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## CHAPTER 5

# DISASTER PREPAREDNESS AND RESPONSE

*by Kara Van Malssen, Partner and Senior Consultant, AVPreserve*

**T**HIS CHAPTER OUTLINES THE FUNDAMENTALS OF disaster prevention, preparedness, and recovery for audiovisual collections. The contents of this chapter address issues of disaster preparedness and response for physical collections—discs, reels, cassettes, and film—that occupy shelves and boxes. However, one thread that will run throughout this chapter is the necessity of performing reformatting and digital preservation for disaster preparedness purposes. As this textbook makes clear, transforming the content of physical media into digital files is critical as analog equipment and expertise rapidly disappears and demands for accessing digital content increase. Disaster prevention and recovery are yet another justification for digitization and proper digital preservation. If managed correctly, through proper backup and geographic separation, recovery of digital data from an offsite copy will be a relatively painless and lossless process compared to the difficult recovery and virtual guarantee of a certain degree of loss in the event that a flood or fire affects physical media.

Collection managers should prioritize digitization and digital collections management for valuable materials. In the meantime, taking measures to protect collections will go a long way toward ensuring that their contents will be accessible over the long term.

Another tenet of this chapter is that disaster preparedness does not have a stopping point or an ending point. Once one risk is addressed, another can emerge. In order

to be effective, disaster preparedness must be an ongoing, integrated part of collection management.

## SECTION 1: DISASTER PREVENTION AND MITIGATION

Preventative measures will help mitigate the chances that a disaster will occur and/or will minimize the effects when one does occur. Proper building and collection security, repairing faulty or exposed wiring, and installing storm shutters are all examples of actions that will reduce the likelihood of theft, electrical fires, and storm damage. Good storage, staff training, and collection knowledge can prevent a host of potential disasters that audiovisual archives may face, especially long-term disasters where damage builds over time, such as continual mishandling and tape deterioration.

The activities outlined here and in “Section 2: Disaster Planning” are not mutually exclusive, nor should they be thought of as sequential. Both preventative actions and preparedness measures can be tackled in parallel. Start with a risk assessment to identify priority areas, and begin to address both preventative measures, such as fixing a leaky roof, while simultaneously performing preparedness actions, such as gathering supplies in case a typhoon threatens to make the damage worse before roof repairs are complete.

## Assess and Reduce Risk

Disasters come in all shapes and sizes. A leaking pipe that goes unnoticed for a few months and that results in mold growth is not the same as a catastrophic fire or Category 5 hurricane. Some damage might not be evident immediately, and performing a risk assessment survey will help you prepare for the threats most likely to affect your collection.

The Canadian Conservation Institute (CCI) and the International Centre for the Preservation and Restoration of Cultural Property (ICCRPM) have developed a useful model for managing and reducing risks to cultural collections using a 5-phase risk management cycle.<sup>42</sup> This simple structure, outlined below, provides a framework for managing risks to collections of audio, video, film, or other formats. By following the ICCROM model, collection managers can address and subsequently eliminate large and small-scale disaster risks to their collections.

### ESTABLISH THE CONTEXT

Perform a valuation of the collection by looking at the organizational context. Are all items valued equally? Do you place higher value on original recordings than you do on commercial recordings? Value may be determined by national significance, high historical or cultural value, or how well an item fits the institution's mission. Some items may be assigned high value because there are no duplicates of that content.

Appraising audiovisual materials is a subjective task that requires collection and subject matter expertise; in large institutions it will likely require the input of many staff members. In small institutions or individual collections there may only be one person who can perform appraisal. At minimum, determine a rough sense of the priority items or collections. Identification of priority items will be relevant to preparedness planning and will be critical during a disaster recovery operation.

### IDENTIFY RISKS

Identify risks to your region, city, building, and collection. Review the history of disasters. Look at possible risks

and think through prospective scenarios that may cause damage. This information will guide how you prepare for an emergency. Sometimes the biggest threats aren't obvious, so be sure to carefully look at all levels of risk. For example, you might not think much about the aging electrical system in the building, but this can actually be a significant fire hazard. Risks may include rare events (flood, fire, earthquake, war) and cumulative events (water leaks). Write simple descriptions of potential scenarios that illustrate what could happen in an actual emergency in order to document risks and bring them to life.

### ANALYZE RISKS

Categorize risks by their frequency and their likely impact. For each one, determine how often the event is likely to occur and how much value will be lost in individual items as well as in the collection as a whole. For example, scratches on an LP caused by a collapsed shelving unit will not likely damage the entire disc and in many circumstances can be repaired. However, the same collapsed shelf could permanently destroy wax cylinders and other fragile formats, thereby affecting a larger percentage of the value and content of each impacted item. Depending on the number of affected items and the total size of the collection, the percentage of the collection affected could be insignificant or very large.

### PRIORITIZE RISKS

Prioritize risks based on your analysis. Rate risks according to the probability of occurrence and the level of impact. For example, is a flood likely to happen in your area in the next ten years? Is it likely to cause major damage to collections? If so, this should be a high priority. Is poor labeling and tracking likely to cause important items in the collection to become lost within the next year? If so, this is also a high priority. Risks that are less likely to occur frequently or will have less of an impact are comparatively lower priorities.

### TREAT RISKS

Take steps to minimize or reduce identified risks. While you may want to address the biggest risks first, these may

42 *The ABC Method: a risk management approach to the preservation of cultural heritage* <https://www.canada.ca/en/conservation-institute/services/risk-management-heritage-collections/abc-method-risk-management-approach.html>

also be the most challenging. Don't let the biggest tasks prevent you from taking steps to treat the lower-priority risks, especially if these are relatively easy to resolve.

## Mitigate Risk

This section highlights areas that typically need attention to reduce risk to collections. This is not an exhaustive list, but it describes solutions for common risks, including those that might be overlooked.

### BUILDING STRUCTURE AND SYSTEMS

The building that houses a collection is the first and at times the only line of defense against disasters. Yet, quite often the building itself or weaknesses within it pose the greatest threat to audiovisual collections. Leaking pipes and electrical fires are often the origin of disasters.

When possible, work with the building's maintenance and facilities staff to identify potential hazards and correct them. Incorporate preventative actions into maintenance scheduling for your collection and building.<sup>43</sup> This includes activities such as regular cleaning of the work and storage areas, inspection of the facilities, and maintenance of the plumbing. If the collection is at a very small institution, conduct a thorough inspection of the building. Seek help from professionals as well as friends or acquaintances who have experience with building construction, renovation, or maintenance.

Take steps to ensure that the building can protect collections from external threats. For example, if you are in a hurricane-prone area, fit shutters and update windows to code. If your area is frequently affected by dust storms, you may need to use heavy curtains or seal cracks in walls and windows.

For the safety of collections and staff, fire detection and suppression systems should be installed if they are not already.<sup>44</sup> There are a variety of systems to choose from, including fire extinguishers, wet and dry sprinklers, gas suppression systems, and smoke and heat detectors. Equipment should be regularly inspected and maintained.

In particular, extinguishers require replacement and gas suppression systems require recharging at specific intervals. All staff members should know where detection and suppression systems are located in the building and should be trained in their operation.

### PROPER STORAGE

These important points will help reduce the effects of any disaster on audiovisual materials and will increase the chances of a complete recovery of content in the event of damage.

- **Keep tapes rewound.** If a tape is damaged, the exposed area may need to be removed. It would be much better to lose the leader at the beginning rather than important content in the middle of the tape.
- **Store collections off of the floor.** Do not store master materials in a basement or directly under a roof.
- **Store cassette tapes with spine up.** This will help maintain proper tape pack distribution and will shed falling water from above in case of sprinkler activation

**FIGURE 5.1**  
Cassettes stored properly, with their spines up.

Credit: AVP



43 For an extensive checklist of housekeeping and maintenance activities, see Johanna Wellseiser and Jude Scott, *An Ounce of Prevention: Integrated Disaster Planning for Libraries, Archives, and Record Centres* (2nd ed., Lanham, MD, The Scarecrow Press, 2002), pp. 53-61.

44 Not only is this important to ensure the safety of personnel and collections, but keep in mind that many granting agencies require that institutions have these systems in place before they will fund preservation projects.

or roof leaks. Ideally tapes should be stored with the spine label facing up.

- **Be sure all items are in some sort of enclosure.** Plastic cases and containers are preferred. The enclosure will be the final point of defense before the carrier itself is damaged.
- **Strive for proper climate control.** Storing media in a climate-controlled environment will greatly increase the life expectancy of your media by reducing the risk of long-term damage, such as binder degradation, vinegar syndrome in acetate open reel tapes and film, and mold growth. This is not always possible, but at minimum don't store valuable materials in areas where climate fluctuates, such as attics. Try to keep them in an insulated environment, and avoid low lying storage areas such as basements, which are more flood prone.
- **Keep a complete inventory of all materials off-site.** In a disaster, it is likely that databases and other electronic records will be unavailable. Having a paper inventory with identifiers will help enormously with identification, prioritization, and recovery.
- **Reformat physical collections as soon as possible.** Obsolescence and physical disasters pose enormous threats to the longevity of audiovisual content. Reformating is a step toward protecting recordings from these threats. Reformatted copies are easier to geographically distribute and are also more widely accessible.
- **Back up and geographically separate digital collections.** Ensure there is at least one geographically separate copy of all digital content. Geographic separation means that the backup is far enough away that immediate risks to the primary copy are not threats to the second copy. Further is always better, but as far away as possible, at minimum in another building, is better than keeping backups in close proximity to primary copies.

## COLLECTION PROFILING

Collection managers who have been through a disaster say that knowing your collection is the single most

important factor to successful recovery. Collections that are unfamiliar, unprocessed, or have no identification are almost impossible to prioritize for recovery. Having a broad overview of the collection will help identify how many items need to be stored in specific environmental conditions, will enable classification by vulnerability to water or fire, and will identify the number of items that may need to be treated by an external service provider in an emergency.

Start by completing a collection profile that documents the number and format of items in the collection. Begin with broad categories, and, when feasible, further categorize into specific audiovisual formats (analog video cassettes, digital video cassettes, film, open reel audio, etc.).

## INVENTORY & LABELING

Subsequently, work on creating or updating collection records and labels.<sup>45</sup> Adequate identification will be critical in a disaster. Recovering audiovisual materials is an expensive and time-consuming process. If you are unable to identify badly damaged items, you may spend time cleaning or sending something to a lab that is not of high priority or that has an undamaged duplicate stored elsewhere, potentially neglecting the items that are of high value or are irreplaceable. Furthermore, labs will need information about the items they are recovering both in order to give accurate pricing and to perform the correct procedures for the carrier.

At minimum, item labels should include a title or brief description and an identifier. Identifiers should correspond to those in your inventory. Ideally, item labels would also include a total running time and record date.

The inventory can have more detail than the label and, in this way, acts as a cross reference. Include the format, date, associated collection, and description. For formats such as 1/4" open reel, it is helpful to note on the label whether the tape is full, half, or quarter track and the recording speed. Inventories should include the role/generation of the item as well: Is it unique? Is it a duplicate? Is there a master recording stored elsewhere? Is this just an access copy?

45 See "Chapter 2: Inventory and Assessment" for more information.



## DEACCESSIONING

In a disaster scenario, materials tend to get knocked over, mixed together, and removed from their original storage locations. Sometimes, media are separated from their containers due to the force of water or impact, and labels can become smudged or detached altogether. As a result, it can be difficult to identify which items are which, and furthermore, which are the most important. In these situations, it becomes painfully clear that precious time may be spent recovering low- or no-value items at the expense of the highest priority materials. Deaccessioning can go a long way toward ensuring that only the important items receive the critical care they need in a recovery operation.

## CARE AND HANDLING

Small disasters are often the result of mishandling. These disasters can be prevented by ensuring that staff and caretakers are well-trained in handling collections with care, are observant of problems, and are able to record accurate information about an item's condition.

To guarantee these types of problems are mitigated, staff working with collections should have the following minimal training:

- **Format identification:** All staff should be familiar with formats found in the collection. At a minimum, this means being able to distinguish different types of media (e.g., Betacam SP versus Digital Betacam, LP versus shellac, Mini DV versus DAT).
- **Handling:** This includes proper transport, inspection techniques, machine threading, rewinding, etc.
- **Condition reporting:** Up-to-date, accurate records about collection items are a critical resource in a disaster and will help with prioritizing recovery decisions.
- **Storage preparation:** Ensure that staff members rewind tapes and secure film and open reel tape ends before an item is returned to storage.

## SECTION 2: DISASTER PLANNING

Often we think that the goal of disaster planning is the creation of a written disaster plan. In fact, the value of

disaster planning is in the process itself—training, familiarization, and practice—so that when a disaster does strike, all staff or collection stewards are prepared. Disaster plans in written form are incredibly valuable. However, these only become effective when collection caretakers participate in their creation and maintenance and are trained in their use. Disaster plans are excellent reference guides; they contain important contact information and emergency response procedures. Effective disaster planning, however, is an ongoing process, one that lives in the minds of those responsible for collections. For individual collectors and artists in particular, a written plan is not nearly as important as taking appropriate steps to be prepared in an emergency.

Disaster preparedness planning should focus on two key goals:

1. Knowing how and when to react to an emergency warning; i.e. ensuring that the appropriate policies and procedures are put in motion when such warnings are issued.
2. Enabling effective response in case of damage.

The key to disaster preparedness is for plans to be quick and efficient to implement in an emergency. This is best accomplished by testing, revising, and practicing the plan regularly. For example, an institution could designate a week every six months to be “disaster week.” During this time, a group of people who have designated responsibility for disaster preparedness planning will review the plan, revise it as needed, check and re-stock response supplies, train staff (especially new staff hired since the last “disaster week”), and conduct drills.

### Preparedness Policies and Procedures

Not all emergencies are preceded by warnings, but when they are, preparedness plans should be put into action to help prevent an emergency from turning into a disaster. Time is of the essence. A well-researched and tested disaster preparedness plan will allow you to take swift action in the short window of time available.

Disaster preparedness actions are by nature very contextual. Hurricanes and typhoons, dust storms, flash floods, tornadoes, fires, and civil unrest warnings require very different preparation steps. Localized threats, arising in



scenarios when pipes have aged or electrical wiring is faulty and the building itself is the threat, require a different set of preparedness steps. Even when the threat is shared, the way it is addressed depends on the location of the building, the material of structures, and where and how collections are stored.

When creating a disaster plan for your organization, start by considering each line of defense for the collection. Think of these as layers as those of a Russian matryoshka, or nesting, doll: the outermost layer provides protection for the next, which protects the one inside of it, and so on. Start with the outermost layer, typically the building or the structures that surround the building. Whenever possible, collaborate with people who know the structure well, such as the building manager or owner. Research and talk to others in the region who have buildings of a similar structure and material to find out what types of precautions they take when emergency warnings are issued. Factor in structural vulnerabilities that may need to be addressed. For instance, are sandbags needed to reduce the chance of floodwaters from entering the building?

Beyond just the building, additional defensive lines may need to be strengthened. Depending on the anticipated risks, emergency procedures may include covering shelves and boxes with plastic sheeting, moving collections off the floor and onto higher shelves, moving collections from one room to another, or other procedures.

All individuals responsible for the collection should be involved in establishing preparedness procedures, led by identified members of the “disaster team.” The team should work together to determine when preparedness procedures should go into effect at the point that warnings are issued, bearing in mind the individuals’ personal needs. If people need time to secure their own homes or evacuate the area, this should be accommodated in the preparedness procedures.

### Staff Training and Simulation

Once a disaster strikes, the availability of individuals to help with recovery will vary greatly depending on their personal circumstances. Therefore, as much as possible, preparedness should be inclusive of anyone who might be available to help in a disaster. A first step in getting staff

thinking about how to react in a disaster is to conduct training exercises. Simulation training is highly recommended as it provides an effective way for people to become familiar with preparedness actions and the process of disaster recovery. It also provides some sense of the confusion and anxiety that arise during disasters, while simultaneously surfacing ways that the constraints and urgency of a recovery scenario can influence disaster preparedness steps.

Two types of staff training should be conducted:

1. **Disaster preparedness drills:** These drills prepare staff to react when a disaster warning has been issued. The more rehearsed these are, the more efficiently they can be enacted when the time comes.
2. **Disaster recovery training:** This training places staff in a post-emergency situation and allows them to work through the organizational factors involved in a recovery operation. It also allows them to practice salvaging collection items.

Simulated disaster recovery training involves setting up a small, isolated “collection” of materials that have been affected by some type of disaster. The collection should include a mix of materials that represent items of different “value” and types, including paper artifacts alongside audiovisual formats. Since nearly all disasters involve water, this is a good damage agent to use during recovery simulations.

The experience should force participants to think through the disaster recovery process and inform the preparedness process by raising questions such as: Who is our insurance company? How do you prioritize when media items are unlabeled? Are these commercial LPs really valuable? How do you clean a ¼” open reel tape? The training should be guided by an expert but largely leave the operation of the recovery and the discovery of lessons-learned to the participants. Training activities include: ensuring the area is safe to enter, damage site survey and documentation, establishing roles and responsibilities, gathering and managing supplies, triage and prioritization, handling and workflow, documentation, and cleaning and drying. The outcomes of this type of training will likely reveal steps that can be factored into preparedness planning procedures.

## Equipment and Supplies

In an area-wide emergency, supplies will be hard to come by, and at first you will likely only be able to work with what is immediately available. Even in the case of a small, localized disaster, such as a burst pipe, it will be much easier to protect collections from damage if basic supplies such as plastic sheeting are on hand. Keeping a stock of emergency supplies will go a long way toward effective recovery.

Use your knowledge of the area and the building (see Section 1 of this chapter) to know which supplies and equipment will be essential after a disaster. For example, if electricity is frequently interrupted, an uninterruptible power supply (UPS) or a small power generator might be a wise investment. If your area is earthquake prone, having emergency lighting or at minimum an adequate supply of flashlights and batteries will be critical.

Keep emergency supplies in a watertight plastic container and in an easily accessible place. This may be near building entrances or in your car. It doesn't hurt to have caches in multiple places. A list of basic supplies you might want to have on hand includes:

- A few gallons of distilled water
- Nitrile gloves (latex and powder free)
- N95 face masks
- Trash bags: large and small
- Tape: paper, masking, duct, and strong (e.g., Gorilla) tape if available
- Plastic sheeting (to cover doorway entrances in advance of flooding, to cover surfaces during recovery)
- Rolls of paper (to cover surfaces for drying)
- Paper towels (lots and lots)
- Towels
- Felt markers (Sharpies), pencils, pens
- Flat trays or bins (for moving items)
- Flashlights, lanterns, headlamps, and batteries
- Notepads and clipboards
- Microfiber towels or other lint free cloths
- Isopropyl alcohol
- Cotton buds (Q-tips)

- Buckets
- First aid kit

## Prioritization and Identification

Think about which items in the collection will be a priority to evacuate or recover if they are damaged in a disaster. This is the point at which the appraisal process is very important (see Section 1). Make sure these items are well identified. Consider storing priority collections in a separate area that can be easily reached in the dark in case of a power outage. Organizations have used various approaches to ensuring these items can be quickly found and retrieved in an emergency, including locations identified on building diagrams and glow-in-the-dark stickers on shelves.

## Disaster Plan Documentation

A disaster plan will be an invaluable resource in the event of an emergency. The written plan is a quick reference for telephone numbers and email addresses of staff and

**FIGURE 5.2**

### A sample disaster supply kit.

Credit: Kenneth Spencer Research Library, University of Kansas  
<https://blogs.lib.ku.edu/spencer/tag/disaster-kit>



external resources (e.g. recovery labs). It also contains information about preparedness steps for the building and collections, including floor plans, the location of emergency exits, shut off valves, electrical breakers and outlets, and priority materials, and the details of salvage procedures.

A written disaster plan does not need to be overly detailed and should not be too long. It should be a well-organized resource and reference in the event of an emergency—not a verbose book that must be read from cover to cover for effective response, salvage, and recovery. Sections of the plan should be tabbed so they can be easily located in a time of crisis. Lists, diagrams, and bulleted, bold text will be most useful in an emergency. Make sure the plan is clear and easy to use. Additionally, it should be available in print and electronic form.

A disaster plan should include:

- **Pre-disaster action steps and evacuation instructions.** Outline the steps to be taken to protect people and collections in the event of a hurricane, typhoon, forest fire, or other emergency for which warnings are issued. Detail evacuation procedures and the location of alarms. Make sure this information is easy to find and very simple.
- **Internal communication information.** Collect the following from all staff: all telephone numbers (home, mobile, partner's mobile, etc.), email addresses (including personal email in case work servers go down), Twitter and Facebook handles, etc. Don't assume that phone networks (landline and cellular) or the internet will be available and reliable in the aftermath of a major disaster. Some methods of communication may work while others don't, and this may change over the course of several days. As part of your planning, ensure that you have access to and are familiar with alternative options such as SMS text messaging and Twitter. You might consider creating a Facebook Group that can be used to keep everyone informed in times of emergency. This will enable updates to be sent out to all staff members simultaneously.
- **Service provider list and contact information.** Include insurance companies, labs, recovery experts, full recovery services, conservators, roofers, plumbers, electricians, transportation and storage services, rental facilities,

drying facilities, the police and fire station, and other local emergency management response agencies.

- **Partner institutions and professional networks.** As part of the disaster planning process, talk to sister institutions or other professionals in your area that may be able to help in an emergency. Come to an agreement about what services or assistance may be provided, such as storing evacuated priority collections. Be sure to offer reciprocal assistance.
- **Building floor plan.** Include the location of water shutoff valves, electrical switches, disaster equipment and supplies, and all collections.
- **Priority collections list and location.** Identify these items in the floorplan as well as in a separate inventory.
- **Response structure and job assignments.** Identify who is in charge of the response effort and include their contact information. Include a backup in case the first person is not available. Be sure anyone put in charge has the authority to spend funds. List names and contact information of staff members who have been trained for various aspects of disaster response and recovery and who are familiar with the disaster plan.
- **Basic salvage instructions.** Instructions should be relevant to the materials in the collection.

Most importantly, be sure the disaster plan is reviewed and updated regularly and that staff training is conducted periodically.

### SECTION 3: FIRST RESPONSE STEPS

Preventative actions and preparedness steps will likely eliminate or reduce any damage to collections. However, sometimes even the most well-prepared collections can be affected. The goal of this section is to provide a basic overview of first steps to take to salvage valuable recordings. It does not go into detail about recovery or restoration. Recovery is a highly specialized task best left in the hands of experts. Even if you are not able to send tapes to a lab right away, taking proper steps to recover collections will buy time while funds are raised. Nonetheless, the earlier experts can be contacted, the better.

This section briefly walks through basic recovery steps, focusing on both human safety and the reduction of further risk to collections during the recovery process. Recovery itself is full of risk; the likelihood of mishandling, losing/dissociating materials from labels or cases, lack of documentation, and slow response leading to mold growth or other damage, is dramatically increased. Seeing your valuable collection lying under a pile of debris or submerged under water induces a sense of panic. Being well prepared will help alleviate permanent loss of content.

## Recovery Tips

### DON'T GIVE UP HOPE

In “Magnetic Tapes Can Survive Flood Exposure,” Peter Brothers notes that it is often assumed that water damaged tapes are ruined and unsalvageable. In fact, this is often not the case. Even tapes that have been submerged for extended periods of time have been recovered by experts. Brothers writes that no matter how bad they may look, “most wet tapes can now be saved and restored, if they are treated properly.”<sup>46</sup>

### CALL THE EXPERTS AND AUTHORITIES AS EARLY AS POSSIBLE

The disaster plan should contain contact information for authorities and experts, including insurance companies, disaster recovery services (for clearing water out of the building), labs and conservation professionals, local and federal disaster recovery agencies, etc. As soon as a damaged item is identified, contact these groups. They can help you determine what next steps to take, including whether or not you should attempt to begin recovery or instead wait for help.

### SAFETY FIRST

Human safety should always trump the desire to get in and rescue valuable recordings. The first step in recovery must always be ensuring that the area is safe to enter. Live wires, contaminated standing water, and damaged structures can pose enormous risk to humans. Have the

building inspected by an authority or expert and cleared for entry before proceeding and handling media.

### STOP AND/OR MINIMIZE DAMAGE

Do what you can to reduce risks to people and collections if the threat is ongoing. Shut off valves as well as electrical and climate systems. Cover collections with plastic sheeting if water or debris is falling. Move collections out of the hazardous space as quickly and safely as possible.

### ACT QUICKLY BUT RESPONSIBLY

Disaster recovery literature for collecting institutions often names 72 hours as the time window during which materials must be rescued in order to be fully recovered. While salvaging media within this timeframe is ideal, it is not always possible. Entire areas of a building may be cordoned off for days or even weeks due to hazardous conditions. Even after you gain entry to the space, it might be several hours or days before a recovery plan can be put in place. It is important that salvage be conducted quickly but carefully at this stage. In some cases, more damage may be done the longer the media sits under a pile of rubble or under water, but in other situations this may not be the case. Mishandling and dissociation of media and containers are some of the biggest risks at this stage. Create a plan of action to avoid these threats.

### DON'T ATTEMPT TO PLAY WET MEDIA

Do not, under any circumstances, attempt to play wet or contaminated media. This can lead to damage of both the media item itself as well as the playback equipment, which are both valuable resources. Wet or contaminated media will need to be cleaned in distilled water and dried before any content recovery can be attempted.

### IDENTIFY DAMAGE AGENTS

It is important to identify the types of contaminants that may be affecting media items. If collections are submerged in water, attempt to identify what types of contaminants may be in the water: salt, chlorine, sewage, etc. This will help determine what recovery actions need to be taken.

46 Peter Brothers, “Magnetic Tapes Can Survive Flood Exposure,” <http://www.specsbros.com/disaster-recovery-magnetic-tapes-can-survive-flood-exposure.html>.



Items submerged in saltwater, for instance, must be cleaned in distilled water as soon as possible, as the salt is highly corrosive and will quickly damage any metal parts (rollers, layers in optical discs, etc.).

### CAREFULLY DESIGN A RECOVERY OPERATION—DON'T JUST ACT

Before diving into salvage and recovery, develop a comprehensive plan. At this point, an awareness of the potential risks is key. The plan should factor in:

- **Space:** Identify a clean and well-ventilated space for cleaning and drying. Remember that drying space will have to accommodate media items as well as their cases, covers, labels, and inserts. Ensure that surface area is sufficient.
- **Supplies:** Make a list of your supply needs (such as gloves, cleaning supplies, flat surfaces for transport, paper towels, etc.), assemble what is available around you, and send someone out to find the rest. In an area-wide disaster, this can be particularly challenging due to regional demand for recovery supplies. Be creative, and start working on this as quickly as possible.
- **Roles and responsibilities:** Many institutions have reported that having “too many cooks in the kitchen” doesn’t work in an emergency situation. Identify at least one person who has the authority to spend funds. Quickly identify a coordinator who can establish needed roles and begin to fill these. These roles will change as the operation progresses: people who start by moving media to the recovery space may become responsible for cleaning or documentation later on. Necessary roles will likely include: coordination, documentation, cleaning, transport, security, and external communication. Some roles will require multiple people.
- **Documentation:** Documentation is perhaps the most important aspect of the recovery. It starts with documentation of the disaster area. Photographic as well as written documentation of the damage will be critical for insurance claims.<sup>47</sup> Ensure that damage to the building

and collections is thoroughly documented. Next, procedures should be well-documented and accessible to everyone participating in the operation. Finally, documentation must become ingrained in all aspects of the recovery: which cassette goes with which insert, what day and time drying started, and the names and contact information of the day’s volunteers. A lack of documentation, particularly the associations between media items and their cases/labels, is one of the biggest risks to successful recovery of audiovisual items.

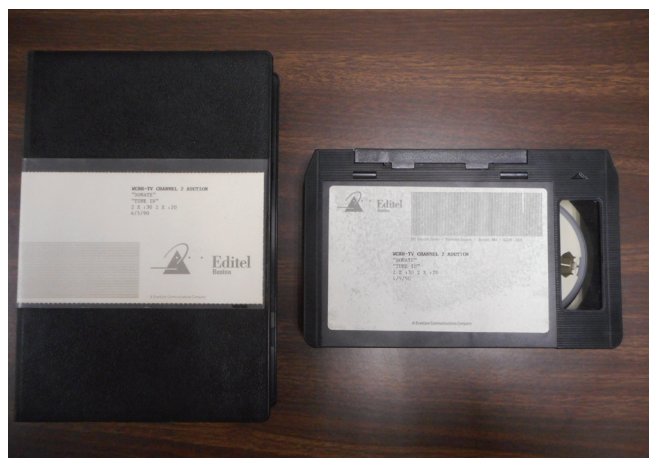
- **Training & knowledge transfer:** Everyone who participates in the recovery should be trained in the specifics of the workflow and procedures. In a situation in which staff and volunteers will be coming and going according to their availability, ensure that procedural knowledge is passed between people and documented as they cycle through.

### TRIAGE AND PRIORITIZE

Separate wet from dry items, and separate items by degree of damage. Attempt to identify the most valuable items and make these the first priority for salvage. The Association of Moving Image Archivists (AMIA) website provides a comprehensive list of triage steps.<sup>48</sup>

**FIGURE 5.3**  
An example of documentation: a U-matic tape and its case with matching and clearly-identifiable labels.

Credit: AVP.



47 Be sure you have approval from your insurance provider before attempting to move or salvage collections. In some cases, an adjuster may need to come survey the disaster site first.

48 See “Disaster Recovery—First Actions for Film, Tape, and Discs,” *amianet.org*, <https://amianet.org/wp-content/uploads/Resource-Disaster-Recover-First-Actions.pdf>

## Media-Specific Salvage

This section offers strategies for salvaging damaged audiovisual items. It does not cover all imaginable types of damage, but instead focuses on the most common such as water, contaminants, and debris. The strategies are limited to formats commonly found in audiovisual collections.

These instructions are limited to salvage and stabilization only. They are not equivalent to recovery or restoration. These steps are intended to stop or slow down ongoing damage and buy you time before transferring contents off of the media item. Following cleaning and drying, media items may still need to be sent to a lab for full restoration and transfer.

### ALL ITEMS

1. Remove media from containers, cases, or sleeves.
2. Remove wet inserts from cases.
3. Ensure that ALL pieces of the media item are labeled with a common identifier so that they can be brought back together after drying. Discard any containers that can easily be replaced (e.g. CD jewel cases). If containers have to be cleaned, be very careful not to smear or remove label information.
4. Cleaning should be done using distilled water. Tap water and even filtered water should not be used for cleaning as the mineral contents can be very harmful to the media.
5. All items that are cleaned in water should be left to dry for at least 48 hours before being placed back inside containers—longer if the relative humidity is high in the drying area or if the item is severely waterlogged.

### OPTICAL DISCS (CD, DVD)

1. Read notes for All Items above.
2. Do not freeze optical media.
3. Contaminated or water-damaged discs should be rinsed in clean distilled water. Do not submerge discs that are not already wet or have not been compromised through debris or contamination.
4. Using a lint-free (e.g. microfiber) towel, dry the data side of the disc by wiping from the center out in a sun-ray motion.

5. If there is any residue remaining, clean using a Q-tip with a solution of 1/3 isopropyl and 2/3 distilled water.
6. Blot the label side; wiping may remove or smudge labels.
7. Ideally, dry discs in new, clean jewel cases with the data side down and the jewel case open like a book, standing upright. If jewel cases are not available, lay media flat on a clean, dry surface with the label side down.
8. If needed, label with a felt tip marker on the (usually clear) inner plastic ring of the disc.

### ANALOG TAPE (VHS, U-MATIC, BETACAM, AUDIO CASSETTES, OPEN REEL AUDIO)

1. Read notes for All Items above.
2. Do not freeze magnetic tape.
3. Do not attempt to rewind wet or damaged tapes.
4. Even when a tape is fully submerged, it is likely that only the exposed parts have been compromised. Taking tapes apart, unwinding, or unspooling will in most cases do more damage. Do not take these actions unless advised by an expert.
5. Contaminated or water-damaged tapes should be rinsed in clean, distilled water. Carefully ensuring that the tape does not unspool in the water, submerge it briefly, giving the tape a slight shake. Dispel dirty water into a separate bin or bucket so as to not further contaminate the water.
6. Remove any residue on the outside of the cassette using a Q-tip with a solution of 1/3 isopropyl and 2/3 distilled water, taking care not to smudge or smear the label.
7. Lay upright to dry with the exposed portion of the tape facing up. For cassettes, prop open the lid and hold in place with a Q-tip.

### DIGITAL TAPE (MINI DV, DVC PRO, DVCAM, DIGITAL BETACAM, DAT)

1. Read notes for All Items above.
2. Do not freeze magnetic tape.
3. Do not attempt to rewind wet or damaged tapes.
4. Do not submerge in water under any circumstances.

5. Taking tapes apart, unwinding, or unspooling will in most cases do more damage. Do not take these actions unless advised by an expert. Even when a tape is fully submerged, it is likely that only the exposed parts have been compromised.
6. Clean the outside of the cassette using a Q-tip with a solution of 1/3 isopropyl and 2/3 distilled water.
7. Lay upright to dry with the exposed portion of the tape facing up.

#### **FILM (8MM, 16MM, 35MM)**<sup>49</sup>

1. Read notes for All Items above.
2. Do not unwind the film. The film may have stuck together, and unwinding could cause further damage.
3. Do not try to dry the film until you have been instructed by an expert on the best way to do so.
4. If the film is not wet, do not submerge it.
5. Rinse the film in clean water to remove debris.
6. If you have access to a freezer, place the film in a plastic bag, remove as much air as possible, and seal the bag. A supermarket bag will suffice for this.
7. If you don't have access to a freezer, place in a bucket of cool water. Change the water daily for up to two weeks until you can get the film to an expert

#### **LACQUER DISCS**

1. Read notes for All Items above.
2. Do not submerge in water under any circumstances.
3. If wet, dry off immediately, laying the disc on a clean, dry, flat surface and using a soft, non-shedding, non-abrasive cloth.
4. Avoid flexing the disc. Lacquer discs may have a glass base that can break. Flexing may also promote delamination if there are already issues with the disc.
5. If packing, place disc in a sleeve and pack with clean, flat cardboard spacers in between each disc. Pack vertically and snug, making sure there is no lateral movement but not so tight that it is stressing the disc.

#### **SHELLAC DISCS**

1. Read notes for All Items above.
2. Do not submerge in water.
3. Shellac can be cleaned in a solution of distilled water and a few drops of mild dishwashing detergent.
4. Using a microfiber or other lint-free cloth, wipe discs using a circular motion following the direction of the grooves.
5. Rinse in clean, distilled water.
6. Wipe again in a circular motion with a dry lint-free cloth.
7. Lay flat to dry.
8. Place in a clean sleeve.

#### **VINYL DISCS**

1. Read notes for All Items above.
2. Vinyl can be cleaned in a solution of distilled water and a few drops of mild dishwashing detergent.
3. Using a microfiber or other lint-free cloth, wipe discs using a circular motion following the direction of the grooves.
4. Rinse in clean, distilled water.
5. Wipe again in a circular motion with a dry lint-free cloth.
6. Lay flat to dry.
7. Place in a clean sleeve.

#### **WAX CYLINDERS**

1. Read notes for All Items above.
2. Do not submerge in water.
3. Gently dry with a non-linting, non-abrasive cloth. Too much pressure may crack the cylinder or alter the grooves of a soft wax cylinder.

49 Adapted from the National Film and Sound Archive of Australia, "First Aid for Water Damage." <https://www.nfsa.gov.au/first-aid-water-damage>



## CONCLUSION

Small, localized emergencies and large-scale disasters continue with alarming frequency and impact as the climate changes. Additionally, the potential for mistakes, negligence, and crime is ever present. Disaster preparedness must be a concern for all individuals and institutions that create or collect content with long-term value. Though disasters may be relatively infrequent, their impact can be devastating, with the potential for total loss of material. Even the simplest response or recovery plan can be highly effective if it is practiced and understood by all stakeholders. Doing something is always better than doing nothing when it comes to emergency preparedness.

This chapter has outlined many emergency preparedness and response basics that have been tried, tested, and improved by those experienced with disaster response and recovery of audio and other media over the years. However, these are only general guidelines. Always remember that the cause, circumstances, and context of each disaster will vary greatly. Guides like this one provide a general playbook but can't answer every question. Again, it is critical to have contact details for emergency response agencies (e.g. FEMA), experts, insurance, and others, so that these groups can be contacted as early as possible and guide you through the dos and don'ts of your particular situation.

Finally, as has been noted in several places in this chapter, the digitization of valuable audiovisual content and proper management of digital collections are two of the most important disaster preparedness steps you can take. A well-managed digital archive with proper intellectual control, backup, and geographic separation will always fare better in a disaster than will unique analog materials. An added benefit is that digitization, already necessary for most analog formats today, will best position the collection for long-term preservation and improved access.

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# GLOSSARY

**Active management:** The performance of consistent and ongoing digital preservation activities (e.g. fixity and validation) to ensure a digital file's continued access for as long as necessary.

**Artifact:** Anomalies during visual or aural representations of recordings.

**Audit trail:** The information associated with a digital file that tracks the transactional history of it from the point of capture or ingest to know whether it has been managed without change to the bits that make it up and according to relevant policies and standards.

**Authenticity:** The quality of being genuine and free from tampering and is typically inferred from internal and external evidence, including its physical characteristics, structure, content, and context.<sup>50</sup> Trustworthiness.

**Back coat:** Layer added to some magnetic tape to help support the magnetic recording layer. The back coat reduces tape friction, dissipates static charge, and reduces tape distortion.

**Binder system:** System through which magnetic particles are held by a binder to a substrate layer.

**Bit rot:** The corruption, loss, or decay of bits, the building blocks of digital files.

**Carrier type:** Refers to the physical carrier of the AV material. Examples of carrier type include reels and cassettes.

**Checksums:** Alphanumeric strings that reflect the uniqueness of every digital file.

**Curation:** The activities that are performed on a digital file throughout its lifecycle, including selection and appraisal, description, ongoing care and management, long-term access, and/or deaccessioning/disposal.

**Degradation:** The process in which the quality or integrity of an object is destroyed over time.

**Delamination:** In disc media, the process that causes layers to separate from the support base.

**Digital preservation:** The active management of digital content over time to ensure ongoing access.<sup>51</sup> It is an integral part of curation (see definition above).

**Digitization:** The representation of an object, image, sound, moving image, or document by generating a series of numbers that describe a discrete set of its points.

**File attendance:** Ensuring that there are no missing or unexpectedly present files in a given location.

**Fixity:** File fixity refers to the property of a digital file being fixed, or unchanged. Fixity checking is the process of verifying that a digital object has not been altered or corrupted.<sup>52</sup>

**Governance:** In the informational sense, governance is the set of structures, policies, procedures, processes, and controls implemented to manage information at an enterprise level, supporting an organization's immediate and future regulatory, legal, risk, environmental and operational requirements.<sup>53</sup>

50 "Authenticity." Glossary of Archival and Records Terminology. Society of American Archivists. <http://www2.archivists.org/glossary/terms/a/authenticity>

51 "About." Digital Preservation. Library of Congress. <http://www.digitalpreservation.gov/about>

52 Wikipedia. File Fixity. [https://en.wikipedia.org/wiki/File\\_Fixity](https://en.wikipedia.org/wiki/File_Fixity). Accessed December 29, 2016.

53 Wikipedia. Information governance. [https://en.wikipedia.org/wiki/Information\\_governance](https://en.wikipedia.org/wiki/Information_governance)

**Ingest:** The process by which digital files and their associated metadata (called a Submission Information Package, or SIP) is deposited or submitted into a digital repository.

**Latency:** In computer networking, latency is the time interval between the request for information, such as a digital file, and the retrieval or display of that file to the user by the system.

**Machine transport:** Playback equipment.

**Mandrel:** A cylindrical rod placed through a cylinder and used to rotate it for playback.

**Media type:** AV materials are classified as audio, video, or film during the cataloging and inventory processes.

**Metal evaporated tape process:** Process in which magnetic particles are vaporized from a solid and deposited onto a substrate layer.

**Migration:** Converting from one format to another format considered to be of greater stability.

**Obsolescence:** The state of being which occurs when an object or practice is no longer wanted or used. Usually occurs when a new technology supersedes the old.

**Preservation planning:** A process by which the general and specific needs for the care of collections are determined, priorities are established, and resources for implementation are identified.

**Refreshing:** Copying information content from one storage media to the same storage media.<sup>54</sup>

**Reproduction method:** Method in which a recorded signal is played back from a physical media object.

**Risk management:** The systematic control of losses or damages, including the analysis of threats, implementation of measures to minimize such risks, and implementing recovery programs.<sup>55</sup>

**RPM:** Rotations per minute. Used to indicate recording speed for discs and cylinders.

**Sidecar file:** A file that is stored next to the AV file in the same directory.

**Signal path:** The route that an audio signal travels from source to output. This may be within a single device (CD to speaker within a stereo system) or within a workflow (original audio recording to reformatted digital file).

**Slipping:** Tape pack problem in which either single strands or groups of strands are misaligned and migrate to rest against the edge of the flange. May cause edge damage to the tape or film.

**Splice:** When two ends of a tape or film are joined together using specially formulated splicing tape.

**Sticky shed syndrome:** A condition resulting from the deterioration of the binder in magnetic tape that results in gummy residues on tape heads during playback.<sup>56</sup>

**Storage architecture:** The computing and network infrastructure required to store digital files.

**Storage capacity:** The amount of data a storage device can hold, often measured in gigabytes (GB), terabytes (TB), and petabytes (PB).

**Storage media:** Devices on which data is stored. These include computer hard disks, optical disk drives, USB drives and other external hard drives, DVDs, and magnetic data storage tapes.

**Stylus:** A hard point following a groove in a phonograph record and transmitting the recorded sound for reproduction.

**Substrate:** The backing film needed to support the magnetic recording layer of a magnetic tape.

**Tails out:** A method for winding tape onto a reel where the end of the tape is on the outside.

54 Digital Preservation Coalition Digital Preservation Handbook Glossary <https://dpconline.org/handbook/glossary#R>

55 "Risk Management." Glossary of Archival and Records Terminology. Society of American Archivists. <https://www2.archivists.org/glossary/terms/r/risk-management>

56 "Sticky Shed Syndrome." Glossary of Archival and Records Terminology. Society of American Archivists. <https://www2.archivists.org/glossary/terms/s/sticky-shed-syndrome>

