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## **Disaster plan [excerpt], 2012**

### *SALVAGE APPROACH FOR DAMP BOOKS/DOCUMENTS*

DAMP BOOKS/DOCUMENTS are items that are not dripping water. They can be wet around the edges or wet halfway through or just cool to the touch. These items may be air-dried if care is taken to follow the guidelines below taken from suggestions by preservation experts. However, if there are hundreds of single pages, other methods of drying will be more satisfactory and cost effective.

Exceptions to air-drying are documents with running or blurred inks. These should be frozen immediately to preserve the written record. After the items are dry, contact a conservator for advice and assistance. Also, documents on coated or shiny paper must be separated immediately to prevent adhesion or they must be frozen to await a later decision.

### **Caution**

All air-drying **MUST** take place in a cool, dry place. Warm humid air encourages mold and mildew growth that can begin within 48 hours and cause more damage than the original emergency. Try to keep the temperature below 70 degrees Fahrenheit and the relative humidity below 55%. Use fans and dehumidifiers if needed. Keep the air in the area circulating. Keep the drying area clean by removing wet debris such as wet carpeting and furniture as soon as possible since this contributes to a humid environment. **If the temperature and humidity cannot be brought under control within 48 hours, move the damaged items to a cool, dry place to begin the air-drying process.** For instructions on packing and moving wet materials see the section on Packing Wet Books.

### **Procedures for Air-Drying**

#### **Loose Pages-- Uncoated Paper**

- Sponge off mud and debris using clean water but **ONLY** if material does not have water-soluble components such as watercolors, runny inks, tempera, and dyes. (Instead allow to dry and then brush off debris when completely dry.)
- Lay out single pages on tables, floors, or any flat surface covered by paper towels or clean, uninked newsprint.
- Or, string clotheslines close together (6-foot lengths spaced 2-inches to 1-inch apart) and lay lightweight records, manuscripts, and photographs across the line or clothes-pinned to the line to dry.

#### **Loose Pages-- Coated paper**

If records are printed on coated paper, they must be separated from one another to prevent them from sticking together. Since this is a tedious process that requires skill and patience, it is useful to have staff practice ahead of time.

- Place a piece of polyester film (such as Mylar) on the stack of records.
- Rub it gently down on the top document.
- Slowly lift the film while at the same time peeling off the top sheet.

- Hang the polyester film up to dry on the clothesline using clothespins.
- As the document dries, it will separate from the surface of the film. Before it falls, remove it and allow it to finish drying on a flat surface.

Once dry, records may be rehoused in clean folders and boxes. Or they may be photocopied or reformatted onto microfilm. However, once wet and dried, records will never look the same, and at least some cockling or distortion should be expected. In addition, dried records will always occupy more space than ones that have not been water damaged.

### **Books**

**Never** try to reshape or force damp volumes open as this will cause harmful distortion. They can be treated **AFTER** drying. (Some books will dry distorted and misshapen. This can be greatly reduced **AFTER** completely drying by placing volumes under light pressure or, in extreme cases, rebinding.)

### **Slightly Wet Books**

- If the edges are only slightly wet, stand the volume on end and fan it open slightly in the path of a flow of air (as from a fan).
- To minimize distortion of the edges, lay volumes flat under light pressure (e.g., a book press or paper-covered bricks) just before drying is complete.
- If an air-conditioned room capable of maintaining a constant relative humidity of 25% to 35% and temperatures between 50 degrees F and 65 degrees F can be established, books with only wet edges can be dried successfully in approximately 2 weeks without interleaving.

### **Damp Books**

- Interleave at least every 50 pages, starting from the back of the volume turning pages carefully to avoid tearing them.
- For interleaving, use unfolded paper towels or clean, uninked newsprint. Be careful not to interleave too much, or the spine will become concave and the volume distorted.
- Complete the interleaving by placing clean blotter paper inside the front and back covers.
- Stand the volume on its head, fan it open, and place it on several sheets of absorbent paper. Change the interleaving frequently and turn the volume over each time it is interleaved.

### **After materials are dry**

- When volumes are dry but still cool to the touch, they should be closed and laid flat on a table or other horizontal surface, gently formed into the normal shape, with convex spine and concave front edge (if that was their original shape) and held in place with a light weight.
- Do not stack drying volumes on top of each other.
- In no case should they be returned to shelves until thoroughly dry; otherwise mold may develop, particularly along the inner margins.

### **Supplies Needed**

Pens, note paper, clothesline, clothespins, sponges, clean water source, unprinted paper towels or newsprint, Mylar sheets

### **Equipment Needed**

dehumidifiers, fans

## SALVAGE APPROACH FOR WET BOOKS AND PAPER

WET BOOKS (as opposed to DAMP BOOKS) are defined as books that are dripping water. They are extremely fragile and must be handled carefully as pages can easily fall out and covers can separate from the text block.

WET BOOKS should be vacuum freeze dried by a professional in the case of a major emergency (see Appendix D for Recovery Services). Vacuum freeze drying dries the material with the least distortion as the water goes directly from the liquid to gaseous state (vapor) without passing through the solid state, i.e., ice never forms. Meat freezers and household freezers do allow ice to form and consequently are not adequate.

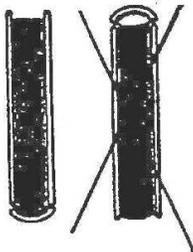
### **Caution**

First, control the environment. Warm humid air encourages mold and mildew growth that can begin within 48 hours and cause more damage than the original emergency. Try to keep the temperature below 70 degrees F and the relative humidity below 55%. Use fans and dehumidifiers if needed. Keep the air in the area circulating. Reduce humidity by removing wet debris such as wet carpeting and furniture as soon as possible.

Before starting any packout procedures, know what the damaged materials are. Specifically, glossy paper (like magazine paper, art books, etc.) is not salvageable after 5-6 hours in water as the inks run and the pages become irrevocably stuck together. Move on immediately to concentrate on salvageable material. Leather and vellum bindings are extremely fragile and should be rescued early or not at all.

### **Packing Wet Books**

- Keep a written record of what volumes are in which box (by floor, range number, and call number) and clearly label each box.
- Use 1 cubic foot, ResCube (or other appropriate box) to pack-out and transfer damp books to the drying area. A one cubic foot box will hold about 15 volumes and weighs about 50 pounds when loaded.
- Wrap each book in one piece of unprinted newsprint; this prevents colors bleeding into one another. Precut sizes to save time.
- Pack books SPINE SIDE DOWN IN A SINGLE ROW ON THE BOTTOM OF THE BOX.



**THIS ARRANGEMENT IS VERY IMPORTANT! DO NOT STACK BOOKS OR OTHER MATERIALS ON TOP.**

**WATER DAMAGED MATERIALS WILL SAG AND DISTORT ESPECIALLY UNDER PRESSURE, CAUSING PERMANENT DEFORMITIES.**

- Seal box with packing tape and label contents with marker on all four sides as well as the top.
- Keep a record of what books are drying where.

### **Shipping Boxes**

- Stack 24-30 boxes (heaviest on the bottom, lightest on the top) on a shipping pallet. Shrink-wrap entire pallet. Try to wrap same classification materials together.
- Ship books to vacuum freeze dry facility in refrigerated or freezer trucks to prevent mold growth.
- Keep careful records of shipment contents and dates.

### Supplies Needed

Pens, note paper, gloves, markers for labeling ResCube or other appropriate carton, unprinted newsprint, wooden shipping pallets, large size shrink wrap, garden hoses, sponges, clean water source

### Freeze-dry facilities:

American Freeze Dry

Owner: John Zioance

1722 Hurffville Rd., Bldg 2A

Five Points Business Center

Sewell, NJ 08080

**Tel: (866) 939-8160**

**Emer: (856) 904-4227 or (609) 458-0510**

<http://www.americanfreedry.com>



Document Reprocessors (East Coast Facility)

40 Railroad Ave.

Rushville, NY 14544

**Emer: (800)-437-9464**

**Office: (585) 554-4500**

**Fax: (585) 554-4114**

<http://www.documentreprocessors.com>

### **MOLD: PREVENTION AND RESPONSE**



Mold: A very large group of microscopic fungi that live on virtually any organic host material, including cellulose-based materials (cotton, linen, paper, wood), proteinaceous materials (leather, parchment, adhesives), and even dust and sooty dirt. Seemingly inhospitable materials such as plastics are not immune to fungal growth (NPS). Most are filamentous organisms and produce spores that can be air-

water-, or insect-borne (Medicine.net). Most molds are not poisonous, but since there is always a mix of species, one cannot rule out the presence of toxins in a growth of mold (McCrary).

Ideal Mold environment: Mold spores are everywhere in the environment, thus a sudden mold bloom in a collection indicates some kind of change in the environment that has caused the mold spores to germinate (i.e. introduction of water, change in RH) (Price). Mold can form in 24-48 hours. Requirements for air and light vary (McCrary). Spore germination is less likely if RH is controlled between 45% and 55%; release of spores is encouraged by a change in the relative humidity. Target temperature is between 64 and 68 degrees F. However, some species can grow in significantly lower temperatures and RH levels, thus certain kinds of materials should be stored in colder environments with a lower RH (NPS).



Mold growth will accelerate under a combination of conditions: rise in temperature, increased RH, poor air circulation, dim light, and accumulated dirt. Without the presence of moisture, spores merely lie dormant until a more favorable condition occurs (NPS).

Prevention: Regulate the environment by routinely monitoring RH levels. Keep temperature and RH levels as constant as possible. RH should *always* be below 65%. Maintain adequate air circulation and proper ventilation (NPS). Conduct routine visual inspections for probable water leaks, water stains, and existing mold formation. Additional inspections should be conducted after inclement weather. Staff and maintenance should report water leaks and watermarks in an expedient fashion (Results). Repair leaking pipes, gutters, cracked windows, problem roofs, cracked walls, etc. Change air filters regularly, insulate cold water pipes, maintain HVAC systems, etc. (NPS). Keep areas housing collections free of dirt, dust, or organic debris. Silica gel and other buffers can help adjust RH conditions in a sealed space, such as a storage cabinet, enclosure, or case (NPS). Procedures should be in place to inspect new accessions.

#### Detection:

Is the mold active (wet, in an environment favorable to growth) or dormant (dry, absent of environmental conditions suitable for growth)? Wet mold will be soft and smears easily. Dry mold will be powdery.



Is there a:

1. Musty odor?
2. Stain of any color visible as pigmentation?
3. Velvety growth of any color (wet mold)?
4. Powdery deposit (dry mold)?

Is it a moderate outbreak affecting a limited number of items (i.e. 100-300 cubic feet) or a major outbreak that cannot be handled in house and that will need outside professional assistance? A *mycologist* should always be contacted to determine if the species is toxic.



Treatment:

1. Isolate the object(s) :

a) *Small Blooms*: Place materials in plastic bags to prevent spread of mold spores to other objects or people. Never directly touch the mold. Remove the object to an isolated space where the mold can be deactivated by lowering the RH, increasing circulation, etc. Do not keep the materials in the bags.

b) *Large Blooms*: Quarantine the area and contact professional help immediately. Close doors, hang plastic sheeting between affected and unaffected areas, and reduce circulation of air from affected to unaffected areas. Consult a mycologist.

2. Deactivation: Look for the source of the problem. Check the HVAC system. Lower the RH and increase air circulation.

Other options include: small scale air drying of damp items, drying at a temperature of 86-104 degrees F, freeze drying, and exposure to sunlight. Consult a conservator before using any method other than air drying. Remember mold can always be reactivated if there is a change in temperature or the RH goes back up.

Treatment methods for dry, inactive mold include *vacuuming* with a vacuum fitted with a HEPA filter, or one which does not exhaust spores back into the room. The preferred method for cleaning active mold is *aspiration*.

Health Concerns:

Certain species of mold may cause serious illness or even death in susceptible individuals. Regardless of species, mold may cause allergies, respiratory problems, skin and eye irritation, and infections. Individuals with serious allergies, diabetes, asthma, respiratory problems, or compromised immune systems should not work on or near affected areas or materials (Price).



The following protective gear is essential:



- Appropriate respirator equipment: N95 (minimum) rated dust mask for particulate contaminated air
- Fitted goggles and/or safety glasses
- Disposable gloves (non-latex, such as nitrile or vinyl)
- Disposable apron or lab coat (non disposable gear should be disinfected in hot water and bleach)
- Appropriate shoes (non slip, full coverage)

Follow Up:

Clean the storage area thoroughly: Vacuum and wipe surfaces with a diluted Lysol-type fungicide. Only return materials after the area is thoroughly dry and stable.

Disinfect clothing if not disposable.

Monitor affected materials and areas on a regular basis to check for renewed growth.

Undertake necessary repairs and upgrades.

Materials needed:

Protective gear (see above)

Plastic Bags

Plastic Sheeting

Crates

Works Cited:

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<<http://cool-palimpsest.stanford.edu/byorg/abbey/an/an23/an23-4/an23-402.html>>.

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1 June 2009 <<http://www.nps.gov/history/museum/publications/consveogram/03-04.pdf>>.

Price, Lois Olcott. ""Mold: Managing a Mold Invasion: Guidelines for Disaster Response.""

*Conservation Center for Art and Historic Artifacts*. Technical Series No. 1. Philadelphia, Pa. 1996.

""Results: Mold Prevention in Facilities."" <http://www.plm.com/Results.htm>

Additional Resources:

<http://www.epa.gov/mold>

<http://cool-palimpsest.stanford.edu/bytopic/mold/>