Shelter From the Storm:
Disaster Prevention and Planning

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Whether by hurricane, lightning strikes, or a broken water pipe, disaster can happen anywhere, anytime. Preventive measures taken before a disaster strikes can minimize devastating damage. Also, steps can be taken post-disaster that will accelerate recovery and minimize loss of collections.

In some cases, speedy responses by quick-thinking librarians or archivists can prevent major losses of material, but a quick reaction without a plan or purpose is not enough to prevent disruptions in service and hefty recovery costs. By contrast, a library or archives equipped with a disaster response plan coordinated in advance and familiar to all staff members will help an institution recover quickly from even a severe disaster, restoring service to near normal during the clean-up process.[1]

The best way to handle disasters is to assume their inevitability and to plan accordingly. Every library, archives, historical society, and records repository needs disaster protection. Planning ahead for disaster not only reduces permanent damage or loss to collections, but may paradoxically prevent disasters.[2]

Fire-related Disasters: causes and prevention

The most feared of the upheavals that libraries suffer is fire. Not only does fire destroy materials, but quite often extinguishing the fire causes as much, if not more, damage than the actual fire. It is imperative for library and archives staff to learn steps that can be taken to prevent fire. A fire may start from many difference sources, and a comprehensive fire prevention program is not a simple undertaking.

Causes of fires include lightning and earthquakes, old or improper wiring, defective heating equipment, and accumulations of combustible trash. Innocently overloading an outlet can result in a fire as damaging as one started deliberately by an arsonist. Little can be done to prevent natural disasters or a determined arsonist, but much can be done to prevent a fire caused by human error and building failure. Remember, library materials constitute a highly combustible, compact fuel that will burn to completion if given the chance.

Profile of a Fire

Typically, a fire will develop in four stages: incipient, smoldering, flame and heat. In the incipient phase, there is significant heat but no visible smoke or flames. Visible or invisible ions or particles of combustion are produced during this phase, and may go undetected over a relatively long period of time. When the particles become visible, the fire enters the smoldering phase. The third phase, flame, is produced when ignition actually occurs. The temperature increases, leading to the final heat stage, when large volumes of heat, flame, smoke and toxic gases are produced.[3]

Elements of Fire Safety

The three types of fire that are likely to occur in a library are Class A (cellulostic materials, such as paper and wood), Class B (flammable liquid, oil, grease or tar), and Class C (electrical).

Building Design

Ideally, a library will incorporate fire-prevention measures during construction. Unfortunately, this is unusual, and in many instances even facility upgrades are not fiscally feasible. Nonetheless, an effort should be made to bring the building to the highest state of disaster preparedness as possible.

Building design should minimize air passages between concrete floors. This will prevent fire from traveling between areas of the building. Another area of concern are concealed spaces, such as false ceilings, which may provide a path

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for fire to spread unnoticed.

If the wiring in a building is over twenty years old, and/or if the wiring is carrying a heavier load than it was designed for, then the library needs a certified electrician to inspect the wiring for safety.

Libraries should develop a good relationship with their local fire departments. Invite them to tour the facility, review the library's fire procedures, inspect areas of concern, provide guidance, and learn more about the building itself. This will save time if they have to respond to an emergency later, and advance notice of what fire-fighting procedures will be used can help the library staff minimize damage to materials.[4]

Fire Detection

It is of primary importance to have any fire detection system connected to the fire department to insure immediate response. Consult with fire experts as well as insurance carriers for their suggestions of acceptable systems, which include different types:

The **Thermal Detector** is useful in compact and enclosed spaces with a high concentration of stored materials that are susceptible to rapid heat build-up. The most common units are fixed-temperature devices that operate when the room reaches a predetermined temperature (usually 135°-165°F/57°-74°C). These systems are adequate for film-based media, which are quickly damaged by rising temperatures.

The **Flame Detector** senses infrared radiation and is suitable for areas where fires could develop quickly due to vast space or strong air movement.

The **Photoelectric or smoke detector** responds to visible particles of smoke. These are recommended for early detection of fire.

The **Products-of-combustion or ionization detector** reacts to particles given off by incipient fire. This does not require flames or heat to be effective and is the best early stage detection.

Fire Suppression

If suppression systems are chosen to prevent fires from spreading, then the hazards of the building, the collections themselves, and the costs should all contribute to the selection process. Enlisting input from fire experts and fire insurance carriers is recommended. Fire suppression equipment is available for all varieties of needs and applications. Experts can test the equipment periodically to ensure its operability without actually turning on the sprinklers themselves.

Portable Extinguishers

If collections are unique, then portable extinguishers should be installed in

In August 1998, a wind-fed fire destroyed a city block of what was part of R.J. Reynolds' manufacturing complex in downtown Winston-Salem. Built in the early 1900s, the property was being renovated as part of the Piedmont Triad Research Park. Left: The interior wall of 256-1 on Chestnut Sreet.
Below: #256-2 on Patterson Ave. The dark 'spot' below left center of the truck was a car. Photos courtesy Elizabeth W. Sapp.

strategic locations throughout the building, whether or not it has an automatic response system. Extinguishers are designed to fight specific classes of fires and can contain water, gas, or chemicals and require staff training.

Sprinkler Systems

Fire protection experts generally agree that automatic sprinklers represent one of the single most significant aspects of a fire management program.[5] Properly designed, installed, and maintained, these systems can overcome potential deficiencies in risk management, building construction, and emergency response. They may also enhance the flexibility of building design and increase the overall level of fire safety.[6]

- Wet-pipe sprinklers are the most common and least expensive system. The pipes are filled with water at all times and sprinkler heads are individually activated.
- Dry-pipe sprinklers have supply pipes filled with pressurized air or nitrogen, rather than water. The opening of a heat-sensitive sprinkler head releases pressure, and water is supplied only to that head and to any others that have opened. This system reduces the risk of leaking pipes or damaged sprinkler heads triggering. The action is, however, slower than wet pipes, and more heads may be triggered in an emergency.
- A pre-action system is normally a dry-pipe system, but with a significant improvement. It is a closed-head system that usually carries only normal air pressure in the pipes. This means that reaction time is shortened, since air under normal pressure is more quickly exhausted from the pipes as the water enters.
- A gaseous system (FM200) — suppresses oxygen and does not use water. This system requires a sealed environment and discharges for ten seconds. There is minimum corrosive or abrasive residue, but the disadvantages to this system are high installation costs, moderate health hazards, and harmful environmental effects. It is also a sensitive detection device that is prone to accidental discharge and so is not intended for use in public areas.
- The water mist system is a new tool. These systems are for applications where very early detection is critical, and where water sensitivity and/or limited water supplies are concerned (libraries, computer

spaces). Primarily intended to identify and control a developing fire during the incipient phase prior to the onset of visible flame, mist systems utilize a fine water spray — essentially producing a fog, which blankets a potential fire.[7]

Performance of Modern Sprinklers

Automatic sprinklers offer an important fire protection option for most libraries. Water damage from an activated sprinkler is usually easier to remedy than the damage caused by fire, smoke, and pressurized water.

The correct application of sprinklers is dependent upon careful design and installation of high quality components by capable engineers and contractors. A properly selected, designed, and installed system will offer unexcelled reliability.

Wind and Water-related Disasters

Although fire may be the catastrophe that strikes the most fear into the hearts of archivists and libraries, violent storms are actually a more common cause of natural disaster. A storm's dual threat of wind and water increases the likelihood of damage. Flooding may be devastating even without wind. We can never be completely free of the less dramatic, but pervasive, threats from sources such as leaking roofs and dripping pipes.

The *causes* of a water-based disaster are wide-ranging. Nature takes its toll through hurricanes, tornadoes, earthquakes, and floods. These types of storms have a widespread, ruinous na-

ture, bringing disarray and destruction to a large segment of the community. Efforts at recovery are compromised due to the competing demands on staff, lack of assistance from local agencies, unavailability of supplies, an increase in potential vandalism, and threats to health.

Water damage may be caused by accidents and catastrophes such as plumbing failures or malfunctioning sprinkler and air conditioning systems. Basement stack areas may fill with ground water entering through cracks in the building foundation, or from ruptured water pipes. Torrential rains find their way onto books or papers in upper levels through leaky roofs.

Vandals may tamper with sprinkler systems, air conditioning mechanisms, fire mains, or plumbing facilities to release water on collections.

Finally, once humidity is high or water has entered collection areas, the danger of a mold disaster exists.

Protection from Water Damage

Protection from water damage is essential to the preservation of library and archival materials. Even a minor water accident such as a leaky pipe can cause extensive and irreparable harm to collections. Several precautions can be taken.

Structural considerations:

Vulnerabilities to an institution can begin with the building itself. Inspection of the building and site will identify some potential hazards.

Remember to clean gutters and drains on a frequent basis. Inspect roof

These photos (above and next page) of property in Kure Beach, NC, illustrate the damage a hurricane's wind and water can do. Photos courtesy Elizabeth W. Sapp.

coverings regularly and repair or replace as needed. Flat roofs are especially problematic and need frequent inspections because dirt and debris can accumulate on them, leading to retention of water and deterioration of the roofing material.

Avoid storage in basements or in other areas where the threat of flooding is possible. If collections must be stored in areas vulnerable to flooding, install water-sensing alarms to insure quick detection.[8] Sump-pumps should be used in basement areas, especially if in a flood region. Drains below ground level should incorporate manual cutoffs that may be activated if flood levels threaten to cause a backup of water into the building.

Because mundane drips from pipes are sources of much water-related damage in libraries and archives, it is advisable to place drip pans under all exposed pipes in the stack areas. It is important that materials never be stored under water pipes, steam pipes, lavatories, air-conditioning equipment, or other sources of moisture.

Consider a library's or archive's location in a "tornado alley" or hurricane locality. The institution's administration must consider construction of wooden frames, protective panels, or shutters to place over impact-resistant glass windows.[9]

Storage practice:
Any repository will be able to take the following recommended storage precautions because they do not involve huge demands on funds or staff time. These steps will reduce the risk of damaging collections from a water disaster:

- Always shelve materials at least 4" off the floor and at least 2' from the ceiling (place on temporary pallets if necessary). Locate shelving at least 12" away from exterior walls to prevent contact with condensation.
- Protective enclosures, such as boxes, provide a barrier between an item and hostile conditions. Do not leave papers, books, or other collection materials on tables or other unprotected surfaces. This presents not only a security problem, but it also makes items more susceptible to damage from leaks.
- Store books and papers at a distance from windows. This will reduce exposure to storm and flood damage, and minimize exposure to ultraviolet radiation. If there is an approaching weather disaster, move materials to an interior location, an upper floor, or another building situated at a higher elevation.

Environmental and housekeeping hazards:
Within the building itself, environmental systems are of primary concern. Maintain proper temperature levels and relative humidity, allow appropriate circulation of air, and permit only clean, clutter-free storage areas. Ideally, temperature should never go above 70°F or relative humidity above 50%. The higher the temperature and humidity, the higher the risk of mold growth. If a water-related emergency occurs, wet materials must be treated immediately before mold growth develops.[10]

Following any severe weather pattern, inspect the building for structural damage, leaks, sprinkler breaks, or fires. Be sure to check for water accumulation in hidden areas, such as attics, false ceilings, closed storage areas, and light fixtures.

Developing a Disaster Plan
The old adage "An ounce of prevention is worth a pound of cure" is never more true than in the case of library and archival disaster planning and prevention. A written plan is the single most important step in preparing for disasters. First, such a written document acknowledges that disasters are possible, and that there is a commitment on the part of the organization to accept responsibility for their amelioration in a sensible and logical way. Second, preparation of a written plan eliminates panic, assures proper decision-making, reduces the damage to collections, and limits the costs of recovery. Finally, a plan consolidates ideas and provides step-by-step instructions that are clear and easy to follow.

Before any steps can be taken, commitment to disaster preparedness must be articulated. Disaster planning requires administrative support for both the staff time needed to carry out various procedures and a pledge for funds to implement the recommendations. This commitment may take the form of a written charge, to an established committee.[11]

Disaster planning can be divided into basic stages. The first stage is information gathering. During this time, collections are assessed, hazards investigated, priorities set, and facts gathered.
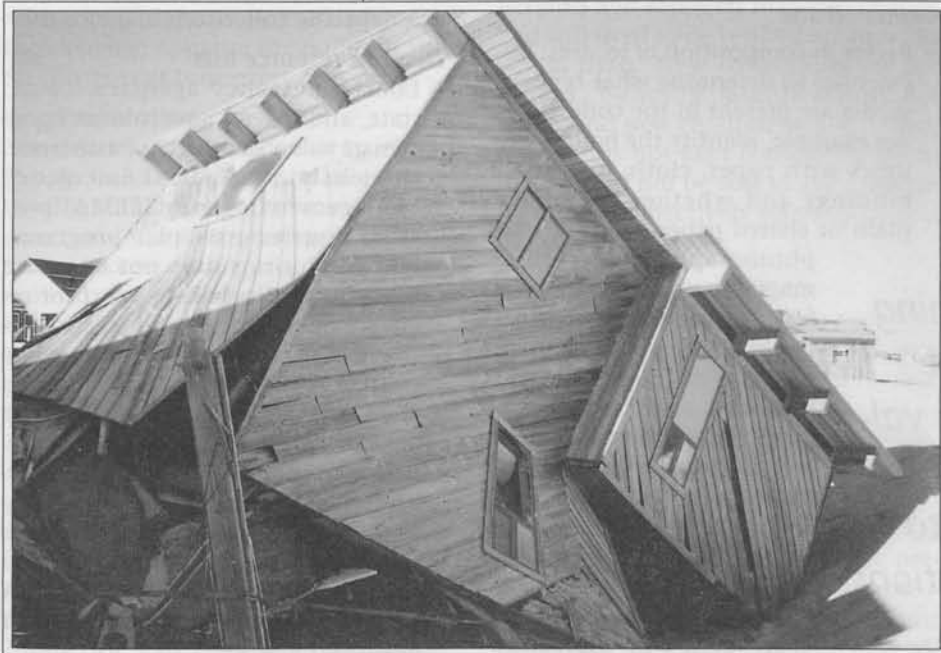
The next stage is the implementation of the written disaster plan.

Information Gathering

Establish planning structure

- Set a timetable: Set reasonable goals with objectives and a time frame for completion to help keep planning on track and provide a sense of accomplishment.
- Identify team: One person should be assigned the responsibility of organizing the plan from start to finish. Once the plan is completed, this person will have the continuing responsibility to update the plan, follow through on its recommendations, and be responsible for a disaster recovery effort.

In establishing a team, include members from a broad base of library and archival backgrounds. Dialog among individuals from special collections, collection development, and public services staff provides invaluable input and experience.[12] Some committees have included building maintenance personnel, security experts, and fire and police experts. Each individual offers unique perspectives on the collections, users, and areas of potential concern.

Assess risk

- Building survey and inspections: Before a reliable disaster plan can be written, it is important to understand the potential hazards and to undertake strong preventive and protective measures. It is helpful to bring in outside experts to help determine potential hazards in a library or archives.

Set up external and internal hazard surveys, design appropriate forms[13] and establish proper channels for communication. Next, conduct a physical examination of all facilities. Assess the results of the surveys, set priorities for the problems revealed, and make recommendations for rectifying or alleviating potentially disastrous situations. The assessment process should identify the most valuable

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materials and how they are protected, stored, insured, and exhibited. At some point, assessment of insurance coverage may be appropriate.

Establish recovery priorities

- Identify the most important collections: As part of the overall planning effort, it is crucial to look at collections and assess their values — fiscal, historical and scholarly — as they relate to the overall goals and intentions of the organization. It is much easier to make these decisions in a calm and reasoned atmosphere than when faced with an imminent or current disaster.

An institution may try a triage approach. Top priority materials are those that are difficult or impossible to replace or replicate and that are essential for the ongoing operations of the institution, that have prime research value, or that have a significant monetary value. Secondary priorities are items that are difficult to replace or replicate and that provide significant operational or research resources. Last priority would be those materials that can be replaced, either in original or a copy format, or that may, if necessary, be considered expendable to the institution and its constituents.[14]

Finding aids and other types of catalogs are essential to most institutions. These may be a major priority; without them it is difficult to verify what was damaged or destroyed by the disaster and to re-establish proper order subsequent to recovery.[15] A number of institutions have records of their holdings in electronic format and have the backup copies or other types of security copies off-site.

- Factor in composition of records: It is essential to determine what types of media are present in the collections. For example, identify the bound volumes with paper, cloth, or leather bindings and whether they have plain or coated paper. Manuscripts, photographs, microfilm, magnetic media and special formats such as blueprints could make up significant portions of an institution's holdings. Each sizable category should be researched and addressed with appropriate recovery procedures and an indication of conservators who could be consulted for advice.[16]
- Consider services available: There are several companies

that provide disaster services as well as sources of technical assistance. Research these services thoroughly — this is an essential part of the planning process. If possible, invite local service providers to visit your institution to become familiar with your site plan and collections in advance of an emergency. Plan for backup companies to provide critical supplies and services in case there is a community-wide or regional disaster.[17]

Contact these sources on a regular basis to determine whether neccessary supplies and services are still available, and to remind them of their commitment. Keep in mind that in a wide-scale, major disaster, these sources may not be available because they have their own institutional damage or because they are assisting another entity. In addition, outside help probably will not be available immediately.

Collect response, recovery, and rehabilitation procedures

Before a well-developed plan can be written, time should be devoted to some preliminary research. The groundwork should include reviewing monographs and articles about disaster planning and recovery. Disaster plans and manuals from similar institutions should be examined.[18] Committee members should be encouraged to attend related workshops.

It is helpful to glean from the experience of others. This will assist in planning for one's own institution's disaster response. Select and adapt those experiences that apply to one's organization, while adding others that will make the written plan practical and applicable to one's specific collections.

Develop resource lists

- Local emergency agencies: Local, state, and federal government agencies are valuable sources of assistance. Obviously, the Federal Emergency Management Agency (FEMA) provides disaster assistance programs, but institutions may not be aware that this can include support for recovery of art objects and cultural resources. An October 1991 policy change allows federal assistance to pay for conservation of objects that are damaged in a disaster. Conservation is defined by FEMA as "the minimum steps, which are both necessary and feasible to place the items back on display without restoring them to their pre-disaster condition." FEMA does not cover the replacement of destroyed items.[19]

- Staff phone tree: The telephone tree is one of the easiest parts of the plan to construct. All personnel who will be expected to assist with recovery procedures should be listed with both work and home phone numbers. Backup staff should also be included. Regular updates and a copy at the homes of all key personnel will insure the tree's validity and availability.

Assess financial resources

When gathering information for a written plan, include emergency funds. Arrange for emergency cash or credit, because it is sometimes difficult to obtain money quickly in a disaster situation. Knowledge of accounting procedures and their simplification are essential during an emergency.

Evaluate insurance policy

A basic understanding of an institution's insurance policy is imperative. Learn what the insurance policy covers and what the insurance company expects an institution to handle financially. Identify those precautions an institution must take that will reduce premiums. These will be identified in the policy, as well as the survey of the building and its contents.

Be aware of exclusions from coverage and have a clear understanding of steps and procedures to be followed after a disaster. It is essential to list all the damage and to provide complete documentation of conditions and recovery procedures following a disaster. This would include taking photographs or videotapes of the cleanup.

Before a disaster, take photographs or videos of valuable items and store them off-site. These could be stored with copies of the finding aids and catalogs. Finally, appraise the building and its contents at least every five years.

Implementation

The disaster plan must be easy to follow. People faced with a disaster often have trouble thinking clearly, so concise instructions and prior training are critical to the success of the plan. The key is to write in a clear, simple style without sacrificing comprehensiveness. Above all, remember that the plan cannot anticipate every detail, so be sure that while it provides basic instructions, it also allows for some on-the-spot creativity and adjustments.

Upon completion, the disaster plan should have administration approval. Members of the in-house recovery team should receive two copies of the plan — one to keep at work and one to keep at home. All staff members should read

and have access to the disaster plan. Simultaneously, order and distribute supplies. Some of these supplies should be stockpiled (various locations) in anticipation of the type of disaster most likely to occur.

Training is an important component for the success of the disaster plan, and especially for the recovery effort if disaster should strike. Holding one or more training sessions to introduce staff to the disaster plan and its use is integral to its successful application. Proper attention to prevention and protection hazards, as well as appropriate reaction to emergency situations, can make significant differences in reducing damage. Staff training should be scheduled periodically for permanent staff, and included as one aspect of the education package or orientation for new staff in a library or archives.

Ongoing Maintenance

No matter how much energy has been put into producing an effective disaster plan, it will be useless if the staff is not aware of it, if it is outdated, or if it cannot be found during a disaster. A concerted effort must be made to educate and train staff in emergency procedures. Each staff member should be made aware of his or her responsibilities, and regular drills should be conducted if possible. Several copies of the plan should be kept in various locations, including off-site, ideally in waterproof containers.

Most importantly, the disaster plan must be reviewed and updated on a periodic basis, and after a disaster has occurred. Names, addresses, phone numbers, and personnel change constantly. Vendors and suppliers may also change and will need to be verified on an occasional basis. New collections are acquired, building modifications are made, and new equipment is installed. If a plan is not kept completely up to date, it may not be able to assist the institution in effectively responding to a disaster.[20]

Conclusion

Disaster can happen anytime and anywhere, but if a library is prepared, permanent damage can be decreased. There is no one perfect disaster plan or one correct way of being prepared. Since an institution and its staff are not likely to make the most informed decisions during a disaster, sensible, thoughtful planning and realistic preparedness will provide the best protection for collections. A disaster plan must be considered a living document — al-

ways changing. An effective disaster plan will assure that historical collections in our institutions are protected for the present and the future.

References
[1] Miriam Kahn, "Mastering Disaster: Emergency Planning for Libraries," *Library Journal* (December 1993): 73.

[2] Mildred O'Connell, "Disaster Planning: Writing & Implementing Plans for Collections-Holdings Institutions," *Technology & Conservation* (Summer 1983): 18.

[3] Judith Fortson, *Disaster Planning and Recovery* (New York: Neal-Schuman, 1992), 3.

[4] *Ibid.*, 5.

[5] Nick Artim, "An Introduction to Fire Detection, Alarm, and Automatic Fire Sprinkles," *Emergency Management Technical Leaflet* (1999): 1.

[6] *Ibid.*

[7] Nick Artim, "An Update on Micromist Fire Extinguishment System," *WAAC Newsletter* (September 1995): 14.

[8] Sherelyn Ogden, "Protection from Loss: Water and Fire Damage, Biological Agents, Theft and Vandalism," *Emergency Management Technical Leaflet* (1999): 1.

[9] *After the Flood: Rehabilitating Historic Resources* (Atlanta, GA: Georgia Department of Natural Resources, 1997), 36.

[10] Ogden, 2.

[11] Forston, 77.

[12] Lisa Fox, "Management Strategies for Disaster Preparedness," *The ALA Yearbook of Library and Information Services* (Chicago, IL: American Library Association, 1989), 3.

[13] SOLINET has a good disaster protection and prevention checklist available via the Web at <http://www.solinet.net/presvtn/leaf/prevlist.htm>.

[14] Fortson, 82.

[15] *Ibid.*

[16] *Ibid.*, 81.

[17] Beth Lindblom Patkus, "Disaster Planning," *Emergency Management Technical Leaflet* (1999): 3.

[18] Some examples of disaster plans can be located on the Internet. Here are some suggested sites: <http://palimpsest.stanford.edu/bytopic/disasters/primer/sidisast.html> (Smithsonian Institution); <http://lcweb.loc.gov/preserv/seibert/begin.html> (Library of Congress); <http://palimpsest.stanford.edu/bytopic/disasters/misc/vitalrec/> (NARA); and various University disaster plans can be found at <http://palimpsest.stanford.edu/bytopic/disasters/plans/>

[19] Patkus, 4.

[20] *Ibid.*, 3.