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National Guard Armory Disaster Plan

An Interactive Qualifying Project Report
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Abstract

The purpose of this project was to devise a disaster plan for the National Guard Armory. The Armory houses a large amount of artifacts that must be protected in the event of a disaster. To be sure that the collection of the armory remains intact, an effective disaster plan must be in place. A disaster plan is designed to prevent the occurrence of and minimize the impact of a disaster. The plan should be flexible to allow for changes, simple so it can be easily understood, detailed to minimize the number of decisions, and adaptable to cover any aspect that it was not specifically designed to incorporate.

Authorship

Matthew Driscoll – Focused primarily on writing the disaster plan using disaster plans from other facilities as guidelines.

Michael Griffiths – In charge of collecting information about disaster recovery companies. Michael had to contact relevant companies to make them aware of our intentions to include them within our disaster plan.

Amy Woupio – Played a large role in researching disaster planning as well as contacting facilities that had experienced disasters to setup up group interviews. She brought a great deal of valuable information back to the group so a good disaster plan could be written.

In general, each group member participated in writing the project analysis and conclusions.

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Executive Summary

Disaster planning is a key factor in the preservation and salvation of documents and artifacts in any facility. A disaster plan can be implemented in many other areas, giving it universal importance. Disasters of all types, natural or accidental, can strike at any time. It is important that one is prepared to handle or combat the effects of a disaster, preventing further spread of the damage. Due to the great importance of disaster planning, no facility should be without such a resource.

Today, the National Guard Armory is a museum that contains documents and artifacts predating the birth of the United States. Most of these artifacts are originals or one of a kind, making them very valuable and irreplaceable. To date, the Armory does not have a catalog of its contents. If a disaster were to strike there would be no way of finding out what was destroyed or missing.

This project's goal was the development of a disaster plan for the mitigation of damage to the contents and structure of the National Guard Armory in Worcester, MA.

Disaster planning is a very in-depth and time-consuming process, but its usefulness must not be underestimated. The effects of disaster planning prove to be very beneficial to the future of the Armory. Without a course of action to be followed, the Armory is extremely vulnerable to damage. With the disaster plan our group has constructed and suggestions we have made, the will be able to greatly enhance the safety of the storage and care of its valuable materials.

1.0 Introduction

The National Guard Armory, located in Worcester, Massachusetts, houses a large amount of artifacts predating the eighteenth century that are invaluable to the research and study of American history. "Museums are the unique keepers of the past. They act as safeguards for the cultural resources of our human heritage. From the chaos and conflict of today's world, the museums will hold the collections that tell us today and tomorrow who we are and where we came from."[1] For this reason, it is beneficial to society to insure the proper care and maintenance of these historical artifacts.

A disaster is defined to be an emergency that occurs with little or no warning, causing more destruction or disruption of operations than a facility can correct by application of it's own ordinary resources. To prevent this, a disaster plan must be prepared in advance, describing immediate actions necessary to cope with a disaster to possibly prevent its occurrence or minimize its impact.

Currently, the National Guard Armory is a building that is not suitable for the proper storage of such valuable materials. In fact, in some areas it is structurally unsafe. Although these are major concerns, our project will exclude these issues, and focus solely on the protection of the museum's contents.

To date, there is no disaster plan in place that can be implemented. The armory has insufficient care and storage of cherished books and documents that are very susceptible to fire and water. Much of our proposed plan will focus on the restoration and salvage of books and materials housed in the armory.

[1] Jack Leo, A Basic Security Checklist for the Small Museum. (Austin, TX)

Each year many historians visit the armory to conduct research that is important to their studies. Currently there is no catalogue system in use. In the event of a disaster, determining what materials were lost would be difficult if not impossible. In many instances lost materials cannot be replaced, and these historical items would be lost forever. For these reasons it is essential to create a disaster plan that can be carried out efficiently and promptly. A proper disaster plan could be the only way to prevent or repair massive destruction.

2.0 Background

2.1 History

The Massachusetts National Guard Armory #62 is located in Worcester, Massachusetts, at 44 Salisbury Street. It was erected in 1889, and is currently the oldest National Guard Armory in Massachusetts. Through the years, the structure has served many purposes for the city and community of Worcester. Aside from being a National Guard Armory, it has also been an annex to North High School and currently an area serves as a veteran's shelter.

Today, the Armory is a historical center and storage space for archives. Many military artifacts including weapons, clothing, and documents are housed and displayed throughout the Armory. Since 1993, it has served as the Massachusetts National Guard Military Museum.

2.2 Building Description

The National Guard Armory is a four-story building, approximately 37,000 square feet. The front of the Armory serves as the museum and archive storage, while the back drill hall is used for Reserve Officers Training Corps (R.O.T.C) student's functions and training. The first three floors display the artifacts that have been collected through the years and contain office space for the staff of the Armory. The fourth floor is structurally unsafe, and therefore, is not currently used. The basement stores many paper documents and other items that are not displayed in cases upstairs or are not meant for viewing.

The condition of the National Guard Armory cannot be compared to many other museums. Typical museums have security systems, card catalogues, and fire suppression systems. Currently, the Armory is a building that is not suitable for the proper storage of such valuable materials. Unfortunately, the Armory does not even have a fire suppression system. There is also no catalogue system in use to keep record of all the materials onsite and therefore, the Armory's exact contents are unknown and difficult to account for. There is no method of replacing these historical items that could be lost in a disaster.

2.3 Disaster Planing

A disaster is defined to be an emergency that occurs with little or no warning, causing more destruction than a facility can handle with its own ordinary resources[2]. To prevent damage and loss to the Armory's contents, a disaster plan is needed. To be effective, such a plan must be prepared in advance.[3]

The plan must describe immediate actions necessary to cope with a disaster in order to prevent its occurrence or to minimize its impact. Disaster plans also include checklists that keep the Armory safe on a day-to-day basis. Other preventative measures include a mock disaster and information session; both are good ways to train the staff at the facility about the disaster plan and its workings. This increases familiarity with the plan and identifies weaknesses the current plan may posses. Another important aspect will be communication, for a disaster plan can only be affective if the person or persons in charge can relay information effectively to others.

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[2] John E. Hunter, "Preparing a Museum Disaster Plan," National Park Service (May 1980), 1.
[3] Ibid., 2.

Before this project began, a disaster plan for the Armory did not exist. The Armory has insufficient care and storage of precious historical items that are very susceptible to fire and water damage.

2.4 Importance of Disaster Plan

The National Guard Armory, houses artifacts that are invaluable to the research and study of American history. The state of Massachusetts has a unique past that predates the birth of the United States. Due to the State's important role in the creation of the United States, documents and artifacts of this time are considered extremely valuable and essential to the history of our country. It is beneficial to society to insure the proper care and maintenance of historical artifacts.

The Armory contains literature predating the eighteenth century. Much of the literature that was written in this time describes the way of life for these early Americans. These documents are one of a kind, and could not be replicated if lost or damaged.[4]

2.5 Research

Due to our lack of familiarity with disaster planning, there are certain studies or techniques that needed to be mastered in order to complete this project. In addition, disaster planning is a very in-depth process, which requires knowledge about the contents of the Armory, and how they should be handled under various circumstances. In order for a disaster plan to be properly executed, there are many skills that must be acquired and mastered. It will be necessary that the disaster team leader to possess good communication skills, poise, and be well versed in the disaster plan.

[4] Steve Seames, interview by Matthew Driscoll, 16 September 1999.

A disaster plan should encompass all possible disasters, regardless of magnitude, although most will not be incorporated into the entire disaster plan. The plan must set parameters for the classification of the size of a disaster, because small and large disaster will be handled differently. A small disaster might be one that only affects one type of artifact (e.g. books, microfilm), therefore it would not be necessary to incorporate the entire plan. Likewise, if the disaster is too large to be handled internally by the Armory, the disaster team leader must contact outside contractors or federal agencies. Depending on the severity and type of incident, the coordinator will have to deal with recovery appropriately. There are various methods and equipment that will be needed for different types of disasters. The basic tools that will help in the recovery process should be stored within the building and be checked periodically to make sure that they are ready for use.

The National Guard Armory is not suitable to withstand the destruction from a flood or fire. However, there are future plans to install a fire detection, sprinkler, and alarm system, but there is none at this time.[5] The artifacts are not stored properly regarding safety concerns in the event of a disaster. Books and documents are not stored on fire resistant shelving, and many items are not catalogued appropriately in case they are lost or damaged. Also, there are no basic supplies available to initiate the recovery process. The addition of a disaster plan, materials, and training will bring the Armory closer to being a safe environment for these historical treasures.[6]

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[5] Kevin Guillotte, Michael Kearns, and Jennifer Sapochetti, "Worcester Armory Rehabilitation" (MQP, Worcester Polytechnic Institute, 1998), 3.

[6] Lisa L. Fox, "Checklist for Disaster Prevention & Protection," Southeastern Library Network, Inc. (Solinet, July 1991), 1.

To ensure the continuation of preserving these artifacts, a disaster plan would be a very beneficial resource. Another valuable aspect of a disaster plan would be the guidelines for the maintenance and upkeep of the artifacts within the museum.

With the technology and the communications that are available in today's society, disaster planning is very thorough and advanced. Satellites allow scientists to alert the public when a natural disaster, such as a hurricane or tornado, will strike, and with the level of severity. There are also flood and fire detection systems that will warn people when a disaster will occur. Today, there are many experts and others who have experienced disasters who can share their wealth of knowledge with others about planning appropriately for these catastrophes. One can also learn how to plan for a disaster due to the immense amount of literature that is available through libraries, the Internet, conferences, and informational seminars. Organizations such as Federal Emergency Management Agency (FEMA) provide seminars year round as well as provide extended information on the Internet.

In general, a typical disaster plan involves a plan of action before and after the disaster strikes. In the past, there have been many disaster plans that have proved to minimize damage to a collection. From our research we have also found that there have been many plans that have failed to be successful in the recovery process. Such plans include the Boston Public Library and Worcester Public Library. It is crucial to see examples of both failure and success. We must investigate exactly where a disaster plan has failed and succeeded so that our plan will operate properly.

A typical disaster plan incorporates many different teams working together. A disaster preparedness committee is composed of the Disaster Prevention Team (DPT) and

Disaster Action Team (DAT). These two teams should be integrated with outside contractors, who will carry out the salvaging of damaged materials, and the local fire department.[7] If the disaster is of a large scale and extends beyond the control of the Armory, an outside contractor will be contacted first. If a natural disaster occurs and more than just the Armory is damaged, then a federal agency like FEMA would be notified.[8]

The DPT's primary responsibility is to prevent a foreseeable disaster. The DPT should meet biannually to conduct safety checks of the building to make sure that all equipment and contacts are in stock and up to date respectively.[9] A chairperson from the DPT group should follow up on any recommendations made by the team. The DAT can consist of the same members as the DPT but it must also contain the following individuals: an administrator, who should be most knowledgeable of the building facilities and its contents; staff members, who will need to assess damage and make decisions concerning the collection in an emergency; a cataloger, who will be in charge of keeping track of damaged materials whether salvaged or discarded; and a recovery director, who is the final decision making authority.[10]

Employees of the Armory will have to work together to create a list of emergency numbers of people who need to be notified of the disaster. These people individuals who will help in the recovery process. The list should also include contracting companies

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[7] Judith Fortson, Disaster Planning and Recovery: A How-to-do-it Manual for Librarians and Archivists. (N.Y.: 1992).
[8] "Response and Recovery," (Federal Emergency Management Agency, [cited 24 August 1998]); available from http://www.fema.gov.
[9] Judith Fortson, Disaster Planning and Recovery: A How-to-do-it Manual for Librarians and Archivists (N.Y.: 1992)..
[10] Hilda Bohem. Diaster Prevention and Disaster Preparedness. (Berkeley: April 1978) 3-5.

capable of dealing with likely disastors. A list of methods and equipment for recovery and exact procedures that need to be followed should be available.

2.6 Special Requirements

Of the many disaster plans we researched, we noted the advantages of each which were integrated into our final disaster plan. The plan for the National Guard Armory follows the common guidelines seen in other disaster plans, and incorporates specialized ideas specific to the Armory.

A major difference between the National Guard Armory and other museums is the lack of staff found at the Armory. Most museums have a large full-time and part-time staff that is aware of the events that follow when a disaster strikes, and their services are depended upon. Because of this lack of full-time staff, the Army Reserves will be needed to carry out the work that needs to be done after a disaster strikes. Our plan incorporates this consideration. A major responsibility of the Disaster Team Leader will be to direct the Reserves. This will be a major task because they are currently unfamiliar with the plan. To prevent mass confusion and further damage of the collection, the Army Reserves must be notified and be aware of what to do in the event of a disaster. This will be one of the challenges we face.

2.7 Literature Review

Throughout our research we came across many resources in the from of books, pamphlets, web sites, other disaster plans and interviews. All these provided the group with the necessary information to proceed with our disaster plan for our specific needs.

Some were more helpful than others due to their unique information or organization. For that reason we noted them in our literature review. (Appendix A)

3.0 Methodology

3.1 Project Planning

In April of 1998, we formed an Interactive Qualifying Project group to be advised by Professor Jonathan Barnett. After closely examining the projects that were available, we decided to create a disaster plan for the Massachusetts National Guard Armory, located in Worcester, Massachusetts.

When we returned to school in fall of 1998, we met with our advisor and began a pre-qualifying project to complete our project proposal. Professor Barnett briefly gave us a description of the state in which the Armory was in, and a description of what our project would entail. He guided us in the right direction to start our research. The Federal Emergency Management Agency, The National Fire Protection Association, and The Library of Congress were the first three agencies we investigated. He also gave us the number of Steve Seames, who is the Military Archivist of the National Guard Armory.

Prior to meeting with Steve Seames, our group began preliminary research. Research began primarily with Internet sources. The Internet proved to be a valuable research tool due to the immense amount of information available. In fact, many institutions and organizations publish their disaster plan for electronic viewing.

Through our inquiry, we found that the best protective measure against a disaster is the preparation, otherwise known as mitigation, done before a disaster strikes. Being prepared is the best way to insure that the effects of a disaster can be minimized. Steve Seames was then contacted, and we discussed important issues concerning the disaster plan. During our first visit, Glen Skillen a retired director of the Maine Historical

Society, was visiting the Armory and this gave us an opportunity to interview someone directly involved with the preservation of historical items, and the first steps that need to be taken to create a disaster plan. We were given a tour of the entire building so we could examine the current conditions and storage of the collections. We noticed that there was no system to catalog the armory's contents and they did not have a record of its valuables. In the basement, there were unorganized stacks of paper documents that would be lost in a flood or fire. Not even a disaster plan could save these items. Currently, the Staff of the National Guard Armory is organizing and rearranging the contents of the Armory so that eventually they will be accessible to the general public Through this organization of items, hopefully a card catalog will be put into effect and make our disaster plan workable.

Throughout A-Term, we held weekly meetings with our advisor to keep him updated of our progress. We mentioned what was accomplished, what needed to be accomplished and asked any questions that we had. This also gave him the opportunity to give constructive criticism, where it was needed.

3.2 Three Steps for Disaster Planning

Disaster planning involves three major areas of concern, those being preparedness, mitigation, and restoration. Being prepared when a disaster strikes and knowing what to do after it occurs are the two most crucial steps that can hasten the salvation process, thereby minimizing the damage. Disaster plans are a very widely used tool, and have become increasingly more helpful to libraries, museums, and public buildings all over. We have put together a summary of these three areas, based upon our research, and observations. The efficient execution of these three steps can be very

helpful in saving thousands to millions of dollars in damage and very valuable time to the buildings workers. Preparedness is an ongoing activity, since the staff, and even the structure of the building, may change over time. Mitigation is something that needs to be done well, and more important, promptly. Restoration on the same hand is a matter that needs to be dealt with right after mitigation is complete.[11] Even short periods of time can add costly damage to materials, and the structure of the building. For example, if a book that is saturated in water, and sits too long in a humid atmosphere, then it is more then likely to grow mold, and also to warp.[12] Timely response to this situation by controlling the humidity levels, thereby preventing mold growth, could help avoid that. Vacuum freeze-drying could prevent the books from warping, and also save money at the same time. These steps, as well as others, are covered in detail further on in this section.

3.2.1 Preparedness

A crucial point in emergency management is a well-planned and effective response. This can only be achieved by taking the proper preparation steps. With proper planning, emergency managers ensure that they can provide the best possible response. "When disaster strikes, the best protection is knowing what to do."[13]

Emergency preparedness is an important component when creating a disaster plan. Key points to preparedness are risk assessment, an effective communication system, training and supplies. Planning is an ongoing process in which all staff members can participate. Checklists, as well as, emergency numbers and contacts will constantly

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[11] Cornell University Library, Disaster Response Plan, (Ithaca, N.Y.: 1993), 8.
[12] Ibid., 8.
[13] Federal Emergency Management Administration Home Page. "Preparedness" <http://www.fema.gov/pte/>

require updating and checks for correctness. Since this project will constantly need improvement, input is required from all persons who work at the facility.

When trying to create the emergency preparedness plan, the best source of information can come from those who have worked in the recovery process of a previous disaster. These individuals will know firsthand what to expect during a disaster situation, and could offer suggestions to make your plan run more smoothly. However planning requires more than just research. The designer(s) of the plan must not limit the scope of their plan. Imagination must be used to think of various scenarios and damage that could be caused during a disaster.[14]

The first step towards preparedness is an assessment of the structure, inside and out, and its surrounding area.[15] For example, is the Armory located near a highway or is it the fly zone of an airplane? The outside of the building should be thoroughly checked to see if the structure has proper fire escapes and that building facades are not damaged. Inside the Armory, the plumbing and electrical workings should be routinely checked so they do not start a fire or flood. An inspection will be performed using a thorough checklist. All items found insufficient or hazardous should be corrected to fulfill the preparation process. Once the initial inspection has been completed it must be rechecked at least once every six months to ensure that the facility remains safe. Checks should include routine testing of fire alarms, suppression system, roof, and basement.

Before a disaster strikes, there are some easy preventive measures that can be taken to forestall the harm to artifacts within the Armory. Storing very rare and valuable materials in plastic can drastically reduce salvage time and can even prevent them from

[14] Nancy Gaudette, interview by Amy Woupio, 10 December 1998.
[15] Ibid.

being damaged.[16] Also, these items should be strategically placed in the Armory where they are not located near pipes of any kind that have potential to break.

When a disaster strikes, numerous materials will be needed to start the recovery process. Since time is an important factor, it is crucial that the institution have materials on site. The most common practice is to have a storage area set aside just for the storage of disaster materials. Such materials as plastic bags, flashlights, extension cords, milk crates, fans, portable dehumidifiers, and many other items should always be accessible.[17] Depending on the size of the emergency, it may be necessary to contact professionals to help in the restoration process.

If the damage or size of a disaster exceeds the limits that can be handled by employees and volunteers then outside contractors must be hired. As mentioned several times earlier, time is extremely important. Therefore, a list of phone numbers and companies to contact will be very helpful. Contracting companies should be contacted ahead of time to insure that they are available to help when a disaster occurs. Although one cannot predict a disaster, this facilitates the process if these companies have an agreement with a building prior to the disaster. Also, one should have a list of local and national companies. If there is a natural disaster in an area, a local company might not be able to help and therefore a national company could take the responsibility.

Preparation is an ongoing process and must be maintained at all times to ensure its correctness. An inspection of the facility and its flaws can be an extremely useful preventative measure. Repairing any structural and external problems of the building can greatly decrease the chances of being a disaster victim. Finally, a disaster closet and

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[16] John Guisoye, interview by Michael Griffiths, 9 December 1998.
[17] Glen Skillen, interview by Matthew Driscoll, Michael Griffiths, and Amy Woupio, 16 September 1998.

phone list must be constructed. Both will quicken the restoration process and help minimize damage done to the affected materials.

3.2.2 Mitigation

Disasters of all types can wreak havoc on individuals and the communities in which they live. One method of reducing the damage created by a disaster is forming a disaster plan to protect and combat the effects of a disaster. Mitigation is the primary building block in disaster planning. It is the ongoing efforts to lessen the impact disasters have on people and property.[18] An important aspect of mitigation is to reduce or eliminate any potential risk to people and property. It was used in the formation of a disaster plan for the National Guard Armory.

Mitigation is defined as "sustained action that reduces or eliminates long-term risk to people and property from natural hazards and their effects."[19] It is active in the Federal, State, Local and individual levels. Mitigation will be used to prevent or lessen the damage done to the Armory and its contents in the event of a disaster. The Armory will be strengthened by the improvements to the building and the protective features that will be installed. If there is damage caused by a disaster, mitigation will also help the restoration procedure. The salvation procedure of valuable materials, books, and documents will be more productive and move in a more timely fashion. Examples of mitigation in the Armory are a flood protection system, fire resistant shelving, the installation of fire suppression systems, a phone tree of people who needed to be contacted in the event of a disaster, a supply closet with the basic cleaning supplies, and a list of contractors to be contacted to help in the recovery of the Armory.

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[18] Federal Emergency Management Agency Home page, "Mitigation", http://www.fema.gov./.

Another goal of mitigation is to reduce the need for response to a disaster, either in recovery time or financially. When a flood occurs, it is crucial to assess the damage done to a collection, and make decisions within 48 hours of the incident. If not, mold and mildew can grow resulting in the loss of books and documents forever. "...Current dollars spent on mitigation will significantly reduce the demand for large amounts of future dollars when natural disasters strike."[20] Steps taken to protect the valuables within the Armory will result in a less outflow of money, than trying to salvage them after a disaster. It will also protect them from being lost forever to a disaster.

"The reinvention of the Federal Emergency Management Agency (FEMA), which established mitigation as the cornerstone of the Nation's system of emergency management, marked a fundamental shift in disaster policy away from just reactive response and toward proactive pre- and post-event mitigation as well."[21] Mitigation is not only effective for large-scale disasters, but it can also prove to be helpful in dealing with the destruction of a building and its contents. It is crucial that mitigation play a key role in disaster planning. Mitigation will strengthen the Armory as a whole, reduce destruction and response time, and allow the Armory to get back in working order for its historians and researchers. "In essence, mitigation is the foundation of sustainable community development."[22]

3.2.3 Restoration

Once a disaster strikes, time is of the essence. Due to our advanced technology, there will be certain sources of information that will make people aware of the fact that

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[19] Federal Emergency Management Agency.Home page, "Mitigation", http://www.fema.gov./
[20] National Mitigation Strategy p.3
[21] National Mitigation Strategy p.8

disasters are brewing. Other times such notice will not available, such as a flood caused by broken water pipes or a fire caused by electrical failure. In either case, there is inevitably going to be some level of damage to areas of concern. When dealing with libraries and museums, or any type of collection for that matter, there are many steps that must be taken to assure quick and effective recovery.

There are certain measures that can be taken to prevent catastrophes during the aftermath of a disaster. Following these steps can reduce the amount of work for those involved in the recovery and salvaging aspects of disaster. Some examples are moving important items to higher shelves in the event of a flood, or securing windows with plywood in the event of a tornado, or strong hurricane. However, it is not always possible to foresee a disaster, which complicates the process of recovery, and may increase the damage to the collection.

The first step in disaster recovery is to establish a task force to coordinate the efforts in recovering the damaged collection. Several teams will carry out the recovery process, each having a leader whom will report directly to the disaster team leader. Once the task force has been set up, a command center must be established.[23] The command center may be a designated area or office space. This will serve as the center of all exchange of information and updates of the recovery process.

At this point a current disaster plan becomes very important for successful recovery. The disaster plan contains important phone numbers, and names of people and companies that will be able to provide assistance in the recovery efforts. It is imperative that a secretary is designated before the disaster strikes, to contact volunteers and

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[22] Federal Emergency Management Agency Home page,"Mitigation", http://www.fema.gov./.
[23] Miriam Kahn, Disaster Response and Planning for Libraries (Chicago 1998).

companies necessary for the recovery. A detailed, easy to follow and instructive guide to recovering damaged materials should be included in the disaster plan. An insurance representative may be needed depending upon the size and extent of damage.

In the event of a flood, the water can create a damp atmosphere in the building. During the care and removal of damaged materials, temperature and relative humidity should be closely monitored. Ideal objectives are less than 75° F, and a 50% relative humidity. If the room does not maintain these standards the contents within have a susceptibility to promote the growth of mold and mildew at a higher rate.[24]

Once the materials have been removed from the area, the building becomes the focus of the operation.[25] Recovery of the building has several different aspects, but the primary one is structural integrity. The structure of the building may be compromised during certain disasters or emergencies. Fires, tornadoes, and hurricanes are just a few examples that can inflict severe structural damage to a building. Once these goals have been reached, undamaged materials may be safely kept in the building, as long as the temperature and humidity is carefully monitored to assure the proper environment. Until salvage begins, make sure to keep the damaged materials separate from the undamaged, making the process easier later on.

3.3 Disaster Case Studies

Our first encounter with a past disaster was at the Boston Public Library. Over October Break we visited Boston to examine the events that had transpired in early August, 1998. Katherine Dibble, Supervisor of Research Library Services, was interviewed. She first explained the cause of the disaster. A 42-inch city water pipe had

[24] Cornell University Library, Disaster Response Plan, (Ithaca, N.Y.: 1993), 8.

burst under a street adjacent to the Library, causing the bottom floor to flood. A janitor on duty contacted the library manager and from there the damage was evaluated. Due to the severity of damage, the manager decided to contact the city of Boston.[26] Service Masters, a company who specializes in janitorial services, was called to clean and sanitize the library. Munters, a company who specializes in the disaster recovery process, was contacted to handle the materials that had been damaged or destroyed. The city workers of Boston did most of the cleanup with the help of library staff. The disaster plan for the library had not been updated in recent years and therefore was not followed. Following the interview, we were given a tour of the library to examine for ourselves the extent of damage. The incidents at Boston Public Library prove that proper maintenance, awareness, and familiarity of the disaster plan is crucial.

The second disaster case study that we researched was at Higgins Armory, in Worcester, Massachusetts. The disaster included flooding on the third floor causing substantial structural, damage but affected very few materials. The building manager found the flood and immediately referenced the disaster plan to dictate his next course of action. He followed the appropriate steps, and contacted all those necessary. Ultimately, those in charge decided that due to the extent of damage and working conditions, emergency services needed to be contacted. The disaster resulted in one million dollars worth of damage and the closing of one-third of the building.

Due to the quick and appropriate response of the building manager, the damage was minimized. If he were not aware of the disaster plan, the damage could have spread beyond structural and affected the collection of the armory. Another key aspect that

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[25] Miriam Kahn, Disaster Response and Planning for Libraries (Chicago 1998).
[26] Katherine Dibble, interview by Matthew Driscoll, Mike Griffiths, and Amy Woupio, 27 October 1998.

saved the collection from further damage was the preparedness of the Armory. The most valuable and irreplaceable items were stored in plastic sleeves and then on plastic lined shelves in the basement. The Higgins Armory is a good example of the importance of preparing and training staff in the event of a disaster.

The last disaster we evaluated was at Worcester Public Library. Due to a backup in the sewage lines, ten gallons of sewage overflowed in a toilet located in the basement of the library. More clean water followed, resulting in a flood of the basement. A custodian noticed the flood and contacted Nancy Gaudette, reference coordinator of the Worcester Public Library. Nancy followed their plan but due to their lack of communication and familiarity with their plan, many reference items were damaged that could have been saved.[27] Munters was called in to handle the damage that had occurred. This proves that there are two key aspects in minimizing damage to a valuable collection. One must have a reliable disaster plan and also be familiar with it and be able to relay its contents to all workers involved.

After analyzing these plans, we realized that we needed to have an easy to follow disaster plan that is made available to all workers in the National Guard Armory. The disaster plan must be read through ahead of time, so that all are familiar with it and communication among the workers should be established. Also, all three disasters were large scale and the staff of each library and museum decided to call in for further help, therefore not relying completely on their own disaster plan. In preparation for a small disaster occurring at the Armory, a mock disaster and informational session should be organized. With more training, extensive damage can more likely be avoided.

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[27] Nancy Gaudette, interview by Amy Woupio, 10 December 1998.

Further research was conducted on how to write a disaster plan and what key points should be included. The University of Colorado and The University of Illinois had very helpful disaster plans to guide us in what should be included. They were very well organized and well written, containing detailed information on how to handle all types of damaged materials that can be found in the Armory.

The planning of a mock disaster began by contacting Lori Brueck of Worcester Polytechnic Institute. She explained the results of a mock disaster that she had helped coordinate. During the summer, the librarians picked a day to have a mock disaster. With the staff that was present, including about 13 workers, the lights were turned off and various materials that were not important were damaged. The workers were left to figure out what to do for themselves. The disaster plan and materials to assist in the cleanup and salvation procedure were available, once they located them. At first, there was a little confusion as for what to do, but then someone suggested looking for a disaster plan. After the plan was found they followed it carefully and found it very helpful to them.

Worcester Polytechnic Institute's mock disaster could have run more smoothly if before hand they notified each staff member of the library disaster plan and where it could be found. Also, they should have made it mandatory for all staff members to be present so they could run through the mock disaster together. The purpose of a mock disaster is to see how good or bad a disaster plan is and where its strengths and weaknesses are. If all are not present to read and carry it out, one will not be sure if the disaster plan is easy to follow and read for all staff members.

3.4 Disaster Plan Evaluations

Since our research has begun, we have found many valuable sources of information about disaster planning. These include books, magazine articles, government pamphlets and web pages. However our most valuable source has been actual disaster plans, which are currently in use at libraries and museums. Each plan has its strengths and weaknesses.

3.4.1 American Antiquarian Society

The Disaster Plan for the American Antiquarian Society has a smoothly flowing disaster plan. The layout is well thought out and is easy to follow step by step. The disaster recovery is divided into eight sections that aid in the maximum recovery of damaged material. They are: Initial steps, assess the damage, stabilize the environment, organize salvage operation, removal and relocation of damaged materials, stabilization and drying of damaged materials, restoration of physical location, and assessment. Under each category there are the basic steps that need to be taken to minimize damage. They are brief and to the point so that there is no confusion. However, the care and restoration process is not very helpful. An outline of the basic salvage techniques are available but for more detailed information the reader is left to consult many attached pamphlets that are not in a step by step form. The reader must analyze them and then go back and decide what needs to be done first and so on. In the case of an emergency this research would not be very time efficient. No specific instructions are given to the reader on how to handle damaged material. For example, "Books should be wrapped in freezer paper,

wax paper, or silicone paper to prevent their sticking together." This statement is found in the disaster recovery but there needs to be an appendix to clearly state how damaged books should be wrapped individually and how they should not be tampered with before the wrapping process to prevent further damage. There is no division of slightly damp volumes to saturated volumes. This is important because prioritizing what gets handled first is important and there are different methods to salvaging different degrees of damaged books. Also, there is no table of contents so the reader is left to search aimlessly for needed information, which can also waste valuable time. There have been no improvements made to the disaster plan. We believe that this disaster plan would be very helpful in the salvation process, but it might cause further damage due to the lack of direction and appendices that have a more detailed step-by-step protocol.[28]

3.4.2 Cornell University

The Disaster Response Plan is not only a plan of action for Cornell University, but for many other libraries like the Worcester Public Library. The disaster response plan for Cornell University Library pays more attention to the details explaining how to handle the affected materials. This disaster plan has a table of contents that is very helpful because the organization of information is not as clear. If there is any confusion the table of contents can lead the reader to the relevant material. The first page of the plan is a well-organized phone tree that has all the numbers of people to be contacted and in what order. The plan is separated into two main sections, one concerning minor

[28] Richard Baker, "A Disaster Plan for the American Antiquarian Society" (Disaster Plan, American Antiquarian Society, 1996).

emergencies and the second explaining major emergencies. Instructions are given to handle each of the situations. As stated above the directions are in great detail, but there are many blanks in the plan. For example, each disaster unit has to locate fans, vacuums, mops and buckets, garbage containers and book trucks. These basic supplies should be made into an appendix with the exact location and number of availability next to them to avoid wasting time. Some of the procedures are in paragraph form is usually not as clear as if it were in a step by step procedure.[29] This disaster plan is very detailed but it does not flow as smoothly as the disaster plan for the Antiquarian Society.

3.4.3 Colorado State University

The Disaster Recovery Manual for Colorado State University has a very well thought out format. They use spacing, font size, bolding and numbering to their advantage. It makes the appearance of the plan very neat and easy to follow. Not only is this disaster plan divided into small, medium, and major disasters, yet it is also divided into earthquakes, fire, flooding, tornadoes, bomb threats and other emergencies. The section on salvage procedures for water-damaged materials is very insightful, detailed, and there are separate sub sections for different types of water-damaged material. There is also a helpful checklist in the end of the plan on disaster prevention. It ranges from the proper disposal of trash to correctly operating fire doors. A potential hazard checklist then follows it where the degree of danger can be noted from low to high. Another key aspect to this plan, is that there are lists of responsibilities for different coordinators, so that there will be no confusion as to whose responsibility certain jobs may be. Also, there

[29] Anne Kenney, "Disaster Response Plan, Cornell University Library" (Disaster Plan, Cornell University, 1993)

is a detailed inventory list of disaster supplies that tells where they are located and how much of each item is available. Lastly, there are step-by-step instructions on how to operate a fire extinguisher, followed by recommended reading. Due to the recent disaster at Colorado State University,[30] there have been improvements made to the disaster plan that make it a very complete guide. The improvements that have been made to the disaster plan pay more close attention to detail. For example the plan states how to handle a wet book that is closed, but there is no mention on how to handle a wet book that is found open. Also, they made mention that no attempt should be made to remove mold from wet or damp papers as it will likely drive the mold spores into the paper fibers.[31] We believe the format and contents of this disaster plan to be very complete and easy to follow in the event of an emergency.

3.4.4 Higgins Armory

The Higgins Armory also has a very inclusive disaster plan. This plan is ready to deal with any disaster from bomb threats to explosions to theft. It includes how to handle every item in the armory from paintings to sculptures. Since many people are not familiar with the proper handling of these valuables, there are very easy to follow descriptive methods on salvaging these materials. Higgins disaster plan also includes a disaster management plan checklist that includes everything from are department keys and code cards accounted for to are flashlights operable. Security is a major part of this disaster plan due to the value of its contents. There are copies of reports that need to be filled out after a break in or a disaster so that they can be analyzed afterwards in order for

[30] Nancy Gaudette, interview by Amy Woupio, 10 December 1998.
[31] "Colorado State University, Disaster Recovery Manual" (Disaster Plan, Colorado State University, 1992).

corrections to be made as needed. There are very helpful and detailed checklists to insure that all items are accounted for. Although the contents and instructions are extremely useful, it is very unorganized and difficult to find the information needed. There is no table of contents so that someone who is unfamiliar with the plan would be very overwhelmed and confused by its layout. This confusion could lead to further loss or damage of a collection.[32]

3.4.5 University of Illinois

The disaster plan for the University of Illinois is located on the Internet. We thought that this disaster plan was very thorough and in depth. It was very well organized and contained very explanatory information dealing with the procedure on how to salvage damaged materials. This disaster plan divided the type of damaged material into slightly damp, damp, very damp, and saturated volumes. It gave in depth directions on how to handle each type of volume. The directions were very thorough but they were not in a checklist form. They were also located in the heart of the plan and not in an appendix. The reader could spend valuable time analyzing the directions instead of running down a checklist to insure that they are carried out properly. Also, none of the key words or sections are bolded to point out their importance.[33] We found this plan to contain useful information that was not included in other plans but we felt the layout was not as easy to follow.

[32] "Disaster Plan" (Disaster Plan, Higgins Armory, 1995).
[33] "University of Illinois Disaster Plan" (Disaster Plan, University of Illinois, 1998).

3.5 Differences

Disaster plans are created to be rendered by many people, led by one executive person.[34] This leader delegates different duties to the workers and volunteers. Most libraries and museums have a large staff that is familiar with the contents and is aware of the institution's disaster plan. Their knowledge can help reduce the confusion involved in the restoration process, when a disaster strikes.

In designing a disaster plan for the National Guard Armory, we were faced with many problems; the most important being that the staff at the Armory is very limited. If a disaster were to occur, there would only be a handful of people knowledgeable of the Armory's specifics available to aid in the salvation process. Therefore, the Army Reserves would be called in to complete the task of salvaging the damaged materials. Due to the lack of staff in the Armory, a mock disaster and informational session would drastically increase the level of awareness for all parties involved in the salvation procedure and exploit the weaknesses that the disaster plan contains. This will be a crucial role in delegating authority and lessening the burden of the disaster team leader. When a disaster strikes, the disaster team leader will not waste valuable time explaining the details of each person's individual duties. The people involved in the disaster will be aware of their responsibilities and the order and process in which damaged materials will be saved.

The next problem we faced was how do the coordinators in charge relay information on how to salvage damaged museum materials to the Army Reserves?

Another major concern of ours is that currently, the Armory does not have a method to catalog its contents. If a disaster strikes, organization is a key aspect. A catalog of the Armory's contents will enable the staff to identify which items have been destroyed and the method needed to salvage them.

3.6 Training

The completion of writing a disaster plan does not mark the end of preparing for a disaster. Further educational tools must be utilized to increase overall knowledge and readiness. Members of a facility can attend a disaster training and preparedness lecture and perform a mock disaster. Both of these will benefit the facility and will not only train staff members, but also uncover gaps that may exist in the disaster plan. Only once the disaster plan has been implemented can its functionality be truly assessed.

Informational and training seminars include the education and demonstration of recovering damaged materials. It is important that damaged items are handled properly to ensure that further damage is not sustained. Through the education session, staff members will be taught the proper way to salvage items that have been damaged to various extents and by different means. Having hands-on training prior to a real disaster will prove to be a tremendous asset.

Once the training has been completed, a facility can stage a mock disaster if they choose. It is not a necessary component in disaster planning, but as mentioned before, will increase the staff's ability to salvage materials and evaluate the plan itself. A mock disaster portrays a real disaster or emergency. It should recreate the events that would

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[34] Judith Fortson, Disaster Planning and Recovery: A How-to-do-it Manual for Librarians and Archivists. (N.Y.: 1992).

take place in a real disaster. Different types of materials will be damaged and employees will be forced to salvage them according to standards set by the disaster plan. A mock disaster can be used as an educational tool to inform members or individuals about the specifics of a disaster plan.

Northeast Document Conservation Center (NEDCC), a company that specializes in the restoration of damaged materials, is the corporation we asked to be involved in our disaster planning and preparedness lecture. It is the largest non-profit conservation center in the United States, "its mission is to improve the preservation programs of libraries, archives, museums, and other historical and cultural organizations...and to provide leadership to the preservations field."[35] NEDCC would organize a half-day disaster planning and preparedness lecture, including a show and tell component for a fee of $350.00, plus travel. This is a small fee to pay now, in which its effects of educating individuals in disaster planning could cover its costs saved in disaster restoration. The assistance of the NEDCC would be a great benefit to the Armory and its contents.

[35] Northeast Document Conservation Center Home page, "Mission and History", http://www.nedcc.org/.

4.0 Recommendations & Conclusion

4.1 Recommendations

Disaster planning is a very in-depth process that involves knowledge of a facility and its contents. Within a complete disaster plan should be preparedness, mitigation, emphasizing education and training, and restoration. It is obvious that the National Guard Armory lacks in many of these areas. With our disaster plan and recommendations it becomes one step closer to providing a safe environment for military artifacts.

Preparedness is an ongoing and important process. A preparedness checklist should be created to conduct an inspection of the physical structure and supplies within the armory. Included in the checklist should be corrections to the physical disaster plan. There must be continuous updating of the disaster plan to ensure its correctness and effectiveness in an emergency. This process should be carried out biannually to minimize the number of corrections, and increase familiarity.

In the event of a disaster, communication plays an important role. If telephone lines are not functioning, there will be no access to individuals and companies necessary for the recovery process. We attempted to use the Worcester Art Museum as a resource for telephone communication in an emergency situation, but due to security reasons, they are unable to assist. It was recommended that a cellular telephone be on-site for emergency use.

Renovations to the Armory are an important process to increase safety to both the physical structure and its contents. Detailed renovations have been proposed in the

Worcester Armory Rehabilitation Project in 1998, to enhance the building's structure and safety. The most important addition for disaster safety is a fire suppression system. In addition to structural improvements, we suggest safety features to prolong the existence of the Armory's materials. These include fireproof shelving and plastic sleeves for the storage of their most valuable documents. Due to future renovations, documents will be stored in the basement of the Armory. From our research of other facilities such as Boston Public Library, floods are prominent in the basement and precautions should be taken. We suggest that the basement be sealed with a waterproofing agent to protect all its contents.

4.2 Conclusion

Many facilities experience disasters every year, including circumstantial and natural disasters. In some cases a disaster can be predicted, allowing time for preparation. Otherwise, one may strike at any time catching the facility off guard. Damage can be inflicted to the building and its contents, destroying some artifacts beyond recovery. These losses may be irreplaceable or too costly to be replaced. Each facility we investigated that experienced a disaster, felt a disaster plan was key in salvaging the materials within the museum or library. Those we interviewed also noted that a disaster plan alone would not be sufficient. Training and proper communication is necessary to unleash the full potential of the plan.

During our project, we developed a disaster plan that is very detailed and includes all aspects of the recovery process. Without a disaster plan any facility can be prepared for natural destruction. It is the unexpected incidents that can be detrimental to the Armory. The National Guard Armory Disaster Plan(appendix B) was created to account

for all disasters, but will be extremely beneficial in the event of a disaster that cannot be predicted. The disaster plan describes every step from assessment of the disaster and recovery, to returning the facility to working order.

Although the plan is very inclusive, it will be left to the Armory to continue training and make necessary updates that can occur over time. If the plan is not adapted with changes to the Armory and its staff, then it will become outdated and non-functional. Our research has shown us the importance of maintaining and updating disaster plans. This will determine its effectiveness and usefulness.

Disaster planning is a timely process, but proves to be very beneficial. The National Guard Armory is a research museum that can benefit from any safety precautions taken due to its valuable documents and artifacts. We have given the Armory a valuable tool and it is the staff's responsibility to continue its advantageous value.

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Appendices

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Appendix A
Literature Review

Morris, John. The Library Disaster Preparedness Handbook. Chicago, IL. 1986.

This book contained valuable information about possible disasters that can strike a library or museum. It also introduced measures to protect against disasters including Halon 1301 systems and flood detection systems. Although Halon 1301 is no longer available there are other substitutes.[36]

Kahn, Miriam B. Disaster Response and Planning for Libraries. Chicago, IL. 1998.

This book acts as a step-by-step guide for what to do in the event of a disaster. When composing our own disaster plan, this book will serve as a good model to follow.

Waters, Peter. Procedures for Salvage of Water Damaged Library Materials. Chicago, IL. 1979.

Peter Waters' book contains useful information to assess damage and step-by-step instructions on common procedures on how to salvage books that have been damaged. Many conservators refer to this as the "old and new testaments" of disaster planning.

Fox, Lisa L. Southeastern Library Network, Inc. Checklist for Disaster Prevention & Protection Atlanta: Solinet, 1991.

The checklist provided by Lisa Fox can help reduce the vulnerability for disasters. Fox furnishes a good starting point for creating a disaster plan and can be used on a periodic basis to make sure all precautions remain up to date as time progresses.

O'Connell, Mildred. "Disaster Planning: Writing & Implementing Plans for Collections-Holding Institutions." Technology & Conservation Summer 1983: 18-24.

This article breaks down several pieces of a disaster plan with great detail. The most useful information found in the article is the section that describes services that may be needed in an emergency. Just a few suggestions include plumbers, electricians, carpenters, and lawyers. There is also a list of in-house materials that should be kept up to date in a disaster closet.

Personal Interview with Katherine Dibble (Appendix B)

This personal interview was very helpful. We learned first hand information of the flooding of the Boston Public Library in August. Katherine Dibble gave us the names of contractors to contact in the event of a disaster. She told us the steps taken by the city of

[36] Barnett, Johnathan. (cited 13 September 1999).

Boston and the contractors to correct the damage. We also learned where the library's disaster plan went wrong.

Personal Interview with Nancy Gaudette (Appendix B)

Nancy summarized the disaster that recently occurred at the Worcester Public Library, and analyzed their response and plan. Their disaster plan is based on the Cornell University disaster plan. Much of the information she provided echoed other interviews and information that was previously gathered. However, a very important point about organization was raised; Nancy explained that even the best disaster plan could fail if the person in charge is not familiar with it or cannot communicate in an effective manner.

The Library of Congress Home Page

The Library of Congress has a very informative web page that has many helpful features dealing with disaster planning. The page offers different areas of reading ranging from risk assessment to supply lists. This site is well organized into separate pages, each featuring a small write-up on the topic. The home page starts with an introduction, and moves to more detailed divisions involved with disaster planning. This online source deals heavily with water damage, but also touches upon fire damage, as well preventive methods for avoiding disasters.

The Federal Emergency Management Agency (FEMA) Home Page

The Federal Emergency Management Agency has an insightful web page on disaster planning. Mitigation is the efforts to lessen the impact disasters have on people and property. It describes the on going effort at the Federal, State, Local, and individual levels. There are also many links that have proved to be helpful in finding more information about disaster planning.

Worcester Armory Rehabilitation (MQP, 1997, library ref # CE LDA 9805)

There has been previous studies done at the Armory, including an MQP titled "Worcester Armory Rehabilitation" by three previous WPI students. This project proved to be extremely helpful due to its content and relevance to our project. This MQP contains important information about fire protection, safety analysis, and the layout of the building.

Risk Analysis and Disaster Recovery (MQP, 1995, library ref # 95D034M)

Another project related to disaster planning is the MQP entitled "Risk Analysis and Disaster Recovery". This proved to be helpful because it was based on a published set of guidelines involving risk analysis and disaster recovery.

Appendix B

Personal Interviews

1. **Glenn Skillen**, over 40 years experience working with libraries and creating disaster plans- Wednesday September 12, 1998.

Q: What are some downfalls of a Halon 1301 fire suppression system?
A: A primary problem of a Halon system is inhalation after the gas is released. A second downfall is that it must be contained to a limited area.

Q: What materials are higher priorities?
A: This will vary depending on the damage that has been sustained. Manuscripts will be more important than books to their uniqueness. Similarly, all books should be separated into two groups, unique and replaceable. This will help in identifying which books have a higher priority.

Q: What precautions can be taken?
A: Precautions are few. Checklists should be made to assure that all equipment remains in good condition and in full stock.

Q: Would you recommend a water detection system?
A: A water detection system would be expensive, but could serve useful if there is a high risk situation.

Q: What level of involvement is required of the fire fighters?
A: Fire fighters should be given a tour of the facility to become familiar with the layout. They should also be given floor plans that direct them towards valuable materials.

2. **Katherine Dibble**, Supervisor of Research Library Services- Tuesday, October 27,1998.

Katherine Dibble first explained the cause of the disaster. A 42" city water main pipe burst in front of the Boston Public Library resulting in the bottom floor to be flooded. A janitor on duty contacted the library manager and from there the damage was evaluated and due to the severity of it, the manager decided to contact the city of Boston. Service Masters was called to clean and sanitize the library. Munters was contacted to handle the materials that had been damaged or destroyed. The city workers of did most of the cleanup with the help of library staff. The disaster plan for the library had not been updated in recent years and therefore was not followed. We then were given a tour of the library to see for ourselves the extent of the damage.

Q: How did the disaster occur?
A: A city water main that runs under the adjacent street burst. The water raised a section of the foundation of the building, allowing water to flood the basement. The entire lower level of the building was flooded with approximately three feet of water.

Q: When was the disaster plan constructed?
A: The original disaster plan was constructed in 1984 by a group of employees at Boston Public Library. It was revised in 1994. It seemed to be out dated. Not all the information contained in the plan was accurate.

Q: What was done with damaged materials?
A: The damaged materials were handled by restoration companies that the city of Boston contracted to deal with the disaster. Some of the badly damaged materials were frozen and sent to Texas to be repaired.

Q: What will be done to prevent a similar accident?
A: Currently, the basement must still be repaired from the damage it had sustained. Once the foundation is repaired, the seams of the building will be treated with water proofing materials. The library is also contemplating the installation of a pumping system.

3. **Kent Russell**, Director of Higgins Armory - Tuesday November 17,1998.

Kent Russell showed us the disaster plan for Higgins Armory. He explained in great detail the damage that had occurred. Then he went on to tell us that John Keaton, the building manager had discovered that a radiator coil had burst and created a flood on the third floor, destroying two-thirds of Higgins Armory. Jon Keaton had a copy of the disaster plan and followed it step by step, first calling 911 and Kent Russell. It was Kent's opinion that following the disaster plan was of crucial importance and minimized damage. After the disaster, disaster plan coordinators met to make improvements and changes to the disaster plan. Kent Russell also gave us the names of important people involved in the disaster and he referred us to the Worcester Art Museum.

Q: What is the most important aspect of a disaster plan?
A: Let the disaster plan be as complete and thorough as possible. The first two pages are very important and should contain a list of emergency numbers and people to be contacted in the event of an emergency. The facility's insurance company should be included in the list of companies to contact.

Q: What is the main purpose of creating a disaster plan?
A: The disaster plan should serve as a handbook in the event of a disaster.

Q: In creating a disaster plan what has first priority?
A:
- Safety of the people within the building should be most important
- Second is the safety of the structure
- Archives
- Within this category there should be another list of priorities. For example, things that are irreplaceable and highly valuable should be removed first.

Q: Where do you feel the plan needs improvement? Where did it succeed or fail?
A: Kent Russell will be sending us a copy of their revised disaster plan including the improvements and revisions that have been made.

Q: Who is a key person to contact about the procedures of salvaging valuable museum archives?
A: He suggested that a curator would be the most informative individual. The curator will play a large role in the disaster recovery.

Q: Should there be a storage site for highly valuable items?
A: An electronic copy of the Higgins Armory card catalog is stored in a bank vault.

Q: In the event of a disaster, do you plan to rearrange the layout of the building to accommodate office space?
A: This should not be the greatest concern. You should first evaluate whether or not the museum has the ability to open. Offices can be moved as you find space.

Q: Who are more people that can be contacted, to gather more information about the disaster that had occurred?
A: Registrar- Barbara Edsall
Curator- Chip Koucheski
Building Manager- John Keaton

Q: What do you feel was the most important aspect of the disaster plan that helps minimize the damage done to the collection of Higgins Armory?
A: All archives are stored in separate plastic bags and placed on plastic lined shelves.

Q: Who did most of the grunge work?
A: Contractors worked on structural repairs. Curators of the Higgins Armory and volunteers helped in salvaging the archives of the museum. The disaster was broadcasted over the news and through the publicity of the event, many curators volunteered to help in the salvation procedure.

4. **Nancy Gaudette**, Worcester Public Librarian - Thursday, December 10, 1998

The Worcester Public Library's disaster pan is based on the plan for Cornell University. Nancy went through all the important items that a disaster plan should have like an introduction, a telephone tree, a disaster team, a quick cheat sheet, a priority list and in depth appendices. There only needs to be basic supplies on site like plastic. One should warn the fire department of the location of the collection with blueprints and floor plans. Someone should go through the building, outside, inside, and around the area regularly with a checklist. If a vast majority of the museum is damaged, then experts should be

brought in. After a disaster, there should be someone or a group of people elected to evaluate the disaster. She also gave me the names of companies that would be helpful like Munters, Northeast Document Center, and Conservation on-line.

Q: What do you believe went wrong during the disaster of '96?
A: Nancy believed that there needed to be a better method of communicating by using walkie-talkies to talk between floors and a better communication. A library/museum can have the best disaster plan but if the person who is in charge is not familiar with it or cannot communicate well, then it will be a flop. She believed that she did not do a good job of directing people and telling the where they needed to go. The conditions that they worked in, water everywhere and no electricity also added to the confusion.

Q: The National Guard Armory currently does not have a catalog system to track all items in the armory. What should be done prior o a disaster to prevent mass confusion and the possible loss of items?
A: First, look at the entire building and make sure there are no hazards near any valuable collection. Second, identify what is on each floor by generalizing on a floor plan or blueprint. Third, decide where to store plastic that can be accessed immediately in the event of a disaster.

5. **John Guisoye**, Building Manager at Higgins Armory - Wednesday, December 9, 1998.

We discussed some material, including the disaster plan utilized by their staff. John was very helpful in discussing general information regarding the steps taken during disaster recovery, as well as some of the specifics. He was able to supply me with the names of some of the companies they hired during a recent flood in January of this year. Aside from the ones we had already looked into, I learned of a local recovery firm, as well as a local storage facility capable of controlling both temperature, and humidity levels in their units. This will become very helpful in the event of a disaster due to the fact that many instances require certain levels of both these conditions to prevent mold growth, among other factors that could hinder recovery. John and I also discussed some of the other steps they took to recover some of the damaged materials after the flood. We also talked about some of the damage at the Boston Public Library which our project group visited, and we came to some conclusions about that. John briefly showed me around the basement of the armory, which was the area most affected by the flood. Lastly, we discussed some of the specifics of the plan we are working on, and he gave some helpful advice about storage, and some lessons they learned the hard way.

6. **Barbara Edsell**, Wednesday, December 9, 1998.

After speaking with John, he introduced me to Barbara Edsell, the Registrar at the armory. Barbara was very helpful in photocopying their disaster plan for me, and as well

as some additional information on composing a disaster plan. Barbara and I discussed the same information, for the most, that I talked about with John. Barbara touched upon the disaster plan currently used in their armory, and the shortcomings of it. They learned some of the weaknesses it had when they used it in January, with one of the main ones being storage. We discussed some possibilities we have come across in our research, and I think that maybe I was able to give her some ideas about storing recovery items both on and off site so that they may be readily accessible in the event of a disaster. Another thing we talked about was a "mock" disaster, and the benefits to staging one. I think she found that fairly interesting, and may be having one in the near future to eliminate imperfections in their plan. We had a good conversation, and some very helpful information came out of it.

7. **Lori Brueck, Mary Remillard, Debbie Bockus, Joan Doghney**, Disaster Plan Creators - Wednesday, December 9, 1998.

Q: What exactly did the mock trial consist of?
A: It was a simulated disaster that affected photographs, books, magazines, and compact disks.

Q: Do you feel your disaster plan is adequate?
A: Judging from the results of the mock disaster we held, yes.

Q: Where did it fail and where did it succeed?
A: It failed when personal safety was concerned. Individuals did not take necessary precautions, as they should have during a real disaster. It succeeds with instructions to handle all material, where important materials are stored, and who was in charge.

Q: Has there ever been a real situation in which the disaster plan was implemented?
A: A few years ago there was a flood on the ground floor. However it was small enough to handle in house. The disaster plan was used but at the time it was fairly inadequate. Librarians covered the stacks in plastic and moved all affected materials.

Q: Has the disaster plan been updated since the mock disaster?
A: No, but it should probably be revised yearly. Some things do change around the library and the plan should stay consistent with these changes.

Q: What do you feel is the most important part of the disaster plan?
A: Chain of command and phone trees. Being able to contact those involved in the recovery process in a timely manner is crucial.

8. **Lori Brueck**, WPI Librarian Mock Disasters -Tuesday, February 9, 1999

Lori Brueck explained the results of their mock disaster to us. Over the summer, the librarians picked a day to have a mock disaster. With the staff that was present, which included about 13 workers, they turned off the lights and damaged various materials that were not important to them and left the workers to figure out what to do for themselves. The disaster plan and materials to assist in the cleanup and salvation procedure were available, once they located them. At first, there was a little confusion as for what to do, but then someone suggested looking for a disaster plan. After the plan was found they followed it carefully and found it very helpful to them.

WPI's mock disaster could have run more smoothly if before hand they notified each staff member of the library disaster plan and where it could be found. Also, they should have made it mandatory for all staff members to be present so they could run through the mock disaster together. The purpose of a mock disaster is to see how good or bad a disaster plan is and where its strengths and weaknesses are. If all are not present to read and carry it out, one will not be sure if the disaster plan is easy to follow and read for all staff members.

9. **Steve Seames,** Director of National Guard Armory- Wednesday September 12, 1998

Steve Seames was the director of the National Guard Armory located in Worcester, Massachusetts. We had many meetings with him. Mr. Seames was our mentor throughout the planning and writing of the disaster plan. We consulted Mr. Seames with questions that we had that were specific to the Armory and its' disaster plan.

Appendix C
National Guard Armory Disaster Plan

National Guard Armory Disaster Plan
44 Salisbury Street
Worcester, MA 01609

Last Updated: 5-99

By: Matthew Driscoll
Amy Woupio
Michael Griffiths

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Introduction

The National Guard Armory Disaster Plan is an important component of the National Guard Armory's continuing effort to protect it collections. There are many possible threats to the valuable materials held at the National Guard Armory, of these fire and water stand out. Almost every disaster will result in either water or fire damage. The majority of this plan will cover the procedures to be taken when disaster circumstances arise.

The National Guard Armory, located in Worcester, Massachusetts, houses a large amount of artifacts that are invaluable to the research and study of American history. "Museums are the unique keepers of the past. They act as safeguards for the cultural resources of our human heritage. From the chaos and conflict of today's world, the museums will hold the collections that tell us today and tomorrow who we are and where we came from."[37] For this reason, it is beneficial to society to insure the proper care and maintenance of these historical artifacts.

A disaster is defined to be an emergency event that occurs with little or no warning, causing more destruction or disruption of operations than the Armory can correct by application of it's own ordinary resources. To prevent great destruction, a disaster plan must be prepared in advance. It must describe immediate actions necessary to cope with a disaster in order to prevent its occurrence or to minimize its impact. In an emergency situation, the first reaction is likely to be panic. Actions taken in a hasty state of panic can significantly increase the amount of damage to a collection. Likewise, someone who does not have proper instruction could waste precious time making the appropriate contacts. A plan for handling emergencies, along with an educated disaster recovery team will reduce unnecessary damage to materials and shorten recovery time.

This disaster plan was organized logically, from the first step to be taken through the final stages of recovery. It includes and emergency phone list as well as outside contractors to be contacted if greater assistance is needed. A portion of the plan focuses on preparedness for any given disaster; being prepared can save important time during the disaster recovery process. Finally, the majority of the document will give instructions for dealing with a wide range of damaged materials. These include damp books, wet books, saturated books, smoke damage, and fire damage.

[37] Jack Leo, A Basic Security Checklist for the Small Museum. (Austin, TX)

Disaster Phone Tree

Emergency Telephone Numbers
For fire or life threatening emergency 911

After emergency personnel are contacted, call Disaster Team Leader and at least one additional member of the Disaster Team. Team members will complete the calling chain.

Disaster Team Leader
Steve Seames ..... (w) 508-797-0334
(h) 508-792-5450

Disaster Team
Mark P. Murray ..... (w) 1-888-301-3103 ext. 6501
(h) 508-856-0384
(emergency) 508-958-3178
Maureen Heard ..... (w) 1-888-301-3103 ext. 6557
(h) 978-927-6972

National Guard Armory (contacted by Mark P. Murray)

*There is natural gas in National Guard Armory

Disaster Prevention

Disasters of all types can wreak havoc on individuals and the communities in which they live. One method of reducing the damage created by a disaster is forming a disaster plan to protect and combat the effects of a disaster. Mitigation is the primary building block in disaster planning. It is the ongoing effort to lessen the impact disasters has on people and property.

Mitigation is defined as "sustained action that reduces or eliminates long-term risk to people and property from natural hazards and their effects."[38] It is active in the Federal, State, Local and individual levels. Mitigation will be used to prevent or lessen the damage done to the Armory and its contents in the event of a disaster. Through the advancements of mitigation, the Armory will become a safer place to store its historical treasures. The Armory will be strengthened by the improvements to the building and the protective features that will be installed. If there is damage caused by a disaster, mitigation will also help the restoration procedure. The salvation procedure of valuable materials, books, and documents will be more productive and move in a more timely fashion. Examples of mitigation in the Armory are a fire and flood protection system, fire proof shelving, a phone tree of people who needed to be contacted in the event of a disaster, a supply closet with the basic cleaning supplies, and a list of contractors to be contacted to help in the recovery of the Armory.

Another goal of mitigation is to reduce the need for response to a disaster, either in recovery time or financially. When a flood occurs, it is crucial to assess the damage done to a collection, and make decisions within 48 hours of the incident. If this does not happen, mold and mildew can grow resulting in the loss of books and documents forever. Current dollars spent on mitigation will significantly reduce the demand for large amounts of future dollars when natural disasters strike. Steps taken to protect the valuables within the Armory will result in a lower outflow of money than trying to salvage them after a disaster. It will also protect them from being lost forever to a disaster.

The reinvention of the Federal Emergency Management Agency (FEMA), which established mitigation as the cornerstone of the Nation's system of emergency management, marked a fundamental shift in disaster policy away from just reactive response and toward proactive pre- and post-event mitigation as well. Mitigation is not only effective for large disasters, but it can also prove to be helpful in dealing with the destruction of a building and its contents. It is crucial that mitigation play a key role in disaster planning. Mitigation will strengthen the Armory as a whole, reduce destruction and response time, and allow the Armory to get back in working order for its historians and researchers. In essence, mitigation is the foundation of sustainable community development.

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[38] Federal Emergency Management Agency.Home page, "Mitigation", http://www.fema.gov./

To insure that the National Guard Armory remain a safe haven for the valuable, historical artifacts within its walls, biannual inspections of the emergency phone numbers shall be made. This is a time when necessary changes can be made. The storage closet, which holds the emergency supplies, shall also be checked to make sure that the supplies that are needed are available and that they are ready to be used. Workers within the Armory shall have copies of the disaster plan and they should be familiar with the steps that should be taken in the event of a disaster. Local fire stations should also have a copy to insure that they know the layout of the building and are aware of the items that have the highest priority in which to be taken from the building. A mock disaster should be performed to insure that the disaster plan has all of its kinks worked out and it is ready to be effective and helpful when needed.

There are also daily measures that can be taken to prevent disasters or the defacing of the contents of the museum. There should be strict rules enforcing no smoking and people should only be allowed to eat and drink in designated areas. Before closing, someone should be designated to make sure that all windows are closed and that no lights or machines are left on over night. To preserve the life of the contents of the Armory, they should be properly stored where minimum dirt, dust and light can affect them. There should be a constant temperature of 68 degrees and a humidity of 50%.

The Disaster Plan

I. Initial Steps

The following steps are to be taken as the situation dictates.

FIRE:

A. Pull the fire alarm. (Public Safety services will automatically be alerted.)

B. Contact the disaster team leader (Steve Seames, 792-5450).

C. Make sure it is safe to enter. If there has been a fire or other structural damage, have the building declared safe by the Fire Marshall.

WATER:

DO NOT enter an area that is flooded until electricians have disconnected the electricity. There is an extreme danger of shock.

A. Contact the disaster team leader (Steve Seames, 792-5450).

B. Stop the water flow. If there is a leaking pipe, turn off the water. If a drain is clogged, remove the clog, if possible.

C. If water is coming from above, while waiting for the disaster team to assemble, use emergency supplies to attempt to minimize damage. Use plastic sheets and tape to drape over damaged stacks. DO NOT remove any material form shelves without proper directions from disaster leader.

II. Assess The Damage

A. Survey damaged site.

1. Disaster team leader should survey and assess the damage to plan a course of action. A photographer should be present to record the damage for insurance purposes.

2. What is the extent of damage?
   a. What types of materials were damaged? Rare books, clothing, paintings, and photographs?

3. What is the nature of the damage?
   a. Are the materials damp or wet?
   b. Was the water muddy or clean?
   c. Is there additional damage from fire, soot, or heat?

4. Determine whether damaged material will require freezing as an intermediate stage before vacuum freeze-drying or air-drying or whether they can be directly air dried (appendix 5).

5. Decide what equipment will be needed, e.g., fans, generators, dehumidifiers, sump pumps, etc

B. Establish a command center.

1. Designate members of the disaster team to-
   a. Phone for volunteers, if necessary.
   b. Phone for rental equipment (appendix 3).
   c. Supervise different parts of salvage operation.

III. Stabilize The Environment

A. To prevent further damage to materials due to mold growth, the environment must be stabilized. The following must be accomplished:

1. Reduce air temperature.
   a. In winter, turn off all heat. (But not so low that the pipes freeze.)
   b. In summer, get the building to the lowest temperature possible by lowering air conditioners to the coolest temperature. If there is no air conditioning, open all windows to cool the air.

2. Reduce humidity to 50% Relative Humidity (RH).
   a. Pump out or remove all standing water (appendix 2).
   b. Remove wet carpeting if applicable and possible.
   c. Use portable dehumidifiers and wet-dry vacuums (appendix 2).
   d. DO NOT raise temperature in an attempt to lower humidity. This will encourage mold growth.
   e. If humidity can not be quickly reduced below 60%, consider moving the books to a dryer environment.
   f. Set up hygrothermographs to monitor humidity levels (appendix 2).

3. Circulate air.
   a. Use portable fans. Keep them on night and day.
   b. Direct fans to expel humid air from building.

c. Open doors and windows to encourage air circulation when compatible with low temperature requirements, and weather conditions.

IV. Organize Salvage Operation

Organization is a very important factor in a successful disaster plan. The disaster team leader should communicate effectively and clearly to everyone. It is important that each individual knows exactly what they are required to do and how to do it.

A. Organize disaster team, staff members and volunteers.

1. Explain all dangers of improper handling and treatment of damaged materials. Emphasize priorities, aims, and timing of the whole operation.

2. Members of the recovery team should be designated specific jobs in accordance with those described in appendix 10. Due to the lack of staffing, it is possible for one person to hold multiple positions.

3. Create teams of workers led by disaster team members to deal with different parts of the salvage operation.

B. Organize a plan of action which should include:

1. A schedule of priorities.
   a. See appendix 1 for a list of priorities with the collection.

2. Determine how affected materials will be salvaged.
   a. Air drying (in house)
   b. Vacuum freeze drying (outside contractor)
   c. Freezing (outside contractor) as an intermediate stage

3. Make arrangements for freezer space and transportation if needed.

4. Designate an area where damaged material can be treated. The area should be atmospherically controlled.

V. Removal and Relocation of Damaged Materials

A. Order of removal, starting from the nearest point of access.

1. Wet materials lying in aisles between stacks and main passageways.

2. Start with the wettest materials, probably those on the lowest shelves, unless water came through the ceiling.

3. Books on shelves removed in horizontal sequence.

B. Method of Removal

1. In the exact condition in which materials are found (no attempt should be made to separate wet manuscripts).

2. A team of packers/recorders should remove the materials. Packers and recorders should work together. Record should be kept of the type, previous location and priority of the material. Each box should be appropriately labeled.

3. Move the boxed materials to a designated area or to a freezer truck for transportation to a cold storage facility.

C. Packing the Materials for Freezing

1. Boxing Materials.
   a. Interlocking plastic crates make good containers for packing wet materials.
   b. Strong cardboard boxes can also be used.

2. Remove volumes from shelves in order, if possible.

3. Books should be wrapped in freezer paper, wax paper, or silicon paper to prevent their sticking together.

   Microfilm and other photographic emulsions must NOT be frozen. Immerse in clean water and send wet to Kodak for reprocessing.

4. Pack items in the condition in which they are found. DO NOT attempt to close open volumes or open closed volumes that are wet.

5. Place them on their spines, not their four edges. Additional weight of water will pull them out of their bindings.

6. Pack crates one layer only, snugly enough that volumes will not slide or lean and be further damaged.

7. Do not pack items too tightly. Allow for air circulation.

8. If books are stuck together, do not attempt to separate them, but pack them as one volume.

9. Wrap open books as found and place on top of a packed container. DO NOT place more than one open volume in a container. Be sure there is a freezer paper barrier between the packed volumes and the open volume to prevent staining from binding dyes.

D. Record Keeping

1. Attach library ownership tag to each box with bright colored book tape. Assign each box a number.

2. On a separate sheet of paper, record the box number, call numbers of each volume or inclusive range, and the total number of books in each container. If they are not in call number order, note the location where found.

3. If the containers are sent to more than one freezer, note which container numbers are sent where.

4. Keep records of discarded items.

E. Transportation for freezing

1. Preferably transfer the packed materials by refrigerated truck.

2. Materials should be placed in a freezer facility as quickly as possible to prevent the growth of mold. Precautions should be taken so containers do not fall over during transport, to prevent further damage.

3. Materials should be placed in refrigerated trucks if they cannot be frozen within forty-eight hours.

VI. Stabilization and Drying of Damaged Materials

Many options are available for treating damaged materials, depending upon the extent and type of damage and the facilities, manpower, and expertise available. The following will refer you to the appropriate appendices to locate salvage techniques for different damaged materials.

A. Books (appendix 6)

1. Water damage

2. Fire Damage

B. Documents/Unbound paper materials (appendix 7)

1. Water damage salvage

C. Non-book materials (appendix 8)

1. Photographic materials (prints, negatives, slides, film)

VII. Restoration of Physical Location

A. If the area is determined to be usable after the damaged materials have been removed it must be thoroughly cleaned.

1. If the original shelving areas are still usable wash it with soap, water, and disinfectant, like Lysol.

2. If the room is still usable, scrub floor, walls, furniture, counter, etc., with soap, water and disinfectant.

VIII. Assessment

A. Assess the salvage operation.

1. What went right?

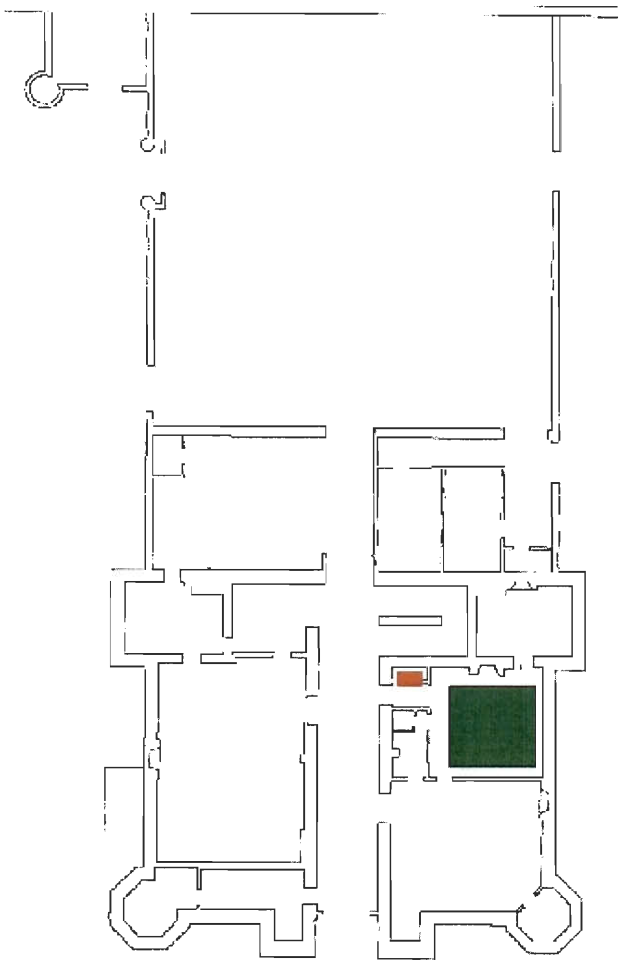
2. Did anything go wrong?

3. Does this plan require changes?

Appendix 1
PRIORITIES

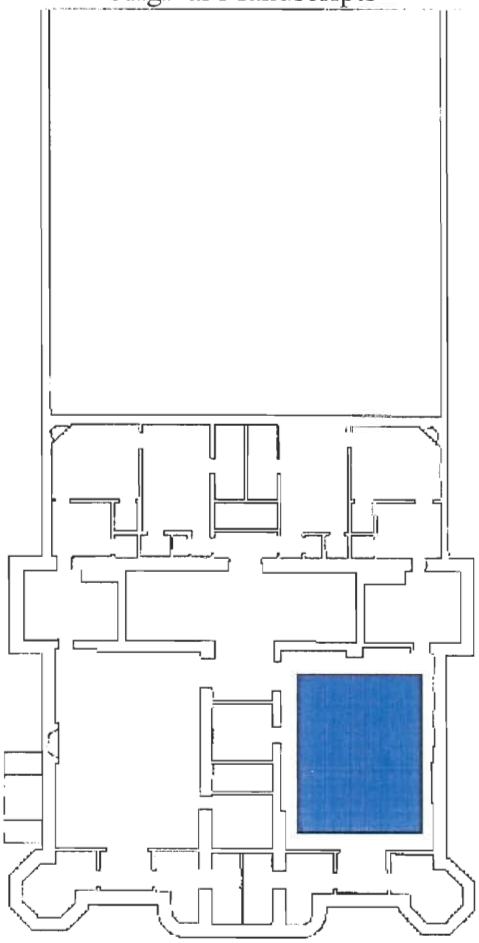
Currently, the National Guard Armory does not have an exact list of items within the building, but there are lists of items that have priority. The following list of items can be found using the attached floor layouts and color coded areas.

1. 
   Located on the first floor
   GAR collection
   -flags
   -uniforms



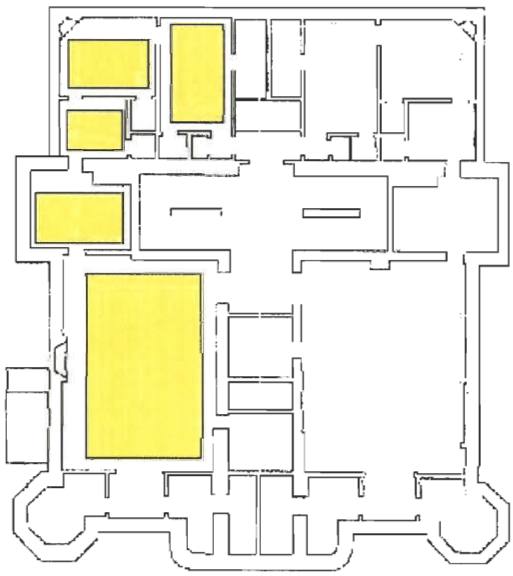
2. ■

Located on the third floor
State Documents
-Archives
-Original Manuscripts



3. ■

Located on the second floor
Display Room
-Pictures
-Swords
-Military Equipment
-Photographs



Other items of concern:

-There are documents in a vault on the first floor that can only be opened by Steve Seames. The vault rests on a floor that is reinforced with concrete and steel. It is located over the men's locker room.

-The artillery and clothing do not need to be salvaged right away. These items can be replaced.

Appendix 2
IN HOUSE MATERIALS

Materials required for salvage can be found in a closet on the first floor. The closet is marked on the floor plans with red.

The following materials are contained within the National Guard Armory. It is important that these materials or on-site and in proper working condition.

Batteries (flashlight)
Boxes (flat)
Brooms
Buckets
Dehumidifiers
Drying racks
Extension cords
Fans
First aid kits
Flashlights
Freezer paper
Fungicides
Hair Dryer
Ladders
Mops
Pallets
Paper towels
Plastic sheeting
Plastic trash bags
Pressboards
Rubber gloves
Sponges
Sump pump
Thermometers
Unprinted newsprint
Water hoses
Wet-dry vacuum
Hydrothermographs
Chemical Sponges
Polyester film

Appendix 3
SUPPLIES OFF-SITE

The following is a list of other materials that may be needed in the event of an emergency. These materials can be obtained by contacting local companies.

Boxes
Dehumidifiers
Fans
Freezer paper (24 hr. delay)
Paper towels
Plastic milk crates
Plastic milk crates
Plastic sheeting
Temperature/humidity gauges
Unprinted newsprint
Generator
Thymol chamber

Appendix 4
COMPANY CONTACTS

Local Companies:

Munters Moisture Control Services
16 Hunt Road South
Amesbury, MA 01913-4404
Tel. (508)-388-4900 Fax. (508)-388-4939

World Wide Drying
Taunton, MA
(508) 823-0189 800-442-1911

Fortress FAE
251 Heath Street
Boston, MA 02130
Tel. (617)-566-1155 Fax. (617)-566-1621

National Companies:

Blackmon-Mooring Steamatic Catastrophe
303 Arthur Street
Fort Worth, TX 76107
Tel. (817)-332-2770 Fax. (817)-332-6728

Disaster Recovery Services, Inc
2425 Blue Smoke Court South
Fort Worth, TX 76105
FW (817)-535-6793
Dallas (972)-445-6509
Fax (817)-535-1167

Service Master
25 W. North Ave.
Villa Parks, IL 60181
Tel. (630)-833-0888 Fax. (630)-833-1748

Document Reprocessors
1-800-437-9464

Appendix 5
FREEZING

Freezing wet materials will stabilize them and provide time to determine the next step. Mold will not grow and further deterioration from water will not occur. Books have been left in a freezer for ten years, then successfully thawed and air-dried. Freezing will also help to eliminate smoke odor from materials.

Rapid freezing is recommended to minimize damage from ice crystals. The faster the materials are frozen, the smaller the ice crystals will be. Temperatures below 15 degrees F will freeze and dry out wet materials. If freezer space is not immediately available, and the outside temperature is below 15 degrees F, place the materials in a secure area outside. Cover them with plastic if rain or snow is a possibility.

Freezing is an intermediate stage. After materials have been removed from the freezer, they must be placed in a vacuum freeze dryer or air-dried.

Priorities For Freezing

1. Materials which have already developed mold

2. Leather and vellum-bound volumes

3. Manuscripts and art on paper stock

4. Materials on coated stock

5. Photographic prints

6. Journal and monograph volumes

Appendix 6
BOOKS

WATER DAMAGED

Slightly Damp Volumes

These materials have only wet edges. They do not need interleaving to soak up excess water; but can be air-dried.

1. Cover drying surface with plain newsprint. Newsprint should be changed as it becomes damp, and the wet paper removed from the drying area.

2. Stand volume on its head and fan open slightly. Paperbacks and other books that will not stand on their own may be braced with wooden pressboards or Styrofoam pieces. Position each volume in the path of circulating air, but do not blow fan directly on wet paper, because this will cause pages to wrinkle.

3. When almost dry, lay the volumes flat and place weights on them to minimize distortion. Bricks would be a good weight to use for this. Do not stack wet volumes.

Damp Volumes

These materials are wet beyond the edges, but not soaked through. They may require some interleaving; but can be air-dried.

Interleaving is used to soak up excess moisture in books to speed air drying process. Use only white paper towels, plain newsprint or polyester web when interleaving.

1. Begin in front and work toward center, placing interleaving sheets each 50 pages (25 leaves) in such a way that the book can stand upright on its head when done. Do not open book more than a 30-degree angle. Repeat this process from back to center.

2. Change interleaving frequently. Place new sheets at different places from the last, so that the book can be turned to stand on opposite end with each change.

3. Do not reuse sheets.

4. When interleaving sheets no longer come out wet, continue air drying as directed for slightly damp volumes.

Wet Volumes

These materials are wet to some degree throughout, but not saturated and dripping. They can be air dried immediately or frozen for later air-drying and will require interleaving.

1. If the quantity of damaged materials is too great to allow immediate individual treatment for each wet volume, they should be frozen until time allows such treatment. See directions for freezing (appendix 5).

2. When materials can be air-dried, interleave as for damp volumes. Care should be taken when interleaving to avoid tearing wet pages. The procedure will be much the same for interleaving and air drying damp volumes -- it will just take longer. Be on the alert for mold.

Saturated Volumes

These are materials that have been soaked through. They may have been submerged in water or standing beneath running water. They will require much individual attention to air dry. If time does not allow this attention, freeze for later treatment. If large quantities are saturated, freeze drying may be the best option.

1. Cover drying surface with plastic sheeting then absorbent paper. Paper should be changed as it becomes wet and removed from drying area to prevent increase in humidity.

2. DO NOT open saturated volumes. Wet paper tears easily.

3. Stand volumes on their heads (upside down) on absorbent paper, and let water drain from books. This position counteracts the pages' natural tendency to "droop" between the covers. When changing the paper beneath books, reverse the standing position each time.

4. Covers may be opened slightly to support the volume.

5. Aluminum foil may be placed between the cover and endsheet to prevent staining from binding dyes.

6. When most of the water has drained off, proceed as for wet volumes.

SPECIAL CONSIDERATIONS FOR WATER DAMAGED BOOKS

Volumes With Coated Stock Paper

Wet coated stock paper (slick) should be handled with care. Print will slide off the wet page if it is rubbed. Do not allow wet books with coated stock paper to dry in a closed state as the pages will permanently bond together. Keep volumes submerged until pages can be separated. The only chance of saving such materials is to interleave every page and air dry. Almost all attempts to separate dried pages by re-wetting them have failed. Vacuum freeze drying of coated stock volumes is also rarely successful. If the value of the item allows, separation of wet sheets as described for Documents/Unbound Materials may be attempted (appendix 7).

Muddy Volumes

Remove muddy volumes from recovery area, preferably outside. Keep book closed tightly and hold it under cold, clean running water, letting the running water clean off the dirt. Remove as much mud as possible from the binding by dabbing gently with a sponge. Do not rub or use brushes, and do not sponge the pages or their edges. This could cause further damage. Squeeze the book gently and with even pressure to remove excess water and to reshape binding. Freeze or air dry according to degree of wetness. Do not wash: open or swollen volumes; vellum or parchment bindings or paper; full or partial leather volumes; fragile or brittle books; books with water soluble components (inks, tempera, water colors, dyes, charcoal, etc.); works of art on paper; manuscripts.

Moldy Volumes

Mold and mildew can develop within 48 to 72 hours in an environment where the temperature is over 75 degrees and the humidity is over 60%. Mold and mildew can never be killed and can remain dormant for many years. Spores are always present and will grow if the environment is warm and humid. The best treatment for mold is prevention through environmental control.

Materials that have begun to mold should be separated from other materials to prevent spreading. Thymol treatment for mold should be undertaken only under the supervision of Health and Safety. If mold treatment can not begin immediately, the moldy volumes can be frozen to inhibit further growth. If weather permits, moldy volumes may also be set in the sun to dry, but will still need to be treated. See Thymol Treatment for complete instructions (appendix 9).

FIRE DAMAGED

In case of fire, all burned or charred materials will have to be removed from the area before ventilation of smoke and air cleaning can be effective. Items obviously beyond salvage can be taken to another location for bibliographic purposes. Those that can be salvaged can be removed by book truck to the recovery area.

Smoke and Soot Removal

If the only damage to books and papers is soot on the outside, it may be possible to remove most of it by cleaning with a chemical sponge (appendix 2). The chemical sponge does not contain chemicals that assist in the removal of dirt and odors. The name refers to the process of manufacturing a sponge that is much more dense than usual. After use, the sponge can be washed and reused several times.

To clean a book, hold the book tightly closed. Gently stroke in one direction away from the spine toward the fore edge on the head and/or tail, and the same kind of technique on the fore edge, spine and covers. Continue this process until no more soot or debris can be removed without damaging the surface area.

Deodorizing

Charcoal and/or baking soda can be used to deodorize fire-damaged materials. Place charcoal briquettes and/or bowls of baking soda in the area to absorb the odor. If a small number of books are affected, a clean metal barbecue or similar container can be used. Spread charcoal briquettes in the bottom and place books on a rack over them. Close the lid and wait two or three days or until the smell can no longer be detected. The thymol chamber can also be used for this purpose.

Appendix 7
DOCUMENTS/UNBOUND PAPER MATERIALS

Loose papers can be dried by spreading them on clean absorbent flat surfaces in areas where there is good air circulation. They can be covered with non-woven polyester web or plastic mosquito screening to keep them from blowing away, if needed. DO NOT attempt to flatten anything materials at this point. Try to get things dry as quickly as possible. Flattening can be done later. Damaged documents that have value only for their information need only be dried enough to be handled and photocopied.

If the number of documents affected is too great to be handled within 24 hours, or has value that will require individual attention, the items should be frozen. Loose papers should be frozen as found. Do not remove from file cabinet drawers, document cases or folders; do not turn containers upside down to empty or drain.

In some cases, wet sheets can be separated. The method described is not highly successful and is extremely time consuming. This method may also be attempted for coated stock paper.

Separation of Wet Sheets

This process is not highly successful and is extremely time consuming.

1. Place a sheet of polyester film (appendix 2) on top of a stack of wet unbound papers, or the first page of a bound volume.

2. Rub gently with a bone folder (appendix 2). Surface friction will cause the wet paper to adhere to the film.

3. Peel back the top sheet and place it on top of a piece of polyester web.

4. Remove the polyester film.

5. Place another piece of polyester web on top of the wet sheet.

6. Repeat the entire process, separating the wet sheets one at a time and interleaving them with polyester web. Materials may be frozen at this stage.

7. Air-dry the sheets by placing them on absorbent paper on tables. Air in the room should be kept circulating, but fans should not blow directly on the materials.

8. The papers may be flattened when they are almost dry by placing them between two sheets of blotting paper to remove excess moisture and applying even pressure with weights.

Appendix 8
NON-BOOK MATERIALS

Photographic Materials (prints, negatives, slides, film)

Air-drying is the preferred recovery method for all photographic materials.

Photographs which have been immersed in dirty water should be rinsed in cold, clean water before drying or freezing. They should then be tilted to allow excess water to run off. Photographs with stable images should be blotted with clean blotters or soft paper towels before air-drying. Non-woven polyester fabric should be placed between the blotter and photograph to prevent sticking. Place wet photographs on a rigid support, such as cardboard or a wooden board, when moving them. Photographs with signs of emulsion deterioration such as bubbling, separation or image loss should not be rinsed or blotted.

Wet photographs should not be allowed to dry out in stacks. They will stick to each other. Any attempt to separate them after they are stuck together may result in damage to the emulsion or the image. If photographs are to be sent to a professional laboratory for treatment, they should be sealed in plastic bags and transported in plastic garbage cans filled with cold water.

Watertight housing should be considered for photographic materials, particularly color products, reel film and microfiche.

Immediate Air-Drying

Air-drying results in the least water damage and mold growth as well as less distortion. However, separation and air-drying must be done quickly to prevent sticking of emulsions and mold growth.

1. Photographs should be separated before air-drying. If photographs do not separate easily, freeze and consult a photograph conservator

2. If photographs cannot be handled immediately, place in sealed polyethylene bags and immerse in cold water. Ice can be added to the water, but not dry ice

3. Air-drying should be done in a clean, dry room.

4. Photographs should be removed from frames, mats or enclosures and be placed emulsion side up on blotters or lint-free cloth. If photograph is stuck to the glass, do not force them apart, consult a photograph conservator.

5. DO NOT allow wet emulsion to come in contact with other materials until it is completely dry. DO NOT touch wet emulsion.

7. Paper-based photographs that are not mounted can be weighed down evenly at their edges with any small clean weights available to prevent curling.

8. If large numbers of photographs prevent this treatment, let the photographs curl as they dry. They can be flattened later by a conservator if necessary. DO NOT try to flatten tightly curled dry photographs.

Color prints, negatives, slides, transparencies

Color materials are very difficult to save. Colored layers will separate and the dyes will fade quickly. If the decision is made to attempt saving color materials, they should be treated as a first priority.

1. Air-drying is the best method. (Can be frozen and later air-dried.)

2. Do not blot or handle on image side.

3. Should not be immersed for more than 48 hours.

4. Remove cardboard mounts from slides and transparencies. Save mounts until bibliographic information can be transferred.

Freezing Photographic Materials

1. If possible, consult a conservator about problems unique to the collection before freezing and thawing.

2. Photographs should be kept wet until they are frozen.

3. It is not necessary to interleave photographs before freezing, but it will certainly make it easier to separate and support them upon thawing. Negatives should be separated before freezing, or they will stick together when thawed.

4. Place photographs in stacks small enough that all can be air dried upon thawing. Stacks of photographs should be sealed in plastic bags for freezing.

5. To prevent formation of ice crystals on photographs, they should be quickly frozen at 15 degrees F or colder.

6. Air dry as described above.

Appendix 9
THYMOL TREATMENT

Materials that have developed mold can be treated in the thymol chamber (appendix 3) to stop its growth. Materials should be dried before treatment. The mold should be cleaned off with cheesecloth away from other library materials, preferably outside. Nothing can be done for mold stains.

Use of the thymol chamber requires access to outside for venting. The room will need to be reserved for three full days. While the concentration of thymol used in this process does not present an immediate health hazard, Health and Safety recommends the room be off-limits for general use during treatment.

1. Place books on racks in chamber upright and fanned open, as for air-drying. Books can be close, but should not touch.

2. Put 1 tbsp. thymol in cup over heat source. DO NOT let thymol touch skin. Wear rubber gloves if necessary.

3. Plug in heat source.

4. Double-check everything inside chamber before putting on lid.

5. Put on and secure lid. Screws should be tight, but be careful not to break lid.

6. Secure vent covers.

7. Plug main power cord into socket and turn on power switch. Heat will evaporate thymol and continue to warm air. Leave heat on 8-12 hours. Check frequently.

8. Turn heat off. Leave chamber closed for an additional 48 hours.

9. Roll chamber outside away from air intake.

10. Plug in power cord, using extension cord if necessary. Open both vents and turn on fan. Exhaust chamber for 15-20 minutes.

11. Return chamber to room. Remove books and allow to air on isolated shelf 1-2 months. Books may then be rebound or repaired, if needed, and returned to the appropriate floor.

Appendix 10
RESPONSIBILITIES

Responsibilities of Coordinators
Disaster Recovery Responsibilities

- Evaluate and critique initial disaster assessment reports and action plans.
- Serve as prime decision maker for situations not included in plan.
- Assign team members to specific responsibilities detailed for each team in the plan and based on the initial disaster assessment.
- Motivate and direct team members.
- Track actual programs/completion of recovery activities.

Disaster Recovery Coordinator
General Responsibilities

- Maintain the disaster recovery plan and Disaster Recovery Quick Reference guide.
- Coordinate the general training of the staff, and disaster recovery training of the disaster recovery team.
- Coordinate testing of the disaster plan.
- Chair disaster recovery group meetings.

Disaster Recovery Responsibilities

- Activate the disaster recovery plan.
- Assess the level of disaster and the specific disaster situation.
- Select and establish the command and control center with in-house communications provided; coordinate communications.
- Coordinate disaster recovery process.
- Identify and assign team members
- Contact team members; coordinate their activities.
- Oversee and monitor the recovery process on site; set and determine the salvage priorities.
- Make recommendations for budget allocations.
- Keeps Armory administration informed.
- Coordinate with emergency response services.
- Coordinate the written disaster reports.
- Use debriefing sessions to review what went well, what did not work as expected, how to improve, etc., disaster recovery plans and efforts.
- Make recommendations for changes to the disaster recovery plan.

Authorizations
Disaster Recovery Responsibilities

1. Signature authorization for:

- Expenditures
- Hiring of additional disaster recovery staff
- Hiring of consultants or outside recovery services
- Utilization of volunteers
- Other financial matters in association with university disaster response management.

2. Public relations
   - Library spokesman in all public relations matters unless otherwise delegated.
   - Keep National Guard informed on recovery operations

3. Personnel Relations
   - Coordination of staff hired for the disaster recovery and volunteers

Building Proctor

General

- Is familiar with flood plans, utilities, and conditions unique to the building
- Maintains contact with the Armory facilities; knows what physical resources are available.

Disaster Recovery Responsibilities

- Part of the assessment team that first enters the building
- Liaison with police, fireman, and facilities
  - Coordinates with National Guard for equipment and supplies needed for recovery efforts.
  - Coordinates security needs.
  - Obtains permit badges, if necessary.
- Works with setting up the command center site by obtaining appropriate tables, book trucks, etc.
- Assembles in-house disaster recovery supplies.
- Designates the person responsible for food, water, and sanitation facilities for recovery workers.
- Designates the person responsible for the phone tree to contact disaster team and/or Armory staff.
- Works with Services Recovery Coordinator
- Plans repair/restoration of damaged areas.

Collections Coordinator

Disaster Recovery Responsibilities

- Part of assessment team that first enters the building.
- Follows priority statement(s) and utilizes selectors in recovery decisions
- Works with Services Recovery Coordinator

- Recommends or assists in public relations news releases regarding information to library patrons.
- Coordinates the relocation of the collections. Recommends priorities for relocation.

Collection Recovery Coordinator

Disaster Recovery Responsibilities

- Works closely with Collections Coordinator.
- Assigns staff to teams.
- Establishes treatment to work areas.
- Recommends techniques and treatments for materials based upon assessment. This may include specifications for commercial assistance.
- Supervises the recovery effort which includes:
  - Following instructions concerning salvage priorities.
  - Proper handling of materials.
  - Ordering/utilization of recovery supplies
  - Selection of outside services
  - Enforcement of safety regulations
- Conducts refresher training and/or training for volunteers as needed.

Records/Photographer

Disaster Recovery Responsibilities

- Maintain complete, unambiguous record of all facets of recovery operations
- Coordinates staff to record all activities of the disaster and its recovery efforts:
  - Decisions made and by whom
  - Assessment reports; extent of damage.
  - During recovery efforts, the number of books, number of boxes, etc.
  - Recommended procedures and treatment decisions.
  - Equipment and supplies required/used.
  - Agencies contacted.
- Takes photographs of:
  - Affected areas before, during, and after the disaster
  - Publicity news release photos to be coordinated with the public relations coordinator.
- Work with building proctor and Armory risk management as required
- Record names and the number of people involved from the beginning to the end of the recovery and rehabilitation of the materials.

Computer Recovery Coordinator

- Determines alternate sites; for example , CARL operations
- Prepare disaster assessment report
- Coordinate recovery/restoration of operations, including:
  - Obtain/replace data communications equipment.

- Arrange for support services required for the operations.
- Coordinate recovery/retrieval of destroyed/damaged files and software programs.
- Recommended salvage effort priorities
- Oversee testing of alternative processing systems.

- Works closely with Services Recovery Coordinator

Services Recovery Coordinator

- Coordinate resumption of departmental operations based on high priority list of critical functions:
  - High priority tasks.
  - Temporary operating procedures.
  - Facilities requirements.
  - A requirement for equipment, forms, and supplies.
  - Minimum operational staff
- Work closely with Building Proctor, Collections Coordinator, and Computer Recovery Coordinator.