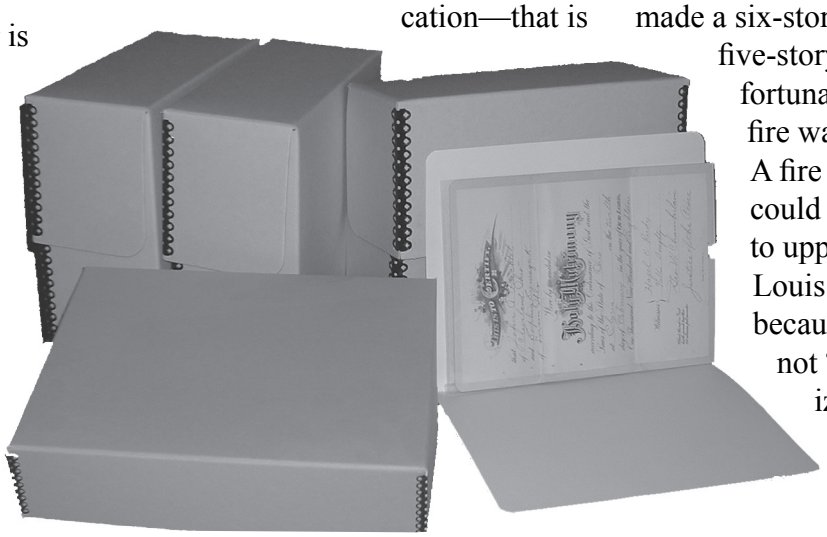
Disaster planning: the "onion" approach

Disasters inevitably happen. The only way to reduce their impact is preparedness. In fact, archival disaster planning is like an onion. At the core are the records we want; surrounding them are layer upon layer of protection. Preserving the permanently valuable records of the United States federal government takes a lot of layering.

"Onion" layers

The onion's outer layer is the building. At the National Archives (NARA), disaster planning starts with state-of-the-art buildings. Of course, older buildings may not meet today's standards, which is why the National Archives Building in Washington, D.C.—as well as some of our other facilities—have undergone renovations to make them reach today's fire, safety, environmental, and other standards.



The next onion layer is compartmentalization. This really works two ways. Turning to another metaphor, our eggs are not all in one basket. That is to say, the records are not all in one place. There is the National Archives Building ("Archives I") in Washington, D.C.; the National Archives at College Park ("Archives II"), Maryland; twelve Regional Archives where original federal records are kept; eleven Presidential Libraries; and the National Personnel Records Center (civilian and military), and specialized off-site storage.

Within each basket, the eggs are not all together. Each building is not one "big" space. Records are in different "rooms" that archivists call stacks. This is an oversimplification—that is not accurate due to renovation and other reasons—but you could think of the basic design of the National Archives Building as a twenty-story building with eight rooms on each floor separated by strong walls and doors. If something bad happened in one of those "rooms" it should not immediately or directly affect other "rooms."

Fire is bad. Once something is burned up, it is gone. Most genealogists have heard of the 1973 fire at the National Military Personnel Records Center in St. Louis, Missouri, that destroyed 16 to 18 million Official Military Personnel Files (OMPF). Eighty percent of OMPFs for Army personnel discharged from 1 November 1912 to 1 January 1960 and 75 percent of OMPFs for Air Force personnel discharged 25 September 1947 to 1 January 1964 were lost. The fire made a six-story building into a five-story building. We are fortunate, however, that the fire was on the top floor. A fire on a lower floor could easily have spread to upper floors. The St. Louis fire was big and bad because the building was not "compartmentalized" and it was built without fire suppression systems. Investigators were never able to pinpoint the cause of the fire.

Fortunately for the affected veterans, evidence of their military service can often be reconstructed from 19 million final pay vouchers and 7.8 million records of admission to a hospital or other treatment facility.

Thus, to guard against fire, everyone now agrees there must be fire suppression systems, which means automatic water sprinklers.

Water damage isn't ideal, of course, but we'll talk more about that later.

Records are stored on steel shelves, not wood. Wood is more likely to burn. Steel may warp and sag from extreme heat.

Records aren't stored "just laying around" like that pile of magazines on your living room table. The next onion layer is housing. Normally that means archival boxes made from very special cardboard. They are acid-free, low-lignin, and have an alkaline reserve. These features guard against creeping deterioration—the kind that we have to worry about over hundreds of years. They are strong and have metal fastenings instead of glue. Archival boxes are excellent guards against water damage. A water sprinkler may soak the boxes on the outside, but records on the inside stand a good chance of staying dry if the box was not subjected to water for too long a time. A wet box will be replaced, but it did its job.

National Archives I Building, Washington, DC.

The next onion layer is more housing. An archival box will easily hold more than five hundred sheets of paper, but the records inside are usually subdivided into folders. These folders are also acid-free, low-lignin, and have an alkaline reserve. Folders are another layer that can help keep records dry.

The next onion layer is optional. Very old, or fragile or brittle original records may be placed in a preservation-quality stable plastic sleeve. This will keep the old paper together and also protect it against water.

The next onion layer is also optional. Some of the most valuable, useful, and popular records have been microfilmed. Archival-quality photography using modern preservation-quality polyester-base microfilm helps the information in records survive in the event of mishandling or total loss of original records. Old cellulose acetate-base microfilm (used from the 1920s to 1970s) is subject to deterioration and those films should be duplicated onto polyester-base film. The original negative microfilm is stored off-site in controlled temperature and humidity conditions that will ensure the film survives for hundreds of years. You use copies of the microfilm at NARA and other research facilities.

The next onion layer is again optional. Digitization with remote storage of the digital copy can also help guard against total loss of the information in the original records. Of course, because of rapidly changing technology, digital copies themselves must be migrated to new storage formats as standards change and evolve.

Disaster recovery

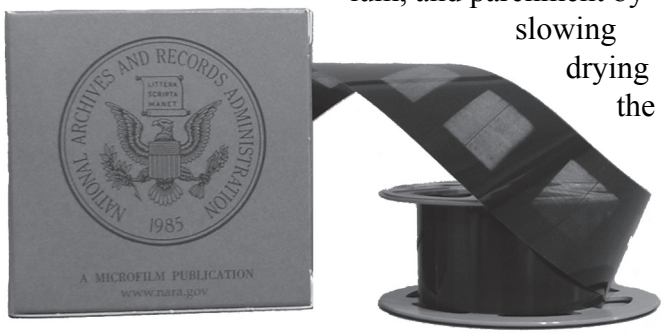
What if disaster happens? If there is fire, the fire suppression systems will spray water. The first priority will be to guard against loss of life. Everybody must get out. (Your kids do fire drills at school. So do we.) Emergency responders will secure the scene. When the building is safe for re-entry, then the "first preservers" will get their turn. Our conservation/preservation staff are highly trained and experienced. They will determine what must be done to recover the records to usefulness.

The first forty-eight hours are critical. After forty-eight hours, the situation gets more complex but is not hopeless. Conservators and archivists work together to assess the extent of the damage. Efforts must be prioritized to focus first on the most unique, valuable, and important permanent records. Are there any classified or privacy-protected materials to which access must be restricted? Are there photographs, film, electronic media, or artifacts that require special handing?

Environmental controls must be restored to normal archival conditions: temperature at 65° Fahrenheit or less, relative humidity 40 percent or less, and no standing water.

Extensive water damage normally means the records must be dried out. Large fans can blow air around the affected area (unless mold is present) until the records can be moved. The next steps de-

pend upon the size of the disaster. If large quantities of records are involved they are often frozen. This buys time as strategies and resources are put into place to recover the records to usefulness. Freezing guards against mold. Some molds are toxic, and some people are allergic to mold. Mold digests paper so it becomes soft and pulpy, destroys text, or causes papers to stick together. Smaller scale disasters can often be handled in-house with simple air drying.



Drying off

The actual process of removing water can begin as time, space, and staffing allow. There are several ways of doing this: (1) vacuum/freeze-drying, (2) desiccant drying; (3) air drying; and (4) cryogenic drying.

Vacuum/freeze-drying is the most efficient method and requires the least human labor. It allows large quantities to be dried out at once in their original containers, folders, and even plastic sleeves. This process also results in minimal distortion (warping or other physical changes) and takes one to two weeks, depending on wetness.

Desiccant drying results in the greatest distortion to paper. It is labor intensive since individual sheets must be taken out of their protective housings (boxes, folders, and plastic sleeves) to spread on shelves to dry in warm dehumidified air. They need to be turned over to expose the other side to the warm air. After drying in two to five days, the paper takes more space to store due to distortion.

Air drying results in less distortion to paper. Like desiccant drying, it is labor intensive due to removal of individual sheets from protective housing. The records are spread out onto flat surfaces to dry. Drying time depends on wetness, relative humidity, and size of the item.

Cryogenic drying is used to minimize distortion to leather, vellum, and parchment by slowing drying the item with modified freeze-drying technology.

The best defense

It has often been said that the best defense is a good offense, and so it is true with archival disaster planning. First, make sure that preventable disasters don't happen. Second, if disaster does strike despite proper precautions, make sure that the personnel and procedures are in place to recover as many records as possible. Our records are our collective historic memory. Without them, our memory is lost.

For more information

For more information about archival disaster preparedness and disaster recovery, visit:

American Institute for Conservation at <http://aic.stanford.edu/>.

"Disaster Response and Recovery" at <http://www.archives.gov/preservation/disaster-response/> and follow the links to topics of interest.

"1973 Fire at National Personnel Records Center (St. Louis, Missouri)" at <http://www.archives.gov/st-louis/military-personnel/fire-1973.html>

Kellee Blake, "'First in the Path of the Firemen:' The Fate of the 1890 Census" (Part 1) at <http://www.archives.gov/publications/prologue/1996/spring/1890-census-1.html> and (Part 2) at <http://www.archives.gov/publications/prologue/1996/spring/1890-census-2.html>.

Susan Page, "Fire Recovery: A Case Study," at <http://www.archives.gov/preservation/conservation/fire-recovery.pdf> describes and shows several drying techniques in action.

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