Superstorm Sandy: Response and Recovery at NYU Ehrman Medical Library

By Angela M. Andres, Lou Di Gennaro, and Laura McCann

Superstorm Sandy made landfall on October 29, 2012 just south of New York City. Amplified by a full moon and high tide, Sandy’s record-breaking storm surge caused 14 feet of seawater to pour into lower Manhattan inundating streets, tunnels, and subway lines and cutting electrical power in and around the city.

The New York University (NYU) Langone Medical Center, situated on Manhattan’s east side, was hit heavily by the storm surge, which flooded the center’s lower levels and caused power outages throughout the facility. NYU Langone Medical Center is a premier institution for clinical care, biomedical research and medical education. Throughout the evening of October 29 and into the morning of October 30, Langone patients were evacuated. Immediate assessments indicated major damage to electrical and mechanical infrastructure, as well as damage to clinical and research facilities including the Frederick L. Ehrman Medical Library.

Located on three floors at the heart of the NYU Langone Medical Center, the Ehrman Medical Library was devastated by the storm. The library is a vital part of the NYU Health Sciences Libraries, providing academic and research support for students and staff of the Langone Medical Center and NYU School of Medicine. The collections include monographs and serials (both print and electronic), reports, audiovisual materials, digital resources, graphic materials, rare books and pamphlets, and a historically important archival collection. The lowest level of the library was completely submerged by the surge. The ground floor level took on a minimum of one foot of floodwater. The flooding resulted in electrical outages which compromised servers, disrupting access to vital digital resources including email access.

Once all patients were evacuated work began immediately to restore power to the medical center and resume clinical care functions. At this time senior staff of NYU Health Sciences Libraries were able to access the facility and set to work salvaging servers and computer processing units necessary to restore basic library functions. Paula
DeStefano, head of the Barbara Goldsmith Preservation and Conservation Department of New York University Libraries, was contacted to provide expertise on the recovery of the flooded print and archival collections.

**Assessing the Damage**

On the morning of November 1, with continuing power disruptions causing major public transport delays, conservators Laura McCann (Conservation Librarian) and Lou DiGennaro (Conservation Technician for Special Collections) from the Barbara Goldsmith Preservation and Conservation Department set out on foot from Brooklyn to the Medical Center to begin damage assessment.

Equipped with headlamps, personal protective equipment, a digital camera and assessment forms, the conservators conducted a survey of the library spaces. Upon entering the library at the mezzanine level, which had had no power or environmental control for three days, a damp musty odor and high humidity were immediately evident. The water had subsided and a dirty tideline, about a foot and a half high, was visible along the walls of the ground floor. Library staff informed the conservators that standing water was still present in the formerly submerged basement level, which contained printed monographs and serials on compact shelving and Medical Center archival materials in flat files.

After a quick assessment of books shelved in open cabinets surrounding the mezzanine and rare books and archives housed on the same floor, the conservators were led by library staff down to the ground floor, which consisted of public service space, a reading room, circulation and reference service desk areas, cataloging, interlibrary loan and acquisition offices, and the server room. Here the carpet was still damp, ceiling tiles had fallen, and books, audiovisual materials and computers below the tideline were completely wet. In the cataloger’s office off the main reading room, the conservators discovered two record carton boxes of rare and valuable pamphlets on the floor that had been submerged and thrown about by the force of the water. A number of early printed books, some in original leather and vellum bindings, safely escaped the rush of water. Access to the basement level was prevented by standing water in the stairwell. With the possibility of biohazards from adjacent research facilities, the conservators and library staff quickly determined the risk to personal safety was too high to pursue the assessment of this level.

The initial reconnaissance completed, the group planned immediate response actions. The first priority was to formalize a contract with Belfor, the disaster response company that was already on the scene at the NYU Langone Medical Center.
The next action for library staff was to define salvage priorities. The next action for library staff was to define salvage priorities. Aided by a recent collection management project and the library's disaster plan, they determined the first priority to be archival material, rare books, rare pamphlets, interlibrary loan items, and computer processing units (the servers had already been salvaged and relocated). The second priority was dry library material on the ground floor. All wet materials that were not archival materials, rare books, rare pamphlets, interlibrary loan items, or computer processing units were determined to be replaceable and therefore were not selected for salvage.

Due to the high relative humidity in the facility the conservators were concerned about a potential mold outbreak on the mezzanine level. Library staff monitored environmental conditions with battery-operated equipment. Elevated relative humidity was successfully reduced by opening adjacent windows and doors to take advantage of the cold and dry conditions outside.

Once salvage priorities were defined the group met with Belfor staff to plan the recovery of library materials. Access to the basement space was still restricted while industrial hygienists and engineers assessed the space, limiting recovery activities to the ground floor. Belfor teams set to work moving dry high-priority items from the ground floor to the mezzanine and then inventorying and discarding low-priority wet material. Discarding wet materials was important to reduce the moisture content on the ground floor and prevent mold growth. The conservators began immediate work salvaging the wet pamphlet collection while library staff salvaged the CPUs.

**Recovery of Collections**

Work on the wet pamphlets commenced in a conference room where large south-facing windows provided necessary illumination and air circulation. Working quickly the conservators, using supplies found in the library's disaster response kit, covered the conference table with polyethylene sheeting and began removing wet housing material, being careful to retain all bibliographic information. The pamphlets were spread out on the table and allowed to briefly air dry before being individually wrapped in Tek-Wipe. (Tek-Wipe is a very strong non-woven reusable fabric made from polyester and absorbent cellulose.) The wrapped pamphlets were then transferred into plastic crates and brought via taxi to NYU Libraries’ Bobst Library for freezing. Bobst Library was one of the few downtown institutions to maintain power after the storm because it is connected to NYU’s co-generation electrical plant. The conservators worked into the evening placing small groups of wet pamphlets, separated by waxed paper, into self-sealing polyethylene bags, labeling the bags, and placing them in the freezer.

In the weeks following Sandy, Belfor teams inventoried and packed the dry books and office papers from the ground floor and mezzanine shelving. The packed books were trucked to a climate-controlled secure offsite facility. Testing of the environmental conditions in the basement was completed in December and the archival materials were transferred from the basement directly to Belfor’s freezer truck.
The archival materials were then shipped to Belfor’s facility for vacuum freeze-drying, cleaning and mold remediation. Treatment of the archival materials and remediation of the library spaces by Belfor is ongoing. The Ehrman Library staff are currently working in temporary offices. Through outreach and the use of digital resources and services they continue to provide vital support for the research, educational and clinical functions of NYU’s School of Medicine and the Langone Medical Center.

Recovery and treatment of the salvaged pamphlets continues at the Barbara Goldsmith Book and Paper Conservation Lab in Bobst Library. Conservators thaw each pamphlet in a shallow tray of water to release the frozen pages from one another, clipping original sewing threads to facilitate the separation. A soft brush is used to dislodge any surface dirt deposited by the floodwaters, and the individual folios are lifted from the water and placed in a stacked “sandwich” of non-woven polyester fabric and blotter to quickly absorb most of the moisture. The pages are then transferred to a fresh stack of dry blotter and reemay and allowed to finish drying under weight. Once dry, the pamphlets may require mending or additional surface cleaning before being resewn.

**Reflecting and Looking Forward**

While it may not be possible to prepare for any and every contingency in a disaster or emergency, it is almost impossible to over prepare. Major weather events such as Superstorm Sandy are increasingly common; the aftermath of Sandy provides an opportunity to consider what such storms mean for library collections and what kinds of steps can be taken to prepare for and defend against these natural disasters before they happen.

The Ehrman Library flood situation demonstrated the importance of having a disaster recovery firm involved from the earliest stages of the response; a firm (or firms) should be identified in the disaster plan, ideally with a pre-arranged contract in place, and key staff members should keep printed copies of the disaster plan at home, since electronic copies and on-site printed copies may not be accessible. Important keys and emergency supplies should be regularly maintained (checked for fresh batteries, for instance), well-organized and clearly labeled. It is useful to prioritize collections so that high-value materials can be quickly identified in an emergency situation, and to store high-priority items in the least vulnerable areas within a facility, avoiding basements, low shelves, and other potentially risky places.

**Sources**

New York University Health Sciences Libraries: http://hsl.med.nyu.edu/


**Disaster Preparedness and Response Resources**

American Institute for Conservation

24-hour Assistance Line: 202-661-8068

Caring for water-damaged family heirlooms and other valuables: http://www.conservation-us.org/index.cfm?fuseaction=Page.viewPage&pageId=597

Conservation Center for Art and Historic Artifacts

Disaster assistance services: http://www.ccaha.org/services/disaster-assistance

Northeast Document Conservation Center

Emergency salvage of wet books and records: http://www.nedcc.org/resources/leaflets/3Emergency_Management/06SalvageWetBooks.php

Emergency salvage of wet photographs: http://www.nedcc.org/resources/leaflets/3Emergency_Management/07SalvageWetPhotos.php


Heritage Preservation

Compilation of resources and publications concerning disaster/flood recovery: http://www.heritagepreservation.org/PROGRAMS/flood.html


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Thawing a frozen pamphlet in a water bath.
J OSEPH WILLIAM ROYER, 1873-1954, was a prominent Illinois public figure and engineer but an under-recognized Midwest architect. An Urbana native, Royer was best known for his school buildings and homes scattered throughout Champaign-Urbana, Illinois. In the 1920s, Urbana could have been called ‘Royerville’ due to the number of buildings created by Joseph Royer. There are approximately 100 Royer buildings still standing around Champaign and Urbana even reaching into Indiana and Iowa. Royer received his Architecture Degree from University of Illinois College of Engineering in 1895.

While the literature covering Royer’s life is sparse, fortunately there are local newspaper articles documenting his personal and private life. Brian Adams, Assistant Director of Public Service of Archaeology and Architecture Program at the University of Illinois at Urbana-Champaign (UIUC), became interested in Joseph William Royer after renovating Urbana homes. His restoration led to research culminating in a book about Joseph Royer called Joseph William Royer: Urbana’s Architect. His book gives a detailed account of Royer’s professional and personal life.

After discovering five packets of Joseph Royer drawings, containing 103 total sheets, Adams immediately contacted UIUC University Archives to preserve these artifacts. University Archives decided that the best course of action, for preservation and access, was to digitize these materials due to the damage, size and nature of the drawings. The University of Illinois has a digital content creation unit (DCC) on campus that digitizes rare and fragile items for the Library. After digitization, the drawings would be stored in the high density cold storage on the UIUC campus, as they will be low-use items. In October 2011, the UIUC conservation laboratory began collaboration with University Archives and DCC to assess and prepare the five packets of Joseph Royer architectural drawings for digitization and permanent storage. The project was recently completed in June 2013.

**Description and Condition**

The 103 Joseph William Royer Drawings came to conservation in very poor condition. There were five packets of drawings: three...
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packets were architectural blueprints and two packets were original architectural drawings. The blueprints on cream wove paper were stable but had suffered much physical damage. The drawings were originally found rolled and retained the curl. Much of the damage was seen as surface soil and grime with tattering of the edges. Other damage included, but was not limited to, yellowing, staining, mildew staining, self-adhesive tape, tears, folds, creases and undulations. There were areas of fading of the cyan media but most of the damage occurred on the top and bottom sheets that were most exposed.

The two packets of original drawings were in a more compromised state than the blueprints because of the inherent quality of materials. The media was friable and the sheets were once again brittle and tattered. One packet had half of the images drawn in black pen and ink on thin coated cloth paper and the other half was drawn with graphite on brown semi-transparent paper. The ink and graphite drawings were interleaved together. The cloth paper had many losses from insect damage with some mildew staining.

The other packet of original drawings was all drawn in graphite on cream tracing paper with covers of Kraft paper. This packet of drawings was extremely brittle and almost torn in half horizontally with many edge losses. There was also much smudging of the graphite with edge losses.

Preparations
The three primary conservation and preservation goals for the drawings were to stabilize the drawings, to prepare for safe handling during digitization and to consider long-term, low-use storage solutions. The initial assessment evaluated the project on an overall level including, condition assessment, treatment hours, materials needed and projected budget. During assessment it was decided that this could be a great learning experience for a student.

A second-year student in the Graduate School of Library and Information Science had been hired for a one-year contract to complete the Royer project. This student had eight months of experience on stabilizing geological maps for conservation and the new project allowed for a more in-depth learning experience about conservation and preservation under the supervision of the Senior Conservator of Special Collections.

Treatment Performed
Item level evaluation was conducted prior to treatment. Each sheet was tested with various
archival erasers because of the different media and supports on each packet, and was a great opportunity to teach our graduate student about conservation materials and tools. The blueprints required much surface cleaning. The recto was friable, so only latex-free hydrophilic sponges were used. White vinyl crumbs and sponge erasers were able to be used on the verso. The transparent papers were very delicate and brittle. Therefore, only the latex-free hydrophilic sponges were used on both recto and verso with great care taken around the graphite. It is important to note that certain brands of these latex-free hydrophilic sponges were more abrasive than others.

Mending was also individually evaluated. Aqueous treatment was not an option and the semi-transparent sheets were very hygroscopic. Tidelines were a concern along with staining, archivability and reversibility. Heat-activated adhesive was a concern because of the potential of burning or darkening the sheets, especially with the semi-transparent papers. After evaluating options of heat-set, self-adhesive and paste, wheat starch paste was determined to be the best option for our concerns.

Because of limited time, cost and space, only local humidification and flattening was carried out. After which, mends of Japanese paper were attached with thin and dry wheat starch paste to the verso. To save time, a 12g 100% Thai Kozo hinging paper from Hiromi was used for the blueprints. This hinging paper is available in different mending widths that worked very well for this project. The transparent papers required a thinner and more transparent mend. For that reason, Gampi was used instead.

The large sheet size created storage and handling concerns. Therefore 3 mil and 4 mil polyester film was tested for encapsulation stability. While the thicker film made for better support during handling, it also produced larger and heavier packages. Packets had to be arranged and stored in groups up to 15 sheets.

A concern for digitization was the semi-transparency of some of the packets. The scanner in DCC could not properly capture a high resolution image with transparency. Conservation came up with two options for DCC to capture the best image: encapsulated drawing with Permalife or an encapsulation with a thick Hollytex backing.

As Permalife was the most opaque material, it produced the best image during scanning. However, some of the wider drawings exceeded the largest size of the Permalife. Hollytex was able to be used in a single sheet on the widest drawings because it is available on a roll. The Hollytex was also time-saving, because it was used as the backing sheet of encapsulation package. Hollytex accepts a weld using a Minter Ultrasonic Welding machine and holds strong, making the Mylar and Hollytex a very suitable encapsulation packet.

DCC used a sheet-fed scanner to image the drawings. The sheets were so large that removing all the air from the encapsulation was virtually impossible, despite appearing completely flat. Trapped air in the encapsulation packet became a problem as the sheets moved through the scanner. Adding small air-exchange holes in the corner welds in the encapsulation reduced jamming.
The encapsulated drawings were permanently stored in large, custom-made four-flap folders providing safe handling and storage with light protection. Various materials such as B flutes, barrier board and 20 point Bristol board were tested. The archival E-flute or double E-flute board became the obvious choice due to the stability needed for the size and weight of the packets.

Large four-flap folders were custom made in conservation out of E-Flute board or double E-flute when needed for the encapsulated stacks. The custom four-flaps were made from pieces of E-flute hinged together with PVA, Jade 405 and book cloth. The inner flaps were made from one sheet of E-flute with creased folds. The first four-flap was made with a small flap using metal posts and grommets with thread to secure the folder closed.

After the first packet, the four-flap portfolio was redesigned to be a true four-flap with no closing mechanism. The overlapping boards, made to the full size of the folder, held closed for safe sturdy enclosure. Also, without the superficial closing mechanisms, stacking of the folders in storage was easier. This technique is now used for many oversize materials in special collections such as panoramic photographs, prints and posters.

**Conclusion**

The end results of the Joseph William Royer project were successful in meeting the concerns for conservation as well as fitting the needs of University Archives and DCC. Correctly assessing the needs of your project and continuing to modify these needs as your project progresses is paramount in successfully obtaining your goals, including staying on budget and schedule. Considering conservation options and testing also makes for a project to run smoothly. Projects such as the Joseph William Royer architectural drawings can be a great way to employ and educate students about conservation and preservation practices in special collections. At the UIUC conservation laboratory, we try to spread conservation and preservation knowledge to the staff and students through experience by collection assessments, conservation treatments and knowledge and awareness of materials in the collection. We feel it is a great way to preserve collections through other professions.

**Sources**


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