wood using recognized preservation methods. Repair may also include the limited replacement in kind—or with compatible substitute material—of those extensively deteriorated or missing parts of features where there are surviving prototypes such as brackets, moldings, or sections of siding.	Replacing an entire wood feature such as a cornice or wall when repair of the wood and limited replacement of deteriorated or missing parts are appropriate. Using substitute materials for the replacement part that does not convey the visual appearance of the surviving parts of the wood feature or that is physically or chemically incompatible.
Replacing in kind an entire wood feature that is too deteriorated to repair—if the overall form and detailing are still evident—using the physical evidence to guide the new work. Examples of wood features include a cornice, entablature or balustrade. If using the same kind of material is not technically or economically feasible, then a compatible substitute material may be considered.	Removing an entire wood feature that is unrepairable and not replacing it; or replacing it with a new feature that does not convey the same visual appearance.

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Design for Missing Historic Features

Recommended	Not Recommended
Designing and installing a new wood feature such as a cornice or doorway when the historic feature is completely missing. It may be an accurate restoration using historical, pictorial, and physical documentation; or be a new design that is compatible with the size, scale, material, and color of the historic building.	Creating a false historic appearance because the replaced wood feature is based on insufficient historical, pictorial, and physical documentation. Introducing a new wood feature that is incompatible in size, scale, material, and color.

Architectural Metals: Cast iron, steel, pressed tin, copper, aluminum, and zinc

Architectural metal features—such as cast-iron facades, porches, and steps; sheet metal cornices, roofs, roof cresting and storefronts; and cast or rolled metal doors, window sash, entablatures, and hardware—are often highly decorative and may be important in defining the overall historic character of the building. Their retention, protection, and repair should be a prime consideration in rehabilitation projects.

Recommended	Not Recommended
Identifying, retaining, and preserving architectural metal features such as columns, capitals, window hoods, or stairways that are important in defining the overall historic character of the building; and their finishes and colors.	Removing or radically changing architectural metal features which are important in defining the overall historic character of the building so that, as a result, the character is diminished. Removing a major portion of the historic architectural metal from a facade instead of repairing or replacing only the deteriorated metal, then reconstructing the facade with new material in order to create a uniform, or "improved" appearance. Radically changing the type of finish or its historical color or accent scheme.
Protecting and maintaining architectural metals from corrosion by providing proper drainage so that water does not stand on flat, horizontal surfaces or accumulate in curved, decorative features.	Failing to identify, evaluate, and treat the causes of corrosion, such as moisture from leaking roofs or gutters. Placing incompatible metals together without providing a reliable separation material. Such incompatibility can result in galvanic corrosion of the less noble metal, e.g., copper will corrode cast iron, steel, tin, and aluminum.
Cleaning architectural metals, when necessary, to remove corrosion prior to repainting or applying other appropriate protective coatings.	Exposing metals which were intended to be protected from the environment. Applying paint or other coatings to metals such as copper, bronze, or stainless steel that were meant to be exposed.

Recommended	*Not Recommended*
Identifying the particular type of metal prior to any cleaning procedure and then testing to assure that the gentlest cleaning method possible is selected or determining that cleaning is inappropriate for the particular metal.	Using cleaning methods which alter or damage the historic color, texture, and finish of the metal; or cleaning when it is inappropriate for the metal. Removing the patina of historic metal. The patina may be a protective coating on some metals, such as bronze or copper, as well as a significant historic finish.
Cleaning soft metals such as lead, tin, copper, terneplate, and zinc with appropriate chemical methods because their finishes can be easily abraded by blasting methods.	Cleaning soft metals such as lead, tin, copper, terneplate, and zinc with grit blasting which will abrade the surface of the metal.
Using the gentlest cleaning methods for cast iron, wrought iron, and steel—hard metals—in order to remove paint buildup and corrosion. If handscraping and wire brushing have proven ineffective, low pressure dry grit blasting may be used as long as it does not abrade or damage the surface.	Failing to employ gentler methods prior to abrasively cleaning cast iron, wrought iron or steel; or using high pressure grit blasting.
Applying appropriate paint or other coating systems after cleaning in order to decrease the corrosion rate of metals or alloys.	Failing to re-apply protective coating systems to metals or alloys that require them after cleaning so that accelerated corrosion occurs.
Repainting with colors that are appropriate to the historic building or district.	Using new colors that are inappropriate to the historic building or district.
Applying an appropriate protective coating such as lacquer to an architectural metal feature such as a bronze door which is subject to heavy pedestrian use.	Failing to assess pedestrian use or new access patterns so that architectural metal features are subject to damage by use or inappropriate maintenance such as salting adjacent sidewalks.
Evaluating the overall condition of the architectural metals to determine whether more than protection and maintenance are required, that is, if repairs to features will be necessary.	Failing to undertake adequate measures to assure the preservation of architectural metal features.
Repairing architectual metal features by patching, splicing, or otherwise reinforcing the metal following recognized preservation methods. Repairs may also include the limited replacement in kind—or with a compatible substitute material—of those extensively deteriorated or missing parts of features when there are surviving prototypes such as porch balusters, column capitals or bases; or porch cresting.	Replacing an entire architectural metal feature such as a column or a balustrade when repair of the metal and limited replacement of deteriorated or missing parts are appropriate. Using a substitute material for the replacement part that does not convey the visual appearance of the surviving parts of the architectural metal feature or that is physically or chemically incompatible.
Replacing in kind an entire architectural metal feature that is too deteriorated to repair—if the overall form and detailing are still evident—using the physical evidence to guide the new work. Examples could include cast iron porch steps or steel sash windows. If using the same kind of material is not technically or economically feasible, then a compatible substitute material may be considered.	Removing an architectural metal feature that is unrepairable and not replacing it; or replacing it with a new architectural metal feature that does not convey the same visual appearance.

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Design for Missing Historic Features

Designing and installing a new architectural metal feature such as a sheet metal cornice or cast iron capital when the historic feature is completely missing. It may be an accurate restoration using historical, pictorial and physical documentation; or be a new design that is compatible with the size, scale, material, and color of the historic building.	Creating a false historic appearance because the replaced architectural metal feature is based on insufficient historical, pictorial, and physical documentation. Introducing a new architectural metal feature that is incompatible in size, scale, material, and color.

Roofs

The roof—with its shape; features such as cresting, dormers, cupolas, and chimneys; and the size, color, and patterning of the roofing material—can be extremely important in defining the building's overall historic character. In addition to the design role it plays, a weathertight roof is essential to the preservation of the entire structure; thus, protecting and repairing the roof as a "cover" is a critical aspect of every rehabilitation project.

Recommended	*Not Recommended*
Identifying, retaining, and preserving roofs—and their functional and decorative features—that are important in defining the overall historic character of the building. This includes the roof's shape, such as hipped, gambrel, and mansard; decorative features such as cupolas, cresting, chimneys, and weathervanes; and roofing material such as slate, wood, clay tile, and metal, as well as its size, color, and patterning.	Radically changing, damaging, or destroying roofs which are important in defining the overall historic character of the building so that, as a result, the character is diminished. Removing a major portion of the roof or roofing material that is repairable, then reconstructing it with new material in order to create a uniform, or "improved" appearance. Changing the configuration of a roof by adding new features such as dormer windows, vents, or skylights so that the historic character is diminished. Stripping the roof of sound historic material such as slate, clay tile, wood, and architectural metal. Applying paint or other coatings to roofing material which has been historically uncoated.
Protecting and maintaining a roof by cleaning the gutters and downspouts and replacing deteriorated flashing. Roof sheathing should also be checked for proper venting to prevent moisture condensation and water penetration; and to insure that materials are free from insect infestation.	Failing to clean and maintain gutters and downspouts properly so that water and debris collect and cause damage to roof fasteners, sheathing, and the underlying structure.
Providing adequate anchorage for roofing material to guard against wind damage and moisture penetration.	Allowing roof fasteners, such as nails and clips to corrode so that roofing material is subject to accelerated deterioration.
Protecting a leaking roof with plywood and building paper until it can be properly repaired.	Permitting a leaking roof to remain unprotected so that accelerated deterioration of historic building materials—masonry, wood, plaster, paint and structural members—occurs.
Repairing a roof by reinforcing the historic materials which comprise roof features. Repairs will also generally include the limited replacement in kind—or with compatible substitute material—of those extensively deteriorated or missing parts of features when there are surviving prototypes such as cupola louvers, dentils, dormer roofing; or slates, tiles, or wood shingles on a main roof.	Replacing an entire roof feature such as a cupola or dormer when repair of the historic materials and limited replacement of deteriorated or missing parts are appropriate. Using a substitute material for the replacement part that does not convey the visual appearance of the surviving parts of the roof or that is physically or chemically incompatible.
Replacing in kind an entire feature of the roof that is too deteriorated to repair—if the overall form and detailing are still evidence—using the physical evidence to guide the new work. Examples can include a large section of roofing, or a dormer or chimney. If using the same kind of material is not technically or economically feasible, then a compatible substitute material may be considered.	Removing a feature of the roof that is unrepairable, such as a chimney or dormer, and not replacing it; or replacing it with a new feature that does not convey the same visual appearance.

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Design for Missing Historic Features

Designing and constructing a new feature when the historic feature is completely missing, such as a chimney or cupola. It may be an accurate restoration using historical, pictorial and physical documentation; or be a new design that is compatible with the size, scale, material, and color of the historic building.	Creating a false historical appearance because the replaced feature is based on insufficient historical, pictorial, and physical documentation. Introducing a new roof feature that is incompatible in size, scale, material, and color.

Recommended

Alterations/Additions for the New Use

Installing mechanical and service equipment on the roof such as air conditioning, transformers, or solar collectors when required for the new use so that they are inconspicuous from the public right-of-way and do not damage or obscure character-defining features.

Designing additions to roofs such as residential, office, or storage spaces; elevator housing; decks and terraces; or dormers or skylights when required by the new use so that they are inconspicuous from the public right-of-way and do not damage or obscure character-defining features.

Not Recommended

Installing mechanical or service equipment so that it damages or obscures character-defining features; or is conspicuous from the public right-of-way.

Radically changing a character-defining roof shape or damaging or destroying character-defining roofing material as a result of incompatible design or improper installation techniques.

Windows

A highly decorative window with an unusual shape, or glazing pattern, or color is most likely identified immediately as a character-defining feature of the building. It is far more difficult, however, to assess the importance of repeated windows on a facade, particularly if they are individually simple in design and material, such as the large, multi-paned sash of many industrial buildings. Because rehabilitation projects frequently include proposals to replace window sash or even entire windows to improve thermal efficiency or to create a new appearance, it is essential that their contribution to the overall historic character of the building be assessed together with their physical condition before specific repair or replacement work is undertaken.

Recommended

Identifying, retaining, and preserving windows—and their functional and decorative features—that are important in defining the overall historic character of the building. Such features can include frames, sash, muntins, glazing, sills, heads, hoodmolds, panelled or decorated jambs and moldings, and interior and exterior shutters and blinds.

Protecting and maintaining the wood and architectural metal which comprise the window frame, sash, muntins, and surrounds through appropriate surface treatments such as cleaning, rust removal, limited paint removal, and re-application of protective coating systems.

Not Recommended

Removing or radically changing windows which are important in defining the overall historic character of the building so that, as a result, the character is diminished.

Changing the number, location, size or glazing pattern of windows, through cutting new openings, blocking-in windows, and installing replacement sash which does not fit the historic window opening.

Changing the historic appearance of windows through the use of inappropriate designs, materials, finishes, or colors which radically change the sash, depth of reveal, and muntin configuration; the reflectivity and color of the glazing; or the appearance of the frame.

Obscuring historic window trim with metal or other material.

Stripping windows of historic material such as wood, iron, cast iron, and bronze.

Failing to provide adequate protection of materials on a cyclical basis so that deterioration of the windows results.

Recommended	*Not Recommended*
Making windows weathertight by recaulking and replacing or installing weatherstripping. These actions also improve thermal efficiency.	Retrofitting or replacing windows rather than maintaining the sash, frame, and glazing.
Evaluating the overall condition of materials to determine whether more than protection and maintenance are required, i.e. if repairs to windows and window features will be required.	Failing to undertake adequate measures to assure the preservation of historic windows.
Repairing window frames and sash by patching, splicing, consolidating or otherwise reinforcing. Such repair may also include replacement in kind of those parts that are either extensively deteriorated or are missing when there are surviving prototypes such as architraves, hoodmolds, sash, sills, and interior or exterior shutters and blinds.	Replacing an entire window when repair of materials and limited replacement of deteriorated or missing parts are appropriate. Failing to reuse serviceable window hardware such as brass lifts and sash locks. Using a substitute material for the replacement part that does not convey the visual appearance of the surviving parts of the window or that is physically or chemically incompatible.
Replacing in kind an entire window that is too deteriorated to repair—if the overall form and detailing are still evident—using the physical evidence to guide the new work. If using the same kind of material is not technically or economically feasible, then a compatible substitute material may be considered.	Removing a character-defining window that is unrepairable and blocking it in; or replacing it with a new window that does not convey the same visual appearance.

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Design for Missing Historic Features

Recommended	*Not Recommended*
Designing and installing new windows when the historic windows (frame, sash and glazing) are completely missing. The replacement windows may be an accurate restoration using historical, pictorial, and physical documentation; or be a new design that is compatible with the window openings and the historic character of the building.	Creating a false historical appearance because the replaced window is based on insufficient historical, pictorial, and physical documentation. Introducing a new design that is incompatible with the historic character of the building.

Alterations/Additions for the New Use

Recommended	*Not Recommended*
Designing and installing additional windows on rear or other-non character-defining elevations if required by the new use. New windows openings may also be cut into exposed party walls. Such design should be compatible with the overall design of the building, but not duplicate the fenestration pattern and detailing of a character-defining elevation.	Installing new windows, including frames, sash, and muntin configuration that are incompatible with the building's historic appearance or obscure, damage, or destroy character-defining features.
Providing a setback in the design of dropped ceilings when they are required for the new use to allow for the full height of the window openings.	Inserting new floors or furred-down ceilings which cut across the glazed areas of windows so that the exterior form and appearance of the windows are changed.

Entrances and Porches

Entrances and porches are quite often the focus of historic buildings, particularly when they occur on primary elevations. Together with their functional and decorative features such as doors, steps, balustrades, pilasters, and entablatures, they can be extremely important in defining the overall historic character of a building. Their retention, protection, and repair should always be carefully considered when planning rehabilitation work.

Recommended	*Not Recommended*
Identifying, retaining, and preserving entrances—and their functional and decorative features—that are important in defining the overall historic character of the building such as doors, fanlights, sidelights, pilasters, entablatures, columns, balustrades, and stairs.	Removing or radically changing entrances and porches which are important in defining the overall historic character of the building so that, as a result, the character is diminished.
	Stripping entrances and porches of historic material such as wood, iron, cast iron, terra cotta, tile and brick.
	Removing an entrance or porch because the building has been reoriented to accommodate a new use.
	Cutting new entrances on a primary elevation.
	Altering utilitarian or service entrances so they appear to be formal entrances by adding panelled doors, fanlights, and sidelights.
Protecting and maintaining the masonry, wood, and architectural metal that comprise entrances and porches through appropriate surface treatments such as cleaning, rust removal, limited paint removal, and re-application of protective coating systems.	Failing to provide adequate protection to materials on a cyclical basis so that deterioration of entrances and porches results.
Evaluating the overall condition of materials to determine whether more than protection and maintenance are required, that is, if repairs to entrance and porch features will be necessary.	Failing to undertake adequate measures to assure the preservation of historic entrances and porches.
Repairing entrances and porches by reinforcing the historic materials. Repair will also generally include the limited replacement in kind—or with compatible substitute material—of those extensively deteriorated or missing parts of repeated features where there are surviving prototypes such as balustrades, cornices, entablatures, columns, sidelights, and stairs.	Replacing an entire entrance or porch when the repair of materials and limited replacement of parts are appropriate.
	Using a substitute material for the replacement parts that does not convey the visual appearance of the surviving parts of the entrance and porch or that is physically or chemically incompatible.
Replacing in kind an entire entrance or porch that is too deteriorated to repair—if the form and detailing are still evident—using the physical evidence to guide the new work. If using the same kind of material is not technically or economically feasible, then a compatible substitute material may be considered.	Removing an entrance or porch that is unrepairable and not replacing it; or replacing it with a new entrance or porch that does not convey the same visual appearance.

The following work is highlighted to indicate that it represents the particularly complex technical or design aspects of rehabilitation projects and should only be considered after the preservation concerns listed above have been addressed.

Design for Missing Historic Features

Designing and constructing a new entrance or porch if the historic entrance or porch is completely missing. It may be a restoration based on historical, pictorial, and physical documentation; or be a new design that is compatible with the historic character of the building.	Creating a false historical appearance because the replaced entrance or porch is based on insufficient historical, pictorial, and physical documentation.
	Introducing a new entrance or porch that is incompatible in size, scale, material, and color.

Alterations/Additions for the New Use

Designing enclosures for historic porches when required by the new use in a manner that preserves the historic character of the building. This can include using large sheets of glass and recessing the enclosure wall behind existing scrollwork, posts, and balustrades.	Enclosing porches in a manner that results in a diminution or loss of historic character such as using solid materials such as wood, stucco, or masonry.
Designing and installing additional entrances or porches when required for the new use in a manner that preserves the historic character of the building, i.e., limiting such alteration to non-character-defining elevations.	Installing secondary service entrances and porches that are incompatible in size and scale with the historic building or obscure, damage, or destroy character-defining features.

Storefronts	Storefronts are quite often the focus of historic commercial buildings and can thus be extremely important in defining the overall historic character. Because storefronts also play a crucial role in a store's advertising and merchandising strategy to draw customers and increase business, they are often altered to meet the needs of a new business. Particular care is required in planning and accomplishing work on storefronts so that the building's historic character is preserved in the process of rehabilitation.

Recommended	*Not Recommended*
Identifying, retaining, and preserving storefronts—and their functional and decorative features—that are important in defining the overall historic character of the building such as display windows, signs, doors, transoms, kick plates, corner posts, and entablatures.	Removing or radically changing storefronts—and their features—which are important in defining the overall historic character of the building so that, as a result, the character is diminished.
	Changing the storefront so that it appears residential rather than commercial in character.
	Removing historic material from the storefront to create a recessed arcade.
	Introducing coach lanterns, mansard overhangings, wood shakes, nonoperable shutters, and small-paned windows if they cannot be documented historically.
	Changing the location of a storefront's main entrance.
Protecting and maintaining masonry, wood, and architectural metals which comprise storefronts through appropriate treatments such as cleaning, rust removal, limited paint removal, and reapplication of protective coating systems.	Failing to provide adequate protection to materials on a cyclical basis so that deterioration of storefront features results.
Protecting storefronts against arson and vandalism before work begins by boarding up windows and installing alarm systems that are keyed into local protection agencies.	Permitting entry into the building through unsecured or broken windows and doors so that interior features and finishes are damaged through exposure to weather or through vandalism.
	Stripping storefronts of historic material such as wood, cast iron, terra cotta, carrara glass, and brick.
Evaluating the overall condition of storefront materials to determine whether more than protection and maintenance are required, that is, if repairs to features will be necessary.	Failing to undertake adequate measures to assure the preservation of the historic storefront.
Repairing storefronts by reinforcing the historic materials. Repairs will also generally include the limited replacement in kind—or with compatible substitute material—of those extensively deteriorated or missing parts of storefronts where there are surviving prototypes such as transoms, kick plates, pilasters, or signs.	Replacing an entire storefront when repair of materials and limited replacement of its parts are appropriate.
	Using substitute material for the replacement parts that does not convey the same visual appearance as the surviving parts of the storefront or that is physically or chemically incompatible.
Replacing in kind an entire storefront that is too deteriorated to repair—if the overall form and detailing are still evident—using the physical evidence to guide the new work. If using the same material is not technically or economically feasible, then compatible substitute materials may be considered.	Removing a storefront that is unrepairable and not replacing it; or replacing it with a new storefront that does not convey the same visual appearance.

The following work is highlighted to indicate that it represents the particularly complex technical or design aspects of rehabilitation projects and should only be considered after the preservation concerns listed above have been addressed.

Recommended

Design for Missing Historic Features

Designing and constructing a new storefront when the historic storefront is completely missing. It may be an accurate restoration using historical, pictorial, and physical documentation; or be a new design that is compatible with the size, scale, material, and color of the historic building. Such new design should generally be flush with the facade; and the treatment of secondary design elements, such as awnings or signs, kept as simple as possible. For example, new signs should fit flush with the existing features of the facade, such as the fascia board or cornice.

Not Recommended

Creating a false historical appearance because the replaced storefront is based on insufficient historical, pictorial, and physical documentation.

Introducing a new design that is incompatible in size, scale, material, and color.

Using new illuminated signs; inappropriately scaled signs and logos; signs that project over the sidewalk unless they were a characteristic feature of the historic building; or other types of signs that obscure, damage, or destroy remaining character-defining features of the historic building.

BUILDING INTERIOR

Structural System

If features of the structural system are exposed such as loadbearing brick walls, cast iron columns, roof trusses, posts and beams, vigas, or stone foundation walls, they may be important in defining the building's overall historic character. Unexposed structural features that are not character-defining or an entire structural system may nonetheless be significant in the history of building technology; therefore, the structural system should always be examined and evaluated early in the project planning stage to determine both its physical condition and its importance to the building's historic character or historical significance. See also Health and Safety Code Requirements.

Recommended

Identifying, retaining, and preserving structural systems—and individual features of systems—that are important in defining the overall historic character of the building, such as post and beam systems, trusses, summer beams, vigas, cast iron columns, above-grade stone foundation walls, or loadbearing brick or stone walls.

Not Recommended

Removing, covering, or radically changing features of structural systems which are important in defining the overall historic character of the building so that, as a result, the character is diminished.

Putting a new use into the building which could overload the existing structural system; or installing equipment or mechanical systems which could damage the structure.

Demolishing a loadbearing masonry wall that could be augmented and retained and replacing it with a new wall (i.e., brick or stone), using the historic masonry only as an exterior veneer.

Leaving known structural problems untreated such as deflection of beams, cracking and bowing of walls, or racking of structural members.

Utilizing treatments or products that accelerate the deterioration of structural material such as introducing urea-formaldehyde foam insulation into frame walls.

STRUCTURAL SYSTEM (continued)

Recommended	*Not Recommended*
Protecting and maintaining the structural system by cleaning the roof gutters and downspouts; replacing roof flashing; keeping masonry, wood, and architectural metals in a sound condition; and assuring that structural members are free from insect infestation.	Failing to provide proper building maintenance on a cyclical basis so that deterioration of the structural system results.
Examining and evaluating the physical condition of the structural system and its individual features using non-destructive techniques such as X-ray photography.	Utilizing destructive probing techniques that will damage or destroy structural material.
Repairing the structural system by augmenting or upgrading individual parts or features. For example, weakened structural members such as floor framing can be spliced, braced, or otherwise supplemented and reinforced.	Upgrading the building structurally in a manner that diminishes the historic character of the exterior, such as installing strapping channels or removing a decorative cornice; or damages interior features or spaces. Replacing a structural member or other feature of the structural system when it could be augmented and retained.
Replacing in kind—or with substitute material—those portions or features of the structural system that are either extensively deteriorated or are missing when there are surviving prototypes such as cast iron columns, roof rafters or trusses, or sections of loadbearing walls. Substitute material should convey the same form, design, and overall visual appearance as the historic feature; and, at a minimum, be equal to its loadbearing capabilities.	Installing a replacement feature that does not convey the same visual appearance, e.g., replacing an exposed wood summer beam with a steel beam. Using substitute material that does not equal the loadbearing capabilities of the historic material and design or is otherwise physically or chemically incompatible.

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Recommended	*Not Recommended*
Alterations/Additions for the New Use	
Limiting any new excavations adjacent to historic foundations to avoid undermining the structural stability of the building or adjacent historic buildings.	Carrying out excavations or regrading adjacent to or within a historic building which could cause the historic foundation to settle, shift, or fail; or could have a similar effect on adjacent historic buildings.
Correcting structural deficiencies in preparation for the new use in a manner that preserves the structural system and individual character-defining features.	Radically changing interior spaces or damaging or destroying features or finishes that are character-defining while trying to correct structural deficiencies in preparation for the new use.
Designing and installing new mechanical or electrical systems when required for the new use which minimize the number of cutouts or holes in structural members.	Installing new mechanical and electrical systems or equipment in a manner which results in numerous cuts, splices, or alterations to the structural members.
Adding a new floor when required for the new use if such an alteration does not damage or destroy the structural system or obscure, damage, or destroy character-defining spaces, features, or finishes.	Inserting a new floor when such a radical change damages a structural system or obscures or destroys interior spaces, features, or finishes. Inserting new floors or furred-down ceilings which cut across the glazed areas of windows so that the exterior form and appearance of the windows are radically changed.
Creating an atrium or a light well to provide natural light when required for the new use in a manner that assures the preservation of the structural system as well as character-defining interior spaces, features, and finishes.	Damaging the structural system or individual features; or radically changing, damaging, or destroying character-defining interior spaces, features, or finishes in order to create an atrium or a light well.

Interior: Spaces, Features, and Finishes	An interior floor plan, the arrangement of spaces, and built-in features and applied finishes may be individually or collectively important in defining the historic character of the building. Thus, their identification, retention, protection, and repair should be given prime consideration in every rehabilitation project and caution exercised in pursuing any plan that would radically change character-defining spaces or obscure, damage or destroy interior features or finishes.

Recommended	*Not Recommended*
Interior Spaces	
Identifying, retaining, and preserving a floor plan or interior spaces that are important in defining the overall historic character of the building. This includes the size, configuration, proportion, and relationship of rooms and corridors; the relationship of features to spaces; and the spaces themselves such as lobbies, reception halls, entrance halls, double parlors, theaters, auditoriums, and important industrial or commercial use spaces.	Radically changing a floor plan or interior spaces—including individual rooms—which are important in defining the overall historic character of the building so that, as a result, the character is diminished. Altering the floor plan by demolishing principal walls and partitions to create a new appearance. Altering or destroying interior spaces by inserting floors, cutting through floors, lowering ceilings, or adding or removing walls. Relocating an interior feature such as a staircase so that the historic relationship between features and spaces is altered.
Interior Features and Finishes	
Identifying, retaining, and preserving interior features and finishes that are important in defining the overall historic character of the building, including columns, cornices, baseboards, fireplaces and mantles, paneling, light fixtures, hardware, and flooring; and wallpaper, plaster, paint, and finishes such as stenciling, marbling, and graining; and other decorative materials that accent interior features and provide color, texture, and patterning to walls, floors, and ceilings.	Removing or radically changing features and finishes which are important in defining the overall historic character of the building so that, as a result, the character is diminished. Installing new decorative material that obscures or damages character-defining interior features or finishes. Removing paint, plaster, or other finishes from historically finished surfaces to create a new appearance (e.g., removing plaster to expose masonry surfaces such as brick walls or a chimney piece). Applying paint, plaster, or other finishes to surfaces that have been historically unfinished to create a new appearance. Stripping historically painted wood surfaces to bare wood, then applying clear finishes or stains to create a "natural look." Stripping paint to bare wood rather than repairing or reapplying grained or marbled finishes to features such as doors and paneling. Radically changing the type of finish or its color, such as painting a previously varnished wood feature.
Protecting and maintaining masonry, wood, and architectural metals which comprise interior features through appropriate surface treatments such as cleaning, rust removal, limited paint removal, and reapplication of protective coatings systems.	Failing to provide adequate protection to materials on a cyclical basis so that deterioration of interior features results.

Recommended	*Not Recommended*
Protecting interior features and finishes against arson and vandalism before project work begins, erecting protective fencing, boarding-up windows, and installing fire alarm systems that are keyed to local protection agencies.	Permitting entry into historic buildings through unsecured or broken windows and doors so that interior features and finishes are damaged by exposure to weather or through vandalism. Stripping interiors of features such as woodwork, doors, windows, light fixtures, copper piping, radiators; or of decorative materials.
Protecting interior features such as a staircase, mantel, or decorative finishes and wall coverings against damage during project work by covering them with heavy canvas or plastic sheets.	Failing to provide proper protection of interior features and finishes during work so that they are gouged, scratched, dented, or otherwise damaged.
Installing protective coverings in areas of heavy pedestrian traffic to protect historic features such as wall coverings, parquet flooring and panelling.	Failing to take new use patterns into consideration so that interior features and finishes are damaged.
Removing damaged or deteriorated paints and finishes to the next sound layer using the gentlest method possible, then repainting or refinishing using compatible paint or other coating systems.	Using destructive methods such as propane or butane torches or sandblasting to remove paint or other coatings. These methods can irreversibly damage the historic materials that comprise interior features.
Repainting with colors that are appropriate to the historic building.	Using new paint colors that are inappropriate to the historic building.
Limiting abrasive cleaning methods to certain industrial or warehouse buildings where the interior masonry or plaster features do not have distinguishing design, detailing, tooling, or finishes; and where wood features are not finished, molded, beaded, or worked by hand. Abrasive cleaning should *only* be considered after other, gentler methods have been proven ineffective.	Changing the texture and patina of character-defining features through sandblasting or use of other abrasive methods to remove paint, discoloration or plaster. This includes both exposed wood (including structural members) and masonry.
Evaluating the overall condition of materials to determine whether more than protection and maintenance are required, that is, if repairs to interior features and finishes will be necessary.	Failing to undertake adequate measures to assure the preservation of interior features and finishes.
Repairing interior features and finishes by reinforcing the historic materials. Repair will also generally include the limited replacement in kind—or with compatible substitute material—of those extensively deteriorated or missing parts of repeated features when there are surviving prototypes such as stairs, balustrades, wood panelling, columns; or decorative wall coverings or ornamental tin or plaster ceilings.	Replacing an entire interior feature such as a staircase, panelled wall, parquet floor, or cornice; or finish such as a decorative wall covering or ceiling when repair of materials and limited replacement of such parts are appropriate. Using a substitute material for the replacement part that does not convey the visual appearance of the surviving parts or portions of the interior feature or finish or that is physically or chemically incompatible.
Replacing in kind an entire interior feature or finish that is too deteriorated to repair—if the overall form and detailing are still evident—using the physical evidence to guide the new work. Examples could include wainscoting, a tin ceiling, or interior stairs. If using the same kind of material is not technically or economically feasible, then a compatible substitute material may be considered.	Removing a character-defining feature or finish that is unrepairable and not replacing it; or replacing it with a new feature or finish that does not convey the same visual appearance.

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Design for Missing Historic Features

Designing and installing a new interior feature or finish if the historic feature or finish is completely missing. This could include missing partitions, stairs, elevators, lighting fixtures, and wall coverings; or even entire rooms if all historic spaces, features, and finishes are missing or have been destroyed by inappropriate "renovations." The design may be a restoration based on historical, pictorial, and physical documentation; or be a new design that is compatible with the historic character of the building, district, or neighborhood.	Creating a false historical appearance because the replaced feature is based on insufficient physical, historical, and pictorial documentation or on information derived from another building. Introducing a new interior feature or finish that is incompatible with the scale, design, materials, color, and texture of the surviving interior features and finishes.

Recommended	*Not Recommended*
Alterations/Additions for the New Use	
Accommodating service functions such as bathrooms, mechanical equipment, and office machines required by the building's new use in secondary spaces such as first floor service areas or on upper floors.	Dividing rooms, lowering ceilings, and damaging or obscuring character-defining features such as fireplaces, niches, stairways or alcoves, so that a new use can be accommodated in the building.
Reusing decorative material or features that have had to be removed during the rehabilitation work including wall and baseboard trim, door moulding, panelled doors, and simple wainscoting; and relocating such material or features in areas appropriate to their historic placement.	Discarding historic material when it can be reused within the rehabilitation project or relocating it in historically inappropriate areas.
Installing permanent partitions in secondary spaces; removable partitions that do not destroy the sense of space should be installed when the new use requires the subdivision of character-defining interior spaces.	Installing permanent partitions that damage or obscure character-defining spaces, features, or finishes.
Enclosing an interior stairway where required by code so that its character is retained. In many cases, glazed fire-rated walls may be used.	Enclosing an interior stairway with fire-rated construction so that the stairwell space or any character-defining features are destroyed.
Placing new code-required stairways or elevators in secondary and service areas of the historic building.	Radically changing, damaging, or destroying character-defining spaces, features, or finishes when adding new code-required stairways and elevators.
Creating an atrium or a light well to provide natural light when required for the new use in a manner that preserves character-defining interior spaces, features, and finishes as well as the structural system.	Destroying character-defining interior spaces, features, or finishes; or damaging the structural system in order to create an atrium or light well.
Adding a new floor if required for the new use in a manner that preserves character-defining structural features, and interior spaces, features, and finishes.	Inserting a new floor within a building that alters or destroys the fenestration; radically changes a character-defining interior space; or obscures, damages, or destroys decorative detailing.

Mechanical Systems: Heating, Air Conditioning, Electrical, and Plumbing	The visible features of historic heating, lighting, air conditioning and plumbing systems may sometimes help define the overall historic character of the building and should thus be retained and repaired, whenever possible. The systems themselves (the compressors, boilers, generators and their ductwork, wiring and pipes) will generally either need to be upgraded, augmented, or entirely replaced in order to accommodate the new use and to meet code requirements. Less frequently, individual portions of a system or an entire system are significant in the history of building technology; therefore, the identification of character-defining features or historically significant systems should take place together with an evaluation of their physical condition early in project planning.

Recommended	*Not Recommended*
Identifying, retaining, and preserving visible features of early mechanical systems that are important in defining the overall historic character of the building, such as radiators, vents, fans, grilles, plumbing fixtures, switchplates, and lights.	Removing or radically changing features of mechanical systems that are important in defining the overall historic character of the building so that, as a result, the character is diminished.
Protecting and maintaining mechanical, plumbing, and electrical systems and their features through cyclical cleaning and other appropriate measures.	Failing to provide adequate protection of materials on a cyclical basis so that deterioration of mechanical systems and their visible features results.
Preventing accelerated deterioration of mechanical systems by providing adequate ventilation of attics, crawlspaces, and cellars so that moisture problems are avoided.	Enclosing mechanical systems in areas that are not adequately ventilated so that deterioration of the systems results.
Repairing mechanical systems by augmenting or upgrading system parts, such as installing new pipes and ducts; rewiring; or adding new compressors or boilers.	Replacing a mechanical system or its functional parts when it could be upgraded and retained.

Recommended	*Not Recommended*
Replacing in kind—or with compatible substitute material—those visible features of mechanical systems that are either extensively deteriorated or are missing when there are surviving prototypes such as ceiling fans, switchplates, radiators, grilles, or plumbing fixtures.	Installing a replacement feature that does not convey the same visual appearance.

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Recommended	*Not Recommended*
Alterations/Additions for the New Use	
Installing a completely new mechanical system if required for the new use so that it causes the least alteration possible to the building's floor plan, the exterior elevations, and the least damage to historic building material.	Installing a new mechanical system so that character-defining structural or interior features are radically changed, damaged, or destroyed.
Installing the vertical runs of ducts, pipes, and cables in closets, service rooms, and wall cavities.	Installing vertical runs of ducts, pipes, and cables in places where they will obscure character-defining features. Concealing mechanical equipment in walls or ceilings in a manner that requires the removal of historic building material. Installing "dropped" acoustical ceilings to hide mechanical equipment when this destroys the proportions of character-defining interior spaces.
Installing air conditioning units if required by the new use in such a manner that the historic materials and features are not damaged or obscured.	Cutting through features such as masonry walls in order to install air conditioning units.
Installing heating/air conditioning units in the window frames in such a manner that the sash and frames are protected. Window installations should be considered only when all other viable heating/cooling systems would result in significant damage to historic materials.	Radically changing the appearance of the historic building or damaging or destroying windows by installing heating/air conditioning units in historic window frames.

BUILDING SITE

The relationship between a historic building or buildings and landscape features within a property's boundaries—or the building site—helps to define the historic character and should be considered an integral part of overall planning for rehabilitation project work.

Recommended	*Not Recommended*
Identifying, retaining, and preserving buildings and their features as well as features of the site that are important in defining its overall historic character. Site features can include driveways, walkways, lighting, fencing, signs, benches, fountains, wells, terraces, canal systems, plants and trees, berms, and drainage or irrigation ditches; and archeological features that are important in defining the history of the site.	Removing or radically changing buildings and their features or site features which are important in defining the overall historic character of the building site so that, as a result, the character is diminished.
Retaining the historic relationship between buildings, landscape features, and open space.	Removing or relocating historic buildings or landscape features, thus destroying the historic relationship between buildings, landscape features, and open space.
	Removing or relocating historic buildings on a site or in a complex of related historic structures—such as a mill complex or farm—thus diminishing the historic character of the site or complex.
	Moving buildings onto the site, thus creating a false historical appearance.
	Lowering the grade level adjacent to a building to permit development of a formerly below-grade area such as a basement in a manner that would drastically change the historic relationship of the building to its site.
Protecting and maintaining buildings and the site by providing proper drainage to assure that water does not erode foundation walls; drain toward the building; nor erode the historic landscape.	Failing to maintain site drainage so that buildings and site features are damaged or destroyed; or, alternatively, changing the site grading so that water no longer drains properly.
Minimizing disturbance of terrain around buildings or elsewhere on the site, thus reducing the possibility of destroying unknown archeological materials.	Introducing heavy machinery or equipment into areas where their presence may disturb archeological materials.
Surveying areas where major terrain alteration is likely to impact important archeological sites.	Failing to survey the building site prior to the beginning of rehabilitation project work so that, as a result, important archeological material is destroyed.
Protecting, e.g. preserving in place known archeological material whenever possible.	Leaving known archeological material unprotected and subject to vandalism, looting, and destruction by natural elements such as erosion.
Planning and carrying out any necessary investigation using professional archeologists and modern archeological methods when preservation in place is not feasible.	Permitting unqualified project personnel to perform data recovery so that improper methodology results in the loss of important archeological material.
Protecting the building and other features of the site against arson and vandalism before rehabilitation work begins, i.e., erecting protective fencing and installing alarm systems that are keyed into local protection agencies.	Permitting buildings and site features to remain unprotected so that plant materials, fencing, walkways, archeological features, etc. are damaged or destroyed.
	Stripping features from buildings and the site such as wood siding, iron fencing, masonry balustrades; or removing or destroying landscape features, including plant material.
Providing continued protection of masonry, wood, and architectural metals which comprise building and site features through appropriate surface treatments such as cleaning, rust removal, limited paint removal, and re-application of protective coating systems; and continued protection and maintenance of landscape features, including plant material.	Failing to provide adequate protection of materials on a cyclical basis so that deterioration of building and site features results.

BUILDING SITE (continued)

Recommended	*Not Recommended*
Evaluating the overall condition of materials to determine whether more than protection and maintenance are required, that is, if repairs to building and site features will be necessary.	Failing to undertake adequate measures to assure the preservation of building and site features.
Repairing features of buildings and the site by reinforcing the historic materials. Repair will also generally include replacement in kind—with a compatible substitute material—of those extensively deteriorated or missing parts of features where there are suviving prototypes such as fencing and paving.	Replacing an entire feature of the building or site such as a fence, walkway, or driveway when repair of materials and limited replacement of deteriorated or missing parts are appropriate. Using a substitute material for the replacement part that does not convey the visual appearance of the surviving parts of the building or site feature or that is physically or chemically incompatible.
Replacing in kind an entire feature of the building or site that is too deteriorated to repair—if the overall form and detailing are still evident—using the physical evidence to guide the new work. This could include an entrance or porch, walkway, or fountain. If using the same kind of material is not technically or economically feasible, then a compatible substitute material may be considered.	Removing a feature of the building or site that is unrepairable and not replacing it; or replacing it with a new feature that does not convey the same visual appearance.

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Recommended	*Not Recommended*
Design for Missing Historic Features	
Designing and constructing a new feature of a building or site when the historic feature is completely missing, such as an outbuilding, terrace, or driveway. It may be based on historical, pictorial, and physical documentation; or be a new design that is compatible with the historic character of the building and site.	Creating a false historical appearance because the replaced feature is based on insufficient historical, pictorial, and physical documentation. Introducing a new building or site feature that is out of scale or otherwise inappropriate. Introducing a new landscape feature or plant material that is visually incompatible with the site or that destroys site patterns or vistas.
Alterations/Additions for the New Use	
Designing new onsite parking, loading docks, or ramps when required by the new use so that they are as unobtrusive as possible and assure the preservation of character-defining features of the site.	Placing parking facilities directly adjacent to historic buildings where automobiles may cause damage to the buildings or landscape features or be intrusive to the building site.
Designing new exterior additions to historic buildings or adjacent new construction which is compatible with the historic character of the site and which preserve the historic relationship between a building or buildings, landscape features, and open space.	Introducing new construction onto the building site which is visually incompatible in terms of size, scale, design, materials, color and texture or which destroys historic relationships on the site.
Removing nonsignificant buildings, additions, or site features which detract from the historic character of the site.	Removing a historic building in a complex, a building feature, or a site feature which is important in defining the historic character of the site.

DISTRICT/ NEIGHBORHOOD

The relationship between historic buildings, and streetscape and landscape features within a historic district or neighborhood helps to define the historic character and therefore should always be a part of the rehabilitation plans.

Recommended	*Not Recommended*
Identifying, retaining, and preserving buildings, and streetscape, and landscape features which are important in defining the overall historic character of the district or neighborhood. Such features can include streets, alleys, paving, walkways, street lights, signs, benches, parks and gardens, and trees.	Removing or radically changing those features of the district or neighborhood which are important in defining the overall historic character so that, as a result, the character is diminished.
Retaining the historic relationship between buildings, and streetscape and landscape features such as a town square comprised of row houses and stores surrounding a communal park or open space.	Destroying streetscape and landscape features by widening existing streets, changing paving material, or introducing inappropriately located new streets or parking lots. Removing or relocating historic buildings, or features of the streetscape and landscape, thus destroying the historic relationship between buildings, features and open space.
Protecting and maintaining the historic masonry, wood, and architectural metals which comprise building and streetscape features, through appropriate surface treatments such as cleaning, rust removal, limited paint removal, and reapplication of protective coating systems; and protecting and maintaining landscape features, including plant material.	Failing to provide adequate protection of materials on a cyclical basis so that deterioration of building, streetscape, and landscape features results.
Protecting buildings, paving, iron fencing, etc. against arson and vandalism before rehabilitation work begins by erecting protective fencing and installing alarm systems that are keyed into local protection agencies.	Permitting buildings to remain unprotected so that windows are broken; and interior features are damaged. Stripping features from buildings or the streetscape such as wood siding, iron fencing, or terra cotta balusters; or removing or destroying landscape features, including plant material.
Evaluating the overall condition of building, streetscape and landscape materials to determine whether more than protection and maintenance are required, that is, if repairs to features will be necessary.	Failing to undertake adequate measures to assure the preservation of building, streetscape, and landscape features.
Repairing features of the building, streetscape, or landscape by reinforcing the historic materials. Repair will also generally include the replacement in kind—or with a compatible substitute material—of those extensively deteriorated or missing parts of features when there are surviving prototypes such as porch balustrades, paving materials, or streetlight standards.	Replacing an entire feature of the building, streetscape, or landscape such as a porch, walkway, or streetlight, when repair of materials and limited replacement of deteriorated or missing parts are appropriate. Using a substitute material for the replacement part that does not convey the visual appearance of the surviving parts of the building, streetscape, or landscape feature or that is physically or chemically incompatible.
Replacing in kind an entire feature of the building, streetscape, or landscape that is too deteriorated to repair—when the overall form and detailing are still evident—using the physical evidence to guide the new work. This could include a storefront, a walkway, or a garden. If using the same kind of material is not technically or economically feasible, then a compatible substitute material may be considered.	Removing a feature of the building, streetscape, or landscape that is unrepairable and not replacing it; or replacing it with a new feature that does not convey the same visual appearance.

The following work is highlighted because it represents the particularly complex technical or design aspects of rehabilitation projects and should only be considered after the preservation concerns listed above have been addressed.

Recommended	*Not Recommended*
Design for Missing Historic Features	
Designing and constructing a new feature of the building, streetscape, or landscape when the historic feature is completely missing, such as row house steps, a porch, streetlight, or terrace. It may be a restoration based on historical, pictorial, and physical documentation; or be a new design that is compatible with the historic character of the district or neighborhood.	Creating a false historical appearance because the replaced feature is based on insufficient historical, pictorial and physical documentation. Introducing a new building, streetscape or landscape feature that is out of scale or otherwise inappropriate to the setting's historic character, e.g., replacing picket fencing with chain link fencing.
Alterations/Additions for the New Use	
Designing required new parking so that it is as unobtrusive as possible, i.e., on side streets or at the rear of buildings. "Shared" parking should also be planned so that several business can utilize one parking area as opposed to introducing random, multiple lots.	Placing parking facilities directly adjacent to historic buildings which cause the removal of historic plantings, relocation of paths and walkways, or blocking of alleys.
Designing and constructing new additions to historic buildings when required by the new use. New work should be compatible with the historic character of the district or neighborhood in terms of size, scale, design, material, color, and texture.	Introducing new construction into historic districts that is visually incompatible or that destroys historic relationships within the district or neighborhood.
Removing nonsignificant buildings, additions, or streetscape and landscape features which detract from the historic character of the district or the neighborhood.	Removing a historic building, building feature, or landscape or streetscape feature that is important in defining the overall historic character of the district or the neighborhood.

Although the work in these sections is quite often an important aspect of rehabilitation projects, it is usually *not* part of the overall process of preserving character-defining features (maintenance, repair, replacement); rather, such work is assessed for its potential negative impact on the building's historic character. For this reason, particular care must be taken not to obscure, radically change, damage, or destroy character-defining features in the process of rehabilitation work to meet new use requirements.

HEALTH AND SAFETY CODE REQUIREMENTS

As a part of the new use, it is often necessary to make modifications to a historic building so that it can comply with current health, safety and code requirements. Such work needs to be carefully planned and undertaken so that it does not result in a loss of character-defining spaces, features, and finishes.

Recommended

Identifying the historic building's character-defining spaces, features, and finishes so that code-required work will not result in their damage or loss.

Complying with health and safety code, including seismic codes and barrier-free access requirements, in such a manner that character-defining spaces, features, and finishes are preserved.

Working with local code officials to investigate alternative life safety measures or variances available under some codes so that alterations and additions to historic buildings can be avoided.

Providing barrier-free access through removable or portable, rather than permanent, ramps.

Providing seismic reinforcement to a historic building in a manner that avoids damaging the structural system and character-defining features.

Upgrading historic stairways and elevators to meet health and safety codes in a manner that assures their preservation, i.e., so that they are not damaged or obscured.

Installing sensitively designed fire suppression systems, such as a sprinkler system for wood frame mill buildings, instead of applying fire-resistant sheathing to character-defining features.

Applying fire-retardant coatings, such as intumescent paints, which expand during fire to add thermal protection to steel.

Adding a new stairway or elevator to meet health and safety codes in a manner that preserves adjacent character-defining features and spaces.

Placing a code-required stairway or elevator that cannot be accommodated within the historic building in a new exterior addition. Such an addition should be located at the rear of the building or on an inconspicuous side; and its size and scale limited in relationship to the historic building.

Not Recommended

Undertaking code-required alterations to a building or site before identifying those spaces, features, or finishes which are character-defining and must therefore be preserved.

Altering, damaging, or destroying character-defining spaces, features, and finishes while making modifications to a building or site to comply with safety codes.

Making changes to historic buildings without first seeking alternatives to code requirements.

Installing permanent ramps that damage or diminish character-defining features.

Reinforcing a historic building using measures that damage or destroy character-defining structural and other features.

Damaging or obscuring historic stairways and elevators or altering adjacent spaces in the process of doing work to meet code requirements.

Covering character-defining wood features with fire-resistant sheathing which results in altering their visual appearance.

Using fire-retardant coatings if they damage or obscure character-defining features.

Radically changing, damaging, or destroying character-defining spaces, features, or finishes when adding a new code-required stairway or elevator.

Constructing a new addition to accommodate code-required stairs and elevators on character-defining elevations highly visible from the street; or where it obscures, damages or destroys character-defining features.

ENERGY RETROFITTING

Some character-defining features of a historic building or site such as cupolas, shutters, transoms, skylights, sun rooms, porches, and plantings also play a secondary energy conserving role. Therefore, prior to retrofitting historic buildings to make them more energy efficient, the first step should always be to identify and evaluate the existing historic features to assess their inherent energy conserving potential. If it is determined that retrofitting measures are necessary, then such work needs to be carried out with particular care to insure that the building's historic character is preserved in the process of rehabilitation.

Recommended	*Not Recommended*
District/Neighborhood	
Maintaining those existing landscape features which moderate the effects of the climate on the setting such as deciduous trees, evergreen wind-blocks, and lakes or ponds.	Stripping the setting of landscape features and landforms so that the effects of the wind, rain, and the sun result in accelerated deterioration of historic materials.
Building Site	
Retaining plant materials, trees, and landscape features, especially those which perform passive solar energy functions such as sun shading and wind breaks.	Removing plant materials, trees, and landscape features, so that they no longer perform passive solar energy functions.
Installing freestanding solar collectors in a manner that preserves the historic property's character-defining features.	Installing freestanding solar collectors that obscure, damage, or destroy historic landscape or archeological features.
Designing attached solar collectors, including solar greenhouses, so that the character-defining features of the property are preserved.	Locating solar collectors where they radically change the property's appearance; or damage or destroy character-defining features.
Masonry/Wood/Architectural Metals	
Installing thermal insulation in attics and in unheated cellars and crawlspaces to increase the efficiency of the existing mechanical systems.	Applying urea of formaldehyde foam or any other thermal insulation with a water content into wall cavities in an attempt to reduce energy consumption.
Installing insulating material on the inside of masonry walls to increase energy efficiency where there is no character-defining interior moulding around the window or other interior architectural detailing.	Resurfacing historic building materials with more energy efficient but incompatible materials, such as covering historic masonry with exterior insulation.
Installing passive solar devices such as a glazed "trombe" wall on a rear or inconspicuous side of all the historic building.	Installing passive solar devices such as an attached glazed "trombe" wall on primary or other highly visible elevations; or where historic material must be removed or obscured.
Roofs	
Placing solar collectors on noncharacter-defining roofs or roofs of nonhistoric adjacent buildings.	Placing solar collectors on roofs when such collectors change the historic roofline or obscure the relationship of the roof to character-defining roof features such as dormers, skylights, and chimneys.
Windows	
Utilizing the inherent energy conserving features of a building by maintaining windows and louvered blinds in good operable condition for natural ventilation.	Removing historic shading devices rather than keeping them in an operable condition.
Improving thermal efficiency with weatherstripping, storm windows, caulking, interior shades, and, if historically appropriate, blinds and awnings.	Replacing historic multi-paned sash with new thermal sash utilizing false muntins.
Installing interior storm windows with airtight gaskets, ventilating holes, and/or removable clips to insure proper maintenance and to avoid condensation damage to historic windows.	Installing interior storm windows that allow moisture to accumulate and damage the window.

Recommended	*Not Recommended*
Installing exterior storm windows which do not damage or obscure the windows and frames.	Installing new exterior storm windows which are inappropriate in size or color, which are inoperable.
	Replacing windows or transoms with fixed thermal glazing or permitting windows and transoms to remain inoperable rather than utilizing them for their energy conserving potential.
Considering the use of lightly tinted glazing on non-character-defining elevations if other energy retrofitting alternatives are not possible.	Using tinted or reflective glazing on character-defining or other conspicuous elevations.
Entrances and Porches	
Utilizing the inherent energy conserving features of a building by maintaining porches, and double vestibule entrances in good condition so that they can retain heat or block the sun and provide natural ventilation.	Enclosing porches located on character defining elevations to create passive solar collectors or airlock vestibules. Such enclosures can destroy the historic appearance of the building.
Interior Features	
Retaining historic interior shutters and transoms for their inherent energy conserving features.	Removing historic interior features which play a secondary energy conserving role.
New Additions to Historic Buildings	
Placing new additions that have an energy conserving function such as a solar greenhouse on non-character-defining elevations.	Installing new additions such as multistory solar greenhouse additions which obscure, damage, destroy character-defining features.
Mechanical Systems	
Installing thermal insulation in attics and in unheated cellars and crawlspaces to conserve energy.	Apply urea formaldehyde foam or any other thermal insulation with a water content or that may collect moisture into wall cavities.

NEW ADDITIONS TO HISTORIC BUILDINGS

An attached exterior addition to a historic building expands its "outer limits" to create a new profile. Because such expansion has the capability to radically change the historic appearance, an exterior addition should be considered only after it has been determined that the new use cannot be successfully met by altering non-character-defining *interior* spaces. If the new use cannot be met in this way, then an attached exterior addition is usually an acceptable alternative. New additions should be designed and constructed so that the character-defining features of the historic building are not radically changed, obscured, damaged, or destroyed in the process of rehabilitation. New design should always be clearly differentiated so that the addition does not appear to be part of the historic resources.

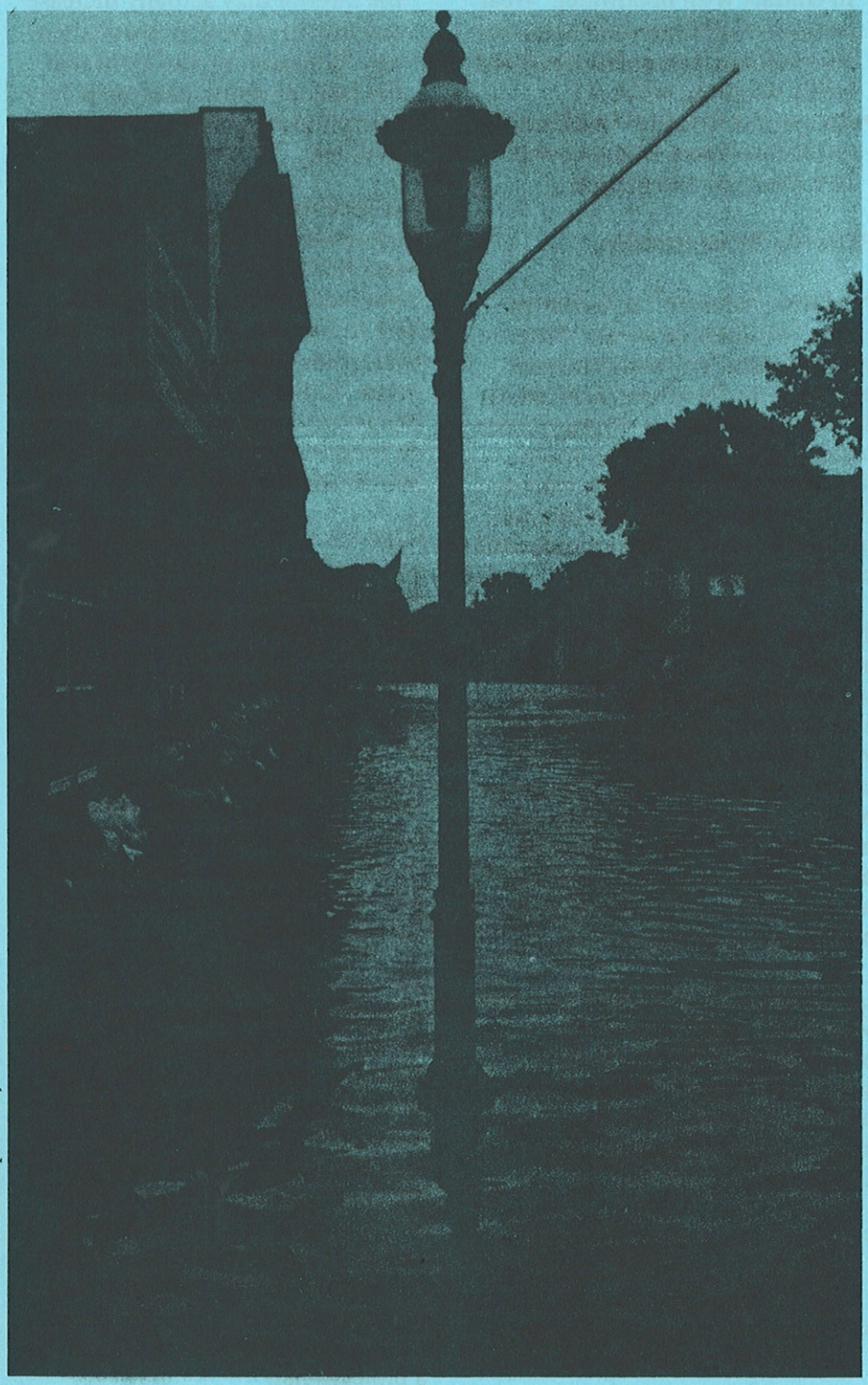
Recommended	*Not Recommended*
Placing functions and services required for the new use in non-character-defining interior spaces rather than installing a new addition.	Expanding the size of the historic building by constructing a new addition when the new use could be met by altering non-character-defining interior spaces.
Constructing a new addition so that there is the least possible loss of historic materials and so that character-defining features are not obscured, damaged, or destroyed.	Attaching a new addition so that the character-defining features of the historic building are obscured, damaged, or destroyed.
Locating the attached exterior addition at the rear or on an inconspicuous side of a historic building; and limiting its size and scale in relationship to the historic building.	Designing a new addition so that its size and scale in relation to the historic building are out of proportion, thus diminishing the historic character.
Designing new additions in a manner that makes clear what is historic and what is new.	Duplicating the exact form, material, style, and detailing of the historic building in the new addition so that the new work appears to be part of the historic building.
	Imitating a historic style or period of architecture in new additions, especially for contemporary uses such as drive-in banks or garages.

NEW ADDITIONS TO HISTORIC BUILDINGS (continued)

Recommended	*Not Recommended*
Considering the attached exterior addition both in terms of the new use and the appearance of other buildings in the historic district or neighborhood. Design for the new work may be contemporary or may reference design motifs from the historic building. In either case, it should always be clearly differentiated from the historic building and be compatible in terms of mass, materials, relationship of solids to voids, and color.	Designing and constructing new additions that result in the diminution or loss of the historic character of the resource, including its design, materials, workmanship, location, or setting.
	Using the same wall plane, roof line, cornice height, materials, siding lap or window type to make additions appear to be a part of the historic building.
Placing new additions such as balconies and greenhouses on non-character-defining elevations and limiting the size and scale in relationship to the historic building.	Designing new additions such as multistory greenhouse additions that obscure, damage, or destroy character-defining features of the historic building.
Designing additional stories, when required for the new use, that are set back from the wall plane and are as inconspicuous as possible when viewed from the street.	Constructing additional stories so that the historic appearance of the building is radically changed.

INFORMATION

Information Booklet No. 82, 1993



Credit: Leader-Record, *photo by Steve Shriver*

TREATMENT OF FLOOD-DAMAGED OLDER AND HISTORIC BUILDINGS

Inside:

We encourage you to duplicate this material for distribution to anyone who might find it useful. It is our intent to get this information as quickly as possible to those individuals responsible for flood-damaged older and historic buildings.

Photo: Bonaparte, Iowa, July 1993

National Trust for Historic Preservation

Many older and historic buildings have been affected by the heavy rains and flooding that occurred during the spring and summer of 1993. The purpose of this booklet is to help building owners minimize structural and cosmetic flood damage. It contains general advice written to cover a wide variety of buildings with varying degrees of flood damage. If you suspect that your building may have some structural damage, contact a qualified structural engineer or architect to thoroughly assess the situation and suggest remedies. Your state historic preservation office (SHPO) can provide you with a list of architects who are experienced in the treatment of historic buildings.

A description of the tax credit programs for rehabilitation of historic structures, free technical publications available through your state historic preservation office and the Federal Emergency Management Agency (FEMA), telephone numbers you can call for more assistance, and additional resources are provided at the end of the booklet.

Once you are able to return to your building, the first tasks will likely be to remove mud and debris and to inspect the building for damage. Saving your building, no matter how historic, is not worth losing your life or risking permanent injury. Please observe these safety precautions:

- Do not walk through flowing water.
- Do not drive through a flooded area.
- Stay away from power lines and electrical wires.
- Make sure that all of your electricity is turned off. If any electrical wiring was submerged, have it inspected before turning the power back on.
- Look before you step. Floods deposit mud which makes most walking surfaces very slippery.
- Be alert for gas leaks.
- Carbon monoxide exhaust kills. If you use electrical generators or charcoal grills, make sure that they are properly vented.
- Clean everything that got wet. Floodwaters carry sewage and chemicals. Hose down concrete and masonry walls. Scrub all surfaces with disinfectant. Discard any food and medicine that came in contact with floodwater. Wear protective clothing and make sure the building is properly ventilated while working inside.
- Remember to follow local health guidelines concerning preventative shots or vaccinations.

After the Water Recedes

No other "element" is as destructive to buildings as water. After your building has been saturated and once the floodwaters recede, it is important that the drying process begin immediately. Most of the damaging effects of water, such as rot, rust, and spalling, can be minimized by reducing both interior and exterior moisture levels.

The least damaging drying process appears to be one that begins by using only ventilation. To speed evaporation, interior air must be vented to the outside. The most effective way to do this is to open windows and doors and allow the moisture to escape. Fans can be used to speed evaporation by moving interior air and exhausting humid air to the outdoors.

Using heat or dehumidification too soon can damage your building. As materials begin to dry, small amounts of heat or dehumidification can be introduced. Use of mechanical means requires some caution:

- None of these devices should be used when water makes their operation dangerous.
- Ventilation remains the primary means of removing interior moisture. All of these devices must be used in conjunction with a ventilation plan designed to exhaust moisture-laden air.
- Beware of using industrial drying equipment to remove moisture at a very fast rate. You are likely to cause permanent damage to wood and plaster.
- If heaters are used without ventilation, the relative humidity in the interior may actually increase and further spread moisture damage. If heaters are fuel powered, the lack of ventilation can be very dangerous to persons inside the building.

Enclosed portions of your building, such as wall cavities, may retain water for long periods of time which can pose a danger particularly to wooden elements such as wall studs, floor joists, and columns. It may be necessary to open walls and remove insulation. Later sections of this booklet contain specific recommendations.

Once the floodwaters recede, you will need to rinse remaining mud, dirt and flood debris from all surfaces with fresh water as soon as possible. It is safer and easier to remove the mud while it is still wet. Do not wait until the material is dry. Make sure that all electricity is turned off before cleaning with water. Avoid using high pressure water on historic materials and exercise extreme care when washing decorative features and damaged or loosened elements.

Silt and mud will accumulate not only on the floor and furnishings, but in interior wall cavities as well. Be sure to open electrical outlets and mechanical chases and rinse these areas thoroughly. Check wiring and connections for damage and repair as required. Let areas dry before closing them. Check heating and air conditioning ducts and clean out any mud or dirt before turning on the units. Large systems may need to be dismantled or cleaned by a professional.

To clean any remaining dirt and stains, use a standard non-sudsing household cleaning product as directed by the manufacturer. Special care should be used when working on or around historic materials. After cleaning, use a disinfectant to kill the germs, bacteria, and odor left by floodwaters.

Keep in mind that floodwaters and the remaining silt are contaminated by sewage and chemicals. Protect your eyes, mouth, and hands, and wear a mask and rubber gloves when cleaning out debris left by floodwaters. Use disinfectants to wash your hands before eating.

Before you begin to clean up your historic property, it is important to carefully document any damage to the structure. This is essential not only for insurance purposes, but also to record important historic building features. If building components are removed for cleaning or repair purposes, a photograph will help to ensure that they are reinstalled correctly.

Take photographs and make written notes describing the damage. A video recording is also a very effective way to document flood damage. Take photos or videos of any discarded items. Because of the intensive cleanup that takes place following a flood, materials might be carted away before an insurance adjuster is able to assess the loss.

Create an inventory of found items, dislodged architectural features, decorative fragments, and furnishings. **Do not throw away materials at will.** Furnishings and architectural elements can be carried a great distance by floodwaters, and items found on your property may be extremely valuable to a nearby restoration project.

Hydrostatic Pressure

If your basement is flooded, it is likely that the level of water in your basement is the same as the groundwater level outside of your house. When this happens, pumping the water from the basement will do no good. New water will continue to seep in until the groundwater level drops.

Foundation Collapse

You should be aware that pumping water from your basement can be dangerous. This water may be providing the necessary pressure to balance the hydrostatic pressure of the groundwater. If the groundwater level is higher than your basement floor and you pump the water from your basement, the foundation walls could be pushed inward and collapse.

If your basement is flooded with several feet of water and you are reasonably certain that your floor drains are operational, you can assume that the groundwater table is high. It is advisable to leave the water in place until the groundwater table sinks and the water recedes by itself. If your basement contains only a few inches of water, however, you may be able to pump it out safely. Keep in mind that if the groundwater level is higher than the floor, the water will return.

Even if you cannot pump the water out of the basement, you should still begin to ventilate the rest of the building. The sooner these materials dry, the less chance of water-related problems. Consult with local health officials to determine if there is any sanitizing agent that can be used to treat standing water in the basement.

Water can exert tremendous pressure on foundation walls and floor slabs. If any portion of a building lies below the groundwater level,

As the Floodwaters Recede—A Checklist of Things To Do

The following checklist will help you respond to flood damage in historic and older buildings. Read the steps through carefully and take time to plan. While it is tempting to wade right in with a shovel and mop, it is very important to develop a plan for cleanup and rehabilitation. Unfortunately, overly zealous cleanup efforts can result in historic materials being carted away, excessively rough cleaning methods, and the unnecessary loss of historic fabric. The best way to prevent additional damage to historic structures and materials during a time of duress is to use caution and plan ahead.

- ☐ Follow all emergency rules, laws, and regulations
- ☐ Turn off all utilities
- ☐ Document building damage
- ☐ Wear protective clothing
- ☐ Stabilize any unstable structures with temporary bracing
- ☐ Use caution when pumping basement water
- ☐ Keep building properly ventilated
- ☐ Clean everything that got wet with a disinfectant
- ☐ Allow saturated materials to dry using natural ventilation
- ☐ Check for foundation damage
- ☐ Replace soil around foundation
- ☐ Save historic materials if possible
- ☐ Use caution when removing lead-based paint or any products containing asbestos
- ☐ Clean and repair roof and roof drainage systems to protect building from future damage

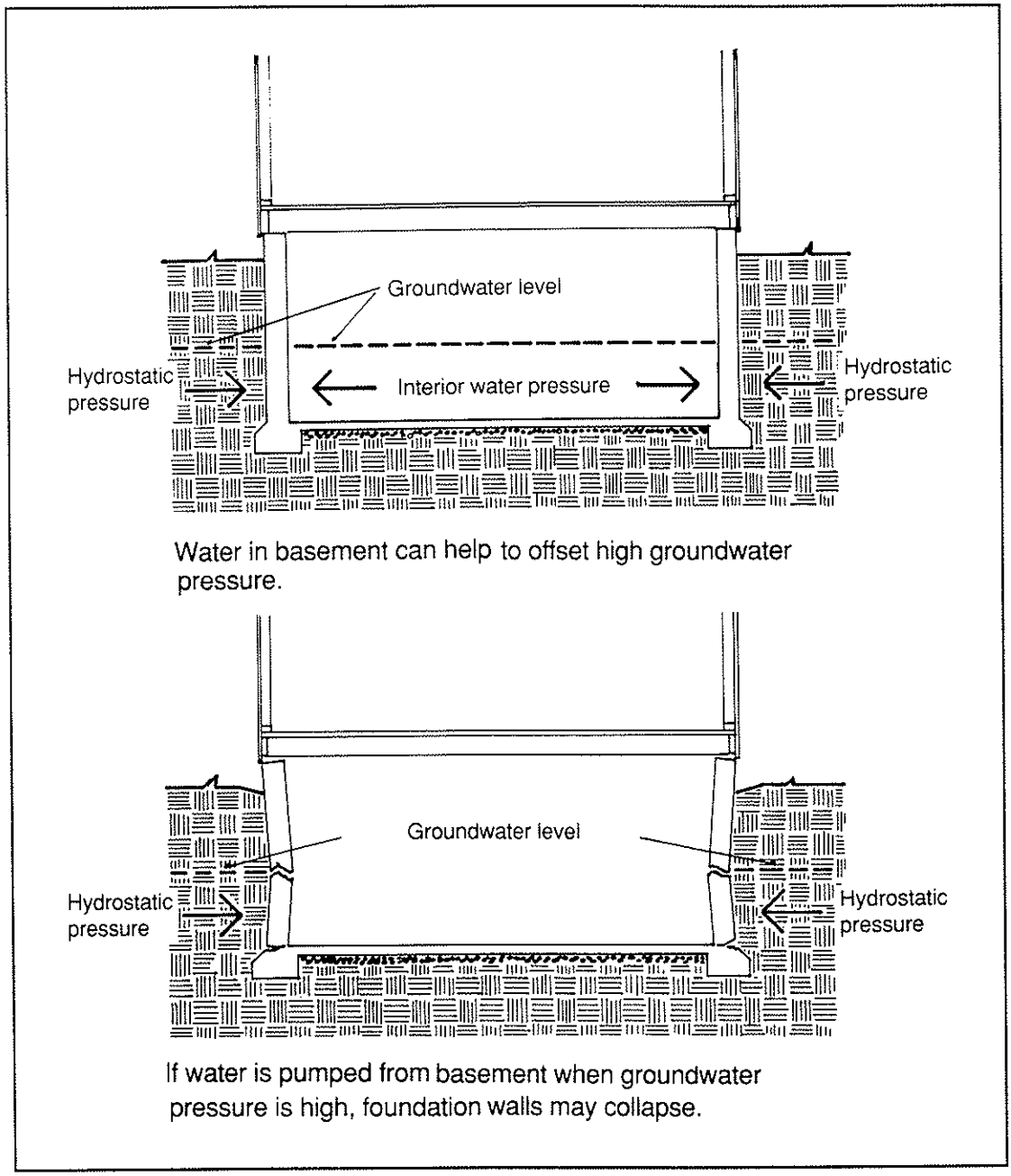


Figure 1.
Hydrostatic Pressure

one of two things will happen: basement slab heaving or loss of mortar.

Basement Slab Heaving

If foundation walls are tight enough to hold back groundwater, it is likely to seep through the floor slab, causing it to leak or heave. In some instances, very high water pressure may be enough to raise the floor slab. Fortunately, this is not a common occurrence in historic buildings.

If your basement slab heaves, you cannot correct the problem immediately. First wait until the soil beneath the building dries thoroughly, as part of the problem may be the presence of clay soils that expand when wet. Concrete slabs in newer buildings are usually poured over a sand bed, which helps them to resist soil pressures, while older concrete floors were often poured right over the existing dirt. If you pour a new slab or surface-coat the existing slab before the clay dries, the new slab or surface could crack when the clay shrinks to its normal dimensions.

If the slab is still heaved or cracks remain after the water recedes and the soil has dried, there is little you can do except to repair the cracks or, in the case of severe heaving, pour a new slab.

Loss of Mortar

The basement may leak and fill with water. This is usually the case with older buildings and actually protects the foundation walls from collapse if the groundwater level is too high. Unfortunately, as water passes through stone and brick foundation walls, it sometimes carries mortar with it.

The foundations of most older and historic buildings are masonry. Stone foundation walls with soft lime mortar are very durable, although the lime mortar does not hold up well to water erosion. Inspect the mortar of stone masonry foundation walls to ensure that it has not leeched from the joints and made the wall unstable. If a significant amount of mortar has been lost, it can usually be replaced without dismantling the wall. In many cases, a "loose" mortar can be poured into the joints to fill the voids.

Make sure that replacement mortar is not too hard for the surrounding stone. If the wall is constructed of sandstone, the new mortar should contain at least two parts hydrated lime to each part of white Portland cement and nine parts sand (known as ASTM "Type O" mortar). If the foundation wall is constructed of limestone or other relatively hard stone, a standard tuckpointing mortar may be used (ASTM "Type N" containing one part hydrated lime to one part white Portland cement and six parts sand).

If the foundation walls are constructed of brick masonry or concrete block, there will likely be less leeching of mortar than if the walls were constructed of stone. Nevertheless, they should be inspected for missing mortar and repaired in the same manner as aboveground walls, unless there is reason to suspect a more serious structural problem created by the flooding (see "Foundation Erosion" below). Generally foundations constructed of concrete block used a harder mortar containing gray Portland cement.

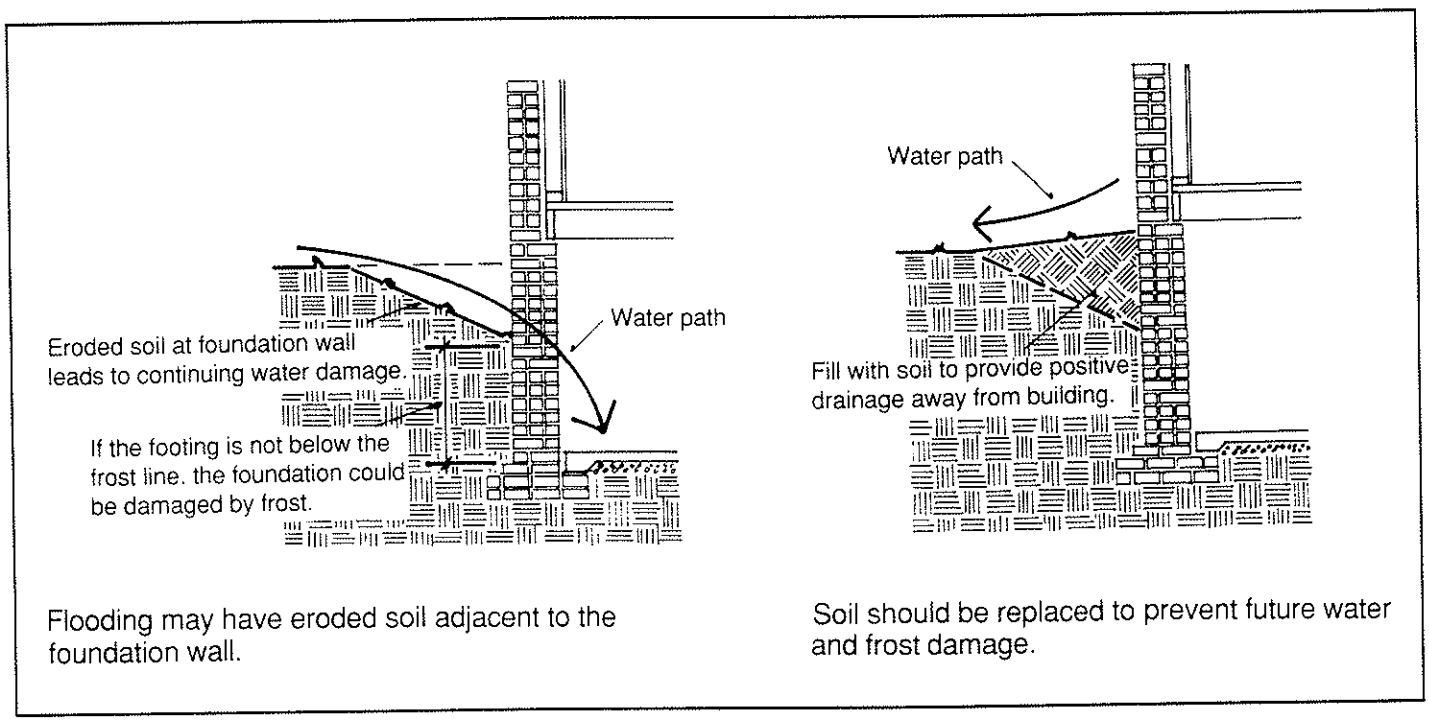
Erosion

Foundation Erosion

Water currents and water traveling in underground "streams" can erode soil beneath foundation walls and footings. Although this situation is not common, when it does occur the building's foundation will be destabilized and repairs will be necessary. The best evidence of structural destabilization is the appearance of cracks in the foundation walls and in plaster or drywall above the foundations.

Keep in mind, however, that not all cracks that appear after a flood are indications of long-term instability. Some may result from temporary expansion of clay soil around the foundation. When the soil returns to its natural water content, the cracks should shrink or, at the very least, not expand. Other cracks may result from moisture-related expansion of wood beams and joists tied to the foundation walls. These cracks should shrink as the wood dries.

Figure 2. Foundation Erosion



Flooding may have eroded soil adjacent to the foundation wall.

Soil should be replaced to prevent future water and frost damage.

Cracks from foundation erosion, however, can be expected to worsen over time as the building settles slowly to its new soil support. The best indicator of this type of structural problem is cracks that move. Movement, particularly widening of cracks, is a sign of structural instability warranting careful examination by a qualified structural engineer or architect.

The best way to determine whether a crack is moving is to purchase a device called a "tell-tale." This small gauge is glued to a wall on either side of a crack. Its markings indicate the crack's horizontal and vertical movement over time. This device can be obtained from engineering or scientific supply firms or by writing the manufacturer directly. (Avongard Crack Monitor, 2836 Osage, Waukegan, IL 60087 (708) 244-4179.)

Another way to determine whether movement exists is to glue a glass microscope slide across a crack. If the slide breaks, movement is occurring.

Soil Erosion

Water may erode the soil adjacent to your building. This can lead to two problems:

- The soil may be "dished" next to the building which may result in additional damage from future rain. The soil adjacent to the building should slope away from it to ensure that future rains do not drain into the building. After the floodwaters subside, check the soil drainage pattern and re-grade as necessary.

- A less common soil problem is the loss of enough dirt to protect your foundation from frost-heaving during cold weather. If the foundation is not sufficiently below the frost line, it may heave upward when the ground beneath it freezes. For this reason, it is best to replace any lost dirt adjacent to the foundation.

Heaving of Sidewalks and Slabs

Erosion can also affect paving. From a building conservation perspective, the worst problem occurs when eroded slabs of asphalt or concrete channel water into, rather than away from, buildings. As with soil erosion, this can lead to water problems from future rains.

If this condition exists, the slab should either be raised (by mudjacking, for example) or it should be removed and replaced with one that drains properly.

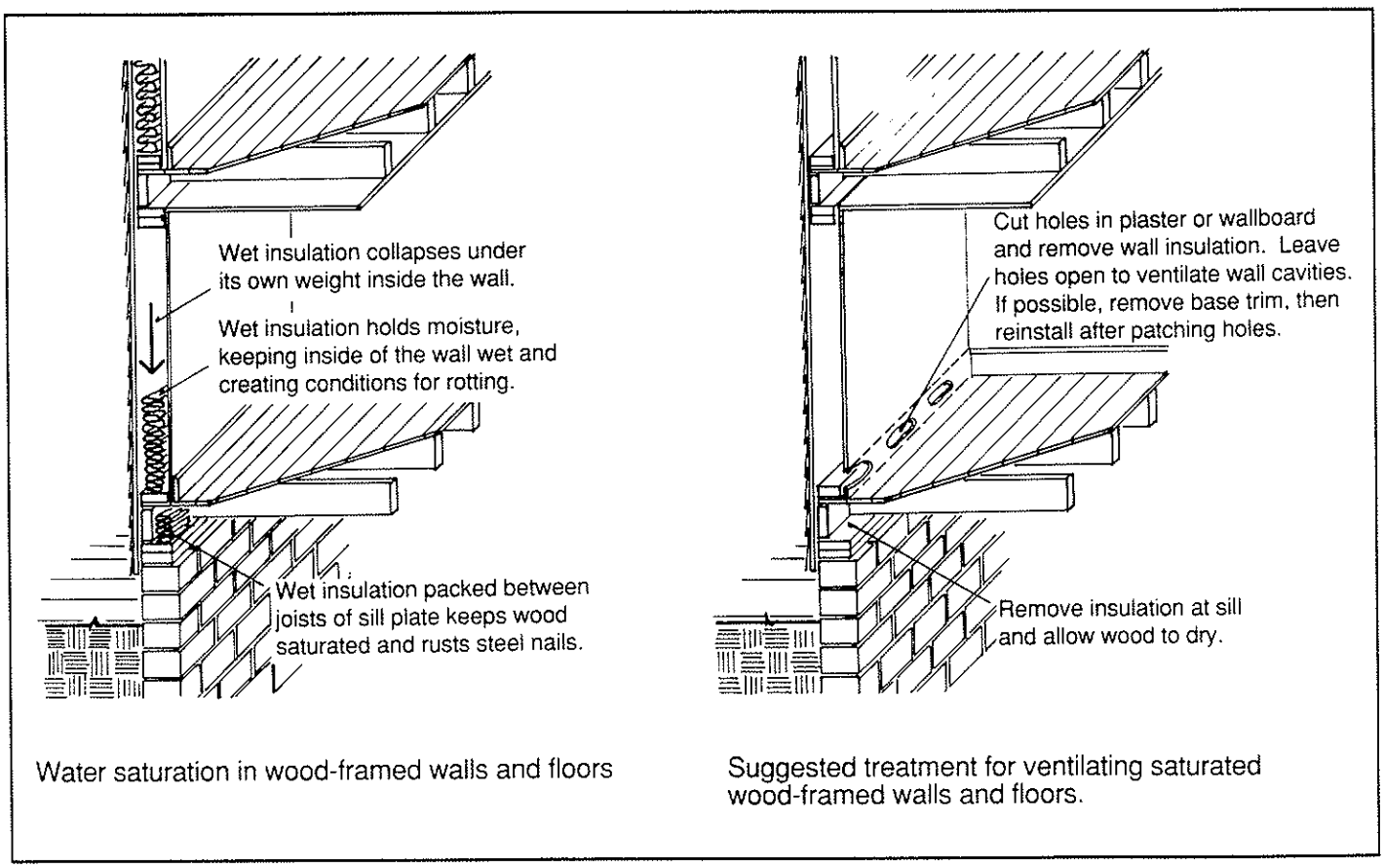


Figure 3. Treatment for saturated wood-framed walls and doors.

Saturation of Insulation

With few exceptions, any insulation that has been immersed in water should be removed for two reasons:

- After being saturated, most insulation is rendered permanently ineffective, particularly loose-fill varieties, such as cellulose, vermiculite, rock wool, and blown fiberglass, which tend to collapse under their own weight.

- Saturated insulation holds water which, if left in place, can perpetuate high moisture conditions destructive to wood, masonry, and steel.

Some types of insulation may be left in place after water contact, such as closed-cell styrene and urethane board insulations that do not absorb water. These should be inspected to determine whether they hold moisture against wood or masonry materials or steel fasteners. If so, the insulation should be removed until all materials are dry. Any mud or silt that remains in the cavity should be removed regardless of the insulation's condition.

Other types of insulation, such as fiberglass battens, must be evaluated on a case-by-case basis. Glass fibers, in themselves, are not water absorbent, but if they impede the flow of air in a wall cavity, and thus the drying-out process, it may be necessary to remove them.

Wood Rot

Wood rot occurs when natural fungi—present in virtually all construction lumber—grow in wood. Like other living organisms, they need food (wood), air, proper temperatures (between about 60-80 degrees F.), and water in order to grow. In most wood construction, the missing element is water which is why ordinary wood lasts for centuries when protected from moisture.

Fortunately for flooded buildings, the fungi must exist over a relatively long period of time in order for wood rot to be destructive. Damage from a one-time event, such as a flood, is usually negligible if the wood is allowed to air dry. Problems occur when saturated wood is encapsulated so that the water cannot evaporate.

Two areas where wood is normally encapsulated are wall cavities and sill plates, particularly when these areas are filled with insulation. Figure 3 describes treatment of walls and sill plates. To properly ventilate walls, it will probably be necessary to cut or drill holes—taking care not to damage pipes and wires buried in the walls—and remove the insulation.

Masonry and Concrete Deterioration

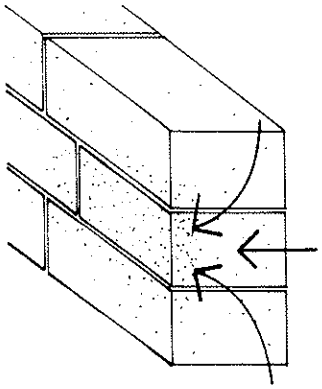
Soluble Salt Damage

Masonry and concrete contain impurities, including water-soluble salts. When these materials are saturated, the soluble salts dissolve and are carried to the surface during evaporation. The result is an unsightly white residue called efflorescence on the exterior or interior of the building—wherever water evaporates. These deposits are not usually harmful and frequently they dissolve and disappear naturally when it rains. Stubborn efflorescence may be removed with water, detergent and bristle brushes, or with chemicals.

Soluble salts can cause significant damage when the building's exterior surface has been treated with building sealer. If this is the case, the salts will travel toward the outside surface, but become trapped behind the surface by the sealer. The water vapor eventually evaporates, but the salts are left behind to crystallize and expand, pushing off the surface of the brick or stone in a process called spalling.

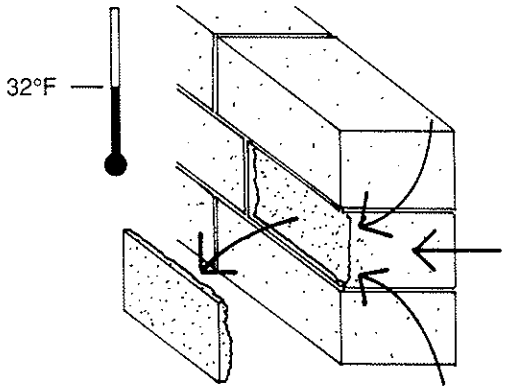
The presence of paint on masonry or concrete walls may also retard the passage of water. Because the paint does not penetrate the masonry or concrete, it is usually removed by the water passing through the wall or by the salt crystallization that takes place just under the paint layer. While the paint may be removed, the surfaces of the brick, stone, or concrete remain intact.

The most obvious way to prevent salt damage is to never apply sealer to a building. If your building has been sealed, there is little that can be done to prevent spalling.



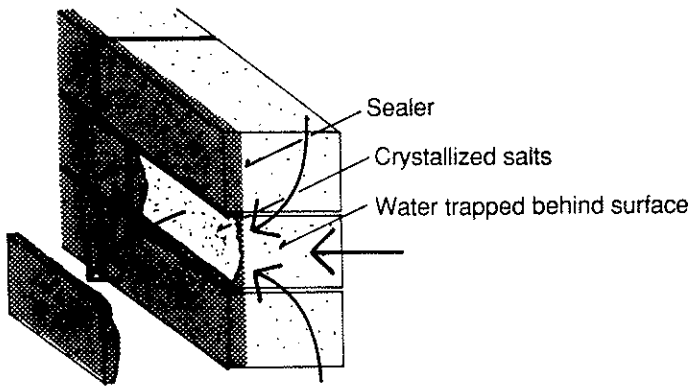
Soluble Salts

Water trapped in masonry walls dissolves soluble salts. As water migrates to the surface, it carries the salts and deposits them on the face of the brick or stone. These deposits, called "efflorescence," are usually harmless and can be easily removed.



Freeze Spalling

Freeze spalling occurs when liquid water remains in the wall when the outside air temperature reaches freezing. Water turns to ice crystals and expands and spalls the face of brick or stone.



The outside surfaces of buildings are sometimes sealed to prevent water from soaking into the materials. Unfortunately, sealer also prevents liquid water from migrating outward. Water is trapped behind the surface and, as it evaporates, allows soluble salts to re-crystallize. When this happens, the salt crystals expand and spall the face of the brick or stone. Sealer also retards the migration of liquid water and increases the chance that flood-soaked masonry will be damaged by freeze spalling.

Figure 4. Masonry and concrete deterioration

Freezing and Thawing Damage

When water freezes, it expands. If the water is encapsulated inside building materials, the expansion can tear them apart. Thus, if significant amounts of water remain in masonry or concrete by early winter, when the weather goes through rapid periods of freezing and thawing, the result is similar to the crystallization of salts: the faces of the masonry or concrete may spall.

Ordinarily, water will evaporate even from saturated masonry and concrete at a rapid enough rate that freeze-thaw damage will not occur. Some conditions under which evaporation may be impeded and spalling may take place are described below.

- Masonry or concrete has been treated with a building sealer. Although newer building sealers allow the passage of water vapor, they inhibit the flow of liquid water and can slow the rate of evaporation. Unfortunately, little can be done to mitigate the effects of building sealer. Some spalling may occur.

- Masonry or concrete has been painted. The vapor pressure of the water may cause some of the paint to fall off, helping to speed evaporation. Otherwise, short of paint removal, little can be done and some spalling may occur.

- Masonry or concrete has been covered with another building material, such as board insulation, wood siding or plasterboard. If the covering was installed flush against the masonry or concrete, it should be removed temporarily to allow the wall to dry out. If the material was installed over sleepers or spacers and an air space exists, it may not be necessary to completely remove the covering material, but it would be helpful to provide air holes to ventilate the wall.

Damage to Metals

Metal Fasteners

Most metal fasteners are made of iron or steel which rust and expand when exposed to water. Fasteners, such as nails, should not be harmed by immersion in floodwaters, as long as they are allowed to dry soon after the waters subside. Opening wall cavities and removing insulation may be necessary. If nails are subjected to long-term moisture, rust may become severe and the nails may fail.

Rusted or weakened nails probably will not cause significant structural problems in the lower portion of a building—the portion most likely to be immersed by floodwaters. In most cases, such as at the sill plate, the nails hold the wood in position but are not solely responsible for its support.

The exception to this is often porch floor joists. Porches are frequently fastened to the house only with nails which, if they fail, may cause the porch to collapse. If your porch was submerged, make sure it is well ventilated by removing solid porch skirts and allowing the air to flow freely.

Once the moisture is removed, iron nails pose cosmetic problems by causing rust stains on finished surfaces. This problem can be corrected by driving the nails further into the wood, caulking them, and applying a primer paint with topcoat.

Damage to Exposed Metals

Most metals will not be permanently damaged by immersion in water. Durable metals such as aluminum, bronze, copper, and brass should survive the flooding completely intact. Commercial storefronts with cast-iron columns and stoops may experience some rusting, but the surfaces can be sanded clean and repainted.

Stamped iron-based metal, most commonly found in "tin" ceilings and stamped metal cornices on commercial storefronts, poses more of a problem. Stamped metal consists of rust-prone iron, coated with lead and tin (called "terne") or zinc (called "galvanized") to prevent rust. These coatings are usually effective, unless water enters the insides of the stampings and is allowed to sit. The standing water penetrates the protective coating and the iron rusts. Stamped metal cornices that have been immersed should be inspected to make sure they haven't filled with water. If so, find a way to drain the water and ventilate the back side, either by carefully prying a portion away from the building or by drilling small weep holes on the bottom. The holes can later be filled with auto body filler and repainted.

There is no easy remedy for stamped ceilings that have been immersed except to dry the building's interior

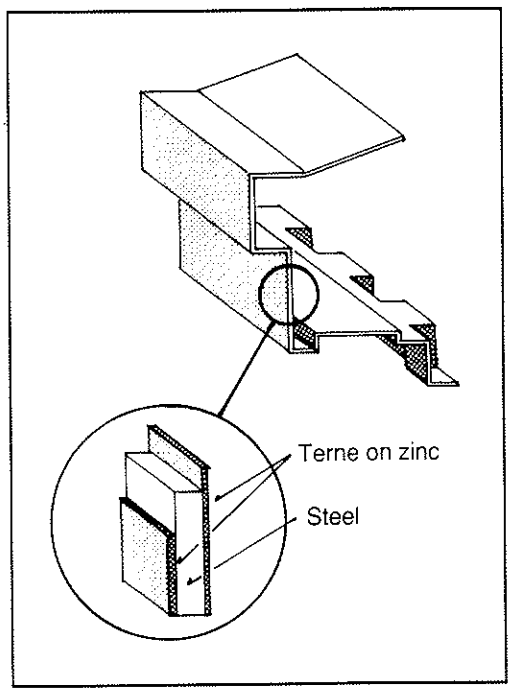


Figure 5. Typical coated steel used in stamp metal

and to monitor the ceilings for possible rusting. Drilling holes to drain water may be ineffective and removing sections of the ceiling would likely result in damage to the ceiling panels.

When repairs are necessary, stamped metal should be treated like auto body work. If surface rusting occurs on stamped metal, the rust should be removed by carefully scraping only the rusted areas, priming with a rust inhibitive paint, and then painting. Do not sandblast or attempt to chemically clean stamped metal or the protective coating will be removed and the metal will rust quickly.

Damage to Imbedded Metals

The problems of exposed and imbedded iron are fundamentally different. When exposed iron corrodes, the problem is mostly cosmetic. When imbedded iron corrodes, it can damage surrounding materials.

When iron rusts, it expands and this expansion generates tremendous force. Of particular concern in flooded buildings are metal lintels—the flat pieces of steel used to support masonry or concrete above door and window openings. Metal lintels are usually used on brick buildings and, when they rust, they can lift whole sections of a wall.

If your building has metal lintels and they were immersed in water, some rusting is likely to occur, although the rust expansion caused by the flooding alone will not cause a great deal of immediate damage. Of greater concern is damage to the surrounding materials that may allow water to enter on an ongoing basis and cause more severe rusting in the future.

After the water recedes and the building materials dry, check the mortar joints near the lintels to see that the mortar has not cracked or fallen out. If it has, repoint the area immediately to make sure that water cannot enter to create further rusting. Before repointing, scrape the metal to remove any loose rust scale. It is uncertain whether rust inhibitive primers are effective in retarding rust in these situations.

If other iron-based metals are imbedded in masonry or concrete, inspect them periodically and repair cracks in the surrounding materials if they occur.

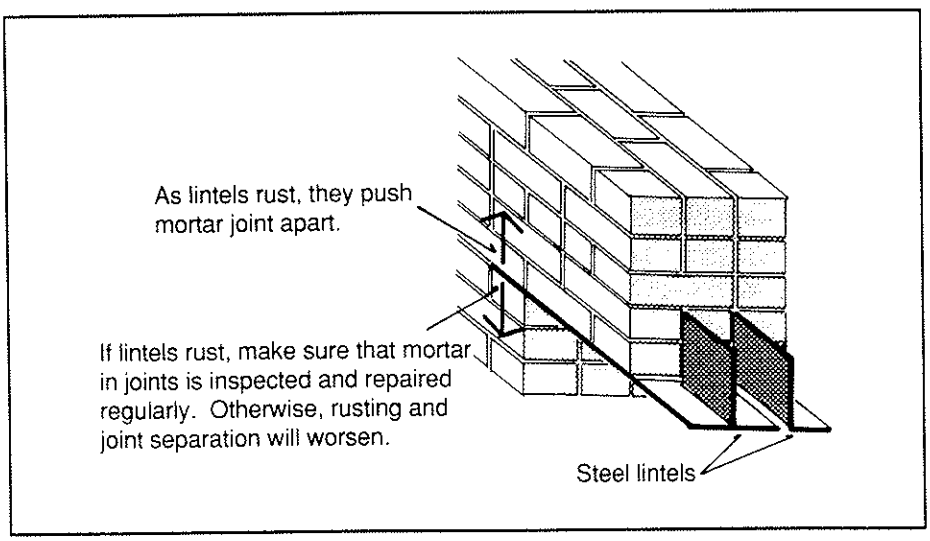


Figure 6. The effect of floodwater on metal lintels in a brick masonry wall.

Damage to Interior Finishes

Drywall

Drywall that was submerged will probably have to be replaced. Drywall consists of a relatively soft gypsum material held in place by a paper "sandwich." The paper does not hold up well to water saturation and, in most cases, wet drywall will simply dissolve. If it was not wet severely, drywall may be salvageable after it dries. Even so, FEMA recommends replacement as contaminants may make it a permanent health hazard. As with other aspects of flood cleanup, use your judgment about whether to retain or discard affected drywall.

Plaster, on the other hand, is unpredictable when wet. Sometimes it survives with no damage, other times it must be replaced. Its durability depends on the plaster mix, the skill used in application, the degree of saturation, whether it is applied to walls or ceilings, and the type of lath used. Plaster over metal lath is more likely to require replacement than plaster over wood lath.

Check for obvious areas where plaster must be removed, such as ceilings with large sags. If your ceiling sags in an area more than about three feet in diameter, it may be difficult to repair the damage. That portion of the ceiling may need to be removed—with care. Falling plaster, especially wet falling plaster, can be dangerous. If the water level was above the ceiling and you suspect that it may contain standing water, you may want to poke drain holes—with a nail attached to the end of a long stick—in the plaster before attempting to remove it. Do not stand directly under the area being prodded in case the plaster loosens and falls.

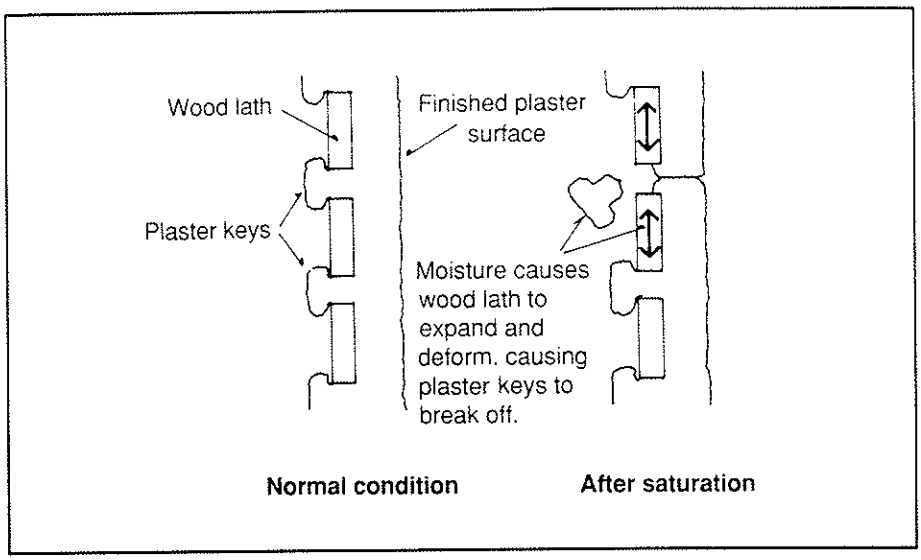


Figure 7. Possible effect of saturation on plaster walls.

Except for areas of obvious damage, the best way to determine whether plaster must be replaced is to let it dry and then inspect it. Here are some suggestions about how to determine whether plaster should be replaced:

- The surface condition of plaster may not tell you whether it is sound. If the plaster keys (sections of plaster that serve to anchor the plaster to the lath) have fallen off or if the lath has come loose from the building structure, the plaster may need to be replaced.

- You can sometimes tell if plaster is sound by tapping lightly on the wall with a piece of wood. Unsound plaster will sound hollow.

- If you ventilate wall cavities by opening holes, look for broken plaster keys. There will always be a few broken keys, but if the number is excessive, the plaster is likely in poor condition.

- Plaster damage can be repaired by re-anchoring the plaster to the wall studs and ceiling joists with screws and plaster washers. Sound plaster, especially decorative plaster, should be retained in place if it is salvageable.

Damage to Wood Floors and Trim

It is difficult to determine whether wood trim that has been submerged needs to be replaced. Most wood will expand and deform when wet and then return more or less to its original form as it dries. The behavior of an individual piece of wood depends on its species, grain pattern, method of anchoring, and whether its grain structure was damaged when the wood expanded against other materials.

Tongue and groove hardwood floors are unlikely to return to their original condition. When they expand, their grain structures are usually damaged. If you have a saturated hardwood floor, let it dry thoroughly. Then, if it remains cupped, you can decide whether to sand the floor flat or replace it. When possible, retain original hardwood floors.

Non-interlocking board floors, such as plain pine boards, stand a good chance of returning to their original shapes when dried. A light, surface sanding and some re-nailing may be necessary.

Wood trim around baseboards, ceilings, doors, and windows is likely to survive a flood because it can usually expand without crushing its fibers. After drying, it should return to its original form and should be retained.

Wooden doors in older and historic buildings are likely to be panel doors that add to the character of the building. Replacement with standard, hollow-core, flush doors may not be appropriate and the original doors should be retained when possible. Fortunately, panel doors usually survive flooding surprisingly well. If you have panel doors, let them dry in place. It may help to open them to allow better air circulation. As they dry, warping should disappear, and their fit and the condition of their glue joints should be inspected before determining whether they need further repair. Be sure that the doors are completely dry before attempting to repair or plane them. Also, if the original glue was not waterproof, the joints may have to be reglued.

If you need to replace any doors, consider replicating original panel doors. Hollow core doors will likely need to be replaced because their internal spacers are usually made of cardboard which dissolves in water.

Damage to Interior Paint

After the flood, most painted interior surfaces that were under water will have to be repainted due to water damage or contamination. Do not paint interior surfaces until they are completely dry and the interior humidity has returned to nearly normal levels. The exception is that wall surfaces can be painted with flat latex paint even if some dampness exists.

The paint on some surfaces, such as window trim, may have been damaged and soft enough to scrape off. If so, new paint will not adhere until the existing paint is removed and the wood is dry. Because the wood trim may contain lead-based paint,

especially in older buildings, observe caution when removing it and dispose of it properly.

Wallpaper

In many cases, older and historic wallpaper may be saved after a flood, but the decision to retain or remove it is a difficult one. On the one hand, FEMA cautions that wallpaper paste may be a breeding ground for molds and contamination and that wallpaper significantly wet by floodwaters may have to be removed and replaced, even if it appears to be in good condition. On the other hand, if the wallpaper is of historical importance or original to your house, you may decide to retain it. The decision will be based on the degree of water damage, the cost of replacement or reproduction, and climate controls that may limit future growth of mold and bacteria.

If your house is historic and the extent of damage determines that the wallpaper must be removed, carefully remove several square feet, all the way down to the plaster. If possible, take samples from several different locations including the ceiling. Label which room the paper came from and store temporarily in a dry part of the house until the paper can be permanently preserved.

Floor Coverings

Most older and historic homes retain few of their original floor coverings and most floor coverings can be discarded with no effect on a building's historic character.

One exception to this rule is tile floors which may be original. Even though tile is a durable material, the materials beneath it, such as wooden sub-floors and grout beds, may have been damaged. The only way to determine whether a tile floor is sound is to inspect it when all of the building materials are dry. This might take a long time as the tile impedes the evaporation process.

If a preliminary inspection shows that the underlying structure may be damaged, the tile floor can be removed and re-laid when the materials have dried. Or the decision whether to remove or reinstall can be postponed until the materials have thoroughly dried with the tile floor in place. The latter method takes longer, but minimizes damage to the tiles.

The most common residential floor covering is wall-to-wall carpeting. Because of the risk of contamination, carpeting touched by the flood waters should be discarded, unless it is small enough to be laundered, such as an area rug, or valuable enough to be professionally cleaned, such as an Oriental rug.

Floor tiles, such as vinyl flooring, and sheet flooring are probably not historic and should be removed to aid the evaporation process if the underlying wooden floor was submerged. On rare occasions, some sheet flooring, such as linoleum, may be historically significant. If this is the case and you wish to retain it, let the floor dry as best it can. Once dry, if the floor is level and the flooring adheres, you may leave it in place. If the bond between the floor and the covering fails, you may be able to remove and relay the flooring. There is no guarantee that either of these techniques will succeed. If it is impossible to relay the floor, make sure to save samples of the historic flooring.

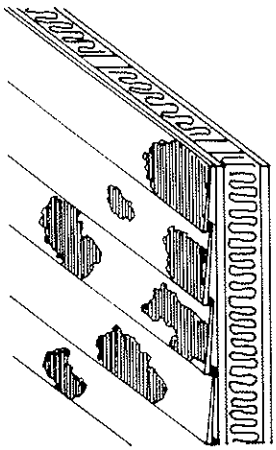
Exterior Paint Problems

Paint failure is likely to occur on any painted surface wet directly by floodwater or on surfaces through which excessive amounts of water will evaporate. Paint failure resulting from the passage of water or water vapor will show up as large sections of paint peeling all the way down to the underlying building material. If this happens, allow the underlying materials to dry thoroughly before attempting to repaint. If you paint before all the building materials have dried thoroughly, the water vapor pressure will "bubble" the new paint and it too will peel.

If the building materials are very wet, it may be necessary to postpone painting for a long time. You may wish to use a water-repellent wood preservative to help to protect the wood from water-related damage and the effects of sunlight until you can safely paint it.

Summary

Churches, schoolhouses, stores, banks, homes, courthouses, and barns in river and coastal communities often bear watermarks on the walls where owners pencil in the dates and levels of significant floods—the 1937 Flood, the 1973 Flood, the Johnstown Flood. Yet many of these buildings have stood the test of time and survived devastating floods. While floodwaters can cause significant damage to historic buildings, they do not spell the end. With proper cleaning and drying out procedures, the only reminder of floodwaters in historic structures should be a watermark and date on the wall.



Illustrated here are the effects of saturated insulation in a wood-framed wall. Liquid water and water vapor passing outward through the wood push the paint off the building, all the way down to the bare siding. A similar type of paint failure will occur if flood soaked walls are painted before they have dried completely.

Figure 8. Moisture-related paint failure

Acknowledgements

This *Information* booklet is adapted from the State Historical Society of Wisconsin's *Treatment of Flood-Damaged and Older Historic Buildings*, prepared by Jim Sewell, senior preservation architect. Richard Wagner of David H. Gleason Associates drafted the illustrations based on Mr. Sewell's original drawings.

Resources

The National Trust for Historic Preservation and the **state historic preservation offices** are offering emergency grants for flood-damaged historic properties through special funding from the National Park Service.

Grants from the National Trust are available to nonprofit incorporated organizations, educational institutions, governmental agencies and individuals for a variety of preservation activities. Assistance will not be provided for construction projects and, due to the federal nature of these funds, cannot be used for such purposes as lobbying, fund raising, aid to religious institutions, entertainment or to match any other federal grant.

Grant projects must specifically relate to damages incurred in connection with the flood, but may not be used to reimburse expenses prior to the date the county in which the site is located was declared a disaster area, unless specifically approved by the grant award. No matching funds are required.

Contact the National Trust's Midwest Regional Office in Chicago or the Mountains/Plains Regional Office in Denver for more information. The addresses for these offices are found on the back cover along with a list of the states under the jurisdiction of each office.

The Preservation Briefs series, published by the **National Park Service**, provide useful technical information in dealing with the effects of floodwater damage to your old or historic building. Contact your state historic preservation office or write: Superintendent of Documents, Government Printing Office, Washington, D.C. 20402-9325. Among the titles available are:

#1 *The Cleaning and Waterproof Coating of Masonry Buildings*
#2 *Repointing Mortar Joints in Historic Brick Buildings*
#6 *Dangers of Abrasive Cleaning to Historic Buildings*
#7 *The Preservation of Historic Glazed Architectural Terra-Cotta*
#8 *Aluminum and Vinyl Siding on Historic Buildings*
#9 *The Repair of Historic Wooden Windows*
#10 *Exterior Paint Problems on Historic Woodwork*
#11 *Rehabilitating Historic Storefronts*
#15 *Preservation of Historic Concrete: Problems and General Approaches*
#16 *The Use of Substitute Materials on Historic Building Exteriors*
#18 *Rehabilitating Interiors in Historic Buildings*
#20 *The Preservation of Historic Barns*
#21 *Repairing Historic Flat Plaster Walls and Ceilings*
#22 *The Preservation and Repair of Historic Stucco*
#23 *Preserving Historic Ornamental Plaster*
#27 *The Maintenance and Repair of Architectural Cast Iron*
#28 *Painting Historic Interiors*

The Federal Emergency Management Agency (FEMA) also produces several publications that may be helpful to you. These are: *Repairing Your Flooded Home* - FEMA 234, *Flood Emergency and Residential Repair Handbook* - FIA 13, *Floodproofing Residential Structures* - FEMA 102, *Design Manual for Retrofitting Flood-Prone Residential Structures* - FEMA 114.

Copies of these publications may be available through your state or local office of emergency services. Otherwise, you may order them through FEMA's Chicago regional office by calling (312) 408-5500, or by writing to: FEMA Publications Office, P.O. Box 70274, Washington, D.C. 20024.

The location of FEMA Regional Offices and the states served are listed below. If your state is not listed, contact: National Office, State and Local Programs and Support Directorate, Office of Disaster Assistance Programs, Washington, D.C. 20472 or call (202) 646-3615.

FEMA – Region V
175 West Jackson Blvd. 4th floor
Chicago, IL 60604-2698
(312) 408-5500
(Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin)

FEMA – Region VII
911 Walnut Street, Room 200
Kansas City, MO 64106
(816) 283-7061
(Iowa, Kansas, Missouri, Nebraska)

FEMA – Region VII
Denver Federal Center,
Building 710
Box 25267
Denver, CO 80225-0267
(303) 235-4811
(Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming)

If You Need Help

Assistance of various types is available from your **state historic preservation office**. Assistance includes survey and assessment of damage of historic resources. In addition the SHPO administers the historic rehabilitation tax credit program for owners of income producing properties certified by the SHPO as historic rehabilitation projects. These tax credits may help to offset the costs of carrying out flood damage repair. Other specific flood-related assistance available from nine different states is summarized below. If your state is not listed, contact the National Conference of State Historic Preservation Officers (NCSHPO), Suite 332, 444 North Capitol Street, Washington, D.C. 20001-1512 or call (202) 624-5465.

Illinois Historic Preservation Agency
1 Old State Capitol Plaza
Springfield, IL 62701
(217) 785-4512
FAX (217) 524-7525

State Historical Society of Iowa
Capitol Complex
East 6th and Locust Street
Des Moines, IA 50319
(515) 281-8719
(800) 528-5270
FAX (515) 282-0502

State Assistance Programs
Available in Iowa
- Resource Enhancement and Protection Program (REAP) - All remaining funds for this state grant program are being reallocated to emergency needs. Both historic preservation and broader cultural preservation can be addressed. Requires local match.
- Cultural Resource Emergency Attack Team - Coordinates the provision of technical and financial assistance for the recovery of cultural resources from the effects of natural disasters anywhere in the state.

Kansas State Historical Society
120 West Tenth
Topeka, KS 66612
(913) 296-4788
FAX (913) 296-6622

Minnesota Historical Society
345 Kellogg Boulevard West
St. Paul, MN 55102-1906
(612) 296-5434
FAX (612) 282-2374

Missouri Department of Natural Resources
Historic Preservation Program
205 Jefferson
P. O. Box 176
Jefferson City, MO 65102
(314) 751-7858
FAX (314) 751-8656

Nebraska State Historical Society
P.O. Box 82554
Lincoln, NE 68501
(402) 471-4769
FAX (402) 471-3100

State Historical Society of North Dakota
Heritage Center
612 E. Boulevard Avenue
Bismarck, ND 58505
(701) 224-2667
FAX (701) 224-3000

South Dakota State Historical Society
State Historical Preservation Center
P.O. Box 417
Vermillion, SD 57069
(605) 677-5314
FAX (605) 677-5364

State Assistance Programs
Available in South Dakota
- State Tax Benefits - Property tax benefits are available to owners of properties listed on the State Register of Historic Places. Owners can receive an eight year moratorium on property tax assessment for improvements on historic buildings.

State Historical Society of Wisconsin
Division of Historic Preservation
816 State Street
Madison, WI 53706
(608) 264-6500
FAX (608) 264-6404

State Assistance Programs Available in Wisconsin
- Architectural assistance from the Division of Historic Preservation.

The National Endowment for the Humanities has created an emergency fund of $1 million for libraries, museums and other cultural institutions ravaged by floods throughout the Midwest. Affected institutions can apply immediately for emergency grants of up to $30,000 to support steps necessary to preserve books, records, manuscripts, art, and cultural artifacts. This opportunity will extend through July 31, 1994. Applications should be addressed to Chairman's Office, National Endowment for the Humanities, 1100 Pennsylvania Avenue, N.W., Washington, D.C. 20506. For more information, contact the NEH Division of Preservation and Access at (202) 606-8570.

The National Endowment for the Arts' Museum Program is concerned primarily with works of art and with institutions that care for and exhibit works of art. Funds from several categories within the Museum Program, as well as the Challenge and Advancement programs, can be applied toward disaster planning. For more information contact: National Endowment for the Arts, Museum Program, 1100 Pennsylvania Avenue, N.W., Washington, D.C. 20506 (202) 682-5442.

The American Institute for the Conservation of Historic and Artistic Works (AIC) and the **National Institute for Conservation of Cultural Property** (NIC) have put together a package of useful materials relating to the conservation of flood-damaged archival materials, textiles, art work, antiques, ceramics, etc. To obtain a free package write: National Institute for Conservation of Cultural Property, 3299 K Street, N.W., Suite 403, Washington, D.C. 20007.

The Small Business Administration (SBA) can provide both direct and bank participation disaster loans to qualified homeowners and businesses to repair or replace damaged or destroyed private property when the SBA administrator declares a "disaster loan area" under SBA's statutory authority. The disaster assistance numbers for SBA are: Iowa, Missouri, Kansas and Nebraska (800) 473-0477; Illinois, Wisconsin, and Minnesota (800) 359-2227; South Dakota and North Dakota (800) 488-5323.

Regional and state museum associations can help coordinate assistance by other museums and museum professionals. For more information contact: Midwest Museums Conference, P.O. Box 11940, St. Louis, Mo. 63112. (314) 454-3110 or Mountains-Plains Museum Association, Box 335, Manitou Springs, Colo. 80829 (719) 593-8840.

The mission of the National Trust for Historic Preservation is to foster an appreciation of the diverse character and meaning of our American cultural heritage and to preserve and revitalize the livability of our communities by leading the nation in saving America's historic environments.

Support for the National Trust and for this booklet is provided in part by grants from the U.S. Department of the Interior, National Park Service. The opinions expressed in this publication are not necessarily those of the U.S. Department of the Interior or the National Trust. Nor does the mention of trade names or commercial products constitute endorsement or recommendation by the Department of the Interior or the National Trust.

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JOIN THE HISTORIC PRESERVATION NETWORK

The Preservation Forum of the National Trust is a membership program for professionals and organizations. The benefits and privileges of membership include subscriptions to *Historic Preservation Forum*, *Historic Preservation* magazine, *Historic Preservation News*, participation in financial/insurance assistance programs, technical advice, and substantial discounts on professional conferences and educational publications. New *Information* booklets are available free upon request. To join, send $75 annual dues to: Preservation Forum, National Trust for Historic Preservation, 1785 Massachusetts Avenue, N.W., Washington, D.C. 20036 (202) 673-4296.

The National Main Street Network is a membership program for individuals and organizations involved in downtown and neighborhood commercial district revitalization. Network members receive the same benefits as Preservation Forum members and, in addition, receive a subscription to *Main Street News*, access to the Network Exchange telephone assistance line and discounts on Main Street Network publications, conferences and workshops. To join, send $195 annual dues to the National Main Street Network at the address listed above or call (202) 673-4219.

Offices of the National Trust for Historic Preservation

National Headquarters
1785 Massachusetts Avenue, N.W.
Washington, D.C. 20036
(202) 673-4296

Mid-Atlantic Office
Cliveden, 6401 Germantown Ave.
Philadelphia, Pa. 19144
(215) 438-2886
(Delaware, District of Columbia, Maryland, New Jersey, Pennsylvania, Puerto Rico, Virginia, Virgin Islands, West Virginia)

Midwest Office
53 West Jackson Blvd., Suite 1135
Chicago, Ill. 60604
(312) 939-5547
(Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, Wisconsin)

Northeast Office
Seven Faneuil Hall Marketplace, 5th Floor
Boston, Mass. 02109
(617) 523-0885
(Connecticut, Maine, Massachusetts, New Hampshire, New York, Rhode Island, Vermont)

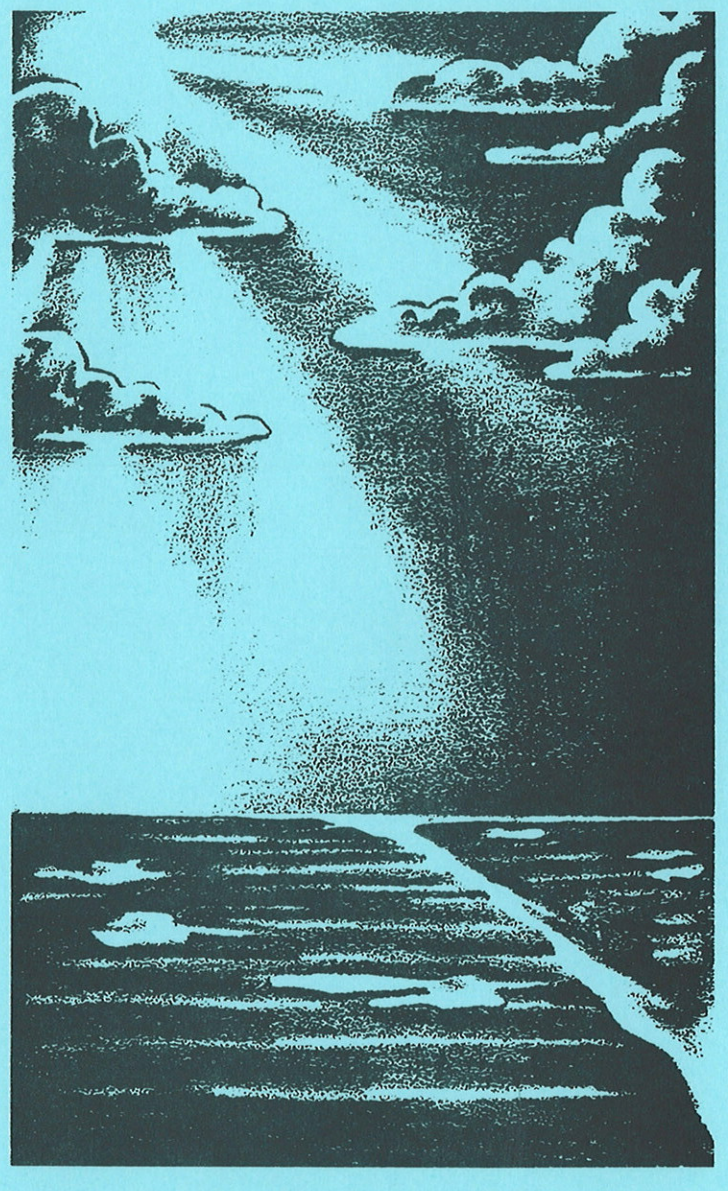
Southern Office
William Aiken House
456 King Street
Charleston, S.C. 29403
(803) 722-8552
(Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee)

Mountains/Plains Office
910 16th Street, Suite 1100
Denver, Colo. 80202
(303) 623-1504
(Colorado, Kansas, Montana, Nebraska, North Dakota, Oklahoma, South Dakota, Wyoming)

Texas/New Mexico Field Office
500 Main Street, Suite 606
Fort Worth, Tex. 76102
(817) 332-4398
(New Mexico, Texas)

Western Office
One Sutter Street, Suite 707
San Francisco, Calif. 94104
(415) 956-0610
(Alaska, Arizona, California, Guam, Hawaii, Idaho, Micronesia, Nevada, Oregon, Utah, Washington)

Repairing Your Flooded Home



American Red Cross

FEDERAL EMERGENCY MANAGEMENT AGENCY

Contents

About This Book

This book is published by the Federal Emergency Management Agency (FEMA) and the American Red Cross to help people who have been flooded. It is designed to be easily copied. Permission to reproduce all or any section of this book is hereby granted and encouraged.

Copies of this book are available free from:

FEMA Publications
P.O. Box 70274
Washington, DC 20024

Copies are also available from your local chapter of the American Red Cross. Ask for ARC 4477.

Introduction

This book gives step-by-step advice you can use to clean up, rebuild, and get help after a flood. Before you start, read the flood safety precautions on the back cover and review the 9 steps summarized on the contents page.

Your home and its contents may look beyond hope, but many of your belongings can probably be restored. If you do things right, your flooded home can be cleaned up, dried out, rebuilt, and reoccupied sooner than you think. While you are doing the job ahead, you should remember 3 important points:

1. **Play it safe.** The dangers are not over when the water goes down. Follow the safety precautions on the back cover. Your house's foundation may now be weak, the electrical system may have shorted, and floodwaters may have left behind things that could make you sick. Many flooded items, such as wallboard and mattresses, will hold mud and contamination forever. When in doubt, throw it out. Don't risk injury or infection.
2. **Ask for help.** Many people can do a lot of the cleanup and repairs discussed in this book. But if you have technical questions or do not feel comfortable doing something, get professional help. If there is a federal disaster declaration, a telephone hotline will often be set up. You can call to get information about public, private, and volunteer programs to help you recover from the flood. Government disaster programs are there to help you, the taxpayer. You are paying for them; check them out.
3. **Floodproof.** It is very likely that your home will be flooded again someday. Floodproofing means using materials and practices that will prevent or minimize flood damage in the future. Many floodproofing techniques are inexpensive or can be easily worked into your rebuilding program. You can save a lot of money by floodproofing as you repair and rebuild. (See Step 8.) You should also prepare for the next flood by buying flood insurance and writing a flood response plan.

Acknowledgments

This book was prepared for the Federal Emergency Management Agency (FEMA) under Contracts EMW-89-C-3024 and EMW-91-K-3738.

FEMA and the American Red Cross gratefully acknowledge the thoughtful assistance provided by the many individuals who reviewed this book. Reviewers included repair and reconstruction contractors, mental health professionals, sociologists, researchers, disaster assistance specialists, insurance experts, underwriters, structural engineers, public health agents, floodplain managers, emergency managers, education specialists, editorial experts, and graphic designers.

STEP 1 *Take Care of Yourself First*

You and your family have been through a disaster. Your life has been turned upside down, and it will take time for things to return to normal. Take a few minutes to review the safety and health precautions listed on the back cover. And watch out for symptoms of anxiety, stress, and fatigue.

With all the cleanup and repair jobs awaiting you, it may seem odd to spend the first chapter of a flood recovery book talking about emotional issues. But a disaster can do damage beyond the obvious destruction and debris you see everywhere. You should recognize that the flood can take its toll on *you* as well as your property. It is important to look after yourself and your family as you focus on the obvious tasks of cleanup and recovery. Your hidden enemy is stress. Watch for it.

Care for Yourself

Your body reacts to stress in many ways. You will probably experience one or more of the warning signs as you deal with the flood and recovery. Your body is just reminding you that times are difficult. Reactions to stress are common and usually temporary. Need some relief? Here are some steps you can take to relieve your tensions.

Keep the family together. Especially in bad times, togetherness provides mutual support for everyone.

Discuss your problems. Talk to family and friends. Share your anxieties. Let others talk to you to help release tension. Crying is a natural response to a disaster. It's also a great way to release pent-up emotions.

Rest often and eat well. You are more likely to suffer from stress and health problems when you are tired. Being active helps, but don't overdo it. Your body must have proper rest and nourishment for you to keep going.

Set a manageable schedule. You have a million things to do, but you can't do everything at once. Make a list and do jobs one at a time. Establish a schedule to clean up and rebuild. Following the steps in this book will help. Try to return to your pre-flood routines as soon as you can. Routines give you something predictable to depend upon.

Watch for signs of stress. You have just been through a disaster, and the recovery period can be long, hard, and confusing. Don't be surprised if you are tense or see signs of stress in family members. Often other people will notice problems before you do. Listen to them.

Seek help. If you cannot shake feelings of despair or other telltale signs of stress, get professional help. So many people need help to cope with their situation following a disaster that special outreach programs

Warning Signs of Stress

- Short tempers, frequent arguments
- Greater consumption of alcohol
- Smoking more than usual
- Getting upset over minor irritations
- Difficulty sleeping, bad dreams
- Aches, pains, stomach problems
- Apathy, loss of concentration
- Depression

and crisis counseling are often set up. Contact the Red Cross for programs available in your area.

Floodproof as you rebuild. People who are prepared ahead of time are better able to deal with disasters. Getting ready for the next flood can give you a sense of control over the future. Besides, floodproofing will be a definite improvement to your property. (See Step 8.)

Care for Your Children

Watch children closely. They may display fear or symptoms of stress.

Because their daily routine has been interrupted, children may experience a lot of anxiety and fear. Those feelings are real and natural. Fear is a normal reaction to any danger that threatens a person's well-being. You can help your children deal with the disaster by keeping in mind the following points.

Try to keep the family together. Make an effort to establish normal family routines. Include children in cleanup activities. Children need and want to be important members of the family.

Listen to what children say. Encourage them to talk or otherwise express their feelings. Teenagers may need to talk with other teenagers.

Explain the disaster factually. Children have vivid imaginations. Things they don't understand can make them afraid. When they know the facts, children may deal better with the disaster.

Reassure children. Show them through words and actions that life will return to normal. Touching and holding are important. Hugs help. Try to find or replace pets or favorite toys.

Be understanding. Try not to scold children for things they do that might be related to the flood, such as bed-wetting, thumb sucking, or clinging to you. Remember, they are also going through a rough time.

Take care of yourself. Your children reflect your fears and worries. If you take care of yourself, you will be better able to help your children cope.

Stay Healthy

Small children, pregnant women, and people with health problems should avoid flooded areas until cleanup is complete. Small children tend to put things in their mouths. Pregnant women need to be cautious to avoid injury and exposure to disease. People with health problems are more likely to get sick or to be injured.

Your body is used to being clean. When you work in an area that has been flooded, you could be exposed to dangerous chemicals and germs that you are not used to. Any of these things can make you very sick.

Wash your hands with soap and water, thoroughly and often. This is especially important before handling food, eating, or smoking. Scrub well between your fingers and under your nails. If possible, use an antibacterial soap. Avoid biting your nails.

Confirm that the water is clean and safe. Don't drink it or wash dishes in it until you're sure. (See Step 5.)

Disinfect dishes and everything else that floodwaters touched. Instructions for cleaning and disinfecting appliances and household items are covered in Step 6.

Avoid injuries. Things are much heavier when wet. Don't try to move large or heavy objects by yourself. Unfortunately, injuries, especially back injuries, are a common side effect of cleaning up after a flood.

Watch out for fatigue. When you are tired, you are more prone to accidents. Set a realistic schedule for the work you will do each day.

Be safe around poisons. Many of the products you will use to clean, disinfect, and repair your home are poisons. Read and follow label instructions. And keep all chemical products out of the reach of children. Have the number for your local Poison Control Center posted by your telephone and call right away if anyone is poisoned.

Report health hazards. Tell the health department about animal carcasses, rats, dangerous chemicals, and similar hazards on your property.

Be patient. Above all, try to be patient with your family, your neighbors, the local, state, and federal authorities, and volunteer agency personnel. Remember that many others are in the same situation you are in, and it may take time for everyone to get service. You may have to wait your turn.

STEP 2

Give Your Home First Aid

It can be dangerous to go back into your home because the flood may have caused structural, electrical, and other hazards. After you have made sure that things are safe, you can take steps to protect your home and contents from further damage.

Most of the information in this section assumes that the person doing the work has experience in construction and electrical repair. *If you do not have experience in construction and electrical repair, do not try to do this work yourself. Hire a qualified contractor or electrician.* It is still a good idea to read the information in this book so you will have a better understanding of the jobs ahead, no matter who does them.

Even if you have some experience with construction and electrical work, *do not attempt any job if you feel uncertain about the right thing to do or you wonder if the job is beyond your skill or physical strength.* Read the instructions in this book all the way through before you start. Gather your tools and supplies, and make sure you have enough help.

There is plenty of work to go around after a flood. Do only those jobs you can do well and without injuring yourself. If you cannot afford to get professional help, check with your Red Cross chapter, your local emergency manager, or your building department to see if there are any volunteer programs available to you.

Make Sure It Is Safe to Go Back

Some floods have more than one crest or peak. Even though the water looks like it's going down, it may rise again and trap you.

Stay tuned to your local radio or TV stations to find out if and when you can go back home. If you are not sure whether you can return, contact your local emergency manager.

Read the flood safety precautions on the back cover of this book. Each year about 150 people die because of floods. Many of those deaths are because of electrocution or other accidents that happen after the floodwaters have gone down. *Have someone with you as you check your home and do repairs.* Dress for the task—wear sturdy shoes and gloves.

Things You Will Need When It Is Safe to Return Home

- ❑ Flashlight
- ❑ First aid kit
- ❑ Battery operated radio
- ❑ Waterproof boots or waders
- ❑ Safety clothing, such as a hard hat and gloves
- ❑ Boots or shoes with hard soles

A Note About Portable Generators

Portable generators can be a big help if you are without power. But remember:

- Connect appliances one at a time to the generator. Never hook a generator directly to your household wiring yourself. Only a qualified electrician can do this.
- Use generators outdoors only. They give off carbon monoxide fumes.
- Avoid using extension cords with generators. If you must use them, check them often to make sure they have not become hot.

- ❑ Dust mask
- ❑ Camera or video camera to record damage
- ❑ Tools: crowbar, hammer, saw, pliers, crescent wrench, screwdrivers, etc.
- ❑ Drinking water
- ❑ Trash bags
- ❑ A wooden stick for turning things over, scaring away snakes and small animals, and moving electrical wires
- ❑ Cleaning supplies

Check Your Home Before You Go In

If there is standing water next to the outside walls of your home, don't go in. You won't be able to tell if the building is safe or structurally sound. Before you go in, walk carefully around the outside of your house and check for loose power lines and gas leaks. You'll know there is leaking gas if you smell the putrid, distinctive odor that is added to gas to let people know gas is leaking. If you find downed power lines or gas leaks, call your utility company.

Check the foundation for cracks or other damage. Examine porch roofs and overhangs to be sure they still have all their supports. Look for gaps between the steps and the house. If you see obvious damage, ask your community's building inspector or a contractor to check the house before you go in. Some communities require official inspections for all buildings after a flood.

If any supports or portions of the foundation are missing, or if the ground has washed away, the floor is probably not safe. If you have any doubts about safety, contact a contractor before going in. *Proceed very carefully.*

Turn Off the Electricity

Electricity and water don't mix. *Turn the power off at your home!* Even if the power company has turned off electricity to the area, you must still make certain your house's power supply is disconnected. You don't want the power company to turn it on without warning while you're working on it.

The electricity must be turned off at the main breaker box or fuse box. Your utility company may have removed your electric meter. *This does not always turn off the power.*

If you have to step in water to get to your electric box, call an electrician. If you can get to your electric box without going through or standing in water, you can turn off the power yourself. (See box.)

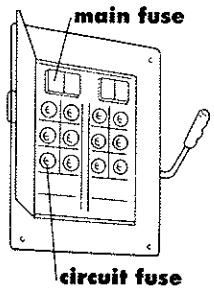
Remember that if the electrical or gas controls are inside the house, *do not* turn them off until you can *safely* enter your home.

Turn Off the Gas

Gas appliances and pipes may have moved or broken during the flood, creating a gas leak. If you suspect a leak or smell gas, leave your home immediately and call the gas company from a neighbor's home. Leave the door open and, if the gas meter is outside, turn off the gas.

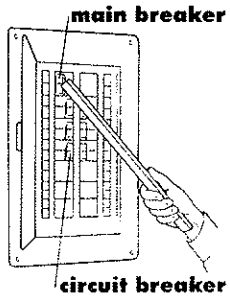
If you have gas appliances that were flooded, you will need

How to Turn Off the Power



Fuse Boxes

1. Stand on a dry spot.
2. If your box has a handle on the side, use a dry wooden stick or pole to pull the handle to OFF.
3. Use the stick to open the door.
4. Carefully pull out the main fuses. Use a dry wooden stick.
5. Unscrew and remove each circuit fuse.



Breaker Boxes

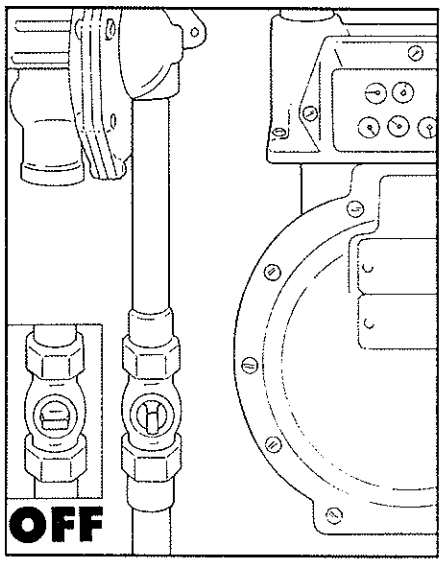
1. Stand on a dry spot.
2. Use a dry wooden stick or pole to open the door.
3. Use the stick to push the main breaker switch to OFF.
4. Use the stick to turn each circuit breaker to OFF.

Safety Checklist

- Wait for the water to go down
- Report downed power lines
- Report gas leaks
- Check for structural damage
- Turn off electricity
- Turn off gas or fuel

to clean the mud out of the pilot and the burners. But first, you must turn off the gas.

There is a valve next to the gas meter. If the valve is parallel to the pipe, the gas is on. You will need a pair of pliers or a wrench to turn the valve. Turn it 90 degrees (a quarter turn) so the valve is perpendicular to the pipe to shut the gas off.



Some gas meter valves have a hole in the handle. This hole lines up with a hole in the valve body when the gas is shut off. (The gas company uses the holes to lock or seal the valve closed when a building is vacant.) When the holes are lined up, you know that the gas supply should be shut off.

To be sure the gas is off, write down the numbers on all the dials on the meter. Check the dials at least 5 minutes later. If the numbers have changed, the valve is not closed. Gas is still flowing. Telephone your utility company for help and keep clear of the area until the gas has stopped flowing.

Fuel Oil or Propane. If you have a fuel oil or propane tank, it may have floated and the connecting pipes might be broken. Even an underground tank can float. Turn off the fuel valve at the tank and follow the instructions in Step 5 before you turn the fuel back on.

Go Inside Carefully

If the door sticks and has to be forced open, it is probably swollen. If it only sticks at the bottom, it can be forced open. If it sticks at the top, it could mean that your ceiling is ready to fall. You can force the door open, but wait outside the doorway for a minute so you'll be protected if something falls.

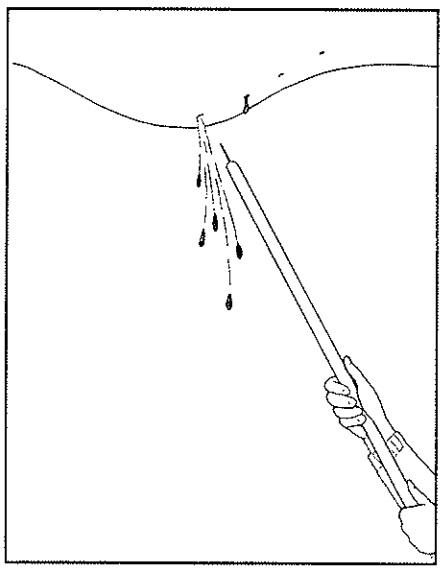
If the door won't open easily, it may be easier for you to enter your home through a window. Look carefully at the ceiling before you go in to be sure it is not ready to fall.

Don't smoke or use candles, gas lanterns, or other open flames in your home. Air out your house completely—there may be explosive gas.

Check the ceiling for signs of sagging. If there was a lot of wind and rain, or if the flood was very deep, your ceiling may be holding water. Wet plaster or wallboard is very heavy and dangerous if it falls. If the ceiling is sagging, do the following before you go in:

1. Make a poker by attaching a nail or other pointed object to the end of a long stick. (You might hammer a finishing nail into the end of a broomstick.)

2. Stand away from, not under, the sag. (Inside a doorway is safest.) Poke a hole in the ceiling at the *edge* of the sag so any trapped water can begin to drain. Do not get close to lights and other electrical fixtures with your stick. Do not start at the center of the sag or the ceiling may collapse suddenly.



3. After the water drains, poke another hole, lower down the sag. Keep poking holes as you move to the lowest point.
4. Tear down the sagging ceiling using extreme caution—it's very heavy. You'll have to replace it anyway.
5. Repeat this procedure in all rooms that have sagging ceilings.

Step carefully. Water and mud make a floor very slippery. Also watch for snakes, other animals, loose flooring, holes, and nails.

Check for cabinets and other tall pieces of furniture that might be ready to fall over. Remove mirrors and heavy pictures from walls. They will not stay up if the wallboard is wet.

Rescue the Most Valuable Items

Find and protect the "irreplaceable" valuables such as money, jewelry, insurance papers, photographs, and family heirlooms. Wash mud off before the items dry, if possible. Put articles in a safe place such as a dry second story, or take them to a friend's home.

Photographs, books, and important papers can be frozen and cleaned later when you have more time. Wash the mud off. Store the articles in plastic bags and take them to a friend who has electricity. Put them in a frost-free freezer to protect them from mildew and further damage until you have time to thaw and clean them. (See Step 6.) A photographer or camera shop can professionally clean wet photographs.

Resist the urge to stop and clean everything you pick up. You need to get to work on protecting your house, assessing the damage, and planning the best way to save and restore as much as possible. You can clean up your belongings *after* you have done the more important things listed here.

Protect Your Home From Further Damage

You need to make sure that there will be no more damage from rain, wind, or animals. If you have flood insurance that covers the contents of your

home, it may cover some of the cost of moving your contents to a safe place. (Read your policy and ask your agent what expenses are covered by your policy.)

Get fresh air moving through your home. Open windows and doors if weather permits. This will reduce the moisture and get rid of any gas in the house. Don't try to force open a swollen window. Instead of breaking the glass, try removing the molding and taking the window sash out of its frame.

Patch holes. Cover holes in the roof, walls, or windows with boards, tarps, or plastic sheeting. You can nail down plastic sheets or trash bags with strips of wood or you can 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 rain. The results won't look pretty, but you need to do this so rain won't cause any more water damage.

Repair sagging floors or roof sections. Use 4 x 4s or other heavy lumber to brace weak areas. If you're uncertain how to shore up floor or ceiling joists, call a contractor.

Remove debris. Clear out any tree limbs or other trash that may have found its way into the house.

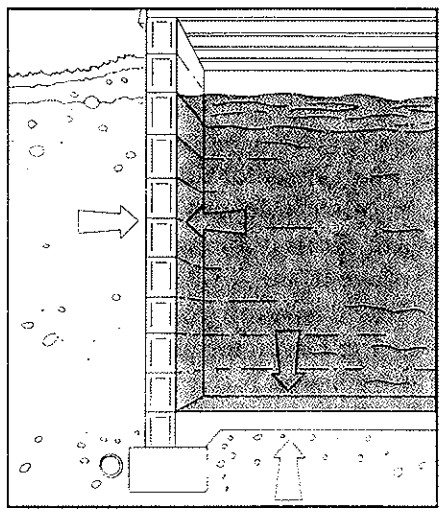
Check for broken or leaking water pipes. If you find any, cut off the water supply by turning off the valve at your water meter. If you can't find it, call the water company for help. Also check floor drains—they may be clogged with debris.

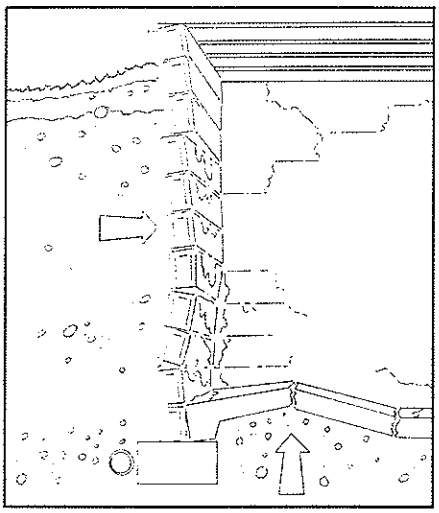
If the water pipes are not leaking, you can use your tap water for hosing and cleaning. But, *do not drink, clean dishes, wash clothes, or cook with tap water until it has been declared safe.* (If you are not on a municipal water system, the local health department will usually inspect your well and test your water. See Step 5.)

Drain Your Basement Carefully

If your basement is flooded, don't be in too big a hurry to pump it out. Here's why.

Water in the ground outside your house is pushing hard against the outside of your basement walls. But the water inside your basement is pushing right back.





If you drain your basement too quickly, the pressure outside the walls will be greater than the pressure inside the walls—and that may make the walls and floor crack and collapse, causing serious damage.

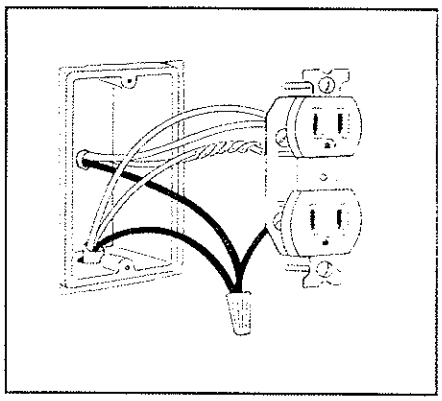
To avoid this situation, follow these steps when you pump the water out of your basement:

1. Never go into a basement that has water standing in it unless you are sure the electricity is off.
2. When the floodwaters are no longer covering the ground, you can start pumping the water out of the basement. Don't use gasoline-powered pumps or generators indoors because gasoline engines create deadly carbon monoxide exhaust fumes.
3. Pump the water level down 2 to 3 feet. Mark the level and wait overnight.
4. Check the water level the next day. If the water went back up (it covered your mark), it's still too early to drain your basement. Wait 24 hours. Then pump the water down 2 to 3 feet again. Check the level the next day.
5. When the water stops going back up, pump down another 2 to 3 feet and wait overnight. Repeat steps 4 and 5 until all water is pumped out of the basement.

Hose the House and Its Contents

The mud left behind by floodwaters contains most of the health hazards you will face. It is very important to get rid of this mud as soon as possible. This is a lot easier to do before the mud dries out. Follow these steps:

1. Shovel out as much mud as possible.
2. *Make sure the electricity is turned off.* Unplug all appliances and lamps, remove all light bulbs, and remove the cover plates to wall switches and outlets that got wet. Check with your local building department to see if your code allows you to disconnect the wiring from the switches and outlets.



If the code does not allow you to disconnect them, leave the wires connected and pull them out of their boxes as shown in the drawing. They can be replaced during Step 5 by an electrician.

Health Precautions

- Assume that anything touched by floodwaters is contaminated.
- Wash hands frequently.
- Disinfect everything floodwaters have touched.

If the code permits, it is probably best to throw away switches and outlets that were flooded and replace them with new ones. (See Step 5.)

3. Check your water system for leaks from pipes that may have moved. (See Step 5.) Even if your water supply is not safe to drink, you can use the water to clean the house. If you have water, hose the house down, inside and out. If you have an attachment that sprays soap, wash and then rinse the walls and floors. Hose the furniture, too, and other major items that got muddy.
4. Heating and air conditioning ducts that got flooded will have mud left in them. If you don't clean them out, your system will be blowing foul, dusty air that contains the same health hazards you are trying to get rid of. To clean the ducts, remove the vents or registers. If possible, remove some sections of the ducts in the basement or crawl space to give you access to all areas. Then thoroughly hose out all the ducts.
5. While you hose the walls, completely hose out the light sockets and electrical boxes that you opened up and prepared. Follow the instructions in Step 5 before turning the electricity back on.
6. After you hose out the duct work to remove the mud, wash it with a disinfectant or sanitizer, such as the quaternary, phenolic, or pine oil based ones. (Check labels for the contents and instructions.) If your ducts are in a slab or are otherwise inaccessible, have them cleaned by a professional.
7. Don't let the water sit for long. Use a mop, squeegee, or, if you have an outside source of power, a wet/dry vacuum cleaner.

STEP 3 Get Organized

Before you try to clean up and repair everything, you need to figure your damage and make a recovery plan—a list of things that need to be done. An organized approach will make the best use of your time and money. If your house has very serious damage, you need to ask yourself if you should rebuild at all—it may be smarter, safer, and cheaper to move. If you do rebuild, your recovery plan should include the floodproofing measures that can be done along with your repairs. This can save you thousands of dollars in the future. (See Step 8.)

Call Your Insurance Agent

You need to tell your agent about the damage to your home and contents so that your agent can file a claim. The sooner you can talk to your agent, the sooner your claim will be filed and an adjuster will be assigned to look at your damage. How much of your loss is covered will depend on your policy. But even if you don't have full coverage, your agent may be able to give you advice about where to get help with cleanup and repairs.

Your property insurance will fall into one of 3 categories:

1. **Homeowner's insurance** usually covers losses caused by wind, storms, or broken water pipes, but not surface flooding. Some homeowner's policies may cover basement flooding caused by sewer backup or sump pump failure.
2. **Flood insurance** covers most losses caused by surface floodwater.
3. **Wind and hail insurance** covers losses in coastal areas from the winds of a hurricane. In coastal areas, homeowner's insurance often does not cover damage from wind.

Read your insurance policies so that you will know what is covered and what is not. If your insurance covers the damage, your agent will tell you when you can expect an adjuster to contact you. The adjuster will determine the costs to repair the damage to your home and your belongings. The adjuster will then give those costs to your insurance company for final approval. Also find out if your insurance will pay for your living expenses while your house is being repaired. (Flood insurance does not cover that cost.)

Start Listing the Damage

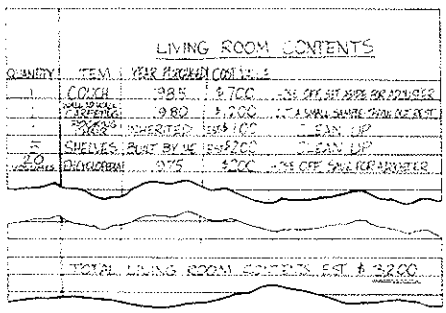
List the damage and take pictures or videotapes as you clean up so you will have a complete record. You need good records for insurance claims, applications for disaster assistance, and income tax deductions.

Some items that are health hazards, such as rotting food

Records to Keep

- Damage to the building
- Damage to the contents (see sample inventory form, next page)
- Receipts for cleanup and restoration expenses, such as material, labor, and equipment rental, and receipts for flood-related expenses, such as motel bills. (Keep these in one place, like in an envelope in your car.)

and debris, should be thrown away. Tell your agent or adjuster that you will be getting rid of this trash. That person should tell you what to do so that all of your losses can be recorded properly by the adjuster. (See pages 16–17 on sorting items to discard.) You may be told to keep a sample of some items, such as a piece of carpet or upholstery, to show the value of what you have thrown away.


LIVING ROOM CONTENTS

QUANTITY	ITEM	YEAR PURCHASED	COST	
1	COUCH	1985	$ 700	
1	CARPETING	1980	$ 1200	
1	ROCKER	INHERITED	$ 100	CLEAN UP
5	SHELVES, BUILT BY ME		$ 200	CLEAN UP
20	BOOKS	1975	$ 200	

TOTAL LIVING ROOM CONTENTS EST. $ 3200

Ask someone to sign your record as a witness. The inventory form shown here gives an example of how you might list damage to the contents of your home. If you have flood insurance, you will need to file a Proof of Loss form within 60 days of the flood. (See Step 7.) Completing your own inventory form will help the adjuster determine the costs to repair the damage to your home and belongings.

Check for Structural Damage

You need to find out whether there is any structural damage to your home. (You will probably need professional help in making this decision.)

Is there evidence of broken or cracked basement or foundation walls? Has the ground next to or under your home been washed away? Are there broken pilings, shifted stairs, or slanted floors or walls? Any of these things could mean that the foundation, floors, or walls will have to be totally rebuilt. Repair safety hazards such as broken pilings or an undermined foundation before you proceed any further. Get professional help for any task you cannot confidently do yourself.

You will need a building permit to repair structural damage. Talk to your local building department before you start building or repairing or before you sign any repair contracts. If the damage to your house's structure is more than 50 percent of the market value of your house, most local building codes will require you to elevate it above flood levels. Some may not allow you to rebuild at all. (For more information about building permits, see Step 8.)

Ask the Big Question

Odds are that the area where you live will flood again. Before you spend a lot of money and effort repairing and rebuilding, ask yourself this question:

Do I really want to be flooded again?

If you think that you would be better off in a different location, talk to your local government or disaster assistance officials about help rebuilding where floods

can no longer damage your home.

There are programs that will buy some properties with houses that have been destroyed or substantially damaged. Other programs give financial help to move or elevate houses so they are above flood levels. See Step 7 for more information on floodproofing assistance programs.

If you decide to stay, you can take steps to protect your house from damage in the next flood. Before you start trying to make things just like they were before, look at the floodproofing measures in Step 8. Floodproofing as you repair and rebuild can save you a lot of money over time. Protecting your house from future floods will also add value to your property.

Plan Your Recovery

Get organized with a recovery plan. A recovery plan is simply a list of jobs that need to be done. Planning can help you save time and money. Doing things in the right order will also make everyone feel better—you'll know you are making progress without wasting effort.

To develop a recovery plan, follow these steps:

- ❑ **Make sure it is safe to work in your home.** You will want to go back to your home as quickly as possible. But you must make sure that the building is safe and sound. (See Step 2.)
- ❑ **Review the rest of the recovery steps in this book.** Start making lists. Begin with the big projects such as "replace furnace" and "dry out walls." Write down things you will need, such as cleaning supplies or film and paper for record keeping. If necessary, make plans for a place to stay while you clean up.
- ❑ **Decide what you can and can't do.** You can save money by doing as much of the work described in this book as you can. But be realistic. Jobs such as propping up broken foundations and replacing electrical service boxes are best left to the professionals. Many other jobs may be too involved or too heavy for you.
- ❑ **Decide if you need financial assistance.** If you need to replace items or hire a professional and you don't have insurance, there may be some volunteer organizations that can help you. (See Step 7.) Check the local newspaper and tune in to local radio and TV stations for notices about Red Cross, church, and government disaster assistance.
- ❑ **Check with your mortgage holder.** If your mortgage holder is listed on your insurance policy, you cannot cash your insurance claim check without their approval. Before you decide on repairing and floodproofing, make sure that your loan will not be affected. The mortgage holder may be able to provide financial help, such as deferring interest payments for a month or two.
- ❑ **Think before you use credit cards.** Credit cards may be the fastest way to handle expenses for repair and

Cleanup and Repair—Who Does What?

Jobs you might want to do by following the steps in this book

- Sorting contents to be repaired or discarded
- Drying the ceiling, walls, and floors
- Drying and cleaning electrical circuits and boxes (if code allows)
- Removing minor debris such as branches and trash
- Checking the gas or oil system
- Fixing leaky pipes
- Checking the sewage disposal system
- Cleaning the building and contents
- Checking sources of financial help
- Doing minor floodproofing projects, such as building an earthen wall or raising appliances

Jobs that usually require services of a professional

- Making structural repairs
- Restoring electrical service
- Replacing, taping, and finishing wallboard
- Checking the water system to make sure that it is safe to drink (This service is often free from the local health department.)
- Removing major debris, such as cutting trees
- Cleaning and repairing electrical and gas appliances and motors
- Cleaning leather, furs, upholstered furniture, and expensive carpeting
- Doing major floodproofing projects, such as moving or elevating a house

rebuilding, but they are also very costly. Their interest rates can be as high as 2 percent a month—that's 24 percent a year. A second mortgage or a low-interest government loan is a much less expensive way to borrow money for home repairs.

- ❑ **Keep talking openly with your family.** Some of the biggest problems that come with a disaster are the mental strain of the loss and worries about the future. Work together and let everyone know what you will be doing in the days ahead.

STEP 4

Dry Out Your Home

Floodwaters affect a house in 3 ways:

1. *The water damages materials. Wallboard will disintegrate if it stays wet too long; wood can swell, warp, or rot; electrical parts can short out, malfunction, and cause fires or shock.*
2. *Mud, silt, and unknown contaminants in the water not only get everything dirty; they are also unhealthy.*
3. *Dampness promotes the growth of mildew, a mold or fungus that can grow on everything.*

The following steps work on all 3 of these problems. It is very important to do these steps in order.

Lower the Humidity

Everything will dry more quickly and clean more easily if you can reduce the humidity in the house. There are many ways to lower the humidity and stop the rot and mildew. But you'll have to delay using some methods if you have no electricity. (Read Step 5 before you attempt to restore the utilities.)

- ❑ **Open up the house.** If the humidity outside is lower than it is indoors, and if the weather permits, open all the doors and windows to exchange the moist indoor air for drier outdoor air. Your body will tell if the humidity is lower outdoors. If the sun is out, it should be drier outside. If you have a thermometer with a humidity gauge, you can monitor the indoor and outdoor humidity.

  On the other hand, when temperatures drop at night, an open house is warmer and will draw moisture indoors. At night, and at other times when the humidity is higher outdoors, close up the house.
- ❑ **Open closet and cabinet doors.** Remove drawers to let air circulate. Drawers may stick because of swelling. Don't try to force them. Help them dry by opening up the back of the cabinet so air can get into it. You will probably be able to remove the drawers as the cabinet dries out.
- ❑ **Use fans.** Fans help move the air and dry out your home. Do not use central air conditioning or the furnace blower if the ducts were under water. They will blow out dirty air that might contain contaminants from the sediment left in the duct work. Clean or hose out the ducts first. (See Step 2.)
- ❑ **Run dehumidifiers.** Dehumidifiers and window air conditioners will reduce the moisture, especially in closed-up areas.
- ❑ **Use desiccants.** Desiccants (materials that absorb moisture) are very useful in drying

Items Soaked by Floodwater

Should I Throw Them Out?

Usually
Mattresses, pillows
Foam rubber
Large carpets, carpet padding
Upholstered couches and chairs
Books, paper products

Always
Food
Cosmetics
Medicines and medical supplies
Stuffed animals
Baby toys

Questions About the Safety of Your Food?

Call the USDA Food Safety Hotline:
1-800-535-4555

Professional home economists will answer your questions from 10 a.m. to 4 p.m. eastern time, Monday through Friday.

closets or other closed areas where air cannot move through. Desiccants like those listed below are usually available at hardware, grocery, or drug stores.

- Chemical dehumidifier packs used for drying boats and damp closets.
- Cat litter made of clay.
- Calcium chloride pellets (used to melt ice in the winter). Hang pellets in a pillow case, nylon stocking, or other porous bag. Put a bucket underneath to catch dripping water. Close the closet or area being dried. Be careful. Calcium chloride can burn your skin. It will also make the air salty, so do not use this product near computers or other delicate equipment.

❑ **Call a contractor.** There are contractors who specialize in drying out flooded buildings. They have large fans and dehumidifiers that can dry out a house in a few days. Look in the yellow pages under Fire and Water Damage Restoration or under Dehumidifying. Be careful about contractors who inflate prices after a disaster and about out-of-town contractors who request payment in advance.

Be patient. Drying your house could take several weeks. Until your house is reasonably dry, damage caused by mildew and decay will continue. The musty odor will stay forever if the house is not dried out well.

Sort Contents and Discard Debris

You have 3 types of contents. They should go to 3 different places:

- Items you want to save
- Items to be thrown out
- Garbage

Things You Want to Save

Move things you want to save to a safe, dry place, such as the second story or outside. The longer they sit in water, the more damaged they become. Don't leave wood furniture in the sun because it will warp as it dries. To save an area rug, lay a sheet or some other material on top of it before you roll it up so the colors will not bleed. Clean it promptly.

Things You Don't Want to Save

Put things you don't want to save outside to dry until the adjuster comes to confirm your losses. Take pictures or videotapes and list each item for the record. If you are not sure whether to throw something out, decide whether it is worth salvaging by checking the information in Step 6.

Garbage

Get rid of food and anything else that could spoil or go bad immediately. Don't let garbage build up. Garbage piles will cause yet another health hazard by attracting animals and insects. If your insurance adjuster has not come, tell your agent or adjuster that you need to get rid of potential health hazards. That person will tell you

how to make sure that your losses are covered. Then throw the stuff out, preferably in sealed plastic garbage bags.

Don't take chances with frozen food if the electricity went off unless the food is still thoroughly frozen and contains ice crystals. As a rule, food will remain frozen for up to 3 days in a closed freezer without power. Don't refreeze thawed food. However, you can cook raw meat that was partially thawed and then freeze it.

Dispose of discarded items properly. Do not burn or bury them. There will usually be more frequent garbage pickups after a flood. Your local newspapers or local TV and radio stations will have announcements about trash pickup schedules and drop-off sites.

How Floodwaters Affect Your Home

Once contents and debris have been cleared, the next step is to get the water out of the ceilings and walls. How you drain and dry your ceilings and walls depends on what they are made of.

Wallboard

Most ceilings and walls are covered with wallboard, especially in newer homes. Wallboard acts like a sponge, drawing water up above the flood level. It becomes very fragile if it stays wet for long and will fall apart when bumped. When the wallboard finally dries, there will still be mud and contaminants dried inside.

Wallboard that has been soaked by floodwater can be a permanent health hazard. Therefore, this book recommends that you throw out flooded wallboard. On the other hand, if the wallboard was soaked by clean rainwater, it can be dried in place with plenty of fresh air moving through the area.

Plaster

Plaster will survive a flood better than wallboard. You should not need to replace it, but it will take a *very* long time to dry.

Sometimes the plaster will separate from its wood laths as it dries. Then the wall will have to be removed and replaced.

Insulation

There are 3 main types of insulation, and each reacts differently to floodwaters. Styrofoam survives best; it may only need to be hosed off.

Fiberglass batts should be thrown out if they are muddy. If soaked by clean rainwater, remove them so the rest of the wall can dry. They can be put back in the wall, but it will take a very long time for them to dry.

Cellulose (loose or blown-in treated paper) insulation holds water for a long time. It can also lose its antifungal and fire retardant abilities. Therefore, flooded cellulose insulation should be replaced.

Wood

If it is allowed to dry naturally, wood will usually regain its original shape. Different layers of

Water and Wood

Wood always has some water in it, but a flood can bring its moisture content up to 30 percent. This causes swelling. However, if allowed to dry naturally, wood will usually go back to its original shape. Unlike wallboard, wet studs and sills that are touched by floodwaters do not need to be thrown out. Hollow wood doors usually have cardboard spacers in the middle that lose their shape when wet. Generally, these doors come apart after they are flooded and need to be replaced.

laminated wood, such as plywood, may dry at different rates, and that may cause the layers to separate.

Some contaminants will stay in the wood after it dries, but not as much as stays in flooded wallboard. Wood studs and sills will be covered by new wallboard and painted, so they are well removed from human contact. Therefore, wet wood studs and sills do not need to be replaced if they are allowed to dry properly.

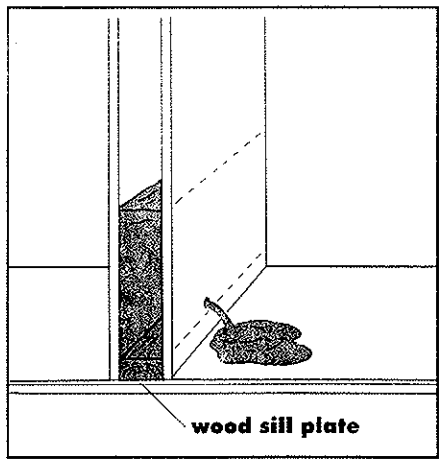
Drain the Ceilings and Walls

Ceilings

Check for sagging ceilings. Drain them carefully as shown in Step 2. If the floodwaters went above your ceiling, you should replace it if it is made of wallboard. A plaster ceiling will dry eventually, but if it has too many cracks or sags, you will have to tear it down and replace it. Remove any wet insulation in the ceiling to allow the joists to dry.

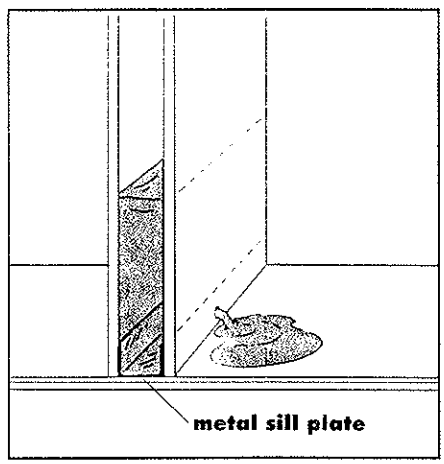
Walls

Remove water trapped within your walls. To check for water, take off the baseboard. Stick an awl or knife into the wall about 2 inches above the floor (just above the 2 X 4 wood sill plate). If water drips out, cut or drill a hole large enough to allow water to drain freely. (Use a hand or cordless drill or saw to avoid shock.) If you are going to replace the wallboard anyway, you don't have to be neat: use a hammer to knock out a hole.



If your walls are plaster, a knife won't penetrate them. Drill a hole above the sill plate to drain the water. (Use a hand or cordless drill to avoid shock.) Do not use a hammer or chisel on plaster because the plaster could shatter.

In a newer home, you may have metal sill plates. A metal sill acts as a gutter at the bottom of the wall cavity. Drill a hole at floor level to drain the water, using a hand or cordless drill.



Repeat the process to drain all the wall cavities. Depending on the spacing between studs in your walls, make a hole every 16 inches or every 24 inches. Watch

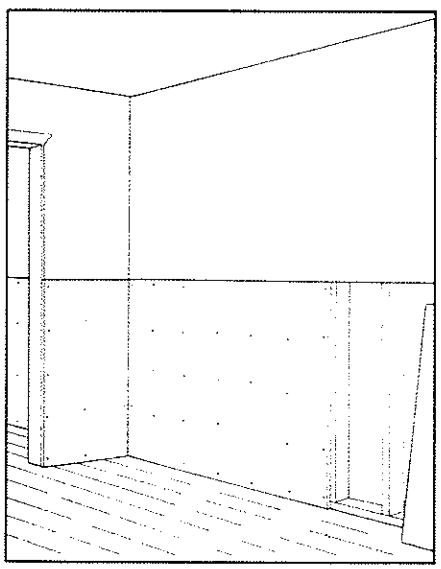
out for the wiring, which is usually at the same height as your electrical outlets. If there is wet insulation, you will have to remove the wallboard in order to take out all the insulation.

Dry the Ceilings and Walls

Flood-soaked wallboard should be removed and thrown away. 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. Different approaches are used for different materials.

Wallboard

If dirty floodwaters soaked the wallboard at least 4 feet above the floor, take down all the wallboard and replace it. If the water was less than 4 feet deep, remove the lower 4 feet of wallboard. You can fill the gap with new 4 ft. X 8 ft. wallboard sheets installed sideways.



If you have Styrofoam insulation—or no insulation—and the wallboard was soaked with clean rainwater, you can dry the walls without removing the wallboard by using the technique explained below for plaster walls. But you will need to remove wet insulation if it is not Styrofoam.

Plaster Walls

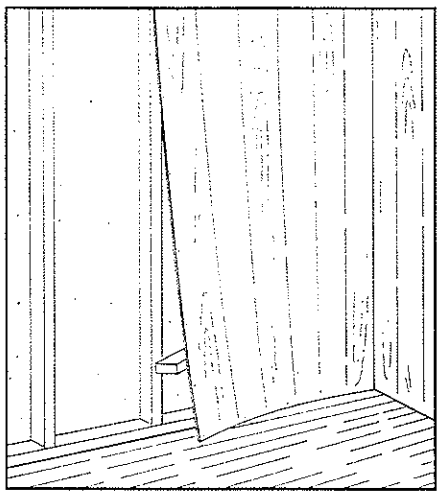
If the plaster or wallboard is clean and in good shape, you can drill or cut ventilating holes in each wall cavity. Place holes low enough so they will be covered by the baseboard after the wall dries out. Open up the wall on both sides of interior walls. For exterior walls, drill or cut holes only on the inside of the house. However, if there is wet insulation, you will have to remove the plaster or wallboard in order to take out all the insulation.

Concrete Block

The cavities in a concrete block wall will drain on their own. The water will not damage the concrete like it will wood or wallboard.

Wall Covering

Vinyl wall covering seals the wall and keeps it from drying out. Wallpaper paste is also a favorite home for mold and mildew. For these reasons, you should remove all wall covering that got wet and throw it out. (If vinyl wallcovering is loose on the bottom, you may be able to save it by pulling it off the wall up to the flood level. Clean and reapply it after everything dries.)



Paneling

Carefully pry the bottom of each panel away from the wall. Use something to hold the bottom away from the sill so the cavities can drain and dry out. You can nail them back into shape after they and the studs dry out. However, if there is wet insulation, you will have to remove the paneling in order to take out all the insulation.

Dry the Floor

Air needs to move around flooded floors so they can dry out. This usually means that you must remove the floor covering. Because floodwaters contain mud and dirt, most soaked floor coverings should be thrown away. Keep a piece of all discarded floor covering so the adjuster can tell its value.

Air needs to circulate below the floor to dry it out. If the crawl space of your house is flooded, pump it out. Remove any plastic sheets, vapor barriers, or insulation from underneath the floor. (Be sure to replace them when the floor and foundation are completely dry.)

If a house with a basement was flooded over the first floor, remove finished basement ceilings, or cut or drill holes between all the joists to allow circulation. Don't cut or drill near electric lines or pipes.

You have now reached the stage where your home should be protected from further damage. Exterior holes have been patched, the utilities have been turned off, and the drying process has started. It may take days or weeks, depending on the humidity, for all the wood and walls to dry out. You can do Steps 5, 6, and 7 while the house is drying. However, do not start Step 8, Rebuild and Floodproof, until the house is completely dry.

Cleaning Floor Coverings

- Small throw rugs can be saved and cleaned in a washing machine.
- Indoor/outdoor carpeting can be hosed off and hung up to dry.
- Large area rugs and any rug with foam backing should be discarded. (Usually only valuable carpets are worth the cost of professional cleaning.)
- If wall-to-wall carpeting was soaked with floodwaters, it usually must be thrown away. To make the job easier, cut it into strips and discard it in pieces that are small enough to carry. Watch out for the tack-down strips along the wall; they have sharp tacks sticking up that held the carpet down.
- A wall-to-wall carpet that was soaked by clean rainwater can be left in place to dry.
- Remove tile, vinyl, or linoleum flooring if it is warped, loose, or has a foam-rubber pad (which should be thrown away).

STEP 5

Restore the Utilities

The rest of your work will be much easier if you have heat, electricity, clean water, and sewage disposal. However, it may take some time for a repair professional to come. If so, you should go to Step 6 and do all the cleaning you can do while you wait for one or more of these utility systems to be restored.

Gas and Oil Systems

If your furnace, water heater, stove, or other gas or oil appliances were flooded to the level of the burners, turn off the valve on the pipe to the appliance. If they were hot when flooded, parts may have cracked. Flood insurance and federal disaster assistance programs will usually help replace flooded gas and oil appliances. If you want to keep a gas or oil appliance, have it cleaned professionally.

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.

Gas System

If the gas has been turned off at the main valve serving your home, you need to have a professional restore gas service to your home, relight pilot lights, and do a final check of the system.

If the gas valve serving only one appliance is turned off, then you can relight that appliance. First, make sure the room is well ventilated and that there are no open flames (or bare electric wires) anywhere. Then turn on the gas valve. Check for leaky pipes. (See box.) Let the gas run for a minute or two to clean any air and impurities out of the pipes. Then turn the gas off for a minute to let the gas in the air go away before you light the appliance.

Oil System

Make sure your main oil valve is turned off. Check your oil pump. If it got wet, have the pump professionally checked and cleaned. If you want to clean it yourself, see Step 6.

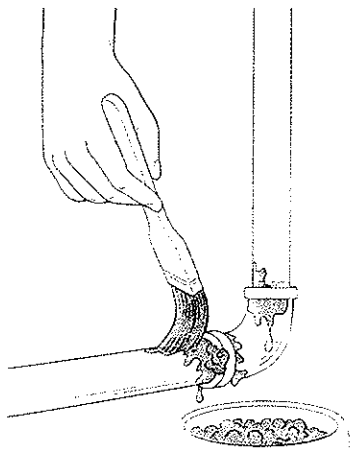
Look carefully for any signs of leaking oil; if you see any, call a professional. Look for signs that the pipes or oil tank moved during the flood. Oil tanks, even buried ones, will float when flooded. After you have turned the electricity back on, open the main valve and turn the pump on. Check for leaky pipes. (See box.)

Propane, L-P, and Butane Systems

These fuels are kept in pressurized tanks, so there is no electric pump to turn on. Check the tanks for signs of movement or floating. Then follow the instructions above for gas systems.

Leaky Pipes

1. Check for leaky fuel pipes by smelling for gas. A chemical that has a disagreeable, distinctive odor is added to natural gas and propane to tell you if there is a leak. If you have any doubts, have a professional check for you. *Do not use open flames.*
2. Make sure the valve that leads to each appliance is closed.
3. If you find any pipes that moved or any area that smells like gas, brush soapy water on each pipe connection. The pressure in the pipes will make bubbles appear where there is a leak.



4. If you find a leak, turn off the gas. Unscrew the pipe connection, clean the joint, and apply pipe joint compound or pipe tape (available at hardware stores) on the threads. Screw the pieces back together tightly.
5. Turn on the gas and check the connection again with soapy water. If you have a leak, or if you are not sure your system is safe, turn off the gas and call a professional immediately.

Electrical Safety

- Use only the electrically operated tools you need, one at a time, to avoid overloading a few working circuits.
- If appliances or motors have gotten wet, have them taken apart, cleaned, and dried before plugging them back in again.
- Make sure all appliances are properly grounded. This is most important if there was damage to the wiring from the flood or during the cleaning.
- 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.
- When in doubt, call an electrician. Electrocution is a major killer in floods.

Important

It is very important that your utility systems and appliances be turned back on the correct way. A leaky gas pipe, an ungrounded electrical appliance, or contaminated water is a serious safety and health hazard. **If you are not comfortable working on your utilities or appliances, call a professional.**

Electrical System

Check with your building or electrical inspector to see how much work you can do on your wiring. Many local codes require that a licensed electrician do the work, or that a municipal inspector check the system before you can turn the power back on.

The electrical system should be tackled in 2 parts: the main breaker or fuse box and the circuits. If the main box got wet, it should be checked and cleaned by an electrician before you turn the power back on. You should have the electrician move your main box above flood level for future protection.

Meanwhile, *if* you are comfortable working with electrical fixtures and wiring, you can clean the flooded circuits. Otherwise call an electrician.

To clean a flooded circuit, follow these steps in order:

1. *Check the switch at the main breaker or fuse box to make sure that the power is still off (see box, page 5.)* Take out the fuses or switch off the breakers to the circuits you will be working on.
2. As noted at the end of Step 2, everything should be unplugged and all light bulbs should be removed. The switches and outlets should be pulled out of the wall. Check the switches and outlets and their boxes for mud and dirt, which can cause a short or overheating. Hose or wash any mud out of the boxes.
3. If you see a lot of mud, dirt, or saltwater corrosion in the switches or outlets, replace them. If you want to keep the switches and outlets that were flooded, rinse them thoroughly in a pail of water. Let them dry for at least 24 hours.
4. Check the condition of the wire that goes to each switch and each outlet. Replace any fabric-covered wire. Plastic-covered wire does not need to be removed unless it has been flooded with salt water. Aluminum wiring may be severely corroded by salt water, so all aluminum wiring that has been flooded by salt water should be replaced before proceeding.
5. After everything has dried out, check to make sure the fuses are still out or the breakers are still switched off. Then reinstall the switches and outlets or install new ones.

If your main breaker or fuse box was not flooded, or if it has been cleaned and checked by an electrician, you can test each circuit once it is cleaned.

To test a cleaned circuit:

1. Make sure nothing is plugged in and no wall switches are turned on.
2. Install one fuse or turn one breaker to ON. Install the main fuse or turn on the main breaker. Some fuse boxes have a main switch—a handle on the outside of the box. It is easier to use the handle than to take out and replace the main fuses.

3. If the fuse blows or the breaker clicks back off, you have a short somewhere. Keep the circuit off and recheck your cleaning and installation work. If the fuse or breaker is OK, wait 15 minutes and then walk around the house. Check for black marks made by sparks or the pungent smell of an electrical short. If there are any signs of smoking or heating, if the fuse blows, or if a breaker goes off, turn the power off and call an electrician.
4. If there are no signs of problems, turn the power off again. Plug a lamp or small appliance in an outlet on the circuit you just tested, or turn on a light switch. Be sure that the appliance you are using to test each outlet is working properly.
5. Turn the power back on and check the fuse or breaker.
6. Repeat steps 4 and 5 on each outlet and wall switch for each circuit to check for shorts or problems.
7. Bathroom and outdoor circuits often have a ground fault circuit interrupter at the breaker box or at a wall outlet. These are very sensitive and may keep tripping the circuit off, so you may have to be extremely thorough in cleaning and drying these circuits.

Water Supply

Public water suppliers usually provide water soon after the flood. If you are unsure of the safety of your water supply, use it only to hose your home or for sanitation purposes (flushing the toilet).

Buy bottled water for drinking if you can. Sometimes large water storage tanks called water buffaloes are brought to communities that need clean water. They are filled with clean drinking water from places outside your area and are towed to your area, often by national guard or U.S. military personnel.

A "boil order" may be issued in your community. If such an order has been issued, do the following:

1. Fill a large pot with water from the tap.
2. Strain the water through cheesecloth, a sheet, a coffee filter, or other clean, porous material to remove as many solids as you can.
3. Bring the water to a rumbling boil and keep it boiling for at least 10 minutes.
4. Pour the water back and forth between two clean pots. This will help it cool and will also add air to the water to make it taste better.
5. Let the water cool. After it is cool, add 8 drops of liquid chlorine bleach (see box, page 26) for each gallon of water. Let the water stand for a half hour. If it gives off a slight chlorine smell and looks clear, it's OK to use.

If you do not smell chlorine, or if the water is still cloudy, add another 8 drops of liquid chlorine bleach and let it stand another half hour. If you smell chlorine, it's OK to use. If you have added bleach twice and the

Will Your House Be Unheated?

If your house will be unheated for a few days, and the temperature will fall below freezing, you should winterize your water pipes so they will not freeze and break. A plumber can blow out the pipes to make sure they are empty. Or you can take the following steps to protect your water and sewer system from damage due to freezing temperatures:

1. Shut off the main water valve. (It is usually found at the water meter.)
2. Turn on all the faucets in the house, both the hot and the cold taps. Leave them on and let them run.
3. Turn off the hot water heater. Open the faucet at the bottom of the water heater to drain it. You may want to connect a hose to the faucet so you can control where the water goes. Be careful; the water may be very hot.
4. Flush the toilets to empty their water tanks.
5. Wait for the lowest faucet in the house to stop running. (This will usually be a faucet in the basement.) Then check all faucets and toilets. If they have stopped running or are empty, your water system should be drained.
6. Pour some propylene-glycol–based antifreeze in all sink, tub, and floor drains and in the toilet bowls. (This type of antifreeze is available through recreational vehicle and mobile home dealers. **Do not use regular automotive antifreeze.**) These drains have traps that keep water in them.
7. You can turn the main valve back on after the building is heated. Do this before you start your repairs. That way, if there is a broken pipe, a water leak won't cause much damage.

water still does not smell like chlorine, don't use it for drinking or cooking.

Do not cook in pots and pans or use eating utensils, baby blankets, or any other items that could go in the mouth or be used to cook in until they have been washed and disinfected in water that has been tested and approved by the water supplier or health department.

Wells. Private wells should be pumped until the water is clear. You can decide whether water is clear enough to hose the house and do other cleaning work. Check with the local health department for instructions before you drink or cook with your well water. Their instructions will account for minerals and chemicals in the water in your area. The health department should be able to advise you about the best way to have your water tested if necessary.

If there are no specific instructions from the local health department, follow these steps to purify your well and water:

1. Open your faucets to pump the water out of your well. Let them run for at least 15 minutes or until you lose pressure.
2. Pour one quart of liquid chlorine bleach (see box, page 26) in the well and leave it for at least 4 hours. Do not use *any* water during this time.
3. Open all the faucets and let them run until you smell chlorine at *each* faucet.
4. Turn off the faucets and let the water sit in the pipes for 2 to 4 hours. Do not use *any* water during this time.
5. Flush out the system by running the taps until you can no longer taste or smell the chlorine.

Water Heater. Check your water heater. If floodwaters got into the gas burner, electrical parts, or insulation, it should be replaced. If you want to save it, have it cleaned and restarted by a professional. If it was not flooded, be sure to flush clean water through it before you wash dishes or clothes with hot water.

Sewage Disposal

Public sewers should work soon after a flood, but mud and debris might clog them. Flush the toilet before you use it. If it is clogged, check with your local sewer department to see if the problem is in the main line. You may need to clean out the sewer line from your house to the main line.

Septic systems will not work until the groundwater level is below the distribution lines. So be careful about flushing the toilet and pouring things down the drain; they may not have anywhere to go. Until your toilet works, you can line it with a plastic trash can liner and dispose of the bag as necessary.

STEP 6 Clean Up

The walls, floors, closets, shelves, contents—every flooded part of your house—should be completely washed and disinfected. Some projects, such as washing clothes, may have to wait until all the utilities are restored. Others may be best done by professionals. This section offers suggestions on the best way to clean flooded items.

Cleanup Supplies

The Red Cross and other organizations often distribute cleanup kits after a disaster. These contain many useful items such as a broom, mop, bucket, and cleaning supplies.

In most cases, household cleaning products will do the job if you use them correctly. Check the label on the products to see how much to use. Some products shouldn't be used on certain materials; the label will tell you that. Apply cleaner and give it time to work before you mop or sponge it up. Follow directions and all safety precautions on the container.

After cleaning a room or item, go over it again with a disinfectant to kill the germs and smell left by the floodwaters. You may also need to get rid of mildew, an unwelcome companion to moisture that shows as fuzzy splotches.

Cleaning Tips

Tackle one room at a time. A 2-bucket approach is most efficient: use one bucket for the cleaning solution and the other for the rinse water. Rinse out your sponge, mop, or cleaning cloth in the rinse bucket. Wring it as dry as possible and keep it rolled up tight as you put it in the other bucket. Let it unroll to absorb the cleaning solution. Using two buckets keeps most of the dirty rinse water out of your cleaning solution. Replace the rinse water frequently. (See box on page 26 for types of products to clean, disinfect, and remove mildew.)

Walls

Start cleaning a wall at the bottom or where the worst damage was. If you did not have to remove the wallboard or plaster, you may find the wallboard or plaster won't come clean and you will want to replace it rather than clean it. If you *have* removed the wallboard or plaster, wash the studs and sills and disinfect them.

Windows

If you taped your windows before the storm, clean the tape off as soon as possible. The sun will bake the adhesive into the glass. If glass cleaners don't remove the adhesive, try tar remover, acetone, nail polish remover, or a razor blade. And next time, don't bother taping the windows. You don't get much protection for all that effort.

Cleaning Supplies Checklist

- Brooms, mops, brushes, sponges
- Buckets, hose
- Rubber gloves
- Rags
- Cleaning products
- Disinfectants
- Lubricating oil
- Trash bags
- Hair dryer

Clean
1st choice: Nonsudsing household cleaners
2nd choice: Laundry soap or detergent

Disinfect
1st choice: Household disinfectants or sanitizers, such as the quaternary, phenolic, or pine-oil disinfectants. (Check labels for the contents.)
2nd choice: 1/4 cup (2 ounces) of liquid chlorine bleach mixed in 1 gallon of water. (See below.)

Remove Mildew
1st choice: Household mildew removers or mildewcides.
2nd choice: Washing soda or trisodium phosphate (available at grocery or paint stores). Use 5 tablespoons for each gallon of water.
3rd choice: 1/4 cup (2 ounces) of laundry bleach mixed in 1 gallon of water. (See below.)

Bleach
Liquid chlorine bleach, such as Clorox bleach or Purex bleach, can do a variety of flood cleanup jobs. Make sure that 5.25 percent sodium hypochlorite is the only active ingredient. Bleach that has a scent added to improve its smell is available. Scented bleach is fine for cleanup jobs, but don't use it to purify drinking water. Don't use dry bleach or any bleach that does not contain chlorine.

Be careful of fumes, and wear rubber gloves. Read the safety instructions on the label. Do not mix bleach with other household chemical products, especially ammonia or toilet bowl cleaner; the chemical reaction can create a poisonous gas. Do not use bleach on aluminum or linoleum.

Furniture

Don't try to force open swollen wooden doors and drawers. Take off the back of the piece of furniture to let the air circulate. You will probably be able to open the drawers after they dry.

Solid wood furniture can usually be repaired and cleaned, but wood veneer often separates and warps. Wood alcohol or turpentine applied with a cotton ball may remove white mildew spots on wood. Cream wood restorers with lanolin will help restore good wooden furniture parts.

Upholstered furniture soaks up contaminants from floodwaters and should be cleaned only by a professional. This is also true of carpets and bedding. Unless the piece is an antique or very valuable, upholstered furniture soaked by floodwaters should probably be thrown out. Get a cost estimate from a professional to see if furniture is worth saving.

Appliances

There's an unexpected danger of shock with some electrical appliances such as TV sets and radios. Certain internal parts store electricity even when the appliance is unplugged. Check the back for a warning label. Appliances with such labels will need professional cleaning. Be sure to get a cost estimate to see if they are worth saving.

You'll need appliances such as the washing machine, dryer, dishwasher, and vacuum cleaner to help clean your house and its contents. The motors or heating elements can usually be cleaned. If you can't wait for a professional cleaning job, unplug, disassemble, and hose off the appliances thoroughly (with hot water, if possible). Then clean and disinfect them, but do not use detergents.

Clean and disinfect dishwashers, washing machines, and dryers only with water that has been declared safe for drinking. Make sure the sewer line is working before you start a dishwasher or washing machine.

You can speed up the drying process for motors and parts by using a blow dryer or a moisture displacement spray. Moisture displacement sprays, such as electronics parts cleaners or WD-40 lubricating and penetrating oil, are available at hardware or automotive parts stores. The sprays can also stop rust and corrosion until the appliance can be disassembled and cleaned. One word of caution: the spray is flammable. Read and follow label instructions and precautions.

Moving parts such as motors and pulleys will need oil or grease. Contacts and electrical switches can be cleaned with a moisture displacement spray or an aerosol contact cleaner available at electronics or auto parts stores. Allow a motor to run for 30 minutes with no load before you use it. For example, run the vacuum cleaner without connecting the belt.

Watch for stripped or damaged insulation around wires. Be sure all appliances are properly grounded. Appliances that

must be grounded have a round third prong or a grounding wire on their plugs. Review the information on your electrical system in Step 5.

Refrigerators, freezers, and ovens are more complicated. They may have foam insulation and sealed components that suffered little water damage. But these appliances hold food, and so they should be cleaned, disinfected, and checked by a professional or replaced. If your repair person says an expensive appliance should be replaced, get the opinion in writing and discuss it with your insurance adjuster before you spend money for another one.

Clothing and Linens

Even if your washing machine did not get wet, do not use it until you know that the water is safe enough to drink and that your sewer line works. (Perhaps a friend or relative has a washing machine you can use until yours is clean and working.)

Before you wash clothes in the washing machine, run the machine through one full cycle. Be sure to use hot water and a disinfectant or sanitizer.

Take clothes and linens outdoors and shake out dried mud or dirt before you wash them. Hose off muddy items to remove all dirt before you put them in the washer. That way your drain won't clog.

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, but bleach fades some fabrics and damages other fabrics. You can buy other sanitizers, such as pine oil cleaners, at the grocery store to sanitize fabrics that cannot be bleached.

If the label says "Dry Clean Only," shake out loose dirt and take the item to a professional cleaner. Furs and leather items are usually worth the cost of professional cleaning. If you want to clean leather yourself, wash the mud off and dry the leather slowly away from heat or sunlight.

Kitchen Items

Throw out soft plastic and porous items that probably absorbed whatever the floodwaters carried. Floodwaters are contaminated, so you may want to wash dishes by hand in a disinfectant. Air dry the disinfected dishes; do not use a dish towel.

Like the washing machine, the dishwasher should be used only after you know your water is safe to drink and your sewer line works. Clean and disinfect it first. Then use a hot water setting to wash your pots, pans, dishes, and utensils. (If you have an energy saving setting, do not use it.)

Food

Throw out any food that has been touched by floodwaters. Even canned food should be discarded if the cans got wet during the flood because there is no way to be absolutely certain the food inside is safe. Do not keep food in bottles or jars with bot-

tle caps or screw-on lids—they do not keep out floodwaters.

The U.S. Department of Agriculture operates a food safety hotline. Professional home economists can answer your questions about whether to keep or discard food. Call 1-800-535-4555 between 10:00 a.m. and 4:00 p.m. eastern time, Monday through Friday.

Paper and Books

Valuable papers such as books, photographs, and stamp collections can be restored with a great deal of effort. They can be rinsed and frozen (in a frost-free freezer or commercial meat locker) until you have time to work on them. A slightly less effective alternative to freezing is to place paper in a sealed container, such as a plastic bag, with moth crystals.

Dry papers quickly when you thaw or unseal them. (A blow dryer will do.) Don't try to force paper products apart—just keep drying them. Photocopy valuable papers and records soon because substances in the floodwater may make them deteriorate.

If a computer disk or tape has valuable information, rinse it in clear water and put it in a plastic bag in the refrigerator. Later, you can take it to a professional drying center and have the data transferred to a good disk or tape. Many companies that specialize in restoring computers and computer records after a disaster are members of the Disaster Recovery Institute. To find a member company near you, call (314) 846-2007.

The Yard

As you get rid of things from your house, don't turn your yard into a dump. Health hazards such as food and garbage must be hauled away as soon as your insurance agent or adjuster has told you how to make sure their loss is covered. Other things you throw away should be removed as soon as your insurance adjuster says it's OK.

Mosquitoes can carry many diseases, and a flood can create ideal conditions for them to breed. Drain or remove standing water because it can become a breeding ground. Also dump water out of barrels, old tires, and cans. Check to be sure that your gutters and downspouts are clean and can drain. Ditches and drains also need to be cleaned so they can carry storm water away from your house.

If you can't get rid of standing water, your hardware or farm supply store may carry a commercial product that kills mosquito larvae but does not harm other animals. A slightly less effective method is to apply a thin film of cooking oil to the water. Repeat the application within a few days if a rain has disturbed the film.

The Lawn

Lawns usually survive being underwater for up to 4 days. Salt water should be hosed off the lawn and shrubs. Some grasses are not damaged by saltwater flooding. Check with your local nursery, garden store, or Cooperative Extension Service (see below). You may have to

replace the lawn if there was mud thicker than an inch deep, erosion, or chemicals in the floodwaters.

Further Information

You will probably see more detailed instructions on how to clean various contents in your local paper or hear them on the radio or TV. Many Cooperative Extension Service offices have more information, especially on animals, vegetables, landscape plants, and household items. Check your telephone book under the name of your county. For example, if you live in Jefferson County, look under Jefferson County Cooperative Extension Service.

STEP 7

Check on Financial Assistance

How much you rebuild and replace depends on what you can afford. Four sources of financial assistance can help you through recovery: insurance, government disaster programs, volunteer organizations, and businesses.

If you are fully insured (80 percent of the replacement cost of your home), you may only have to pay the deductible and your flood insurance policy will pay for professional cleaning and reconstruction. Even if you are insured, the other sources of assistance can help with expenses that your insurance policy doesn't cover.

Volunteer Organizations

Private volunteer organizations such as the American Red Cross, the Salvation Army, and church groups are usually on the scene during or right after a flood. These groups help with things people need right away, such as new clothing, groceries, shelter, medical aid, and counseling.

Some private organizations can help you restore your house. They may offer supplies or even volunteers to help you clean up and rebuild. The services are usually provided free of charge regardless of a person's eligibility for government aid.

The American Red Cross provides emergency assistance to people affected by disasters, whether or not the affected area has been declared a disaster area by a governor or the President. All Red Cross disaster assistance is free and is provided as a gift of the American people. The Red Cross does not receive funding from the government to provide this assistance.

The American Red Cross can help by providing you with a voucher to purchase new clothing, groceries, essential medications, rent, bedding, essential furnishings, and other items to meet emergency needs. The Red Cross can also provide you with a cleanup kit: mop, broom, bucket, and cleaning supplies. Listen to news reports to find out where to go for this assistance, or look up *American Red Cross* in the telephone book and call.

Businesses

Your local TV, radio, and newspapers will usually publicize the ways that businesses are contributing to the recovery process. Some businesses may offer reduced prices, but be wary of "flood sales" of flood-damaged items.

Some insurance companies and lenders may let you delay your monthly payments. Sometimes banks will offer low-interest loans for reconstruction. While these may seem easier to get than government disaster loans, their interest rates are usually higher.

Be careful about out-of-towners who offer "special deals," especially repair contractors. Sometimes the local builders' association will offer advice on reconstruction or advice on choosing contractors. (See Step 8 on dealing with repair contractors.)

Flood Insurance Claims

You may have as many as 3 separate insurance policies: homeowner's, flood, and wind and hail. This section covers the procedures for handling a flood insurance claim. Claims for damage not caused by the flood will be handled in a similar manner.

You should call your flood insurance agent to file a claim and to report your damage as soon as possible after the flood. An adjuster will be assigned to visit your home so that your claim can be settled. Be sure you leave phone numbers where you can be reached.

If you are unable to contact your agent or company, call the National Flood Insurance Program at 1-800-638-6620.

Under ideal conditions, the adjuster should contact you to set up an appointment to visit your home within a few days after you call your agent. But if flood damage is widespread in your area, it may take longer for the adjuster to schedule a visit, and it may take time for your claim to be settled. If flooding is extensive, the adjusters will schedule their visits to review the most severe damage first. The adjuster cannot estimate your damage until floodwaters are away from the building.

In the meantime, protect your home and its contents from additional damage, but do not make repairs that make it impossible for the adjuster to see the damage. Step 2, Give Your Home First Aid, discusses how to protect your home from further damage.

While you are waiting for the adjuster, the following suggestions will help you organize the information that you will need:

- ❑ **Take photos or videotape the damage** to both the inside and outside of the building and the contents.
- ❑ **Separate your damaged and undamaged belongings** and store them for the adjuster to examine.
- ❑ **Find receipts, cancelled checks, or proofs of purchase** for high-cost items such as major appliances, if possible. The adjuster will need the manufacturer's name; serial and model numbers; price; location and date of purchase; and a description of the item.

The claims adjuster's job is to collect information, which is then sent to a central office for processing. The insured (you) must file a Proof of Loss form within 60 days of the flooding. In many cases, the adjuster will ask you to sign this form and then file it for you. The form states the amount of your loss and is signed by both the insured and the adjuster. An important point to remember is that *you may not be reimbursed*

Some Points on Settling Claims

- You are supposed to be reimbursed fairly for your loss, but you are not supposed to profit from a disaster.
- You cannot collect more than the face value of your policy.
- You cannot collect for uninsured items, such as landscaping.
- Most adjusters receive a flat salary or compensation for each case they handle. There are no financial incentives that encourage the adjuster to give you a small claim payment.
- You should get the adjuster's name, company, and telephone number. He or she will probably be from out of town.
- In most cases, you will be reimbursed for the actual cash value of an item. That is the cost of replacing the item minus depreciation. If your policy is for 80 percent or more of the replacement cost of your house, you will be reimbursed for the replacement value of damage to your house (no depreciation).
- If you have problems with a flood insurance claim, your policy should list an office or telephone number that you can contact, or you can call your insurance agent.

for expenses not authorized by the adjuster.

You can ask the adjuster for an advance or partial payment for your building or contents loss, especially if you need the money to make your house liveable. Later, when your total payment is determined, the amount you were advanced will be subtracted from it. You can also ask for a partial payment if you disagree with the amount of your loss on the Proof of Loss form. Tell your adjuster if you disagree and ask what steps can be taken to straighten out your claim payment.

The check to settle your flood insurance building claim will most likely be made out in your name as well as the name of your mortgage holder. Some insurance companies may send the payment to your mortgage holder. Talk to your mortgage company ahead of time to make sure there won't be a delay in getting your claim payment to you.

Disaster Assistance

If the flooding was widespread and caused a lot of damage, your community might be eligible for state or federal aid. Before it can receive such assistance, your community must be declared a disaster area by your governor, a federal agency director, or the President. Local TV, radio, and newspapers will keep you informed about disaster declarations and where to get information about any programs that might be available to you.

If the flood was severe and your area is declared a major disaster area by the President, one or more Disaster Application Centers (DACs) may open. These centers give information and take applications for assistance. They are usually located in a school or other public building.

Check local TV and radio reports and newspapers for the location and hours of DACs. A toll-free (800) number may also be publicized to call for information on programs and to take applications for assistance over the phone. A TDD line is usually available.

Federal disaster assistance may be available in some cases to deal with uninsured losses and needs. People who are not insured should go to a DAC first. If possible, those with insurance should file their Proof of Loss form before visiting a DAC. If there is a long wait, you can make an appointment for another day or use the 800 number.

When you go to a DAC or apply for disaster assistance, take as many of the items listed in the box on this page as possible. The first person you will talk to at a DAC will be the receptionist. He or she will review your damage and needs and identify the programs most appropriate for you. You will receive a checklist of programs that can help you. You can then talk to representatives of these programs in the DAC.

There are 6 types of federal or state disaster assistance. Except as noted, the following are available *only* if the President issues

DAC Visit Checklist

Before you go to a DAC or phone the 800 number, do your best to get together the following information and documents. If you don't have all of them, don't worry; gather what you have and start your disaster assistance application process.

- Your name, address, social security number, and identification
- Telephone numbers where you or a neighbor can be reached
- Names and ages of all persons living in your home at the time of the flood
- Insurance papers, including the Proof of Loss form
- A summary of your damage and a rough idea of the cost of repair or replacement (See Step 3.)
- Your income and the income of all other members of your household
- A list of who you owe money to and how much you owe (mortgage, car loan, etc.)
- The total amount of your living expenses (rent or mortgage payment, food, clothing, utilities, medical, and transportation costs)
- Directions to your property, starting from a major road, and a road map with an X for your property

a disaster declaration for your area.

Disaster Housing Assistance
This program may provide a safe place to live until repairs to damaged homes are completed. Rent assistance or mobile homes may be provided to those without insurance. If repairs can be done quickly to make your house liveable, the program may provide funds to make those repairs.

Disaster Loans
Home and business owners, farmers, and others with real or personal property losses may be eligible for low-interest loans. These loans are administered by the federal government's Small Business Administration (SBA) and the Farmers Home Administration (FmHA). SBA and FmHA may provide loans even if there is no Presidential disaster declaration.

Eligibility and loan interest rates vary according to the income and financial condition of the applicant. Check your local paper or TV or radio station for the type of loans available for replacing your personal property and for repairing your house.

Individual and Family Grants
This program may provide funds for necessary expenses and serious needs. Grants can cover immediate expenses such as medical treatment, transportation, home repair, replacement of essential personal items, and the cost of protecting your property from the flood. Applicants must not have other financial or insurance resources or be able to qualify for an SBA disaster loan.

Income Tax Deductions
If a federal declaration is made, you might qualify to file an amended tax return for the past year and get a partial refund for your uninsured casualty losses. Even if no federal declaration is made, you can often deduct your uninsured losses on your next income tax return. Ask the Internal Revenue Service for Publication 547, *Non-Business Disasters, Casualties, and Theft,* for more information.

Floodproofing Assistance
Restoring a building to the condition it was in before the flood used to be the focus of government disaster programs. Now some programs encourage floodproofing—that is, modifying the building to help it withstand damage from the next flood. (See Step 8.) The SBA's Disaster Loan program can loan additional money to cover certain floodproofing costs—ask SBA about it. Other programs for floodproofing assistance vary from state to state.

Counseling
A variety of programs give advice on recovering from a disaster. These include help with unemployment, food stamps, income taxes, insurance claims, legal issues, veterans benefits, and

crisis counseling. Crisis counseling can be especially helpful in coping with problems as you recover from the flood before they get out of hand.

Rebuild and Floodproof

Don't just build it back; build it better. Now is the best time to think about floodproofing your home because you can do many things that will protect your property in the future. Many floodproofing measures are quite simple, cost effective, and easy to put in place. By floodproofing as you rebuild, you can make the next flood easier on you and your wallet.

Floodproofing

To floodproof means to remodel or rebuild using materials and methods that will prevent or minimize damage from future floods. There are many benefits to floodproofing your house:

- Floodproofing will save you money and aggravation during the next flood.
- Many floodproofing measures are inexpensive.
- Protecting your house from future flood damage will increase your property's resale value.
- Many floodproofing measures can be easily worked in during repair and rebuilding, reducing your costs.
- Some financial assistance programs can help pay for floodproofing.
- By preparing for the next flood, you regain control over your future—a guaranteed way to reduce your level of anxiety and stress. You don't need to wait for the government to act; you can take care of protecting your home yourself.
- Floodproofing won't make it possible for you to stay at home in a flood. But it is likely to make it much quicker and easier for you to clean up the next time.

Before you repair or rebuild, the first thing you should do is talk to your town's or city's building department. You will need to ask the following questions:

- ❑ What are the procedures for applying for a building permit? What inspections will need to be done?
- ❑ Is your home substantially damaged? (See box, page 38.) This is important because you may be required to elevate or relocate your house to meet local building codes.
- ❑ Are there additional building code requirements or other restrictions on what you can do to your house and your property?
- ❑ What flood protection level should you use to protect your home? The *flood protection level* is the level of flooding that you want your house to be able to withstand without damage to your house or your belongings.

Start by asking your building department what flood

protection level it requires for your area. If there has been a flood higher than the level they give you, you should use that flood's level plus 1 or 2 feet for safety. The next flood may be worse.

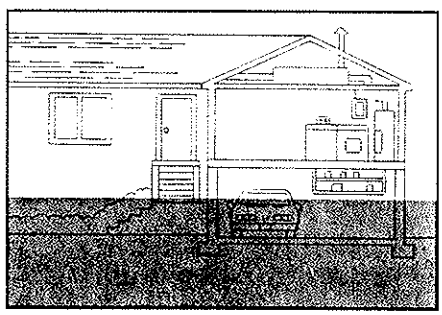
The next step is to decide if you will be better off living in a different location, away from areas that flood. Ask your building official about government agencies that sometimes purchase property for open space or flood protection in areas that flood—you may qualify.

If you are sure that you will repair or rebuild your house in the flood-prone area, choose the floodproofing type that is best for your home or property. There are 5 basic types of floodproofing described here, as well as rebuilding tips to help you safely repair and rebuild.

Five Types of Floodproofing

1. Elevation

Most houses can be raised so that the lowest floor is above the flood protection level. If you had foundation damage from the flood, you may need to raise the house to repair it. It will be easier and cheaper to elevate the house at that time.



There should be many contractors qualified to undertake elevating your house above flood level. Elevation or relocation are the only reasonable ways to protect your home if it is subject to coastal flooding or to deep flooding (flooding more than 6 feet deep). Elevation and relocation are also the most dependable measures for floodproofing your home.

An elevated building will need a new foundation. The contractor will jack up the house and set it on a temporary framework called cribbing while the new foundation is built underneath. The foundations of an elevated building may be columns, piers, pilings, or raised foundation walls (see drawing). The elevated building will usually look better and have added protection if fill dirt is placed around the new foundation. But check with your building department before adding fill dirt. It may not be allowed in all areas of your community.

2. Relocation

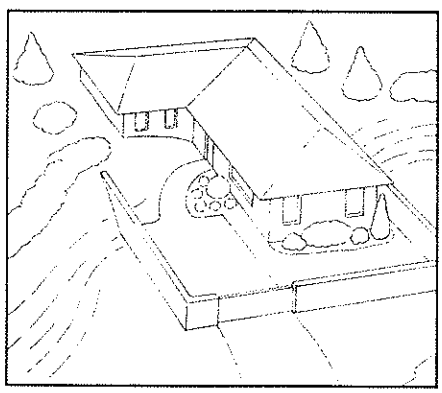
Moving a building out of the flood-prone area is the surest way to protect it from flood damage. Most houses and smaller commercial buildings in good condition can be moved, and it is usually no problem to find contractors experienced in moving buildings. You will have to purchase a new lot unless your present lot is large and has a good spot on higher ground for

your house. Relocation and elevation are the only reasonable choices for protecting a house that is subject to deep flooding (flooding more than 6 feet deep) or to coastal flooding.

3. Floodwalls

Floodwalls, berms, and levees all work to keep floodwaters from reaching your house. They are built to at least the height of the flood protection level in your area. Floodwalls are usually made of concrete. Berms are simply small levees, usually built from fill dirt.

Floodwalls, berms, and levees can either surround the building (ring levee) or connect to high ground. They can also be built up against a building's foundation walls. A sump and pump will be needed to pump out water that seeps under the wall. Floodwalls, levees, or berms may not be allowed in your area if they could create a drainage problem on your neighbor's property. Check with your building department before you build.

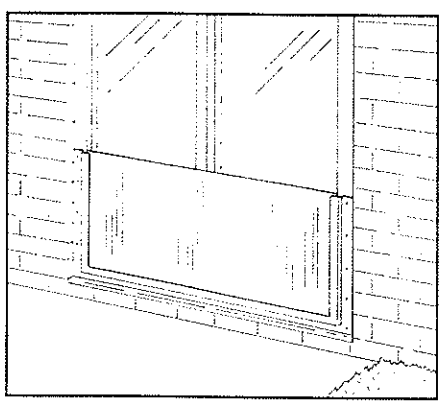


Floodwalls of all types work best in places where flooding is less than 3 feet deep. If floodwaters near your house develop swift currents, earthen levees and berms cannot be used—they may wash away. Floodwalls and berms may not be appropriate for homes with basements.

If there is not enough room for a berm or levee, you may be able to build a floodwall of concrete, which takes up less room. The wall should contain internal reinforcing bars to add strength to the wall and to help it resist cracking and damage from settling over time. The wall must be properly anchored to withstand the same water pressure that can destroy basement walls. (See page 8.)

4. Dry Floodproofing

Dry floodproofing means sealing a building to keep floodwaters out. All areas below the flood protection level are made watertight. Walls are coated with plastic or rubberized sheeting or special waterproofing compounds. Openings such as doors, windows, sewer lines, and vents are closed permanently, or they are temporarily sealed with removable shields or sandbags.



Dry floodproofing can only be

When to Floodproof

Two projects should be incorporated into your repairs:

- If your foundation must be rebuilt, you may be able to relocate or elevate using the same equipment needed to hold the house up during foundation repairs.
- Wet floodproofing measures are easy and not very costly. A number of the Rebuilding Tips in this section will help you as you repair your home.

Of course, some of the measures can be implemented after repairs are made. For example, it may be easier to build a floodwall or berm during summer vacation. In the meantime, you should order the floodproofing publications listed at the end of Step 9 and read about how to protect your home with floodproofing.

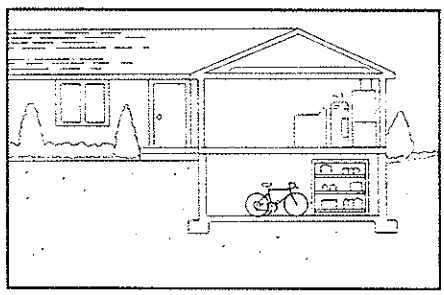
Is Your House Substantially Damaged?

Substantially damaged means that the cost to restore your house to its "before damaged" condition would equal or exceed 50 percent of the value of your house before the damage occurred.

done if the walls of your house are strong enough to hold back the floodwaters without collapsing. For this reason, dry floodproofing is not recommended if your flood protection level is more than 2 or 3 feet above ground level. Dry floodproofing is generally *not* appropriate for houses with basements or crawl spaces. (See pages 8 and 9.)

5. Wet Floodproofing

Wet floodproofing means modifying a building so that floodwaters will cause only minimal damage to the building and contents. Building materials below the flood protection level are replaced with materials that are resistant to water. Floodwaters are allowed into the building to counteract the pressure of the water on the outside of the walls. (See drawings, pages 8 and 9.)



You should furnish areas that have been wet floodproofed with light, portable furniture that can be easily and quickly moved before a flood. Objects that are difficult to move quickly, such as furnaces, water heaters, appliances, and bookcases, are either put permanently on platforms or reinstalled upstairs.

Wet floodproofing has one advantage over the other 4 floodproofing types: even the smallest efforts will significantly reduce flood damage the next time. Thousands of dollars can be saved simply by moving furniture and electrical appliances out of areas that will flood. If you decide not to use one of the other 4 floodproofing types, you should use wet floodproofing measures as you repair and rebuild. The Rebuilding Tips in this section give more wet floodproofing ideas.

Building Permit

Once you've determined the repairs and floodproofing measures you are going to take, local codes generally require that you get a building permit. Before you make repairs or alterations to your home or property, make sure your plans are reviewed and OK'd by your building department. You may also need to get the OK of your homeowners' association or mortgage holder before you make repairs or alterations to your home or property.

If you are just replacing items such as carpeting or wallboard, you will probably not need a permit—but you should check with your local building department before you proceed. You will usually have to get a permit for electrical work and repairs of structural damage, such as broken walls.

Most local and state building codes require that a building that is substantially damaged (see box) be treated as a new building. A new residential building must be built so that its

lowest floor is at or above the flood protection level. In other words, if your house is substantially damaged, you will have no choice but to elevate or relocate your house in order to meet local building codes.

Failure to follow the local building code can result in an order to stop reconstruction, a fine, higher flood insurance rates, denial of flood insurance, or all of the above.

Rebuilding Tips

Give your house plenty of time to dry. Many problems result from rebuilding after a flood before everything dries. If it takes a week for the moisture you can see to disappear, allow at least another week for the parts you cannot see to dry. Don't try to force a swollen door to close. Don't force wooden parts to fit. When completely dry, the wood may regain its original shape.

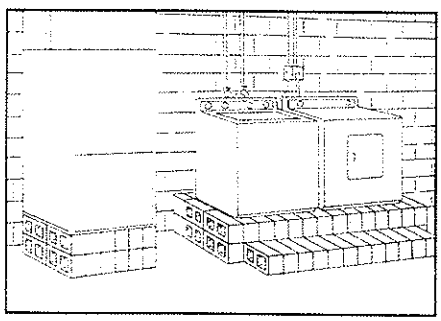
There are small, inexpensive measures you can take to make your recovery easier after the next flood.

Utilities

Move the main breaker or fuse box and the utility meters above the flood protection level for your house. Make sure each circuit is labeled so you know which circuit controls which outlet and switch. If the electrical code allows, raise the electrical outlets and switches above your flood protection level.

If you are going to replace a flooded furnace, water heater, or air conditioner, install the new one on a higher floor. If your new air conditioner or heat pump will be outside, install it on a platform above your flood protection level. A water heater can be put anywhere near a hot water pipe. An updraft furnace located in a basement can be replaced with a downdraft furnace on a floor above the flood protection level.

Where the flood protection level is not too high, a furnace, water heater, or other heavy appliance can be raised on a platform inside the house. Put the appliance on concrete blocks or a wooden platform supported by concrete blocks. Make certain that appliances such as washers and dryers are secure and will not vibrate off the blocks or platform during use.



You can protect the furnace, water heater, washer, and dryer from shallow flooding with a low floodwall built around the appliance. A concrete or wooden wall 1 or 2 feet high can stop low-level flooding. The wall should be waterproofed with plastic sheeting or waterproofing compounds that can be purchased at hardware stores.

Products That Resist Water Damage

The products below resist water damage and are safe to use in flood-prone areas.

- Concrete, concrete block, or glazed brick
- Clay, concrete, or ceramic tile
- Galvanized or stainless steel nails, hurricane clips, and connectors (in areas subject to saltwater flooding)
- Indoor-outdoor carpeting with synthetic backing (do not fasten down)
- Vinyl, terrazzo, rubber, or vinyl floor covering with waterproof adhesives
- Metal doors and window frames
- Polyester-epoxy paint (Do not use mildew-resistant paint indoors, especially on cribs, playpens, or toys, because it contains an ingredient that is toxic.)
- Stone, slate, or cast stone (with waterproof mortar)
- Mastic, silicone, or polyurethane formed-in-place flooring
- Styrofoam insulation
- Water-resistant glue

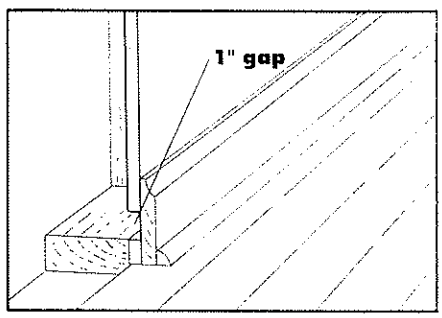
Walls

Wash and disinfect the studs and sills if the wallboard and insulation had to be removed. If you are going to rebuild the walls, remember that metal studs and sills are not damaged by water as much as wooden ones.

Pressure-treated wood will resist mildew and wood-eating insects outdoors, but it may swell as much as untreated wood when it is soaked. Some kinds of pressure-treated wood should not be used inside the house, where they will come into contact with food or skin. (It depends on which chemicals were used to treat them.) Ask your lumber company to help you choose the right products for the jobs you will do. They should also have consumer information sheets that give specific precautions for some products. Ask for them.

Wallboard

Think horizontal rather than vertical. Install the wallboard panels sideways so they are only 4 feet high. If the next flood is less than 4 feet deep, you will only have to replace half the wall. (See page 19.)



This drawing shows another suggestion. Leave the wall open one inch above the sill. The baseboard will hide this gap. When you remove the baseboard after the next flood, the wall cavity will drain freely and air will circulate better. Check your local codes, however. If a fire wall is required, the building code may not allow the gap.

"Greenboard" or other moisture-resistant wallboard is made for bathrooms and other damp areas, such as basements. It may be more sturdy when wet than regular wallboard. But if it is soaked with floodwaters, it presents the same health hazard as regular wallboard and should be replaced.

Floors

Some floors are made with particle board or plywood, materials that fall apart when wet for long. Floor joists and some wood floors will regain their shape if allowed to dry naturally.

After re-nailing, a wooden floor may need a little sanding to be smooth, or you can place a new underlayment for a new floor over it. Use screws or screw nails on floors and stairs to minimize warping. Do not lay new flooring or carpet until the subflooring is completely dry. (See box on this page for flooring that will resist water damage.)

Painting

Do not paint until the surface is completely dry. If the surface still contains moisture, the paint will peel. Things look dry on the surface long before they are dry on the inside, and this can lead

to costly mistakes. It may take several weeks for the surface to dry out enough.

To get an idea if a wall or floor is dry enough to paint, dry an area approximately 18 inches square with a blow dryer. (When checking a wall, select an area on the lower part of the wall near the floor, where it will be most damp.) Cover the area with a piece of clear plastic sheeting. Carefully seal all the edges with tape. Check the plastic 24 hours later. If there are beads of condensation on the side of the plastic that faced the wall or floor, it's still too damp to paint.

You can cover concrete surfaces with a clear coating of penetrating sealer to make cleanup easier next time. Don't paint over water stains—they will bleed through several coats of paint. Coat the stained area with shellac or a commercial stain killer before painting.

If you are going to dry floodproof your walls, don't rely on waterproofing paints; they cannot keep floodwaters out. Such paints may protect a deck from rain, but they cannot protect walls and floors against the pressure of standing water. (Thick plastic or rubberized sheeting provides the most secure waterproofing seal.)

Windows

If you live near the coast, your house is likely to suffer damage from the high winds and floodwaters of a hurricane or northeaster. Boarding up all your windows and doors or installing permanent hurricane shutters are the best ways to protect them from breaking and letting in the heavy rains that a coastal storm brings. Taping windows will not prevent them from breaking during a storm.

Cut plywood to fit each of your windows and doors before a storm threatens. Label each piece so you'll know which window or door it covers. Store the plywood pieces with the nails or other fasteners you will need to attach them. That way, you will be able to put the plywood up quickly when a storm threatens.

Contractors

You may need a contractor to help you rebuild, especially to handle the difficult jobs such as foundation repair and electrical work. If you have been satisfied with work done by licensed local contractors, try them first. If they cannot help you, ask them for recommendations.

If you must hire a contractor you do not know, talk to several contractors before you sign anything. A good contractor would agree that you should take the following steps:

- ❑ **Check on the firm's reputation.** The local Better Business Bureau, home builders association, or building trades council are excellent sources. Ask if the firm has had unanswered complaints filed against it.
- ❑ **Ask for proof of insurance.** Be sure that the contractor has disability and workers' compensation insurance. If the contractor is not insured,

Products to Avoid

Avoid using or storing these products in areas likely to flood.

- Fiberglass or cellulose insulation
- Cork, corkboard
- Gasoline, motor oil, weed killer, pesticide, lye, drain cleaner, swimming pool and other chemicals
- Linoleum
- Particle board, plywood, chipboard, fiberboard, paperboard, strawboard, Masonite paneling
- Wallboard, Sheetrock, drywall, gypsum
- Wallpaper

you may be liable for accidents on your property.

- ❑ **Ask for references.** Contractors should be willing to provide names of previous customers. Call some of the customers and ask if they would hire the contractor again.
- ❑ **Ask for a written estimate.** Check it to make sure it includes everything you expect the contractor to do. Some contractors charge a fee for an estimate, which is understandable because they have plenty of work to do after a flood.
- ❑ **Ask for a contract.** The contract should be complete and clearly state all the work, the costs, and the payment schedule. Never sign a blank contract or one with blank spaces. If a lot of money is involved, it may be worth your while to have a lawyer look at the contract before you sign.
- ❑ **Ask for any guarantees in writing.** If the contractor provides guarantees, they should be written into the contract, clearly stating what is guaranteed, who is responsible for the guarantee (the dealer, the contractor, or the manufacturer), and how long the guarantee is valid.
- ❑ **Get a copy of the final signed contract.** Once signed, it is binding on both you and the contractor.
- ❑ **Don't sign off before the job is finished.** Don't sign completion papers or make the final payment until the work is completed to your satisfaction. A reputable contractor will not threaten you or pressure you to sign if the job is not finished properly.

Areas recovering from floods are often prime targets for less-than-honest business activities. Building codes often require that work be done only by licensed contractors. Some building departments and trade associations keep lists of contractors who work in the community.

Here are some points to remember:

- Be cautious when contractors you don't know offer "special deals" after a disaster or want to use your house as a "model home."
- Ask for complete financial details in writing and for an explanation of any difference between what you are paying and regular prices. Sales are worthwhile and they do exist, but be sure you are getting the services and products you are paying for.
- Do not sign a contract if a salesperson has pressured you. Federal law requires a 3-day cooling-off period for unsolicited door-to-door sales of more than $25. If you want to cancel such a contract within 3 business days of signing it, send your cancellation by registered mail. Other types of sales may have contracts with different cancellation clauses. Read your contract carefully.
- Beware if you are asked to pay cash on the spot instead

of a check made out to the contracting company. A reasonable down payment is up to 30 percent of the total cost of the project.

- Make sure your contractor calls you or a qualified observer to inspect work before it is covered over. Shoddy work on sewers or basement walls will be hidden from view, and you won't know if there is a problem until the next flood. Most building departments must inspect electrical and plumbing lines before the walls are covered with wallboard or paneling.

If you are a victim of fraud or have problems with a less-than-reputable contractor, the state or local consumer protection office or public attorney should be able to tell you what to do.

STEP 6

Prepare for the Next Flood

Be prepared *is more than just a Scout motto. Your house will very likely be flooded again some day. Preparing for the next flood will protect you and your family, your property, your finances, and your peace of mind. In addition to the floodproofing measures discussed in the previous step, you should buy flood insurance, develop a flood response plan, and help your community implement a flood protection program.*

Flood Insurance

Even if you have floodproofed your house, you still need insurance to protect you from unexpected events, such as a flood that rises higher than your flood protection level. If you have insurance, find out whether you have the right kinds of coverage, and whether you have adequate coverage. Homeowners' policies do not cover damage caused by floods, so you will need to purchase a separate policy under the National Flood Insurance Program (NFIP).

An NFIP policy covers the following:

- Damage to your building or contents caused by a general condition of surface water flooding (up to the amount of your coverage)
- Costs for moving and storing your contents for up to 45 days (up to the amount of the minimum deductible)
- Expenses for removing debris left by the flood

An NFIP policy does *not* cover the following:

- Damage caused by high groundwater, sewer backup, subsurface flows, wind-driven rain, or local drainage problems that are not considered a "general condition of flooding"
- Property located outside an insurable building, including fences, outdoor swimming pools, driveways, docks, floodwalls, crops in the field, and landscaping
- Vehicles, trailers on wheels, and boats
- Paneling, carpeting, furniture, and contents in the finished portion of a basement or underneath an elevated building
- Animals
- Money, valuable papers, and land values
- Living expenses and lost income

The NFIP provides federally backed insurance coverage for any building in a community that is participating in the program. Almost every type of walled and roofed building can be insured. *It does not matter whether the building is in or out of the floodplain.* A mobile (manufactured) home affixed to

a permanent site and properly anchored can also be insured. You can get coverage on the building as well as for contents.

Building Coverage. Insurance can be purchased for the building, including walls, floors, insulation, wall-to-wall carpeting, furnace, and other items permanently attached to the structure. (Permanent items include anything that would not fall out if you were to turn the building upside down.) Up to 10 percent of the policy value for building coverage may apply to a detached garage or carport on the same lot.

If you buy insurance for 80 percent or more of the replacement value of your house, you will be reimbursed for the replacement value of damage to your house—no depreciation will apply. If your coverage is for less than 80 percent, you will be reimbursed for the actual cash value of the damage—replacement value minus depreciation.

Contents Coverage. Contents coverage insures your personal property. Renters as well as owners may purchase contents coverage. Although you can get contents coverage without having a building coverage policy, those contents must be located in a building that can be insured under the NFIP. Contents coverage will pay some of the costs of moving and storing contents in a safe place when a flood threatens.

Basements. Building coverage is recommended to cover the walls, floor, furnace, and other structural components of a basement. However, the NFIP does not cover finished portions of a basement (carpets, wallboard) or its contents. Damage to the basement foundation is a major problem during floods, so this coverage can be very important even though it does not cover the finished portions (carpets, wallpaper) of basements. Some private companies sell coverage for water damage caused by sewer backup or sump pump failure—items that are not covered by the NFIP.

NFIP flood insurance is sold through private insurance agents and companies. All policies offer identical coverage and rates. Newer or substantially improved houses are charged flood insurance rates according to their elevation in relation to the expected flood level. Older houses, which are "grandfathered" in, qualify for a flat, subsidized rate. Houses outside floodplains that are identified on Flood Insurance Rate Maps often pay lower rates. You can check your property's location on a Flood Insurance Rate Map at your building department or ask an insurance agent.

A few private insurance companies sell their own flood insurance policies, although the coverage and rates are different from the NFIP's. Some mobile home insurance covers flood losses. Unlike the NFIP, private insurance varies from company to company, so check around to compare their coverage and rates.

If you are located in a flood-

Don't Wait

Buy flood insurance protection before the next flood is threatening. There is a 5-day waiting period before NFIP flood coverage takes effect. Call your insurance agent for information on rates and coverage.

plain shown on a Flood Insurance Rate Map, you must buy flood insurance coverage as a condition of having a mortgage or home improvement loan from a federally regulated lender or as a condition for getting federal disaster assistance. In some cases, private insurance will satisfy this requirement, but generally the lender or disaster assistance agency will ask you to get an NFIP policy.

Flood Response Plan

Preparing a flood response plan will help you think through all the details that will demand your attention as the floodwaters approach. This is a project for the whole family. As you write down the plan, you can make sure everyone understands it. And having the plan in writing will help you all remember what to do when everyone is in a hurry and excited because a flood is coming.

The next flood might be worse than the last one. Talk to your building official or city or county engineer about that possibility. See Step 8 for information on the flood protection level in your area to use as you prepare your flood response plan.

Check with your local emergency manager or Red Cross chapter for the official warning and evacuation procedures in your area. Find out how much warning time you will have to leave your home before the flood reaches you. Identify a friend, relative, or motel where you can go when you are asked to evacuate. Test-drive your evacuation route to be certain it will be passable when flooding is likely. Be prepared to evacuate when told to do so or if you see floodwaters rising. You may hear flood warning and evacuation information on your local TV and radio stations.

Make a record of all your personal property. Go through your home room by room. Make a list of everything in the room. Take photographs or videotapes. Inventory forms are available free from most insurance companies, or you can use the format shown in Step 3. Keep photocopies of inventory records, insurance policies, deeds, and other valuable papers at a different location, someplace outside of the flood-prone area.

If flooding in your area is from sewer backup or basement seepage, having your own water alarm can give you precious lead time before your belongings are damaged by floodwaters. A water alarm is similar to a smoke alarm; it beeps when water touches it. Water alarms cost 10 to 20 dollars and are available at hardware stores.

Develop a flood response plan based on your flood protection level, local warning procedures, and the amount of warning time you will have to respond before the flood comes. In flash flood areas, you may only have enough warning time to evacuate immediately. But if you live in areas in the path of a hurricane or near a large river, you may have 12 to 24 hours of warning time.

Flood Watch, Flood Warning

Floods can take several hours to days to develop.

- A *flood watch* means a flood is possible in your area.
- A *flood warning* means flooding is already occurring or will occur soon in your area.

Flash Floods

If you live in a mountainous area, or if your flooding comes from a small stream or ditch, your home may be subject to flash flooding. Flash floods can occur before the local emergency managers have time to issue a warning. In these cases, the National Weather Service may issue a *flash flood watch* advising people that conditions are favorable for a flash flood. You may not be notified of a flash flood warning before flooding actually begins.

Hurricanes

If you live near the coast, you will be asked to evacuate when a hurricane threatens your community. It is important to evacuate when you are asked to. Prepare your hurricane response plan to take into account all of the time that you will need to protect your house before you evacuate. You will need time to board up your windows and to clear your yard so that your belongings will not blow or float away. You may also want to take time to move your belongings above the flood protection level. (See Step 8.)

Developing a Checklist

Your flood response plan should be a checklist of steps to take before floodwaters reach your home. The following are examples of things to include:

- ❑ Listen to your local radio or TV stations for flood information and evacuation instructions.
- ❑ Read the safety precautions on the back cover of this book.
- ❑ Get into the habit of keeping a full tank of gas in your car, especially at times of the year when flooding can be expected in your area.
- ❑ Pack the car with supplies you will need while away from home. (See "If You Are Asked to Evacuate," below.)
- ❑ Put supplies needed for cleanup and recovery in a safe place. (See "If You Are Asked to Evacuate," below.) If your flood protection level is over your top floor, store supplies at a friend's house away from the flood-prone area or take them with you in your car.
- ❑ Take pets to a kennel or friend's home on high ground. Health codes do not allow animals in public shelters.
- ❑ If you have enough warning time, move the contents of your home above the flood protection level or to another safe place. Some of the cost of doing this can be covered under an NFIP flood insurance policy.
- ❑ Install flood shields and other floodproofing measures you may have prepared.
- ❑ In hurricane-prone areas, protect against wind damage. Install hurricane shutters or plywood covers over your windows and doors, take down TV antennas, and securely tie down boats, garbage cans, and everything else left outdoors.
- ❑ Tape plastic around the cap to your well. This will prevent

Flash Flood Warning, Flash Flood Watch

If it is raining a lot, or if you are in a mountainous area, it's a good idea to keep listening to local radio or TV stations (not stations in locations away from where you are). If you hear about a *flash flood watch* for your area, it's a good idea to stay on high ground.

If you hear a *flash flood warning,* climb to higher ground immediately. Leave your car, camping gear, or other belongings where they are. You may have only minutes to escape.

Flash floods can happen without warning. If you hear a rumbling sound, if animals are running away from where you are, or if you feel the ground shaking, climb to higher ground immediately.

most, but not all, floodwater from entering your water supply. You will still have to disinfect your water, as explained in Step 5.

- ❑ Turn off the electricity, gas, oil, and water. (See Step 2.)
- ❑ Lock your house.
- ❑ Follow your designated evacuation route to a place of shelter.

If You Are Asked to Evacuate

Your family should have a disaster supplies kit ready for emergencies.

Evacuation Supplies

Store the following supplies, which you're most likely to need if you are asked to evacuate, in an easy-to-carry container:

- ❑ Battery operated radio and extra batteries
- ❑ Flashlight and extra batteries
- ❑ First aid kit and manual
- ❑ Three-day supply of nonperishable foods and water (one gallon of water per person per day)
- ❑ Essential prescription and nonprescription medications
- ❑ Mess kit or paper cups and plates and plastic utensils
- ❑ Baby supplies such as formula, bottles, diapers, powdered milk, and medications (if needed)
- ❑ Nonelectric can opener
- ❑ Utility knife
- ❑ Toilet paper, towelettes
- ❑ Soap, liquid detergent
- ❑ Feminine supplies
- ❑ Personal hygiene items
- ❑ Contact lenses, extra eye glasses (if needed)
- ❑ Supplies for dentures, contact lenses, and other aids (if needed)
- ❑ Complete change of clothing and footwear for each person*
- ❑ Sturdy shoes or work boots*
- ❑ Rain gear*
- ❑ Blankets or sleeping bags*
- ❑ Cash or traveler's checks, change
- ❑ Whistle
- ❑ Entertainment—games and books

*Can be packed and carried separately

Important Family Documents

Keep these records in a waterproof, portable container you can grab quickly in case of evacuation:

- ❑ Will, insurance policies, contracts, deeds, stocks, and bonds
- ❑ Passports, social security cards, immunization records
- ❑ Bank account numbers
- ❑ Credit card account numbers and companies
- ❑ Inventory of valuable household goods, important telephone numbers
- ❑ Family records (birth, marriage, death certificates)

Supplies to Keep at Home

Also have the following supplies ready. You will need them when you return home or if you are confined to your home.

- ❑ Fire extinguisher: small canister, ABC type
- ❑ Tools: crowbar, hammer, saw, pliers, screwdrivers
- ❑ Shut-off wrench, to turn off household gas and water
- ❑ Tape

- ❑ Plastic sheeting
- ❑ Plastic garbage bags, ties (for personal sanitation uses)
- ❑ Disinfectant
- ❑ Liquid chlorine bleach
- ❑ Plastic bucket with tight lid
- ❑ Wooden stick (to poke and turn things over)
- ❑ Camera (to record damage)
- ❑ Aluminum foil
- ❑ Paper, pencil
- ❑ Needles, thread

Community Activities

Your neighborhood or community can take steps to reduce flood losses in the future. Recent flooding may prompt local governments to start a flood planning effort that encourages citizens to participate. If no effort is underway, encourage your community leaders to get a flood protection program started.

There are many ways to reduce flood damage. A community flood protection program should consider a variety of activities. The obvious solution often seems to be "fixing" the shoreline or river through flood control projects such as dredging or seawalls. Unfortunately, these activities may not be effective, feasible, or affordable without state or federal aid. Because flood control projects require so much planning, time, and money, communities should also consider and implement other approaches.

Keeping ditches and drainage ways open is one very important step most communities can take. Trash, construction materials, shopping carts, and even grass clippings dumped in a ditch can clog bridges and culverts, and add to water pollution.

Neighborhood efforts to keep ditches clean and to report dumpers can make a big difference in the amount of flooding, especially during smaller storms. Report illegal floodplain construction activities (that is, those without a permit posted) to the building department.

You can work with your neighbors to monitor stream levels or rain gages to give your community or neighborhood advance warning of a flood. It may also be possible to monitor common debris catching sites, such as bridges, and keep the openings clear.

Sandbagging

Sandbagging can be very expensive. If your community wants to establish a plan for sandbagging, you will have to buy sandbags before a flood to be sure you have them on hand. Get burlap or plastic sandbags. Other kinds of bags simply won't hold up. Burlap or plastic bags cost 25 to 50 cents each. Sand and plastic sheeting must also be stockpiled.

Sandbagging can also be very time consuming. It takes 2 people about an hour to fill and place 100 sandbags, giving you a wall only a foot high and 20 feet long. If you skimp on the bags, you risk putting up a wall that will be knocked over.

When a flood is coming, everyone wants to sandbag, usually because they don't know what else to do. While it does

Community Flood Protection Activities

Your community can take a number of steps to minimize damage from floods, such as purchasing flood-prone buildings, setting regulations for building in floodplains and for storm water management, and preserving open space. Depending on the location of your community, projects such as channel and basin maintenance; construction of levees, floodwalls, seawalls, reservoirs, or detention basins; dredging and other channel improvements; and watershed run-off controls such as terracing may be appropriate. Services such as floodproofing assistance and a flood warning system can lower the risk that people or property will be damaged, as can community preparedness and evacuation plans.

have a therapeutic effect, sandbagging should be considered only as part of an overall flood response plan, or as a last resort for individuals.

A good plan will help use your limited time and resources most efficiently. For example, a flood response plan might call for sandbags to fill in gaps in a floodwall.

Sandbagging is supposed to keep water away from vulnerable flood-prone property. Taking floodproofing measures and moving contents out of the way are much more secure methods to accomplish the same thing. Therefore, before you consider sandbagging for your personal property, consider the flood protection alternatives discussed in Step 8. They are more effective and more dependable ways to protect a house from flooding.

Sources of Information

The following people can provide advice or assistance on flood recovery. Some of these people may be able to speak to neighborhood groups or help in developing a community flood protection program.

Flood Preparedness and Safety

The American Red Cross and local emergency managers conduct sessions to increase public awareness and to educate the community in ways to prevent, prepare for, and cope with emergencies. Local emergency managers also sponsor public meetings on damage reduction, safety, response planning, how to handle stress, and other flood-related topics.

The following publications are available from the American Red Cross. Contact your Red Cross chapter for more information.

- *Family Survival Guide* (Stock No. 329195)
- *Your Family Disaster Plan* (ARC 4466)
- *Su plan para el hogar en caso de desastres* (ARC 4466S)
- *Your Family Disaster Supplies Kit* (ARC 4463)
- *Su Equipo de suministros para la familia en caso de desastres* (ARC 4463S)
- *Safe Living in Your Manufactured Home* (ARC 4465)
- *Are You Ready for a Flood or Flash Flood?* (ARC 4458)
- *Está preparado para una inundación o una inundación súbita?* (ARC 4458S)
- *Are You Ready For a Hurricane?* (ARC 4454)
- *Está preparado para un huracán?* (ARC 4454S)

Cleanup

Most Cooperative Extension Service offices have home economists and food, plant, and farm experts. Check your telephone book under the county name (for example, if you live in Jefferson County, look under Jefferson County Cooperative Extension Service).

Questions about cleaning or disinfecting specific materials can be answered by manufacturers of cleaning products. Check the product labels for toll-free telephone numbers.

Flood Insurance

Your property insurance agent is the best source of information on flood insurance. He or she can give you forms and instructions for making your own property inventory. A free copy of *Answers to Questions about the National Flood Insurance Program*, FIA-2, is available from the Federal Emergency Management Agency. (See address below.)

Repairs and Rebuilding

Local building and housing departments are excellent sources of technical advice, as are hardware stores. Their staffs have many years of experience in dealing with local construction conditions. Home maintenance and repair books available at your library or bookstore are also good references for the do-it-yourselfer.

Private home inspectors can give you itemized lists and cost estimates of needed repairs. (Look in the yellow pages of your phone book under Building Inspection Services.) Building trades associations and the Better Business Bureau can provide guidance on dealing with contractors.

Floodproofing

Some local building officials and contractors are familiar with floodproofing techniques. Several states and communities have published floodproofing or "retrofitting" manuals. The Federal Emergency Management Agency (FEMA) and the U.S. Army Corps of Engineers have several publications that provide excellent summaries of various floodproofing measures. The following are available free from:

FEMA Publications
P.O. Box 70274
Washington, D.C. 20024

- *Coastal Construction Manual*, FEMA-55
- *Design Manual for Retrofitting Flood-prone Residential Structures*, FEMA-114. This detailed manual explains all the floodproofing options in language a homeowner can understand.
- *Elevated Residential Structures*, FEMA-54
- *Floodproofing Non-residential Structures*, FEMA-102
- *Manufactured Home Installation in Flood Hazard Areas*, FEMA-85
- *Your Family Disaster Plan*, L-191
- *Your Family Disaster Supplies Kit*, L-189.

The following are available free from:

U.S. Army Corps of Engineers
Attn: CECW-PF
20 Massachusetts Avenue, NW
Washington, DC 20314

- *Flood-Proofing Regulations*, Corps of Engineers, EP 1165-2-314, 1992. This manual lists materials for floors, walls, and ceilings that are resistant to damage by floodwaters.
- *Flood Proofing Systems and Techniques*, Corps of Engineers, Flanagan, Lower

Mississippi Valley Division, 1984.

- *Flood Proofing Tests, Tests of Materials and Systems for Flood Proofing Structures*, Corps of Engineers National Flood Proofing Committee, 1988.
- *Raising and Moving the Slab-On-Grade House*, Corps of Engineers National Flood Proofing Committee, 1990.

References on technical aspects of floodproofing can also be located through the Floodplain Management Resource Center, a free service provided by the Association of State Floodplain Managers. Call (303) 492-6818 from 9:00 a.m. to 4:00 p.m. mountain time Monday through Friday.

FEMA Regional Offices

Region I—
CT, ME, MA, NH, RI, VT
FEMA Region I
J.W. McCormack POCH,
Room 442
Boston, MA 02109-4595
(617) 223-9561

Region II—
NJ, NY, PR, VI
FEMA Region II
26 Federal Plaza, Room 1337
New York, NY 10278-0002
(212) 225-7202

Region III—
DE, DC, MD, PA, VA, WV
FEMA Region III
Liberty Square Bldg., 2nd Floor
105 S. Seventh Street
Philadelphia, PA 19106-3392
(215) 931-5750

Region IV—
AL, FL, GA, KY, MS, NC, SC, TN
FEMA Region IV
1371 Peachtree St., N.E.
Suite 700
Atlanta, GA 30309-3108
(404) 853-4400

Region V—
IL, IN, MI, MN, OH, WI
FEMA Region V
175 West Jackson, 4th Floor
Chicago, IL 60604-2698
(312) 408-5533

Region VI—
AR, LA, NM, OK, TX
FEMA Region VI
Federal Regional Center,
Room 206
800 N. Loop 288
Denton, TX 76201-3698
(817) 898-5127

Region VII—
IA, KS, MO, NE
FEMA Region VII
911 Walnut Street, Room 200
Kansas City, MO 64106-2085
(816) 283-7002

Region VIII—
CO, MT, ND, SD, UT, WY
FEMA Region VIII
Denver Regional Center,
Building 710, Box 25267
Denver, CO 80225-0267
(303) 235-4830

Region IX—
AZ, CA, HI, NV
FEMA Region IX
Building 105
Presidio of San Francisco
San Francisco, CA 94129-1250
(415) 923-7176

Region X—
AK, ID, OR, WA
FEMA Region X
Federal Regional Center
130 228th St., S.W.
Bothell, WA 98021-9796
(206) 487-4682

Index

Important Numbers

Police	Insurance Agent
Fire	Homeowner's Insurance Policy Company Number
Ambulance	
Emergency Management Office	Flood Insurance Policy Company Number
Neighbors	
	Wind and/or Hail Insurance Policy Company Number
American Red Cross	
Power Company	Disaster Hotline (announced if there is a federal disaster declaration)
Gas Company	Hardware Stores
Water	Lumber Companies
Health Department	Cooperative Extension Service
Poison Control Center	

FLOOD SAFETY

Do not walk through flowing water. Drowning is the number one cause of flood deaths. Most of these drownings occur during flash floods. Six inches of moving water can knock you off your feet. Use a pole or stick to make sure that the ground is still there before you go through an area where the water is not flowing.

Do not drive through a flooded area. More people drown in their cars than anywhere else. Don't drive around road barriers; the road or bridge may be washed out.

Stay away from power lines and electrical wires. Electrocution is also a major killer in floods. Electrical current can travel through water. Report downed power lines to your utility company or local emergency manager.

Turn off your electricity when you return home. Follow the instructions in Step 2. Some appliances, such as television sets, can shock you even after they have been unplugged. Don't use appliances or motors that have gotten wet unless they have been taken apart, cleaned, and dried.

Watch for animals, especially snakes. Small animals that have been flooded out of their homes may seek shelter in yours. Use a pole or stick to poke and turn items over and scare away small animals.

Look before you step. After a flood, the ground and floors are covered with debris including broken bottles and nails. Floors and stairs that have been covered with mud can be very slippery.

Be alert for gas leaks. Use a flashlight to inspect for damage. Don't smoke or use candles, lanterns, or open flames unless you are sure that the gas has been turned off and the area has been aired out.

Carbon monoxide exhaust kills. Use a generator or other gasoline-powered machine outdoors. The same goes for camping stoves. Fumes from charcoal are especially deadly—cook with charcoal only outdoors.

Clean everything that got wet. Floodwaters have picked up sewage and chemicals from roads, farms, factories, and storage buildings. Spoiled food and flooded cosmetics and medicines are health hazards. When in doubt, throw them out.

Take good care of yourself. Recovering from a flood is a big job. It is tough on both the body and the spirit. And the effects a disaster has on you and your family may last a long time. Read Step 1 on how to recognize and care for anxiety, stress, and fatigue.

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