

ABSTRACT

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DISASTER RISK MANAGEMENT FOR
CULTURAL RESOURCE PRESERVATION

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This paper examines disaster preparedness and planning for risk with a focus on historic properties and resources. Hazard *preparedness, response, and recovery* work are critical to protecting historic resources, and should be an essential part of any disaster risk management strategy (DRM). This paper explores and reviews threats and hazards which DRM practitioners must plan for and respond to. It presents efforts of United Nations' UNESCO and Japanese planners as examples of good DRM practice, and examines locally designed and locally implemented DRM activities throughout North America, Europe, and Asia. Specifically this study investigates DRM practices at the state and local site level in the U.S.

Property managers or owners must be familiar with preventative practices capable which can reduce the amount of damage caused by disaster and with actions to deal with disaster events once they occur. Historic property owners and managers must also contend with space constraints, limited funding, staffing, and deciding between conflicting budgetary demands. In the face of these challenges, the owner must properly plan for managing the effects of disasters on their property. Rising rivers, coastal wind sheer, harbor waves, earthquakes, meteorological phenomena (hail,

tornado), fire, and human impacts raise the stakes for preserving historic resources. The best practice for historic preservation in this context is risk management vis a vis planning for and responding to an event.

The goal of this paper is to highlight specific trends and lessons learned from various types of hazards and disasters, especially as it pertains to historic resources. The vast majority of research on DRM draws on data regarding life and property loss, without much attention to historic buildings and landmarks. Therefore, one searching for data specific to DRM for historic resources struck by disaster has a difficult task. In this paper I have utilized international and national sources as well as local level cases to illustrate the types of approaches DRM professionals have implemented to reduce the effect of disasters. I present six case studies which draw on site specific data from DRM plans and personal interviews of site staff. This paper presents useful tactics, lessons learned, and, lastly, recommendations for the museum manager, site facility manager, historic property owner, repository director/archivist, and others responsible for securing and protecting artifacts, objects, monuments, buildings, and sites from loss due to disaster events.

DISASTER RISK MANAGEMENT FOR CULTURAL RESOURCE PRESERVATION

By

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Final project submitted to the Faculty of the Historic Preservation Program of the
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Chapter 1: At the Nexus of Disaster Risk Management, At-Risk Populations, and Cultural Heritage

“FACT: IMPACTS OF DISASTERS OVER THE PAST TEN YEARS. Overall, more than 1.5 billion people were affected by disasters in various ways, and (*sic*) with women, children and people in vulnerable situations being disproportionately affected.”¹

INTRODUCTION

This paper explores the threats and hazards which disaster risk management (DRM) practitioners and property owners must address and plan to mitigate. Historic property owners and managers must contend with space constraints, limited funding, staffing, and deciding between conflicting budgetary demands. This reality magnifies the importance of DRM practices and policies being implemented at sites and properties with historic resources. In this chapter, I will present the work of UNESCO and Japanese planning agencies as examples of good DRM practices.

Risks endemic to certain locales (e.g.: coastal zones in earthquake-prone areas, or riverine flooding) have left an imprint upon the psyche of humans everywhere, and those lessons get passed to subsequent generations. Increasingly, these lessons are shared with and disseminated to a global audience. For example, there are significant ideas and improvements developed and tested in Asia to mitigate flooding which Dutch

¹ World Conference on Disaster Risk Reduction (WCDRR). Sendai Framework for Global Disaster Risk Reduction 2015-2030 [PowerPoint Slides]. (2015) Retrieved from www.pitt.edu/~super7/53011-54001/53191.ppt. Accessed April 20, 2016.

researchers are using to minimize the threat of seasonal flooding on the physical and cultural heritage along the Waal River (the Dutch name for Germany's Rhine River). As well, the innovations developed for constructing buildings in various risk environments to address extreme temperature, rising waters, shaking ground, and severe wind conditions (near rivers, fault lines, and coastal regions) can be applied to disaster planning and risk mitigation at many types of properties.

While not all historic properties will face the myriad risks present across global human settlements, historic property owners and managers should be aware of what may be termed 'current good practice' in order to minimize their risks. Years of research, improvements to infrastructure and the collective responses of various governmental, private, and academic entities in North America and beyond, have led to advances in disaster risk management. Ultimately, this paper will offer practical guidelines provided by DRM experts, presenting results of my investigation into selected historic sites and agencies who have considered how best to plan for and mitigate disasters.

Defining Disaster Risk Management

In order for property managers to decide which disaster risk management policies and practices best apply at their site, they should inquire of and explore the examples provided by other DRM professionals. For example, an organization may choose to mitigate the effect of hazards while they are constructing a new repository to house artifacts. This could be done by including backup power generation or a new dry pipe sprinkler system in engineer plans for the new construction. Due to cost

ineffectiveness of retrofitting their facility to mitigate flooding, another organization may choose to respond directly to a disaster. In this second example, response efforts would include a call list of volunteers who will help evacuate artifacts from the lower level of a museum situated near a river. Those management approaches are generally referred to as disaster risk reduction.

What is meant by the term “risk reduction” in the context of hazards? Disaster risk reduction (DRR) may be succinctly stated as: a process of using administrative direction, “organizations, and operational skills and capacities to implement strategies, policies and improved coping capacities in order to lessen the adverse impacts of hazards and the possibility of disaster.”² The United Nations International Strategy for Disaster Reduction Office states that disaster risk reduction is an extension of a more general “risk management process” used in the context of risks from hazard events. Further, the Office says, disaster risk management seeks to “avoid, lessen or transfer the adverse effects of hazards through activities and measures for prevention, mitigation and preparedness.”³

Generally speaking there are three phases (Figure 1) to disaster risk management. The first phase is the planning phase, often referred to as *preparedness*. In this phase prevention efforts focus on gathering information on local threats, insurance policy purchasing, reviewing and codifying asset inventories, and training staff in disaster event skills and continuity of operations. In the next phase, *response*, the focus is on the immediate and short term effort to stabilize the effects of the hazard

² United Nations International Strategy for Disaster Reduction. Terminology on Disaster Risk Reduction. (2016). <https://www.unisdr.org/we/inform/terminology>. Accessed May 11, 2016.

³ Ibid.

event. Finally, the *recovery* period begins just after the event has dissipated or stopped. This stage will then flow naturally back into a new preparation for the next event, which is the first stage of the next cycle--planning.

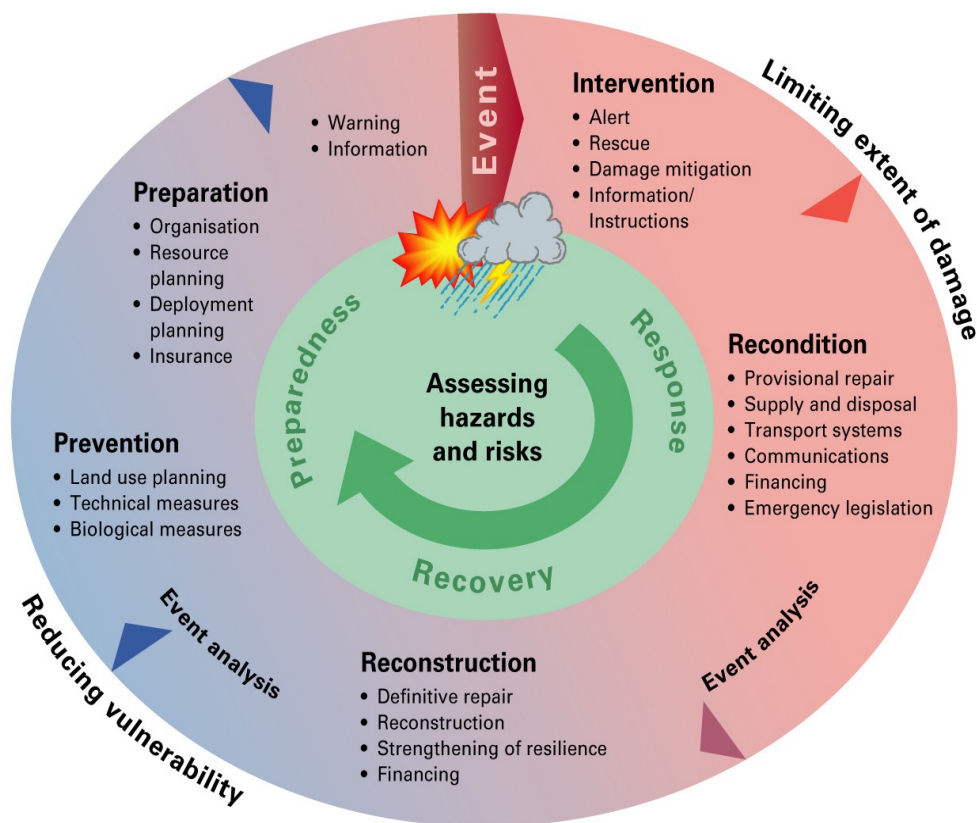


FIGURE 1: Cycle of Integrated Disaster Risk Management. (Source: Swiss Federal Office for Civil Protection FOCP, 2010.⁴)

An International Perspective on Disaster Risk Management

The hazard events codified by Wehrli, et al⁵ in their 1998-2009 summary (from among the 32 nations covered in their European Environment Agency [EEA] report)

⁴ Wehrli, A., Herkendell, J., & Jol, A. *Mapping the impacts of natural hazards and technological accidents in Europe*. (2010). Pp. 144. EEA Technical report 13/2010, European Environment Agency, Copenhagen, Denmark.

⁵ Wehrli, 9.

revealed a variety of vulnerabilities which exist for Europeans and their physical property. For example, deaths from heat waves tend to be mostly among elderly persons, while flooding tends to hit hardest the lower income populations who live in flood-prone areas. Thus, flooding deaths are disproportionately higher in poor rural areas where flood control and civil defenses are insufficient.⁶ World disasters in the past ten years have affected more than 1.5 billion persons with “women, children and people in vulnerable situations being disproportionately affected.” Table 1 provides an overview of 11 years’ data from various disaster events which affected Europe.⁷ This table provides a good sense of the type and frequency of disaster events across Europe over more than a decade. As such, it can be used to illustrate the range of risks and results of not considering those hazards in risk management planning. To further address this point, I point to the Hyogo Framework for Action 2005-2015 and its updated version, the Sendai Framework for Disaster Risk Reduction 2015-2030, in which disaster professionals detail the lessons learned from earthquake, tsunami, nuclear reactor meltdown response and recovery. Importantly, these types of disasters respect no political borders.

In historic city cores, where cultural sites are often stacked nearly one upon another, poor households and their homes and property can suffer greatly when a hazard event strikes because they are often already suffering from overcrowding and lack of sufficient infrastructure.⁸ What ought to be done? Is not the physical

⁶ Ibid.

⁷ Ibid, 9.

⁸ Taboroff, J. Cultural heritage and natural disasters: incentives for risk management and mitigation. *Managing Disaster Risk in Emerging Economies*. (2000). Pp. 2, 71-79. New York: World Bank.

TABLE 1: Overview of the Major Hazard Events in Europe, 1998-2009 (Wehrli, et. al.,2010:9.)

Hazard type	Recorded events	Number of fatalities	Overall losses (EUR billion)
Storm	155	729	44.338
Extreme temperature	101	77551	9.962
Forest fires	35	191	6.917
Drought	8	0	4.940
Flood	213	1126	52.173
Snow avalanche	8	130	0.742
Landslide	9	212	0.551
Earthquake	46	18864	29.205
Volcano	1	0	0.004
Oil Spills	9	n/a	* (a)
Industrial accidents	339	169	* (b)
Toxic Spills	4	n/a	* (c)
Total	928	98972	148.831

Note: (a) Estimation is between EUR 500 and EUR 500 000 per tonne of oil spilled.

(b) Costs for major events reported in Table 12.1 aggregately amount to more than EUR 3.7 billion. (c) Costs for one particular toxic spill amount to EUR 377 million, see Chapter13. The thirty-two European Environmental Agency (EEA) member countries comprise the EU-27, Iceland, Liechtenstein, Norway, Switzerland, and Turkey.

Source: EM-DAT, 2010;; EMSA, 2010;; MARS, 2010.

infrastructure of these areas at risk because they are not getting enough investment and attention? Similarly, is not the heritage of these areas at risk? A greater focus must be afforded to the vulnerable portion of the population, as often times they are the ones living in older neighborhoods and in older homes which may be critical to the historic fabric of that community. During stakeholder meetings and disaster mitigation planning and facility design meetings, citizen preparation through education, and more historic

buildings disaster event ideas must come from those living in potentially affected areas. In order to fully utilize the natural drainage of an area, for example, certain preparations for flooding can be done best at the household and community levels. As well, these local residents will likely be the best resource of information detailing how previous hazard events have affected the area. Therefore, DRM experts' efforts at education and risk reduction measures ought to be approached with input from local inhabitants who have experienced various local hazard events and weather conditions. From these experiences common guidelines and methods may be extracted and made into policy statements, which then inform how educators utilize the information.

Immediate Disaster Response for Cultural Resources

Within the professional risk reduction practice there is general acceptance of the three phases of disaster risk management: preparedness, response, and recovery. In the U.S., FEMA (Federal Emergency Management Agency), the national agency tasked with response to disasters, works to educate the public and private sectors on disaster risk management and mitigation strategies. A consideration of FEMA's role is important as it employs some of the best DRM practitioners with strong financial and regulatory support from the federal government. Much of FEMA's assistance in the form of expertise, financial resources (grants), and oversight in recovery efforts can be applied to historic properties damaged in a disaster, but where insurance coverage is insufficient to repair the building. As local governments are typically the first responders in a disaster event, FEMA only becomes involved in response and recovery if the President, a tribal government, or a state governor declares an emergency. This mechanism is meant to ensure that local resources (personnel and funding) are used

first to address a hazard event. If the local assistance is overwhelmed with the event, the state administration must join the effort to respond and recover. Upon the application of the state's resources, if the governor of the state or the tribal leader, in the case of Indian property being affected, decides the effort needs federal assistance they may request the President to declare a state of emergency. Federal funding for a disaster event response is only released if the President makes a disaster declaration.

FEMA's assistance is generally categorized under three principle headings: individual assistance, public assistance, or hazard mitigation assistance. Individual assistance post-disaster will likely take the form of insurance, short-term housing, emergency help, and small business loans. The concern is to meet the immediate needs (food, shelter, finances, first aid) of persons and organizations. With public assistance, the focus is on the immediate threats to public health, safety, life, and the built up public and private properties. These funds reimburse local Emergency Medical Services (EMS) and assist with debris cleanup efforts. FEMA also assists the public facilities sector with the repair, restoration, and replacement of eligible infrastructure. Lastly, hazard mitigation assistance means an analysis of risk, steps to reduce risk, and providing insurance for the risk.⁹ This help may take the form of FEMA providing money to a municipality to acquire and demolish properties in a flood hazard area, thus relocating a homeowner out of harm's way. Cummings also says, "Any property owner seeking federal funds through FEMA must now realize there are laws with which FEMA must comply in giving any reimbursement funding for historic resources." If the applicant

⁹ Cummings, April. Disasters and Historic Properties. Presentation on October 23, 2009. http://www.heritageemergency.org/wp-content/uploads/2014/05/Raleigh_CummingsPPT1209.pdf. Accessed April 24, 2016.

would like to continue to apply for help, prior to their doing any permanent work at the property: 1) FEMA staff will review the Scope of Work for the proposed project, 2) FEMA determines National Register eligibility and effect of the proposed work on the historic property, 3) the State Historic Preservation Office (SHPO) then has 30 days to concur with the determination of FEMA, and 4) an integration of the SHPO and FEMA recommendations into the Scope of Work must be done, or if not, the project could lose federal funding assistance.¹⁰

Section 106 of the NHPA, which requires federal agencies to consider the potential impacts of projects they carry out, assist or permit on historic properties,¹¹ also encourages federal agencies to create procedures or specifications in a “Programmatic Agreement” which spells out how agencies ought to consider historic properties in operations responding to a disaster. While immediate rescue and salvage operations to save life or property are exempt from Section 106 regulations, a federal agency may not waive its Section 106 responsibilities. Essentially, the federal agency must consider, and give the State Historic Preservation Office time to respond to a proposed action, permit, or assistance given in response to a disaster. A programmatic agreement can help to streamline the Section 106 process for certain previously agreed upon resources.

Although the Federal government can help a property owner respond to a hazard event, the owner may be left to ponder “how could have I seen this problem coming?” and “What could have I done to prevent or lesson the damage?” What resources and

¹⁰ Ibid.

¹¹ American Council on Historic Preservation. Role of Section 106 in Disaster Response - Frequently Asked Questions. (2016). http://www.achp.gov/sec106_disaster-responseFAQ.html. Accessed May 2, 2016.

guidelines are available to help owners and managers of historic properties to prepare and to plan for disaster mitigation? DRM for these owners may seem daunting, but DRM practitioners have guidelines for rebuilding (old and new) and for prevention. Indeed, there are lessons to be learned from scholars and officials outside of the US in addressing the *prevention* of a calamitous event at a historic site. These lessons can help us as we consider best practices for DRM in the U.S.

Risk Reduction For Cultural Heritage: Design Guidelines & Prevention Practices

In regard to current mechanisms to manage risks, Taboroff specifies several key areas¹² in which heritage preservation within cultural agencies could be strengthened. She calls for implementation of several action items to better manage risk:

- Integrate measures for heritage protection in global disaster management efforts.
- Support the creation of comprehensive national inventories of historic places;
- Institute the use of 'Object ID';
- Identify higher risk sites for priority action;
- In vulnerable areas draw up emergency preparedness plans, especially for museums; and
- Allocate resources for planning and implementation of management systems.

The Eurocode provides a good *design source* for historic property disaster protection. To reduce risk and mitigate damage, the parameters and principles set forth in this document deal with *designs for new construction* and also provide guidance for

¹² Taboroff, 2000.

FIGURE 2: Catastrophe Classes According to Munich Re, a German Insurance Group. (Wehrli, et. al., 2010:126)

Catastrophe class		Loss profile	Overall losses			and/or fatalities
			1980s*	1990s*	2000 – 2008*	
0	Natural event	No property damage	-	-	-	none
1	Small-scale loss event	Small-scale property damage	-	-	-	1-9
2	Moderate loss event	Moderate property and structural damage	-	-	-	> 10
3	Severe catastrophe	Severe property, infrastructure and structural damage	US\$ >25m	US\$ > 40m	US\$ > 50m	> 20
4	Major catastrophe	Major property, infrastructure and structural damage	US\$ > 85m	US\$ > 160m	US\$ > 200m	> 100
5	Devastating catastrophe	Devastating losses within the affected region	US\$ > 275m	US\$ > 400m	US\$ > 500m	> 500
6	Great natural catastrophe „GREAT disaster“	Region's ability to help itself clearly overtaxed, interregional/international assistance necessary, thousands of fatalities and/or hundreds of thousands homeless, substantial economic losses (UN definition). Insured losses reach exceptional orders of magnitude.				

* Losses adjusted to the decade average.

historic buildings. Addressing the design and retrofitting of buildings preemptively may be the difference between a community facing a small scale loss event (see highlight in Figure 2¹³), and a major catastrophe, such as the 1999 Izmit, Turkey earthquake (death toll included in Table 1¹⁴) and as was experienced in Banda Aceh's coastal region after the 2004 tsunami event. In order to appreciate the types of design parameters engineers and architects may use to buttress historic buildings against a hazard, I will present Eurocode Section 8. It is specifically designed to be a tool for builders who must build in an earthquake hazard environment.

¹³ Wehrli, 2010.

¹⁴ Ibid.

For the site manager or owner of an historic structure, building, site, or monument, Eurocode Section 8 (addressing design standards relating to earthquake) offers basic guidelines to ensure resistance to seismic action.¹⁵ The conceptual design ought to consider these principles: 1) structural simplicity, 2) uniformity, symmetry, and redundancy, 3) bi-directional resistance and stiffness, 4) torsional resistance and stiffness, 5) diaphragmatic behavior at story level, and 6) adequate foundation. For existing historic structures, implementing these principles will involve, first, an investigation into the as-built engineering of the structure. Even post disaster, there is value in getting the help of a structural engineer who is familiar with material strength engineering and the forces which act on a structure during a hazard event. In point of fact, this initial investigation, as discussed by Spenneman and Look,

may lead to stabilization and repair or it may lead to demolition if the owner is unable or unwilling to pay for the needed work. There are few historic buildings that cannot be stabilized, repaired, retrofitted and reconstructed as witnessed by other cultures around the world.¹⁶

The Eurocode also addresses various materials¹⁷ (masonry, concrete, steel, aluminum) employed in construction, so its guidelines would also be useful for an historic structure in need of buttressing and shoring up.¹⁸ For example, bi-directional

¹⁵ Eurocode, C. E. N. Eurocode 8: Design of structures for earthquake resistance—Part 1: General rules, seismic actions and rules for buildings (EN 1998-1: 2004). *European Committee for Normalization, Brussels*. http://web.ist.utl.pt/guilherme.f.silva/EC/EC8%20-%20Design%20of%20structures%20for%20earthquake%20resistance/64-1998-1_e_stf.pdf. Accessed April 20, 2016.

¹⁶ Spennemann, D. H., & Look, D. W. From Conflict to dialogue, from dialogue to cooperation, from cooperation to preservation. (2004). *Disaster Management Programs for Historic Sites*, 175-188. <http://csusap.csu.edu.au/~dspennem/PDF-Articles/SFO-25-Final.pdf>. Accessed April 20, 2016.

¹⁷ Eurocode, 2004.

¹⁸ Ibid.

bracing in a wood frame structure could be accomplished using additional beams (compressed wood and glue elements, or wood elements) sistered at engineer-specified locations within the structural framework.

The lessons learned and applied in areas hit by repeated hazard events (such as earthquake-prone Japan) can manifest into something like the multi-hazard / multi-risk approach to hazard events and disasters, as shown in the Hyogo Framework for Action 2005-2015,¹⁹ which has since been updated to the Sendai Framework for Disaster Risk Reduction: 2015-2030.²⁰ The Hyogo and Sendai Framework are the direct result of the international community coming together to create DRM policies which may be standardized for dissemination across much of the world. These frameworks can be a sort of “book of knowledge” for disaster risk management in both developing and developed countries. The frameworks are strong in terms of dealing with disasters related to coastal and earthquake prone areas, but the principles are general enough to apply to most hazards and most geographical regions.

As illustrated with examples and principles presented above from the Hyogo Framework, the Eurocode, the European Economic Area (EEA) guidelines (which is mentioned only as an authority for European builders), and academic sources such as Taboroff, the prepare/respond/recover model is sufficiently diagrammed and supported with sound research. As will be discussed in the next section, this knowledge can help

¹⁹ United Nations International Strategy for Disaster Reduction (UNISDR). Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disaster. (2005). <http://www.preventionweb.net/publications/view/1037>. Accessed April 18, 2016.

²⁰ United Nations International Strategy for Disaster Reduction (UNISDR). Sendai Framework for Disaster Risk Reduction 2015-2030. (2015). <http://www.preventionweb.net/files/43291sendaiframeworkfordrren.pdf>. Accessed April 18, 2016.

an historic property owner or a facility manager initiate a process of planning and thinking about how to ensure their property is less at risk and more resilient to natural disasters.

Integrating Mitigation Activities at the National, Regional, and Local Levels

Agencies and non-profit organizations involved in the preservation and management of cultural resources in the face of disaster have long shared wisdom amongst each other and across borders. While there is not total agreement on best practices there are a loose set of essential elements which ought to be included in preparing a property for risk reduction. In the *preparedness* aspect, an organization must anticipate the risks present in their region and, specifically, at their site. In terms of *response*, what can be done to keep the effects of a hazard to a minimum? And lastly, how shall the organization propose to rebuild and *recover* from the hazard event? Other such elements can include knowing what the organization has as its resource, knowing how to handle risks within each category of resource (wood, paper, textiles, ceramics, roofs, cement walls, post-in-ground structures, etc), and response and recovery in terms of the artifacts, and structures, and staff performance adjustments based on lessons learned.

Inventories, GIS, Documentation, and Advice

Maintaining inventories of historic structural, landscape, and archaeological sites, creating and inventory of objects and artifacts, and establishing an emergency response and advice service provide the backbone of any approach to risk reduction. With regard to inventories, two advances in the industry have recently become available. The first is

a definition of core standards. A good example of implementing this definition are archaeological and historic sites under the care and direction of the Council of Europe. The Council has streamlined the recording of information: think least common denominator in heritage site information.²¹ Secondly, inventories may now quickly and for reasonable cost be completed using a Geographic Information System (GIS). In using GIS, staff assign a site's resource a location expressed as coordinates on an electronic mapping system. With spatially linked data in GIS, tracking and monitoring historic sites becomes much easier. This method of data capture requires technicians familiar with the software, but the outputs will allow the gathering, reconfiguration, and specialization/optimization of data useful in hazard preparedness, mitigation, training, recovery efforts, and planning/landscape design.²² For example, maps created using GIS information can show planning commissions/building code drafters where historical flood and storm data suggests there are unreasonable risks²³ in citing certain land use categories (schools, hospitals, homes) and where those risks might be tolerable for other land uses (ball fields, sports courts, parking lots, green space, vegetative barrier along coast susceptible to large waves).²⁴ Turning to the U.S. for an applicable example, a flood episode in the Chesapeake and Ohio Canal National Park sparked a creative response from the park officials, an interagency task force, and mapping professionals in which flood patterns and impacts over time, flood peak data, monitoring

²¹ Taboroff, 75.

²² UNISDR, 2015. and Tanaka, N. Vegetation bioshields for tsunami mitigation: review of effectiveness, limitations, construction, and sustainable management. (2009). Pp. 5(1), 71-79. *Landscape and Ecological Engineering*.

²³ Barredo, J. I. "No upward trend in normalized windstorm losses in Europe." (2010). *Natural Hazards Earth Systems Science*, 10, 97-104. <http://www.nat-hazards-earth-syst-sci.net/10/97/2010/nhess-10-97-2010.pdf> Accessed April 18, 2016.

²⁴ Tanaka, 71-72.

flood damage, and directing aid to those areas most vulnerable were all indispensable outputs of GIS.²⁵ These benefits were only realized and available through the use of an electronic mapping database--GIS. Another electronic database system, Object ID, can assist in the tracking and quantification of movable cultural objects.

Aside from not knowing where a site is located, not knowing where an object is located (a curator's nightmare) can be especially troublesome after a disaster event. Vulnerabilities exist for the curating professionals in the sense of security degradation after a disaster--e.g.: doors not locking or walls and premises' perimeters become compromised due to power failure after a disaster. Creating an inventory of artifacts and collections in an easily retrievable format or database will make that inventory an invaluable tool during the recovery and rebuilding period after a disaster. In fact, international donors and world renowned museum and crime fighting authorities have put their heart and soul into developing an international standard of documentation for objects and artifacts. Named "Object ID," this program²⁶ is for movable heritage, those objects which are at risk in hazard situations primarily because they are mobile and can disappear easily unless protected. "Spearheaded by the Getty Information Institute, Object ID is the result of...key groups' [consultation]...in the art trade," both in illicit/theft activities and in legal transactions. Auctioneers, customs officials, international agencies, and museums all specified the content categories, means of identifying "distinguishing features," and that the system be tailored to staff needs.²⁷ Keep in mind

²⁵ Tabaroff, 76.

²⁶ Ibid.

²⁷ Ibid.

the local professionals' input is usually the authoritative voice in most cases. When choosing a software application for artifact control, the end-user's preferences should be given top priority.

As to the choices made when the local manager is at a loss for what may need to be done in disaster response and recovery, English Heritage has set up an Emergency Works and Advice Scheme. It is meant to help owners and site managers deal with unusual and unpredictable circumstances in battling a disaster affecting a monument or historic structure. The work suggested will be the bare minimum to protect the property, using cost effective measures and deployable regional experts to assist the home site manager/owner.²⁸ Beyond advice, in the U.S., FEMA pays for shoring up, stabilization and perimeter fencing of damaged structures.²⁹ However, after a set period of time, often just month(s) after a disaster, federal funds to assist owners (at least for demolition) expire. Additionally, federal funds are not available to cover repairs to privately owned (whether residential, commercial or industrial) structures.³⁰ This presents a dichotomy for many historic structure owners who may want to keep a structure,³¹ but who through pressure from local emergency management/municipal officials, or from neighbors concerned about risks from a damaged historic structure, are forced to face the reality that the decision to save or destroy their property may be out of

²⁸ Ibid.

²⁹ Craigo, Steade. 'A helping hand', in *Disaster Management Programs for Historic Sites*, eds Dirk H. R. Spennemann & David W. Look. San Francisco and Albany: Association for Preservation Technology (Western Chapter) and The Johnstone Centre, Charles Sturt University. (1998). Pp. 17-24. https://archive.org/stream/disastermanageme00spen/disastermanageme00spen_djvu.tx. Accessed April 20, 2016.

³⁰ Ibid.

³¹ Ibid, 17.

their hands. Furthermore, the states in which a disaster event occurs have the authority, as long as the U.S. President, or tribal government, or state governor have declared a state of emergency, to suspend regulations such as Section 106 in a disaster recovery situation.³² In the utter chaos of the recovery from the Loma Prieta Earthquake (see Figure 3, notice the wrecking machine in lower left of photo), for example, for the first



FIGURE 3: A Case of Retribution. The Oddfellows' Fraternal Hall, Watsonville, CA, was damaged during the 1989 Loma Prieta earthquake, the falling parapet masonry killing a pedestrian. Although repairable, the building was quickly demolished a few days after the disaster. The tower had been, indeed, a wood frame construction with metal covering and did not fail during the earthquake event. (Photo: Steade Craigo 1989). (Spenneman and Look, 1998:178).

time ever, an entire historic district was removed from the National Register for Historic Places due to the number of demolished contributing historic structures (17 of 36). This decision was hastily made and is a blot on both DRM and historic preservation practice.

³² Ibid, 18.

The question which may never be answered is “how many of those demolished structures could have been saved?” if enough time had been given to inspect the buildings. Indeed, had there been a proper DRM plan in place which included a thorough structural engineer’s review and offered repair guidelines, the structures may have been saved. And, “what if the decision could have been made by a team of stakeholders who, appreciative for the safety and wellbeing of local inhabitants, decided to implement the advice the structural engineers and historical architects, that is, keep the structure?” How much pressure would the local elected and appointed officials be willing to bear as concerned neighbors, parents and worriers descend on their offices demanding demolition? Reconciling the concerns of cultural resource professionals with the perceived threat vs. the hazard reality dichotomy among the public at large will prove crucial in solidifying local buy-in for the recovery process and the acceptance of those cultural resource professionals implementing response and recovery.

Local Community and Site Level Risk Assessment Overview

Another important aspect of DRM plans is risk assessment. Specific hazard events will inform how a site manager/owner may interpret the risks potentially affecting their site. For example, looking specifically at data (see Table 2) for storms, floods, earthquakes, and extreme temperature, Wehrli, et al. report that losses to physical assets (environment and what are termed insured losses, which may include residences, structures holding industry or business activities, capital investments, private property) are most costly due to high probability/high cost events--e.g. storms, flooding, extreme temperature.³³ Another potential hazard that is low probability but high

³³ Wehrli, 8-9.

TABLE 2: Appended version of “Overview of the Major Hazard events in Europe, 1998-2009.” (Wehrli, et. al., 2010:9)

Hazard type	Recorded events	Number of fatalities	Overall losses (EUR billion)
Storm	155	729	44.338
Extreme temperature	101	77551	9.962
Forest fires	35	191	6.917
Drought	8	0	4.940
Flood	213	1126	52.173
Snow avalanche	8	130	0.742
Landslide	9	212	0.551
Earthquake	46	18864	29.205

cost is earthquake phenomena. Site managers/owners use this classification model data (such as the catastrophe data table presented earlier, Figure 2), locally present dangers, and similar data to effectively plan their strategy for mitigation. Training staff about likely risks brought about by locally prevalent natural hazards will maximize the return on the site’s hazard training investment.

The site’s heritage type (monuments, house museum, historic figure’s birthplace home, site of an important historic event, landscape heritage/memorials) can also influence how disaster principles ought to be presented to site staff. For example, a staff working primarily at a house museum will need training tailored to structural integrity issues (roof repair techniques, securing structure elements against wind shear, etc); whereas staff at a museum with archaeological artifacts would best be served by training which focuses on the best practices for mobilizing, securing, and treating

artifacts affected by disaster events (similar to the work done at the Maryland Archaeological Conservation Laboratory).

Regional weather patterns can also help determine a more accurate risk scenario for a chosen site. For example, if the building is located adjacent to a coast or near a mountainous region, the storm and earthquake trend data can best speak to the hazard risk and probability levels.

Another hazard event that effects heritage sites with large numbers of visitors is hot weather. This is important due to safety and economic concerns and to keep visitors safe from extreme temperatures. The extreme temperature mortality risk increase of 1-4% for every 1 degree C of temperature³⁴ must be considered with a diverse group of visitors (especially the very aged and very young) at heritage sites. Older historical cities with a significant number of youth and senior citizens must monitor closely the condition and upkeep of their historic buildings' climate controls. In older buildings air conditioning systems may fail more often due to the design parameters and equipment standards which may have been less robust when originally installed.

Finally, poor infrastructure and lack of a consistent, focused local historic preservation ethos can create chaos during a disaster event. Even routine maintenance must not be neglected. The proper monies to support the staff/contractors who perform routine maintenance work and for acquiring materials must be planned, Taboroff warns.³⁵ For example, the impact of slowly leaking water pipes in several historic

³⁴ Ibid, 10.

³⁵ Taboroff, 78.

buildings in the historic district of Tbilisi was magnified due to a sudden storm and flooding event which overwhelmed the already weakened foundation walls (due to ground water saturation from poor rainwater/roof runoff water system and supply water pipes' leaking components) leading to their collapse. Had the systems been monitored correctly and maintained, the hazard presented by the storm and flood event would not likely have been as detrimental.

Disaster Risk Reduction Principles and Actions For Cultural Heritage Sites

As a heritage site manager begins the work of disaster risk reduction, the first step would be to develop a set of broad principles around which the organization will develop its actions. The next step is to implement feasible actions the organization will undertake in line with the principles it considers crucial for cultural resource survival.

In setting out a strong set of disaster risk reduction principles, Taboroff integrates hazard environment realities within a solid heritage perspective³⁶:

1. "Disaster planning for a cultural heritage site should be conceived for the whole site including its buildings, structures and contents, and landscapes.
2. This planning should integrate relevant heritage considerations within a site's overall disaster preparedness and mitigation strategy.
3. Preparedness requirements should be met in heritage sites by means that will have least negative impact on heritage values.
4. Documentation of heritage sites, their significant attributes and any history of disaster response is the basis for appropriate disaster planning.
5. Maintenance programs for historic sites should take into account a cultural heritage at risk perspective.
6. Property occupants and users should be directly involved in the development of emergency response plans.

³⁶ Ibid, 75.

7. During emergencies, securing heritage features should be a high priority.
8. Following a disaster, every effort should be made to ensure the retention and repair of structures of features that have suffered damage or loss.
9. Conservation principles should be integrated where appropriate in all phases of disaster planning and mitigation.”

Taboroff also advises that the site must be considered as a whole, not just in individual segments. Addressing the structure-level issues independent of what’s nearby could hide overlapping issues between structures. Also, in order to avoid redoing prevention efforts it is best to thinking broadly in order to find DRM strategies which will protect multiple classes of artifacts and multiple type of buildings. Documentation and implementing approved mitigation methods for heritage resources will ensure successful, longterm preservation. When the staff perform maintenance, always use the opportunity to make the structure/artifact more disaster resilient. In terms of what makes for a successful integration of operations into DRM, owners should consider how disaster prevention and planning can be overlain the already existing operations and maintenance at their facilities. For example, do not neglect personnel, security, and conservation principles in addressing the cycle of risk reduction: preparedness, response, and recovery.³⁷

In order to create a workable matrix for assessing DRM at individual sites and agencies, I devised a table of common aspects of DRM that could be distilled into a single document. Figure 4 provides 17 aspects by which to measure an agency’s/site’s

³⁷ Taboroff, 75.

effectiveness in three distinct portions (preparedness, response, and recovery). The case study chapters (2, 3, & 4) include a larger table along with a scoring methodology.

Interpreting the matrix presented in Figure 4 (“Main Components of Hazard Mitigation Plans & Disaster Risk Reduction Plans”) is as follows: Along the left side margin is the entity whose DRM program or site I have evaluated based on the criteria (of which there are seventeen) located in columns across the table. The red color tab indicates that site’s survey response or website information does not account for that aspect of DRM. A green tab indicate that site does account for that aspect. To allow better reading of details within the Figure 4 matrix, I have included callouts (Figure 5) for each of the three main areas, preparedness, response, and recovery.

Nation / Agency State	Main Components of Hazard Mitigation Plans / Disaster Risk Reduction Plans																
	Organize resources			Preparedness		Assess risks		Response		Implement plan		Recovery		Monitor progress			
	Assess community support	Assign personnel	Engage public	Hazard identification	ID preventative approaches	ID historic assets	ID critical infrastructure	Assign responsibility	ID & prioritize actions	Document planning process	Mitigation Assistance \$\$	Allocate resources	Interagency coordination	Sensitive/ regulatory info	Site restoration	Evaluate & update plan & inventory	Perform drills
USA FEMA																	
JAPAN States: MD																	
MN																	
FL																	
SC																	
IL																	
LA																	

FIGURE 4: Main Components of Hazard Mitigation Plans/Disaster Risk Reduction Plans.

(Source: Author, 2016)

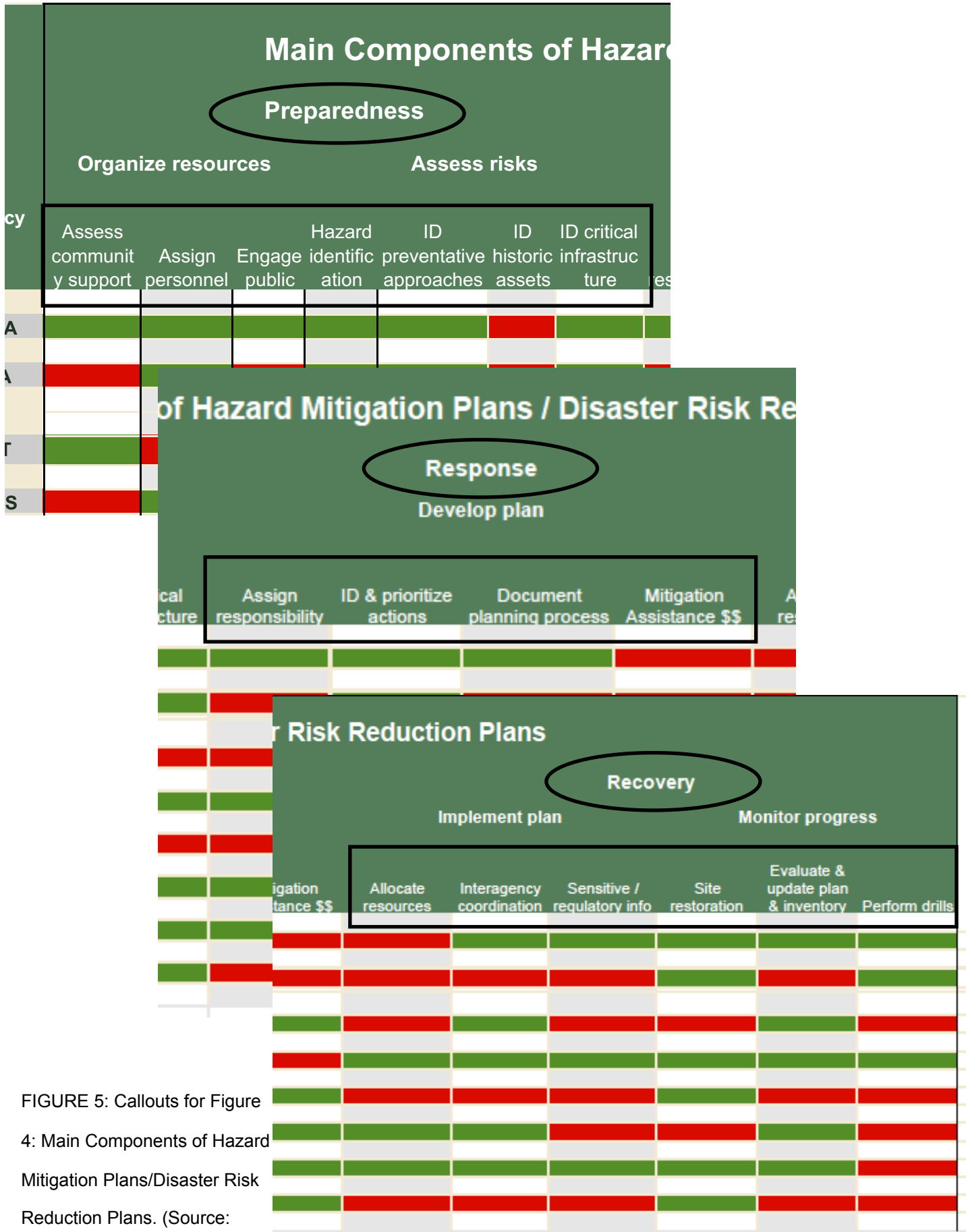


FIGURE 5: Callouts for Figure 4: Main Components of Hazard Mitigation Plans/Disaster Risk Reduction Plans. (Source: Author, 2016)

Advanced planning and preparation is one of the keys to successful heritage site protection. There will be some compromise about what a cultural resource professional might think is best, and some compromise about what a disaster risk management professional may think is best, but working together will create dialogue which will lead

TABLE 3: Key Summary Lessons from Review of International Agencies and Sites (Johnnides. 2001:2)

Key lessons learned from international experience

- The key to effective protection of cultural heritage at risk is advanced planning and preparation.
- Advanced planning for cultural heritage properties should be conceived in terms of the whole property and provide integrated concern for buildings, structures, and associated contents and landscape.
- Advanced planning for the protection of cultural heritage against disasters should integrate relevant heritage considerations within the overall disaster prevention strategy for the property. For instance, a sprinkler system may be unwelcome by conservation experts but may be essential in saving entire collections.
- Preparedness requirements should be met in heritage buildings by means that have the least impact on heritage values. An example is applying waterproof coatings to the foundation of a building to decrease humidity levels instead of using a dehumidifier.
- Heritage properties, their significant attributes, and the disaster response history of the property should be clearly documented as a basis for appropriate disaster planning, response, and recovery. For example, risk mapping was used successfully in Italy.
- Maintenance programs for historic properties should integrate a cultural heritage-at-risk perspective.
- Property occupants and users should be directly involved in the development of emergency response plans.
- Security of heritage should be a high priority during emergencies.
- Following a disaster, every effort should be made to ensure the retention and repair of structures or features that have suffered damage or loss. In other words, conservation specialists should be integrated into all phases of risk management, including recovery.
- Conservation principles should also be integrated where appropriate in all phases of disaster planning, response, and recovery. If collections become waterlogged, air drying is preferable to adding heat since the latter may cause brittleness and exacerbate damage.

to proper decision making mechanisms. Johnnides offers a summary of key lessons learned from disaster risk management experiences (Table 3).³⁸

Conclusions and Recommendations

What is clear from the review of the disaster risk management cycle presented above (Preparedness, Response, and Recovery) and from considering various DRM agencies and some specific site examples, is that disaster risk management is a local issue. Each site must integrate their responses to the specific realities present at their location. In a given area, the cultural resource professional and facility management professionals can probably quite readily recall the disaster response history of a property. As Johnnides reiterates,³⁹ this should be well documented and, if done well, can be the backbone for that property's new disaster planning response and recovery model / plan. A graphical way of presenting the history of a local area's experience with a hazard event is with risk mapping. With risk mapping, much of the disaster event, its location, extent, and duration of the event, can be digitally presented using GIS.

As disaster data management has become more mainstream and is more readily available to municipalities and agencies responsible for mitigation efforts, projections of risk areas and the scope of hazard events have helped to improve elements of prevention planning and in evacuation procedures (applied to areas affected by

³⁸ Johnnides, Christianna. *Disaster preparedness for cultural heritage*. East Asia and the Pacific (EAP) Disaster Risk Management (DRM) knowledge notes working paper series ; no. 14. Washington, DC: World Bank. (2010). <http://documents.worldbank.org/curated/en/2010/12/13337564/disaster-preparedness-cultural-heritage>. Accessed April, 12, 2016.

³⁹ Ibid.

floods).⁴⁰ This ability to plot at risk locales (where life and property are at an elevated risk) should highlight the impetus of having a database which encompasses and analyzes local data from hazard events. Whereas city planning regulations (such as “noxious fumes laws”) have been effective in mitigating the death/losses resulting from a local manmade disaster, so too land-use mechanisms can benefit populations and assets along coasts, low-plains regions, and river delta areas. For example, mapping a floodplain susceptible to recurrent flooding events is a good way to use historical hazard event data to inform where to place infrastructure and buildings. These laws and policies can place important activities and resources out of harm’s way. Their effect will prove valuable and ought to become a priority funding initiative for civil planners and engineers, and emergency response departments.⁴¹

Whether or not a site has historic structures or monuments, ensuring a site’s structures are prepared for hazard events improves the success of disaster risk reduction. Planning and preparation which reinforce historic structures’ likelihood to withstand the dynamic forces of an earthquake, wind loading from a storm,⁴² water inundation from storm water runoff or massive waves cannot be stressed enough. The benefits of thoughtful preparation is not only that direct economic damage will be reduced, but also the risk of losing irreplaceable heritage resources-which is often difficult to codify.

⁴⁰ Wehrli, 11.

⁴¹ Ibid.

⁴² Ibid, 36.

Another similar post-disaster recommendation comes from Christianna Johnnides, who explains that “heritage can play a catalytic role when it comes to the economic recovery after a major disaster.”⁴³ Visitors to cultural resource sites with rich heritage resources will be attentive to the local community’s response and recovery after a disaster. The appropriate planning and right circumstances with recovery will lead to the community rebuilding well and on an appropriate timeline. This story, then, can be advanced, promoted, highlighted, and accentuated in order to inspire tourists to learn more by visiting. Even if much is lost at a site, what remains is worthy of stewardship, and can elicit important support.

In the next chapters, I will examine specific case studies which employ various elements of the disaster risk management scheme discussed in this chapter. In Chapter 2, I present the Minnesota Historical Society as an example of how a state or large regional agency may implement DRM into their cultural resource management policy. In Chapter 3, I discuss the Koreshan State Historic Site, located in Florida. This survey includes recommendations given by 1000 Friends of Florida, a nonprofit whose goal is to assist historic properties manage their sites, especially in DRM. Chapter 4 discusses the results of considering four sites within Louisiana as an example of how a state agency develops DRM within differing types of sites (state capitol district, museums, and smaller historic person related sites). In Chapter 5, I will summarize the findings of my evaluations of the state and local sites, and offer recommendations for improving specific aspects of the DRM practices of each site.

⁴³ Johnnides, 5.

Chapter 2: Site Investigation: Koreshan State Historic Site

INTRODUCTION

Within the state of Florida, private and public entities must prepare their buildings and sites for a variety of disasters. As the coastal region of Florida is no stranger to intense, adverse weather conditions, first responders, the local emergency preparedness authorities, and those responsible for keeping facilities operational know very well they must give careful consideration to how their sites will handle an hazard event. Tornados, wind gusts, hurricanes, thunderstorms, coastal/tidewater flooding, storm surge, fire, pest infestation, and mold create a long list of hazards for which property managers must prepare. The specific concerns at Florida sites depend on priorities of the organization, the specific geographic setting of the site, the types of resources present, the history of threats and magnitude suffered, and how the organization approaches routine maintenance. Given this backdrop, the Florida State Parks (FSP) organization, which manages 189 park areas, trails, and sites with 21 million visitors, is faced with tremendous disaster management challenges.

With responsibility to “provide resource-based recreation while preserving, interpreting, and restoring natural and cultural resources,”⁴⁴ the FSP faces many challenges in Koreshan State Historic Site (Park), not the least of which is disaster

⁴⁴ Department of Environmental Protection (DEP, Florida). About the Florida Park Service: Mission Statement & Vision. (2012). <http://www.dep.state.fl.us/parks/aboutus.htm>. Accessed May 7, 2016. And Florida State Parks (FSP). Koreshan State Historic Site website. (2016). <https://www.floridastateparks.org/park-history/Koreshan>. Accessed April 22, 2016. <https://www.floridastateparks.org/park-activities/Koreshan#Historic-Site>. and <https://www.floridastateparks.org/photos/Koreshan?page=2>. Accessed May 7, 2016.

planning and mitigation. The Koreshan Park, an environmental and cultural resource site in the Gulf coast area between Fort Meyers and Naples, is presented here as an example of disaster and hazard mitigation in a coastal/river delta area. The Estero River runs adjacent to the park, before entering the Gulf of Mexico, about a mile away. The Koreshan site staff have taken the knowledge, funding, perception of threats, and geography/climate present at their site and formatted a course of action to address risk elements within their day-to-day operations.

Celebrated for its historic structures, landscape design, and unique fauna, thousands of visitors explore the Koreshan Park's historic core, leisurely paddle canoes, or stroll among the site's gardens. Unlike the vast majority of FSP outdoor recreation and activity-related sites, FSP must approach the Koreshan site with additional expertise and diligence because it holds significant historical and cultural value. In fact, eleven Koreshan sect buildings, dating from 1882-1920, are listed on the National Register for Historic Places.⁴⁵

The Florida State Park's duties involve maintaining structures, landscape maintenance and improvements. FSP staff also provide a period specific interpretation of the sect's commerce and industry activities, living arrangements, and cultural artifacts (including art, textbooks, posters, teaching aids like lessons with activities, and instructional objects like maps and globes). Another duty is rehabilitating structures to meet storm preparedness standards, such as when a structure is due for a new roof

⁴⁵ Florida State Parks, 2016.

installation. At that time, Park staff take the opportunity to incorporate preventative measures such as hurricane-force wind ties and strapping attached to the framing members of the structure (Figure 6).

This chapter illustrates how historic property with site attributes and circumstances (climate, weather, and pests) typical to many Florida Park Service sites, has dealt with those risks and challenges within its local context. I review how the site's planning and prevention mechanisms align with those guidelines set out at the state level; illustrate the awareness, preparedness, and training the staff have and receive; and consider the thoroughness of the DRM plan for the Koreshan site.

BACKGROUND

The Park was the locus of activity for a religious sect known as the Koreshan Unity from the end of the nineteenth into the twentieth century. This group believed the earth held the entire universe, and they lived a communal lifestyle not uncommon among turn-of-the-century utopian groups in America. To this day, the College of Life Foundation exists to continue the group's legacy of utopian living on earth. The site holds numerous structures and features dating from the period of the sect's founding, including residence halls, a founder's house, storage sheds, and gardens. In 1961, the sect gave the site (Figure 7) to the state of Florida for its preservation in perpetuity, at which point the site became part of the state park system.

FIGURE 6: Tie down straps securing roof rafters & joists. (Source: 1000 Friends, 2008)



Hurricane straps

The state of Florida's Department of Environmental Protection has ownership of and operational responsibilities for the grounds and structures at the Koreshan Site, as well as hosting thousands of visitors each year. The site is maintained and preserved at a high professional level of environmental awareness as numerous species of flora and fauna exist here, and a main mission of the historic site staff is to return present day landscape conditions (this is mainly addressing the current presence of invasive plant species not present during Koreshan activity) to those which existed during the sect's occupation of the site.

The Koreshan story is presented on the Florida State Park's website:

Dr. Cyrus R. Teed's utopian community of 200 followers relocated from New York to Florida in 1894. Dr. Teed took the name 'Koresh,' the Hebrew translation for Cyrus, meaning shepherd. The colonists believed that the entire universe existed within a giant, hollow sphere. They conducted experiments that seemed to confirm their beliefs. The Koreshans built and operated a printing facility, boat works, cement works, sawmill, bakery, store

and hostelry. Education, science and art also helped shape their community. After the death of Dr. Teed in 1908 at the age of 69, membership of his religious group began to decline. In 1961, the four remaining members

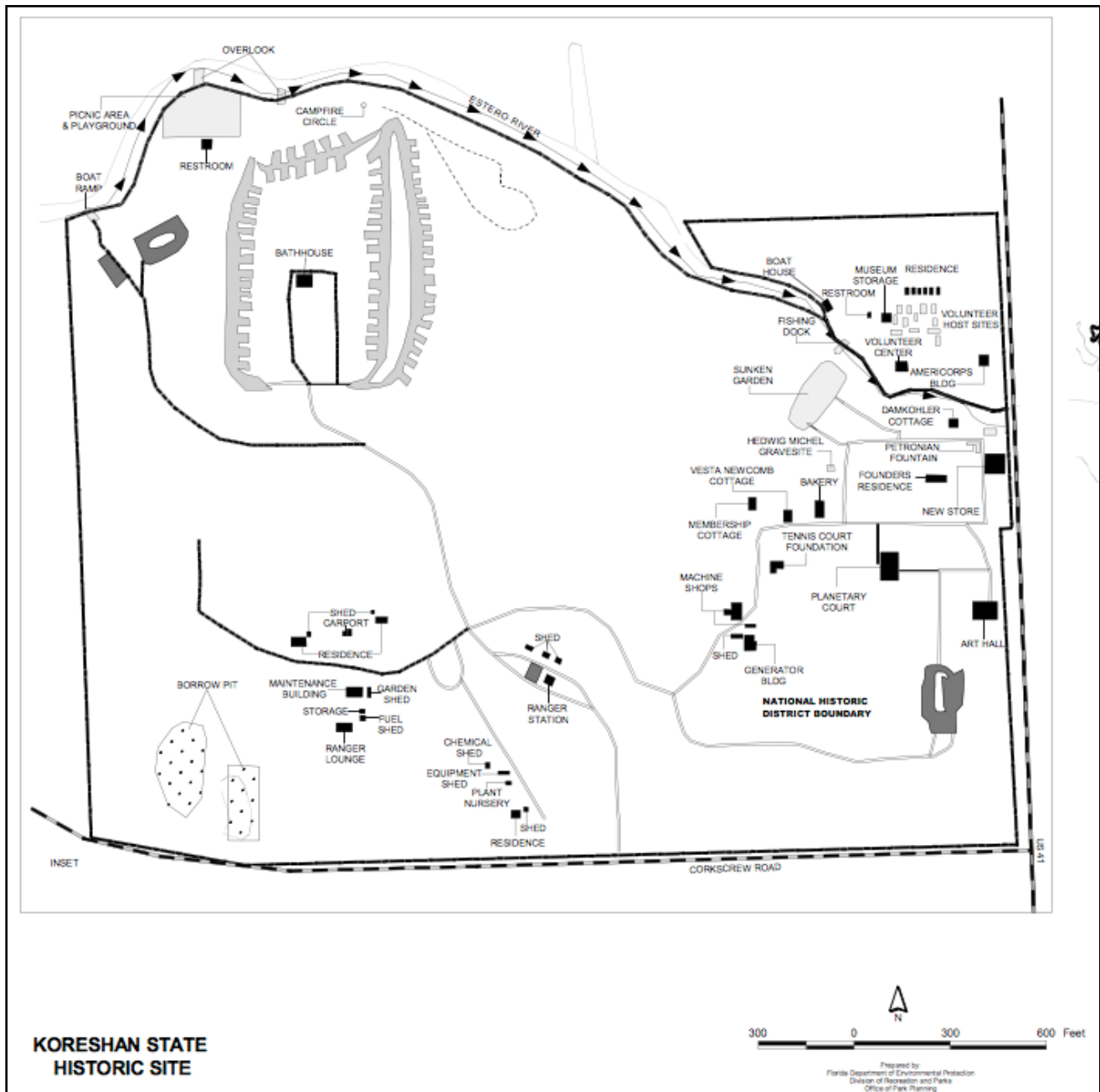


FIGURE 7. Koreshan State Historic Site plan. Notice how well the site balances the core functions of visitor accommodation in the northwest corner of site, staff space needs in the southwestern portion of the site, as well as the historic core set apart on the eastern edge of the site. (Source: Florida DEP)

deeded 305 acres of their land to the state of Florida as a park and memorial. The Koreshan Unity Settlement Historic District is on the National Register of Historic Places [nominated in 2009, when College of Life officials donated items of historic significance to the Park Service].⁴⁶

HERITAGE PROTECTION & SIGNIFICANCE

Known for its botanical and cultural richness, the Park is a site with multiple hazard risks due to its location in southern Florida. Located just north of the Everglades and Cypress parks, the Park is subjected to water and wind events, inundation events, insect concerns, and land animal intrusions. Park officials must also plan for the effects of thousands of visitors each year on the historical buildings--e.g. vandalism, some theft, wear and tear on floor surfaces and walls. Florida State Park's staff are always on site, with the park manager, park assistant manager, and the museum curator living on the property. The staff requires the assistance of local law enforcement officials to both monitor the cultural resources as well as providing vehicular and pedestrian patrols on a regular basis. An FPS review found that improved access must be provided in order to provide security for cultural resources and accessibility for staff and contractors conducting repair and removal activities (of buildings, and of artifacts and tree debris, respectively) in the response and recovery of a disaster event.⁴⁷ Table 4 provides a summary of major disaster plan components which the Koreshan site officials indicated are in place.⁴⁸

⁴⁶ Ibid.

⁴⁷ DEP, 42.

⁴⁸ Tetlow, Andrew. Multiple dates in April and May, 2016. Personal communication and survey questionnaire.

TABLE 4: Summary of Hazard Mitigation Functions for the State of Florida’s Koreshan State Historic Site Disaster Risk Management Plan.⁴⁹

1. Assign Personnel / Engaging Consultants and Experts	2. Staff Perform Drills / Culture Resource Training	3. ID Historic Assets / Prevention Approach	4. ID Critical Component Gaps / Hazard Threats	5. Evaluate Plan / Post-Event Lessons Review
<p>Staff & volunteers</p> <p>No experts on retainer; must establish MOU with local consultants</p>	<p>Staff and volunteers get onsite cultural training from curator; advanced topics training from FPS, DEP*</p> <p>Lists park ranger training in conservation</p>	<p>Thirteen (13) historic structures; need historic structure report for each</p>	<p>Flooding, insects, wind/forced rain</p>	<p>Need policy to capture lessons learned and to implement into plan</p>
6. Assign Staffs / Outfitting for Priority Actions	7. Mitigation Funding / Ensure Operational Continuity	8. Objects Curated	9. Physical Assets	10. Documenting Plan Process
<p>Does not list decision tree, but staff will know of risks</p>	<p>Need duplicate records at offsite location; must ensure post event site access (fallen trees)</p>	<p>Domestic articles, photos, archival documents, personal effects, artwork</p>	<p>More information needed to best prepare</p>	<p>Only planning done at Department of Emergency Services</p>

*FPS is the Florida Park Service and DEP is the (FL) Department of Environmental Protection.

The site’s building collection includes facilities for industrial and commercial enterprises, cultural activities and objects, and residential use. The sect built and

⁴⁹ Data sourced from interview records (questionnaire) and emails

operated a printing facility, sawmill, large and small machine shops, bakery, store, a boat works, and a cement works. Several of these are pole barn type, post-in-ground structures, and some are constructed slab on grade. Numerous tools used in agriculture, horticulture, printing and animal husbandry are presented and preserved in these buildings, as well as a steam engine.⁵⁰ In addition, the author found two period bridges (one in the Victorian style) present on the site. The fact that several buildings have survived over 100 plus years gives a strong indication of both the manner in which these buildings were constructed and how they have been maintained in the period since construction.

The Art Hall houses mostly artifacts and cultural and educational materials that remain from the Unity settlement. The residential structures (the DumKohler, Vesta Newcomb, and Membership Cottages, a hostelry, and the two-story homes (the regal Planetary Court, and Mr. Teed's Founder's House) complete the site's diverse historic structures. In the Founder's House, furniture and other accessories (draperies, board games, etc.) are featured in the publicly accessible first floor.⁵¹

The Park's museum curates some 6,000 objects that are related to the Koreshan pioneer group. These objects vary in their provenience/origination dating from 1840 to 1960. Objects include those used for domestic activities, kitchen wares, clothing, works of art and education, records for archival storage, photos, and include industrial works and farm implements.

⁵⁰ FSP, 2016.

⁵¹ Ibid.

To manage these records, documents/imagery, and large industry-related artifacts, along with the site's buildings and landscape, the park employs a regular staff of 12 employees. This staff includes the aforementioned senior staff (curator, manager and assistant manager) as well as eight park managers responsible for various aspects of operations within the park. In addition, there are two full-time specialists whose work includes researching and providing expertise in the interpretation and conservation of the site's history. During the prime season at the Koreshan site, volunteers (interpreting farm / industrial works and the historical religion narrative) number over five dozen. To supplement the site's research mission, two consultants (working as needed) provide consultations and expert perspectives on whatever subject needs attention.

RESPONSIBLE PARTIES

The park has an overarching structure of responsible persons who provide oversight in the case of an emergency or hazard event. Should such an event occur with regard to the structures and the cultural artifacts (as well as those at related sites) it is immediately brought to the attention of the museum curator and park manager, who live on site. These officials then implement the disaster management plan which is based on guidance from the Department of Interior. The site's disaster management plan was first adopted in 1995, is reviewed every 5 years, and modified as necessary.

Andrew Tetlow, Koreshan site curator with the Florida Park Service (FPS), who the author interviewed for this investigation, mentioned that if a hazard event becomes

so dire as to need more funding or experts/staff to assist during the event, the District 4 Bureau Chief and Assistant Bureau Chief within the FPS are authorized to provide additional relief monies or personnel. As of the time of the interview, no hazard event has required alterations to the plan as written.

As part of the disaster mitigation plan and overall preparedness strategy, the park deploys an education and training program which not only reinforces principles established within the Department of Interior mitigation framework, it also offers a curator-managed, basic historic preservation training program. This effort ensures that all volunteers and regular staff members receive training in disaster preparedness and mitigation industry standards as applied at the Park. Curator Tetlow said the Florida Department of Environment Protection, under which the Park is administered, and the FPS both offer more advanced historic preservation technique and response advice on a rotating basis. It was unclear who those visiting FPS training experts were, or their credentials, as this data was not discussed during the survey/interview process. Additionally, FPS sites with resources and situations which would specifically benefit from more advanced coursework are singled out and their senior staff (managers and specialists) are so trained.

When asked about outside assistance, whether federal or state funds, additional expertise, conservationists, or object restorers, and donations being part of the toolbox for the park to plan for disaster, Mr. Tetlow replied by saying,

Funds from the State of Florida (designated emergency funds if necessary) are provided if the situation arises. An independent 501c3 non-profit organization that works with the park called the Friends of Koreshan State Historic Site* also would provide emergency funds if needed. An expert in

building restoration/preservation is also kept on retainer by the park and would be consulted as well.⁵²

*On a related note, an internal 2013 DEP financial audit recommended remedial training for Friends members and Park staff using bank card and checks regarding proper support documentation for expenditures (Friends, 2013, p. 5).

In addition to the funding from the FPS, the Friends of Koreshan State Historic Site nonprofit annually hosts (per the Park Manager's approval) events such as a Ghost Walk, an RV Show, an Engine show, and an Art Fair. Receipts from fundraising activities in 2012 totaled over \$29,000.⁵³ These funds would ostensibly be available for capital improvements and maintenance and repairs due to the Friends group focus on the vitality of the park.

SPECIFIC PHYSICAL HAZARD MITIGATION MEASURES

Hazard preparedness action plans have been implemented at the park but there is need to improve them in order to provide sufficient protection. Systems utilizing plywood storm shutters have been installed for only three historic structures on site.⁵⁴ Other buildings either presently do not have shutters during a storm or receive plywood sheathings over the openings held in place with wood screws (see Figure 6 for illustration). The park needs a consistent approach for enclosing window and door openings across the whole property in order to provide adequate hurricane protection.

⁵² Tetlow.

⁵³ Friends of Koreshan State Historic Site, Inc. (Citizen Support Organization). Division of Recreation and Parks [Audit] Report: A-1213DEP-039. (August 13, 2013). Pp.8 https://www.dep.state.fl.us/ig/files/reports/a_1213DEP_039%20.pdf. Accessed April 22, 2016.

⁵⁴ DEP, 41.

As part of long-term disaster planning initiatives, two park structures have received tie-down bracing (Figure 8) during roof restoration projects. Past hazard events (high winds, in this case) have been powerful enough to shift buildings off their foundations. Suggested action items from the DEP audit include a complete reporting/documentation of all structures utilizing the National Park Service’s “historic structure reports” format.⁵⁵ With this information park staff will be able to better implement and document building/structure repairs and recovery efforts after a disaster.

A Park Protection Plan for Koreshan, which is to be reviewed and improved annually, includes preparation procedures before a disaster strikes. The current protection plan suggests that the first things to consider for preparations are: evacuation of park collections, photos, and guidelines which direct the order of recovery efforts (what to do, and, who to call, first). In response to the Protection Plan, park staff have prepared supplies which are used to stabilize artifacts/property and have stored these items so they are not damaged in a storm.

CONCLUSIONS AND RECOMMENDATIONS

The Koreshan Park’s operational and maintenance monies appear to be sufficient for sustaining current commitments in regard to protecting historic structures. The manner in which the facilities were built (some over 100 years ago) speak to the surprising longevity they have enjoyed. This aspect will be an important asset going forward, even if the funding for new or replacement roofing materials and foundation improvements does not materialize in the short term. However, because Park staff concurrently provide interpretive, hosting, educational, and maintenance works

⁵⁵ Ibid, 42.

FIGURE 8: Storm Preparation Measures in Florida. Clockwise from top left: Koreshan windows' protection added (plywood held with screws). Top plates being secured to wall plates and pillars. Temporary wind abatements added to protect foyer doors and windows. (1000 Friends, 2008:8).



24/7/365, they are not afforded much freedom to seek funding from outside organizations. In this regard there must be a serious effort put toward developing a thorough, building by building hazard mitigation and risk reduction plan. Knowing what the site has as assets is the first stage. From artifact and object identification (and photographing and labeling) to investigating each structure so as to complete a historic structure report, to informing the insurance carrier of each asset now more fully catalogued. Identifying, knowing the specific disaster risks facing the Park, and the frequency with which those risks occur is critical. Even if the risk is human activity

(hundreds of daily park guests and visitors or vagrants, as in the increased police patrols mentioned earlier) and not based on the environment or climate conditions, Park staff must plan preparedness, mitigation, and contingency strategies in order to best sustain daily operations and to protect the historic core (buildings and artifacts) and the landscaping / gardens, as each is a revenue stream for the Park.

One item which should receive immediate attention is facilitating *quick access* (via vehicle or watercraft, clearing debris, and securing power for the site) for emergency personnel and recovery specialists during post-disaster response and recovery. Many of the site's objects and cultural resources will need immediate attention in the aftermath of a disaster, as some items can be damaged in a matter of hours. Water often does irreversible damage to some artifacts/records. Perhaps a collection list of prioritized artifacts would assist the staff in allocating time and effort to those more important items.⁵⁶

Additionally, more effort is needed to ensure the staff and volunteers, and other stakeholders who may be called upon to help in a disaster or hazard event have all the right tools and sufficient knowledge and training to swiftly implement the correct actions. Next, in order to provide better access to larger emergency vehicles, the park will need to implement administrative and financial reforms in order to more solidly manage its dedicated funds.

⁵⁶ Ibid.

Additional reforms are needed to find more resources (both personnel and financial) to accomplish the long term capital improvements to which the Park staff aspire. Indeed, those goals will engender greater public involvement and buy-in as they visit the grounds more often and participate in activities which center around the historic core of the site, the locus for “interpreting and preserving...cultural resources” mentioned in the mission statement of FPS.

Drawing on the DRM comparison matrix presented in Chapter One, and through interviews and document research, I assessed the site’s DRM program. Florida’s Koreshan site scores an overall 30 out of 51 points (see Table 6). Each aspect of the matrix is given a value of 1 if poor, 2 if good, and 3 if excellent. In regard to Koreshan’s staff *preparedness*, they score 15 out of 21. For *response*, they score an 8 out of 12. And, for the *recovery* aspect, they score an 8 out of 18. The site clearly needs to focus on the latter two, response and recovery.

TABLE 5: Ranking the Koreshan State Historic Site’s preparedness, response and recovery aspects of their DRM planning. (1 is poor, 2 is good, 3 is excellent)

	Component Preparedness Mitigation Response and Recovery	Koreshan State Historic Site
	Assess community support	1
	Assign personnel	1
	Engage public	3
	Hazard identification	3
	Identify preventative approaches	2
	Identify historic assets	3
	Identify critical infrastructure	1
	Staff tasking orders	1
	Identify & prioritize actions	3
	Document planning process	2
	Mitigation assistance access	2
	Allocate resources	1
	Interagency coordination	1
	Sensitive regulatory information	1
	Site restoration	3
	Evaluate, update plan & inventory	1
	Perform drills	1

Therefore, specific areas for the attention of Koreshan staff members are:

- Select a point person who will be tasked with greater outreach measures to assess and harness community support (which will lead to increased affinity, attendance, and donations)
- Assign DRM roles within the staff including decision tree diagrams for DRM response to an emergency event, as well as reinforce *training* as per those roles
- Conduct building-by-building assessment surveys (Historic Structure Report [HSR] used by historic preservation professionals) for each of the 13 historic structures
- Assess a facilities DRM preparedness survey, including *critical needs* (power, running water, HVAC, security, first responder's access) during and after a disaster event
- Conduct a review of partnerships with, and commitments of, local EMS, local historic preservation agencies and nonprofits, Florida's State Historic Preservation Officer, 1000 Friends of Florida, Florida Emergency Services, and Florida Department of Environmental Protection in regard to DRM recommendations presented in this paper
- Update Koreshan's DRM plan, inventory of artifacts, and perform quarterly drills to better prepare staff

Chapter 3: Agency Investigation: Minnesota Historical Society

INTRODUCTION

The discussion in this chapter focuses on the preparations and deliberations of a state historic society in terms of disaster recovery and response. The Minnesota Historical Society (MNHS) hazard mitigation model demonstrates thought leadership and good modeling of how a disaster preparedness scheme may be organized. MNHS manages a huge inventory of resources including thirty-one historical sites, including a battlefield and a camp (28 buildings on 103 acres), Native American sites and interpretive facilities (15 buildings and 671 acres), historical figures' homes (25 buildings on 28 acres), natural and environmental resource sites (29 buildings and 171 acres), historical industry and agricultural sites (29 buildings and 294 acres), and the MN state Capitol Building⁵⁷. Of particular interest is an early European American settlement (Figure 9) which, in 1820, became a camp for U.S. soldiers and, today, is within a half mile of a U.S. Army Reserve Station and the Minneapolis-St. Paul International Airport. Dozens of miles of recreational trails along old railroad lines are another notable cultural resource which MNHS owns and operates. Among these sites are several that present the lives of and curate donated private domestic items of aviator Charles Lindbergh (who spent most of his early summers near the Twin Cities) and the Mayo family (founders of the globally acclaimed health care research institution and hospitals, the Mayo Clinic). In order to sustain and protect these and the other sites, MNHS has

⁵⁷ Novodvorsky, Aaron. Responses to personal email correspondence and survey interview. Various dates in March and April 2016.

incorporated modern best practices into its disaster risk management (DRM) planning (preparedness, response, and recovery).

The task of mitigating risk, assigning duties to responsible employees, managing collection inventories, and facilitating the recovery from an adverse event all require forethought and planning which is quite evident at MNHS. Their plan demonstrates prioritization of “first tasks first” and assigns them to appropriate personnel and/or experts. Hierarchical organization is evident in the manner in which the responsibilities of team members are defined. Within the plan, staff, supervisors, volunteers, and even first responders/emergency services professionals will find clear guidance on how to deal with structures, artifacts, and objects owned by MNHS.

This chapter examines a state-level agency’s approach to disaster risk management planning and response. After introducing the Minnesota Historical Society (MNHS), I describe its roots, organizational structure, and its historical preservation responsibilities. I then present the MNHS infrastructure and some of the challenges it must address in DRM for its properties and sites. Finally, I review the MNHS’ disaster risk reduction approaches and DRM methodologies.

BACKGROUND

Founded in 1849, the MNHS manages 31 properties, a camp (Coldwater, the first European American settlement in Minnesota), a river headwater, and rights of way along railroads within Minnesota. The organization owns or partly owns 15 properties with the State of Minnesota, and also operates sites that are solely owned by the State.

FIGURE 9: Map of Camp Coldwater (dated 1823), where US soldiers encamped in 1820, likely the earliest European American settlement in what is now Minnesota. (White & Lindberg, 2004.)



Sites under MNHS control vary from historic Army forts, an early American fur trading post, sites along waterways and lake shores, as well as an prehistoric location of petroglyphs and early Native American settlements and museums. In 2008, a legislative act was passed mandating state funding for the MNHS, which also receives monies from generous donors and members. The organization is a 501(c)(3) charitable entity; gifts to the organization are tax deductible.

Much of Minnesota's history is captured in the properties owned or operated by MNHS. Prehistoric settlements and early trade centers and routes along Minnesota

frontier waterways have as strong a case to make for important American heritage sites as do sites commemorating famous Minnesota citizens like Charles A. Lindbergh's (the first person to fly non-stop from New York to Paris) boyhood home in central Minnesota (Figure 10).



FIGURE 10: Charles A. Lindbergh, the first person to fly non-stop from New York to Paris, grew up on a farm in Minnesota. (Biography.com)

Early disaster preparedness considerations at the Minnesota Historical Society (MNHS) can be found within a network of guidelines and procedures, particularly the

document entitled, “Thinking About the Unthinkable: A Disaster Plan For Historic Properties in Minnesota.” This document was prepared under contract in 1999 for Minnesota’s SHPO by the small Taylor Falls, MN, architecture firm Claybaugh Preservation Architecture, Inc. These guidelines and parameters set out a general primer of what the MNHS expected of its staff. The document, as presented on the MNHS website, offers a basic outline useful in any conservation nonprofit or preservation organization.

As the case for more deliberate disaster preparedness got stronger and the call for significant action magnified, MNHS went deeper in its analysis and recommendations for its staff in a 2007 internal document, later publicly disseminated, called “Emergency Preparedness and Recovery Plan for the Minnesota Historical Society” (plan). In this document the MNHS addresses numerous concerns, questions, and processes not fully considered in the recommendations by Claybaugh’s firm. This comprehensive document of “steps and procedures to be used in response to an emergency at any of the facilities of the Minnesota Historical Society”⁵⁸ provides greater assistance to MNHS staff and volunteers to reduce loss in the event of a disaster. The Facilities and Risk Management Division of MNHS is currently updating the plan to reflect local, state, and national disaster plan revisions as well as incorporate institutional management changes.⁵⁹

⁵⁸ Minnesota Historical Society (MNHS). Emergency and Preparedness and Recovery Plan for the Minnesota Historical Society. (April, 2007). Pp.82 <http://www.mnhs.org/preserve/conservation/reports/emergencyplan.pdf>. Accessed March 3, 2016.

⁵⁹ Novodvorsky.

SIGNIFICANCE & HERITAGE PROTECTION

For the sites it owns and maintains, the MNHS oversees all aspects of the operations, from groundskeeping, to building maintenance, capital improvements, repairs, and custodial requirements. When a partner organization, such as the Minnesota State Capitol or various house museums, maintains the controlling authority over the property, the MNHS sustains the long-term maintenance, repairs, collections and exhibits maintenance and repair of that site within its Historic Properties Department. MNHS Facilities Manager of Historic Properties, Aaron Novodvorsky, indicated that a variety of site operation schemes exist within the statewide network of 31 historic properties. The primary example is one where the MNHS is the sole (or joint) owner and operator of a site and has various contractual, state employees, and volunteers performing the daily operations work. However, this model presents challenges regarding continuity of personnel and management systems. Perhaps that is what led the administrators to create a thorough site/artifact management scheme. Part of that scheme is captured in Table 6 which was compiled from interviews with MNHS staff, their responses to questionnaires, email communication, and from the MNHS website and news articles.

Table 6: Summary of Hazard Mitigation Functions for the Minnesota State Historical Society's (MSHS) Disaster Risk Management Plan.⁶⁰

1. Assign Personnel / Engaging Consultants and Experts	2. Staff Perform Drills / Culture Resource Training	3. ID Historic Assets / Prevention Approach	4. ID Critical Component Gaps / Hazard Threats	5. Evaluate Plan / Post-Event Lessons Review
<p>Protocols in place for training staff in disaster education; additional training as staff's job responsibility requires it.</p> <p>Retains experts on as needed basis</p>	<p>Includes such information as which staff member is lead recovery for a specific artifact class (and how staffs help the leader) to listing who shall be the staff member to address media inquiries</p>	<p>Assets ID'd (147 buildings, on over 1200 acres), but need more site specific structural information</p> <p>Power failure & weather event responses in place</p>	<p>Must show more site specific detailed information</p> <p>Comprehensive listing of various threats to artifacts and site assets & buildings (and how to prepare)</p>	<p>After action review or after event review must be mandatory, and must be shared up the management chain</p>
6. Assign Staffs / Outfitting for Priority Actions	7. Mitigation Funding / Ensure Operational Continuity	8. Objects Curated	9. Physical Assets	10. Documenting Plan Process
<p>Facility manager and their staff oversee all needs; consists of assigning staff to monitor local water table level (for flood risk)</p> <p>Have plans for preparing for & evacuating artifacts and assets</p>	<p>Need more information about state agency funding</p> <p>Plan indicates chain of command, decision trees, staff's responsibilities</p>	<p>Textiles, photos, metal, artwork, wood, documents, bone, ceramic, glass; maintain ability to store all types of object</p>	<p>With nearly 150 buildings, MNHS did not list the items in DRM plan, only quantities. Having a site specific hazard plan is needed.</p>	<p>Need to update as per their own timeline, to accommodate new items & buildings added to assets</p>

⁶⁰ Data sourced from interview records (questionnaire) and emails

Across the entire organization there are four main categories of artifacts/material culture held within the MNHS museum facilities:

1. Paintings, prints, etchings, books, paper documents
2. Photographs, microfilms, motion picture films, and magnetic media
3. Fabric, clothing, and leather
4. Wood, metal, bone, stone, glass, ceramic objects

To address the various dimensions of handling this diverse collection of artifacts, not to mention the additional great responsibility of historical landscapes and buildings (within historical districts, or otherwise), MNHS has a fairly well organized approach to its disaster risk reduction. For example, the DRM plan is very thorough in terms of experts within and outside the organization whose knowledge regarding certain categories of artifacts, display items, and other physical property might be needed.⁶¹ Questions such as: Who should address media inquiries? Which staff have full discretion to make emergency purchasing decisions? and How to deal with disasters involving archaeological collections are all highlighted.⁶² Finally, the plan illustrates the appropriate actions and manners in which artifacts and facilities are to be restored/protected in a disaster. These directives mainly concern artifacts of various materials (paper, animal hide, microfilm, disks, tapes, photos, textiles, wood, and organics).⁶³ Due to the 2007 DRM plan being revised and abridged (this is stated on the plan's title page)

⁶¹ MNHS, 6-8, 22-24.

⁶² Ibid, 20-21, 25-28.

⁶³ Ibid, 28-50.

for outside distribution, I could not find enough case by case detail about specific disaster risk reduction pertaining to its 140-plus buildings.

RESPONSIBLE PARTIES

In the event of an emergency, the primary contact person varies based on the type of emergency. For a weather or power failure closure of a historic site/grounds in which there was no damage to structures, buildings, or collections, the Site Manager works directly with the MNHS Marketing and Communications Department to restore operations. There is a strong emphasis on contacting the appropriate specialists/departments in order to mitigate effect on daily operations, i.e. the show must go on. In cases where a natural or manmade disaster with damage occurs, the Site Manager must call the individuals within the emergency preparedness and recovery plan, in this order: 1) Program and Operations Manager, 2) Facilities Manager, 3) Director of Historic Sites and Museums, and 4) Deputy Director of Programs and Interpretation.⁶⁴ With each hazard event the contact tree is rooted in the program/interpretation operations and in communications with the public. The functionality (could be termed the “business continuity”) of preserving the operations which ultimately are serving the visitor is paramount in disaster mitigation at Minnesota historic sites.

The Facilities Manager of Historic Properties oversees the mid- and long-term maintenance and repairs of 144 buildings, basically all the MNHS buildings except the Capitol complex and a warehouse. The day-to-day maintenance, groundskeeping, and

⁶⁴ Novodvorsky.

custodial work is performed by site maintenance technicians and other site or partnership staff. Also, there are six other major structures (overlooks, staircases, and shelters) along with hundreds of trail graphic signposts which need maintaining along miles of bike paths winding through Minnesota.

Should a facility manager receive a notification of a problem, their responsibilities are to: 1) Establish that there is not threat to public and personnel safety, then, 2) secure the affected area, and then, 3) alert the assessment director. The assessment director organizes and manages the determination of damage. This step is likely performed by a staff member who holds and manages collections. Once the assessment director has received the facility manager and assessment team leader findings as to the nature of the event, they will evaluate the findings and call the recovery director with recommendations for the recovery effort. The assessment team leader's main role is to select the appropriate members and set the course of team action. The team leader will manage and monitor those persons chosen for assessing the damage, and will give the assessment director periodic progress reports. The assessment team must investigate where damage exists, discover the type of damage, and determine the importance of the affected material (see Table 7 and Table 8).

The team also estimates the amount of the affected material and recommends initial recovery priorities. Next, the recovery director will set priorities for organization recovery and recovery team formation. This person will be responsible for expending funds/awarding contracts for outside experts, must coordinate with the

Table 7: Example of MNHS checklist for assessment of property damage.(MNHS)

Historic Property Damage Assessment Checklist Minnesota Historical Society		Assessor	Date	Page 1
General Information	Property Name Address Owner Primary Use			
			Telephone Secondary Use	
Historic Significance	N. R. Listed <input type="checkbox"/> N. R. Eligible <input type="checkbox"/> CLG Listed <input type="checkbox"/> Other <input type="checkbox"/> Inventory No.	Sketch	Photo	
Building Data	Basement <input type="checkbox"/>			
			No. of Stories	
	Foundation			
	Exterior Wall Structure		Covering	
	Roof Structure		Covering	
	Floor Structure		Covering	
	Building Date		Floor Area	
Damage Data	Damage Cause Wind <input type="checkbox"/> Flood <input type="checkbox"/> Fire <input type="checkbox"/> Snow/Ice <input type="checkbox"/>			
	Description			
	Damage Date			
	Hazards		Yes	No
			Comment	
	Collapse		<input type="checkbox"/>	<input type="checkbox"/>
	Off Foundation		<input type="checkbox"/>	<input type="checkbox"/>
	Noticeable Lean		<input type="checkbox"/>	<input type="checkbox"/>
	Severe Racking		<input type="checkbox"/>	<input type="checkbox"/>
	Chimney/Falling Hazard		<input type="checkbox"/>	<input type="checkbox"/>
	Ground Shift		<input type="checkbox"/>	<input type="checkbox"/>
	Utilities Down		<input type="checkbox"/>	<input type="checkbox"/>
	Other		<input type="checkbox"/>	<input type="checkbox"/>

DMN-3A.CDR

Table 8: Example of MNHS checklist for property damage prevention. (MNHS)

**Historic Property Damage Prevention Checklist
Minnesota Historical Society**

Assessor _____

Date _____

Page 1

General Information	Property Name		
	Address		
	Owner	Telephone	
	Primary Use	Secondary Use	
Historic Significance	N. R. Listed <input type="checkbox"/>	Sketch	Photo
	N. R. Eligible <input type="checkbox"/>		
	CLG Listed <input type="checkbox"/>		
	Other <input type="checkbox"/>		
	Inventory No.		
Building Data	Basement <input type="checkbox"/>	No. of Stories	
	Foundation		
	Exterior Wall Structure	Covering	
	Roof Structure	Covering	
	Floor Structure	Covering	
	Building Date	Floor Area	
	Wind Checklist	Feature	Existing Conditions
Roof/Wall Connection			
Floor/Wall Connection			
Floor/Fdn Connection			
Porch Connections			
Tower/Dormer Connection			
Garage Doors			
Other Openings			

facility manager, the marketing and communications head, and MNHS administration in order to determine: a) whether or not the site will remain open to visitors, b) assigning staff for recovery tasks, and c) determining and arranging the space needed for the recovery effort; for example, temporary storage space for damaged materials/resources.⁶⁵ On the recovery team there are leaders (who typically are the specific staff assigned to manage the artifact types affected), staff who are assigned documentation and communication duties, and conservators who may be tasked to perform many duties within the team structure, given their familiarity with the artifacts in question.

Novodvorsky mentions that MNHS does not rely on any outside sources for the organization's initial responses to a disaster event. Those initial actions, investigations, and mitigation/recovery will be performed by in-house staff. Only when those steps are completed and a decision has been made to involve outside advisors will other institutions be called. At the same time, the state insurance and fine arts insurance agents will be notified of a hazard event's occurrence, along with the MN state disaster planning department and FEMA (if needed). There is a strong sense of triage and internal management structure within the MNHS's preparedness plan. Novodvorsky also said, that even with the extensive planning and training for facility managers and staff, there can be leeway and a fair amount of flexibility as long as the first call has gone back to the "staff at the MN History Center (administration) to trigger and activate a response team, based on the need."⁶⁶ In other words, as the staff assess the risks

⁶⁵ MNHS, 4.

⁶⁶ Novodvorsky.

and disaster response actions proposed, they are given sufficient authority to complete the recovery in-house if they determine that is all that is needed.

The types of disaster training and preparedness for personnel at MNHS is as varied as its personnel's areas of expertise; for example, the facilities people are trained in hazardous substances, while the collections personnel have advanced facilities disaster training. There have, surprisingly, been conservation staff, who, through their preparation and expertise, have consulted and assisted on natural disaster operations at museums affected by hurricanes in the southeast and Gulf states. MNHS relies on the American Association of Museums educational material and resources to train, and educate, and to accredit its staff.⁶⁷

SPECIFIC PHYSICAL HAZARD MITIGATION MEASURES

The specific scope of the MNHS Emergency Preparedness Plan (plan) is to minimize or eliminate damage to the collections after the primary concern of ensuring personal safety. This plan has a sister plan, the evacuation plan, which applies to many MNHS sites as well. Hazard events addressed in this plan are:

- accidental damage
- biological (such as mold)
- fire
- power / HVAC failure
- vandalism

⁶⁷ Ibid.

- flooding water
- damage to collections
- major outbreaks of insects or rodents
- fire damage due to heat, water, or smoke
- loss of electricity/temperature controls
- defacement of materials and theft
- leaking roofs & pipes
- inclement weather

Even though some may be a rare, all of these events must be considered in terms of preparing and mitigating a risk event. In addition, other similar risks to physical assets and buildings must be planned for and handled sufficiently to secure the property within the MNHS.⁶⁸

CONCLUSIONS

Drawing on the DRM comparison matrix presented in Chapter One, and through interviews and document research, I assessed the MNHS's DRM plan. The Minnesota Historical Society scores an overall 40 out of 51 points (see Table 9). Each aspect of the matrix is given a value of 1 if poor, 2 if good, and 3 if excellent. In regard to MNHS' *preparedness*, they score 18 out of 21. For *response*, like the Koreshan site, they score an 8 out of 12. And, for the *recovery* aspect, they score an 14 out of 18.

⁶⁸ MNHS, 2.

The areas which the MNHS must improve upon quickly are their ability to assess community support and in their finding access to mitigation assistance, both at the state and national levels. Within the responses to my questions I did not sense MNHS had a really solid awareness of the mechanisms and funding assistance available to them to address DRM.

TABLE 9: Ranking the Minnesota Historic Society’s preparedness, response, and recovery aspects of their DRM planning. (1 is poor, 2 is good, 3 is excellent)

	Component	MNHS
	Preparedness Mitigation Response and Recovery	
	Assess community support	1
	Assign personnel	2
	Engage public	3
	Hazard identification	3
	Identify preventative approaches	3
	Identify historic assets	3
	Identify critical infrastructure	3
	Staff tasking orders	2
	Identify & prioritize actions	3
	Document planning process	2
	Mitigation assistance access	1
	Allocate resources	2
	Interagency coordination	3
	Sensitive regulatory information	2
	Site restoration	3
	Evaluate, update plan & inventory	2
	Perform drills	2

Scoring better, but with room for improvement, is the feedback the organization needs to capture. After a disaster has struck and the recovery team has completed its work, the MNHS administrative process requires a post mortem review of the proceedings in order to “evaluate and update the plan” (see Table 9). The review may be quite brief, or it may be extensive, depending on the severity of the event and type of recovery project; the main point here is that it must be completed.

Based on the relatively comprehensive approach of the MNHS plan, it is useful to highlight several basic but critical items for historic preservation professionals in hazard event management:

- detailed job descriptions/roles of those positions which are responsible to lead the response in a risk or disaster event
- a solid relationship with other cultural resource managers, facility managers, SHPO/THPO and preservation colleagues to call upon
- Claybaugh’s report provides useful checklists and maps
- store records at least 6 inches off ground; label vital and historical records, and create list and locator map to aid in immediate retrieval; keep duplicates of locator maps, inventories, and disaster plans, policies, and staff/contractor/conservator contact information offsite.⁶⁹

⁶⁹ Minnesota Historical Society. Preserve Records (State Archives Department). (November, 2003). p.1-3. http://www.mnhs.org/preserve/records/docs_pdfs/disaster_000.pdf. Accessed April 3, 2016.

- establishing security routines; regular building, roofs, and drains inspections; install, monitor, and maintain smoke alarms, water detectors, fire alarms, fire extinguishers, and evacuation routes/shelters--and map their locations.

RECOMMENDATIONS

One serious flaw in the MNHS plan, is that the table of contents lists the a subheading “Site Specific Information” after the Appendices. Yet, in the body of the report there is absolutely no information given. There is an indication that the report will include discussions for site-specific information; yet, in final publication, the last draft of the plan does not list any sites nor those sites’ disaster specific preparations. Omitting site-specific information may be simply to protect the organization’s security interests at those specific sites. The last major aspect of the report does provide no less than twelve pages of names and contact information for “Team Leaders and back-ups.” While this information indicates the thoroughly prepared authority scheme in regard to collections, facilities, and emergency response in general, the management should be mindful of keeping the contact information up-to-date. According to the date the plan was created, the contact information is already ten years old. Perhaps the document would be further strengthened with current names and site specific information for all 31 MNHS owned or MNHS operated facilities and sites.

Lastly, my survey of MNHS showed two areas needing attention in regard to the DRM matrix presented in Chapter 1: the MNHS needs to do a better job of assessing the community support for the historic preservation work it is doing in regard to DRM;

and, the MNHS staff would be well served to dedicate some individual(s) to discovering more Federal and state mitigation assistance, both in terms of expertise and financial assistance which may help MNHS.

Chapter 4: Site Specific Investigation: Four State-Administered Louisiana Sites

INTRODUCTION

Louisiana provides a valuable example for considering the protection and preservation of historic sites and objects. With a predominantly warm, moist climate and close proximity to both the Mississippi River and the Gulf of Mexico, Louisiana builders and building owners alike must address multiple threats to building integrity and longevity and to cultural objects in general. In order to better understand how historic property managers and artifact repositories are preserving valuable assets at risk due to riverine and coastal threats within the state of Louisiana, I examine four sites' plans and approaches to mitigation efforts at those sites. These sites include museum campuses and state legislative and administrative complexes as well as domestic properties.

The state government facilities located in what is called the Capitol Park Complex in Baton Rouge will be considered due to its wide array of building types under a myriad of threats; it is also the Louisiana seat of government. The Louisiana Museums organization handles multiple sites within many areas where experience has shown personnel how to prepare for the worst. The Audubon site just outside of Baton Rouge, provides a local level case study in which issues such as operational funds and personnel availability present a unique challenge to hazard mitigation. Finally, the Longfellow-Evangeline site, listed on the National Register of Historic Places, offers a

perspective from a local organization well aware of risk management. Within this diverse group of case studies are examples of various levels of preparation, numbers of personnel assigned to emergency/disaster management agendas, and financial means by which to address the risks.

CAPITOL PARK COMPLEX

The city of Baton Rouge, located along the Mississippi River in south-central Louisiana, has a rich history including events related to the Civil War, hosts numerous cultural and tourism attractions, and has a strong University-oriented atmosphere with nearby Louisiana State University (LSU). The climate and elevation of the area, as well as the geographical contours of the surrounding Mississippi River floodplains create unique challenges for private and public entities when responding to hazards and the damages wrought by them. Heavy seasonal rainfall and hurricane activity and their incumbent flooding events can wreak havoc on local residences, commercial properties, and recreational facilities. However, Calvin Mayeux, Operations Division Manager within the State of Louisiana's Office of State Buildings, notes that the weather is not the only risk category with which facilities personnel at the Capitol Park Complex must contend. They must plan for everything from weather events to human activity such as bomb threats. Though the Capitol Park Complex (Complex) has no catch-all Disaster Risk Management Plan in place, there are mechanisms and personnel in place to respond to hazardous/emergency events.⁷⁰

⁷⁰ Interview/questionnaire responses from Operations Division Manager Calvin Mayeux, State of LA, Office of State Buildings, Division of Administration.

The Complex is located on a loosely defined campus on about 250 acres in the heart of Baton Rouge, Louisiana.⁷¹ The property plays host to the State Capitol building, the Capitol's Welcome Center, the State Capitol Park (grounds, gardens, and walking paths), the Pentagon Barracks and Museum, the Capitol Park Welcome Center, the State Library of Louisiana, and various other state government office buildings. To the

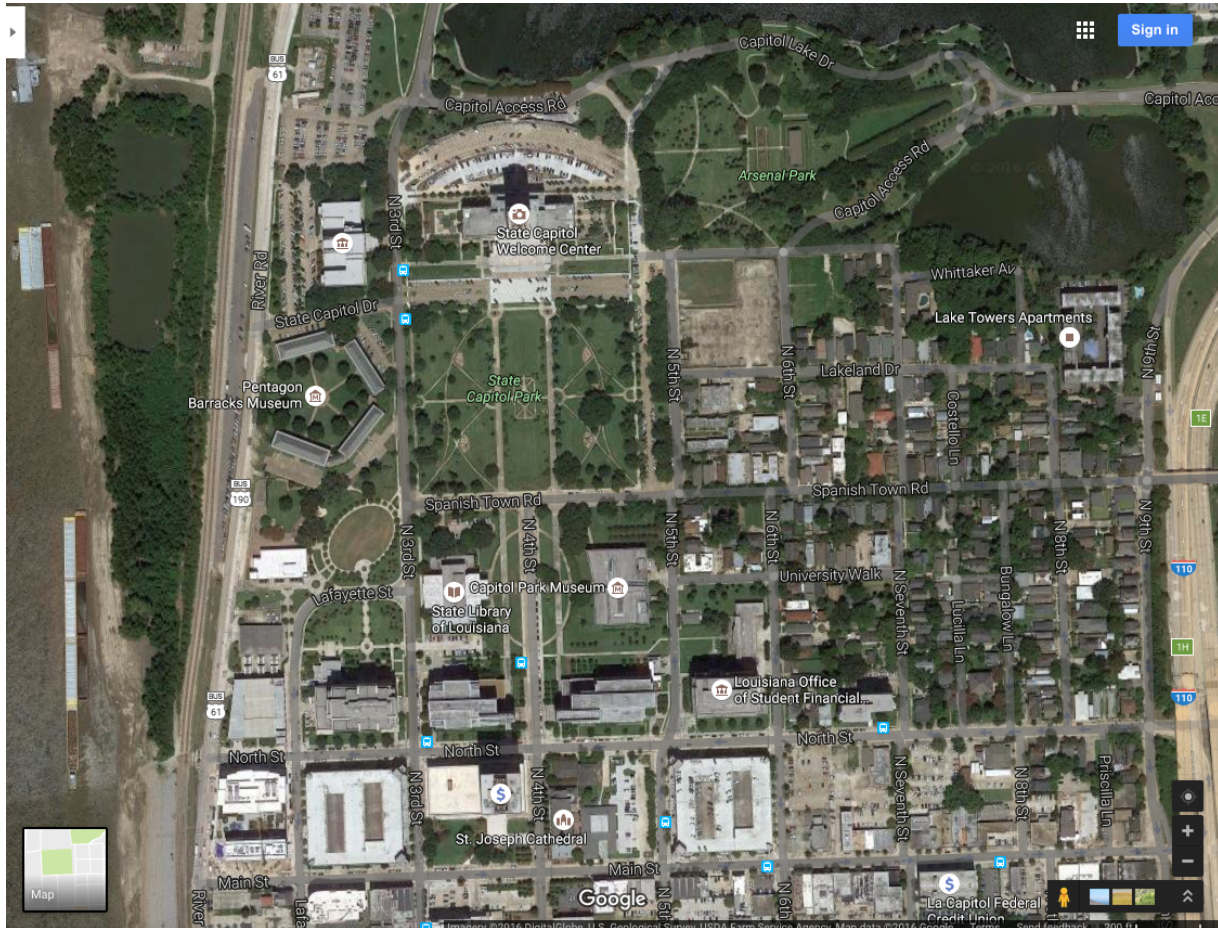


FIGURE 11: A Google.com Map Showing the Capitol Park Complex and Surrounding Vicinity.⁷²

⁷¹ Capitol Park Interpretive Plan, State Capitol Complex, Baton Rouge, LA. Capitol Park Interpretive Plan. September 15, 1999. Eskew+ Post Architects. http://downtownbatonrouge.org/wp-content/uploads/2014/12/Capitol-Park-Interpretive-Plan_lowres.pdf. Accessed October 22, 2016.

⁷² Google.com. Capitol Park, Baton Rouge, LA. <https://www.google.com/maps/dir/30.4530601,-91.1828505/Capitol+Park+Museum,+660+N+4th+St,+Baton+Rouge,+LA+70802/@30.452993,-91.1838349,432m/data=!3m1!1e3!4m8!4m7!1m0!1m5!1m1!1s0x8626a0c20be06001:0x2078ed4fb1f605fe!2m2!1d-91.1863908!2d30.453891>. Accessed October 22, 2016.

immediate west of the site, the Mississippi River serves as a natural boundary to the Complex (Figure 11). The river is a conduit for leisure water craft bound for the adjacent casino, for barges heading to nearby material handling depots, and for oil tankers docking at the massive ExxonMobil Baton Rouge Refinery and Chemical Company less than a mile upriver. On the site's southern boundary numerous restaurant, lodging, entertainment, and private and public office properties provide employees and visitors downtown lifestyle options. Toward the east of the Complex is a residential neighborhood offering a blend of single and multi-unit occupancy properties, sandwiched between Capitol Park and a large Interstate Spur (Number 110) within a 5 minute walk. Lastly, to the north of the Capitol grounds, a nearly 200-acre lake forms a backdrop for the Governor's Mansion and a sizable warehouse district, including railroad storage facilities.

Given the multiple sources of hazards and potential hazards within close proximity to the Capitol Park Complex, I anticipated greater attention to mitigating potential hazard events than what was highlighted in interviews with Complex personnel. The Complex has hazard mitigation effort assistance in the form of a Office of State Buildings safety position, the holder of which "will assist the [Complex staff] and be a primary liaison in emergency situations for those facilities under its jurisdiction."⁷³ In the circumstance in which large scale relief and recovery efforts are needed (as in the aftermath of a significant hurricane event), Mayeux mentioned, "the state of Louisiana

⁷³ Interview/questionnaire responses from Operations Division Manager Calvin Mayeux, State of LA, Office of State Buildings, Division of Administration.

will outsource for services beyond the norm” and what is beyond scope of the Complex’s safety officer.⁷⁴

With assistance and funds from the state government of Louisiana, various departments within the Office of State Buildings (Office) receive both financial and emergency-mitigation and response training. Safety topics covered in these seminars are designed to provide the audiences topics relevant for their job responsibilities. For example these seminars provide adequate training for park rangers in the topics of conservation and preservation. The Office as a whole is cognizant of the threats to the site, including even chemical leaks and terrorists’ activities, given the proximity to various industrial and governmental potential targets. Office employees are trained in how to employ various strategies and interventions in light of the threats to the Complex. Mayeux mentioned that all of the Office employees are taught ways to mitigate and address safety concerns. Statistically, the most present threats may be hurricanes and tornados. Repeated occurrences of tornados or an as yet “unexperienced event” have been the usual trigger forcing the Office personnel to update or modify their disaster mitigation plans.⁷⁵ Also, the Office uses a computerized maintenance tracking application which allows personnel to input completed minor repairs and other vulnerabilities needing attention into a database which may prioritize and highlight matters which need immediate remediation in the aftermath of a hazard event (Table 10).

⁷⁴ Interview/questionnaire responses from Operations Division Manager Calvin Mayeux, State of LA, Office of State Buildings, Division of Administration.

⁷⁵ Ibid.

TABLE 10: Summary of Hazard Mitigation Functions for the Capitol Park Complex's (Baton Rouge, LA) Disaster Risk Management Plan.⁷⁶

1. Assign Personnel / Engaging Consultants and Experts	2. Staff Perform Drills / Culture Resource Training	3. ID Historic Assets / Prevention Approach	4. ID Critical Component Gaps / Hazard Threats	5. Evaluate Plan / Post-Event Lessons Review
<p>Onsite 24/7/365 emergency duty-designated staff</p> <p>Retains experts</p>	<p>Staff and volunteers get emergency preparations training onsite from managers topics in safety</p> <p>Good training program for Park Rangers in preservation/conservation.</p>	<p>Lacks onsite artifact conservation capacity</p> <p>Need to contract with more artifact experts</p>	<p>State Museum and Office of State Lands well prepared</p> <p>Well cognizant of site's threats</p>	<p>Need more effort toward updating & implementing changes to disaster plan</p> <p>After action review process in place</p>
6. Assign Staffs / Outfitting for Priority Actions	7. Mitigation Funding / Ensure Operational Continuity	8. Objects Curated	9. Physical Assets	10. Documenting Plan Process
<p>Has responders with specific safety and disaster training and response duties.</p> <p>Need more attention to regular disaster plan updates.</p>	<p>Must secure an MOU or contract w/ expert/consultant & designate funds for retaining them;</p> <p>Some other agency coordination specifics; post-event reviews in place</p>	<p>Domestic articles, clothing, personal effects, archival docs, photos, artwork</p>	<p>Thirteen (13) historic structures; need duplicate records at an offsite storage location</p>	<p>Need more robust policy to capture lessons learned & integrate them into disaster management plan; lists a "work-performed" data management system in place (should be utilized in hazard mitigation plans)</p>

⁷⁶ Data sourced from interview records (questionnaire) and emails.

LOUISIANA STATE MUSEUM

The Louisiana State Museum (LSM) organization oversees the maintenance, operation, and collections within nine (9) facilities in New Orleans and across Louisiana. Five of these nine buildings are museums, the remaining four (with two additional auxiliary structures) are administrative or support facilities. The State of Louisiana owns all buildings within the LSM organization, and each museum has staff responsible for daily operations and maintenance. LSM Director of Curatorial Services, Dawn Hammatt, notes that the number of staff at each museum varies as does the availability of a dedicated onsite facility manager. Some sites only have maintenance staff available daily, and not all of these sites are remotely monitored.⁷⁷

The LSM is responsible for curating, storing, and interpreting numerous domestic articles and artifacts representing Louisiana's historical character. These items range from weapons, toys, to Mardi Gras costumes. As the LSM museums in New Orleans are located within the French Quarter floodplain, which has an average elevation of 1.5 feet above mean sea level, many of these artifacts remain in a hazardous location. No details were given in the interview about how these artifacts are to be protected, dried, stored, repaired, moved, or secured. The original 2006 disaster response plan (read: post-Hurricane Katrina) authors are no longer with the LSM organization.⁷⁸

⁷⁷ Interview/questionnaire notes with Dawn Hammatt, Director of Curatorial Services, Louisiana State Museum, New Orleans, LA.

⁷⁸ Ibid.

Disaster planning and expertise at LSM includes department-specific training, hurricane preparedness, an annual disaster plan review, and post-event meetings to determine effectiveness of and discuss improvement to LSM action plans. The hazard preparedness training opportunities within the LSM is department-specific and were not fully disclosed in the survey for this paper (Table 11). Director Hammatt mentioned the LSM police department receives training specific to its mission as does the curatorial department. The needs identified from within each department (e.g., police, curatorial, maintenance, operations, administration) dictates the topics presented during training, Hammatt pointed out. Though Hammatt notes that, “the museum staff is capable of handling many situations,” no clear distinction was made as to which department is specifically enabled or charged with creating, sustaining, and/or improving the LSM hazard response effort. Not having a specific facility manager or facility coordinator for each site who not only can *lead* a hazard mitigation effort, but who also is *responsible* for leading the mitigation and preparedness regime is perhaps a failing of the LSM’s overall response to disaster planning and hazard mitigation (Table 11). In addition, however, LSM has a solid team of on-call consultants and professional experts, including FEMA, local, and state agencies which may assist LSM respond to the hazard episodes which necessitate outside expertise.⁷⁹

⁷⁹ Interview/questionnaire notes with Dawn Hammatt, Director of Curatorial Services, Louisiana State Museum, New Orleans, LA.

TABLE 11: Summary of Hazard Mitigation Functions for the Louisiana State Museum’s (headquartered in New Orleans, LA) Disaster Risk Management Plan.⁸⁰

1. Assign Personnel / Engaging Consultants and Experts	2. Staff Perform Drills / Culture Resource Training	3. ID Historic Assets / Prevention Approach	4. ID Critical Component Gaps / Hazard Threats	5. Evaluate Plan / Post-Event Lessons Review
<p>Vague in-house assignments;</p> <p>Good that they partner with FEMA, local professional experts, and local agencies in consultation capability</p>	<p>Hazard mitigation training not specified, but staff and volunteers get training pertinent to their department; safety topics addressed from police department, and curators have different training</p>	<p>Have different types of curators specific to type of materials at the various sites.</p> <p>Sparse details about preventative measures in place</p>	<p>State of LA owns five museums, and land on which situated, in New Orleans French Qtr. (1.5 ft above sea level) floodplain</p>	<p>Post-event meetings to evaluate response as per action plan and to discuss improvements to plan</p>
6. Assign Staffs / Outfitting for Priority Actions	7. Mitigation Funding / Ensure Operational Continuity	8. Objects Curated	9. Physical Assets	10. Documenting Plan Process
<p>Lacks onsite facility manager & uninterrupted monitoring;</p> <p>In the case maintenance staff unable to respond to hazard, need backup mitigation plans</p>	<p>Well prepared with experts on call; hurricane section reviewed annually; includes other agency coordination (fed, state, local), but no listing of funding sources/assist.</p>	<p>Objects of all categories from weapons to toys to Mardi Gras costumes.</p>	<p>Nine (9) total collections’ storage structures; 2 auxiliary structures; Must ensure duplicate records at an offsite storage location</p>	<p>Meetings, discussions, and evaluations held after event; having facility mgr onsite everyday provides a strong institutional knowledge resource--but they also need to capture their knowledge in plans / documents</p>

⁸⁰ Data sourced from interview records (questionnaire) and emails.

AUDUBON STATE HISTORIC SITE

Located just a half hour drive from downtown Baton Rouge, the Audubon State Park is within sight of the Mississippi River, a main source for southern Louisiana's perennial flooding. Given the richness of the wetland flora and fauna adjacent to the River, it is no wonder John James Audubon paused here long enough in 1821 to draw several dozen of his now famous bird illustrations. Due to Audubon's work and fame and the natural splendor of the area, the Louisiana Office of State Parks has nominated the buildings and grounds located within the former Oakley Plantation (Audubon's hosts) for historic preservation protection. The current tourism offerings at the site include interpretation of the main house to the period of Audubon's stay, hosting teas (at which visitors are shown how to make their own butter), and walking the grounds from which Audubon derived his inspiration.⁸¹ This site's personnel have implemented a Mitigation Plan (plan) to handle disasters. In response to a hazard mitigation questionnaire, the Park Manager, John House stated that there has not been an incident which has triggered a revision or review of their original 2009 plan. Additionally, since that time, the site has prepared a mitigation effort to address recurrent flooding and other threats, such as theft.⁸²

In terms of administration and hazard response capabilities of the Park, the Audubon Site (site) is owned and operated by the Louisiana Office of State Parks, and all employees responsible for preparing for and responding to disaster events are

⁸¹ Notes from Park website, <http://www.crt.state.la.us/louisiana-state-parks/historic-sites/audubon-state-historic-site/>. Accessed August 29th, 2016.

⁸² Interview/questionnaire notes with John R. House III, Park Manager, Audubon State Historic Site.

government employees. There is always a park manager onsite. Also, in addition to remote monitoring of buildings (11 in total), there are 6 full-time employees located at the Site. The details of the remote monitoring were not provided, however, the staff at Audubon have various security providers from which to choose whose security monitoring likely includes elements such as “glass break” monitors, window and door sensors, motion detectors, and entry monitoring (biometric keypads) for critical storage facilities. These elements, while overseen by Audubon staff, would have redundancy in that a contracted monitoring company would mirror the Audubon staff’s efforts and can alert Audubon staff if there is a system fault / concern in terms of a security risk.

According to Park Manager House, there is a significant shortage of outside financial and personnel assistance in terms of local or state partners to assist Audubon after disaster events.⁸³ With this shortage of financial and operational partners, House will have a difficult task in working to secure additional educational opportunities for his staff. The Audubon disaster plan will also suffer in terms of a failure to address preparedness and prevention aspects. Finally, lack of personnel dedicated to DRM and funding for DRM will lead to less effort ensuring the Audubon Site is ready and able to best respond to water hazard events such as hurricane activity and riverine flooding, which are both recurring and known hazards in this area of Louisiana (Table 12).

House stated that the original disaster risk management plan was adopted in 2009. State review occurs every two years, and capturing best practices in the hazard’s aftermath response is the Plan’s current means of improvement. House said site

⁸³ Ibid.

administrators use “documentation of actions” in order to harness what lessons may be learned from a hazard event and the response to it. In addressing how well his staff will be trained for the next disaster, Park Manager House stated, “unfortunately due to budget cuts” there have been “[no]” educational and disaster training opportunities.

In summary, the Audubon’s site has a dated plan (the existing plan is already seven years old); the plan has no stated preparation actions and no planned response actions; the reviews which may occur are listing only after-actions, and not truly mitigation actions, or preventative actions, nor are the reviews robust enough to highlight the need for these other hazard preparation actions/preventative plans; and lastly, staff will need better opportunities for further hazard mitigation education and prevention training when funding becomes available.

TABLE 12: Summary of Hazard Mitigation Functions for the Audubon State Historic Site's (St. Francisville, LA) Disaster Risk Management Plan.⁸⁴

1. Assign Personnel / Engaging Consultants and Experts	2. Staff Perform Drills / Culture Resource Training	3. ID Historic Assets / Prevention Approach	4. ID Critical Component Gaps / Hazard Threats	5. Evaluate Plan / Post-Event Lessons Review
<p>Staff familiar with disaster planning;</p> <p>No expert consultation capability listed; need to secure relationship to FEMA & local assistance (for example, an MOU)</p>	<p>No training of any kind; reason= lack of funding from LA Office of State Parks</p>	<p>Has significant assets, but lists budget cuts as #3 biggest asset threat.</p> <p>Disaster plan first adopted 2009, after eleven (11) hurricanes and 9 tropical storms in previous 10 yr. period*</p>	<p>Office of State Parks needs more funding for training, give more effort to updating disaster plans; lists "Theft" as site's #1 biggest threat</p>	<p>Lists a process of documenting post event actions; need to include more of those details for new staffs' training, and improve plan after each review</p>
6. Assign Staffs / Outfitting for Priority Actions	7. Mitigation Funding / Ensure Operational Continuity	8. Objects Curated	9. Physical Assets	10. Documenting Plan Process
<p>Full time manager on site, with five (5) other full-time staff;</p> <p>Staff familiar with disaster planning; though, due to budget cuts no additional training available</p>	<p>No mitigation funding sources given.</p> <p>Original disaster risk management (DRM) staff still with agency; plan updated every 2 yrs; must capture institutional knowledge of those staff to improve plan</p>	<p>Textiles, metallic, artwork, wood, documents</p>	<p>Eleven (11) total structures & all remotely monitored; need more comprehensive hazard planning to protect site's significant high value artifacts</p>	<p>Captures lessons learned from actions documentation; next step is to infuse them into DRM plan updates</p>

*Hurricane Data Sourced from Wikipedia: "List of Louisiana Hurricanes (2000-present)."

⁸⁴ Data sourced from interview records (questionnaire) and emails

LONGFELLOW-EVANGELINE STATE HISTORIC SITE

Another valuable case study for disaster preparedness and hazard mitigation investigation within the state of Louisiana is the Longfellow-Evangeline Historic Site (site). The site takes its name from its association with American author Henry Wadsworth Longfellow and his poetic fictional character's ("Evangeline") plight memorializing the British expulsion of Catholics from present day Nova Scotia (formerly Acadia). The Acadians sought refuge and home in a locale similar to their lost homeland and in a place that provided French protection against British protestants and British nonreligious who wanted the Acadians out.⁸⁵ The Site contains 20 buildings housing local artifacts from the early 1800s, the period in which Acadians arrived en masse.

Located in Martinville, St. Martin Parish in south-central Louisiana, the site is sandwiched between a trailer park residential area and a small river (Figure 12). It is worth noting that adjacent to the site on the west side is portable housing (which are homes elevated about 2 feet above ground) and on the east side is the Bayou Teche River (Figure 13). The site's elevation is listed as about 3 to 7 meters above sea level, depending on where the reading is taken onsite. Noting that the nearest coastal waters to the Site, Weeks Bayou, is about 27 miles (43,200 meters) away, the elevation drop of 3 or even 7 meters spanned over 43K meters distance is just over 1.5% of 1% of slope-- a very minimal slope providing little drainage from the site. This fact contributes to the adverse effect accumulated water and rainfall runoff with which the site's managers

⁸⁵ Notes from two historical versions of the events which Longfellow's "Evangeline" portrays, found at Lafayette Travel.com, <http://www.lafayettetravel.com/explore/legend-of-evangeline/>. Accessed September 18, 2016.



FIGURE 12: Plat Map of Longfellow-Evangeline State Park and Vicinity. (Source: topozone.com)

must contend in water hazard events such as hurricane activity and heavy or concurrent rain events.

FIGURE 13: Site Map of Longfellow-Evangeline State Historic Site. (Source: Louisiana CRT, 2016).



The historic assets (both in terms of artifacts and buildings) located here may soon be good candidates for relocation should river levels rise and stay elevated, or coastal waters rise, even just above two meters, as this will affect the site⁸⁶ and its ability to protect and interpret the property.⁸⁷ Figures 14 and 15 provide a visual presentation of the building's site elevation and the immediacy of the threat present at

⁸⁶ Longfellow-Evangeline State Historic Site, site plan map. <http://www.crt.state.la.us/louisiana-state-parks/historic-sites/longfellow-evangeline-state-historic-site/>. Accessed August 27, 2016. and <http://www.loc.gov/pictures/item/la0402.sheet.00006a/resource/>

⁸⁷ Note: elevation information gleaned from studying topographical maps and Google Earth imagery found at: www.iTouchMap.com, www.google.maps.com & www.topozone.com. Elevation listed as 3 meters - 10 feet, by iTouchMap. Longfellow-Evangeline State Historic Site <http://itouchmap.com/?d=1627565&s=LA&f=park>. Accessed August 27, 2016. Also, see [http://elevationmap.net/state-rte-736-st-martinville-la-70582-usa?latlngs=\(30.133176618573636,-91.82278633117676\)#menu2](http://elevationmap.net/state-rte-736-st-martinville-la-70582-usa?latlngs=(30.133176618573636,-91.82278633117676)#menu2), and TopoZone.com. Longfellow-Evangeline State Historic Site. <http://www.topozone.com/map-print/?lat=30.1377007&lon=-91.8173382&title=Longfellow-Evangeline%20State%20Historic%20Site%20Topo%20Map%20in%20St.%20Martin%20County%20Louisiana>. Accessed August 27, 2016.

FIGURE 14: South Elevation of Maison Olivier, at Longfellow-Evangeline State Historic Site. Source: HABS renomination form (2016).

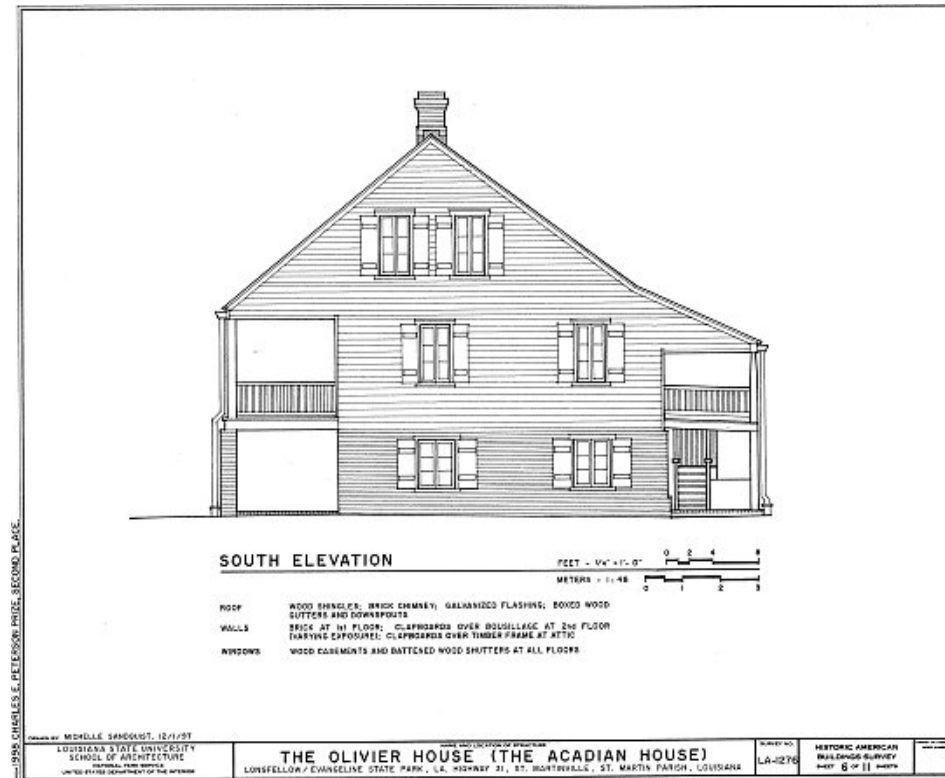


FIGURE 15: Maison Olivier, Dining Room looking east into Loggia. Source: HABS renomination form (2016), from Jessica Richardson (photo dated Nov. 2015).

the front door.

The site manager of Longfellow-Evangeline, Christi Disher, is a Louisiana State employee as are four other full-time and one part-time employee working at the site. There is no facility or grounds manager onsite, and the site is monitored remotely with a security system. While there is no specific point of contact listed in the event of an emergency, the employees are responsible for taking action in such event, and no contractors were listed as being available or on call to assist in such event.

Administratively, the site employs a risk mitigation plan that is reviewed annually; the plan's original authors are no longer available and the plan's adoption date was unavailable. When annual review occurs, the Longfellow staff captures lessons learned from the past year about hazard mitigation and site preparedness to update the plan. According to Disher, there has not been an incident which warranted changing/updating their mitigation plan. In light of storm risks and damages, educating staff about disaster risk mitigation is perhaps the first line of defense; however at Longfellow, this task is left to the officer who coordinates loss prevention. The three main threats facing the Longfellow site, stated in staff communications with author, are hurricanes, flooding, and tornadoes (Table 13).

Raymond Berthelot, Program Manager for the Louisiana Office of State Parks, says, "There isn't a standardized document or disaster plan that is utilized by State Parks, rather disaster mitigation is handled on a case by case, site by site basis"

cooperating with other state offices and FEMA before (if possible) and after a disaster.⁸⁸

The site's staff, specifically the curators and managers, participate when possible in "disaster prevention and recovery seminars and training when suggested through our sister agency, the Division of Historic Preservation or organizations such as the Louisiana Association of Museums."⁸⁹

⁸⁸ Berthelot, Raymond. Program Manager, Louisiana State Parks Program. Personal communication and interview responses. April 22 (& other), 2016.

⁸⁹ Ibid.

TABLE 13: Summary of Hazard Mitigation Functions for the Longfellow-Evangeline State Historic Site's (St. Martinville, LA) Disaster Risk Management Plan.⁹⁰

1. Assign Personnel / Engaging Consultants and Experts	2. Staff Perform Drills / Culture Resource Training	3. ID Historic Assets / Prevention Approach	4. ID Critical Component Gaps / Hazard Threats	5. Evaluate Plan / Post-Event Lessons Review
<p>No mention of assigned roles for staff.</p> <p>No mention of outside experts consulted or on retainer.</p>	<p>Local disaster risk management (DRM) plan in place; manager not on site.</p> <p>No resource training noted.</p>	<p>Twenty (20) buildings, one building listed on HABS, 2 others interpret resettled-Acadian history.</p> <p>No prevention given, other than DRM plan.</p>	<p>Early 19th c. context, hence buildings difficult to modify for hazard prevention.</p> <p>Archaeological midden at risk for storm-related damage</p>	<p>Annual review of plan.</p> <p>Respondent indicated no event has caused her organization to update plan</p>
6. Assign Staffs / Outfitting for Priority Actions	7. Mitigation Funding / Ensure Operational Continuity	8. Objects Curated	9. Physical Assets	10. Documenting Plan Process
<p>Loss prevention officer trains staff, though not specified as to what type of loss prevention training given (in theft or storm-related or disaster prevention)</p>	<p>Indicate state/federal funding has been available in past.</p> <p>No manager onsite could be problematic</p>	<p>No classes indicated; site interprets context of Acadians who were forced by English to leave NE Canada during French and Indian War</p>	<p>Site monitored with remote security system; site's elevation & proximity to the nearby river places its twenty (20) buildings at significant risk of storm-related flood damage</p>	<p>No stated plan process, except the yearly review; as to specific facilities, interviewee said extreme weather is good for highlighting weak points in facilities/planning not seen under normal conditions</p>

CONCLUSIONS

The Louisiana state government owns and operates all of the sites surveyed within this chapter. The four sites' response data were aggregated using the color-coded

⁹⁰ Data sourced from interview records (questionnaire) and emails

categories presented in matrix shown in Figure 4. The four sites are considered in the same order as presented in the discussion above. Table 14 summarizes the four Louisiana sites' disaster planning scaled from poor to good to excellent.

A brief summary of highlights will be followed by recommendations for improvements to both hazard mitigation plans and administrative measures pertinent to each site. These measures and improvements are conclusions gleaned from hazard mitigation practices presented in Chapter One.

Collectively, the four Louisiana sites have prepared numerous components of disaster planning quite well. The respective site administrators and staff have aptly identified each of the four sites' hazards, preventative approaches, and historical and critical infrastructures. Most staff have an awareness of their role to engage the public in its overall mission of protection and preservation, and, in general, has prioritized actions needed in event of disaster. Each site has at least a post-event review process in place or an annual review of the disaster plan.

At the Capitol Park Complex, hazard plan components needing further development and improvement are as follows: assess community support, document planning process, allocate resources, interagency coordination, sensitive regulatory information, evaluate, update plan & inventory, and perform drills.

Table 14: Ranking the Four Louisiana Sites' preparedness, response, and recovery aspects of their DRM planning

	Component Preparedness Mitigation Response and Recovery	Capitol Park	LA State Museum	Audubon Historic Site	Longfellow- Evangeline
	Assess community support	1	1	1	1
	Assign personnel	2	1	1	1
	Engage public	3	2	2	2
	Hazard identification	3	2	2	1
	Identify preventative approaches	3	1	2	2
	Identify historic assets	3	2	2	2
	Identify critical infrastructure	3	2	2	1
	Staff tasking orders	2	2	2	1
	Identify & prioritize actions	3	2	2	2
	Document planning process	1	1	2	1
	Mitigation assistance access	2	3	1	1
	Allocate resources	1	1	1	1
	Interagency coordination	1	3	1	1
	Sensitive regulatory information	1	1	1	1
	Site restoration	3	2	2	1
	Evaluate, update plan & inventory	1	2	2	1
	Perform drills	1	2	1	1

Grading scale 1 to 3; 1=poor, 2=good, 3=excellent

CONCLUSIONS

In terms of preparedness, at each of the four Louisiana sites, the DRM aspects of “assess[ing] community support” and “assign personnel” for DRM *preparedness* planning are two glaring weak points. Then, it would follow, perhaps, that each of the four sites is also weak in the aspect of “documenting the planning process” and allocating the resources in the *response* phase and the *recovery* phase of the DRM cycle. Other aspects of response & recovery which are underperforming at each of the four LA sites include:

1. Handling sensitive or regulated information well (which these sites do not)
2. Allocating resources to expedite the response and recovery effort, and
3. Performing DRM drills and evacuations

RECOMMENDATIONS

Therefore, I recommend the Louisiana sites’ staff and leadership implement these reforms (as indicated by the lowest scoring areas, shown in Table 14 above, of the matrix presented in Chapter 1, Figure 4):

- Select a point person who will be tasked with greater outreach measures to assess and harness community support (which will lead to increased affinity, attendance, and donations)
- Assign DRM roles within the staff including decision tree diagrams for DRM response to an emergency event, as well as reinforce *training* as per those roles

- Document the process through which the organizations who perform DRM for LA sites (museums, historic personage homes, historic government office buildings) have delineated action items and funding protocols which guide their plans
- Select a senior historic preservation staff member to investigate and demonstrate understanding of the Federal and state disaster relief grant programs available, and of the budgeting and money allocation process needed to implement a DRM recovery
- Conduct a review of partnerships with, and commitments of, local EMS, local historic preservation agencies and nonprofits, Louisiana's State Historic Preservation Officer, Louisiana Governor's Office of Homeland Security and Emergency Preparedness as it pertains to DRM recommendations presented in this paper
- Update each sites' DRM plan, inventory of artifacts, and perform quarterly drills to better prepare staff

Chapter 5: Conclusions and Recommendations

This paper has explored disaster risk management (DRM) in the context of historic and cultural resources. Drawing on the preparedness, response, and recovery themes and examples presented in the work of UNESCO, Japanese agencies, and FEMA, I presented a sample of current best practices employed for historic property protection. I then developed a matrix of critical components found in strong DRM programs and analyzed 6 case studies in the U.S. I investigated one agency and five individual sites. In this chapter I will present the results of the case study analysis, focusing in particular on patterns of strengths and weaknesses in the DRM plans and processes that I analyzed. Then, I provide some recommendations for improving DRM planning in general.

CONCLUSIONS

The following summary table (Table 15) illustrates the conclusions reached in this paper's assessment of DRM capabilities at six case study sites, a historic sites and museums agency (MN) and 5 sites (FL & LA) within three diverse regional environments.

Table 15: Ranking the Six Sites' (FL, MN, & LA) preparedness, response, and recovery aspects of their DRM planning (1 is poor, 2 is good, 3 is excellent)

Component Preparedness Mitigation Response and Recovery	MNHS	Koreshan State Historic Site	Capitol Park	LA State Museum	Audubon Historic Site	Longfellow-Evangeline Site
Assess community support	1	1	1	1	1	1
Assign personnel	2	1	2	1	1	1
Engage public	3	3	3	2	2	2
Hazard identification	3	3	3	2	2	1
Identify preventative approaches	3	2	3	1	2	2
Identify historic assets	3	3	3	2	2	2
Identify critical infrastructure	3	1	3	2	2	1
Staff tasking orders	2	1	2	2	2	1
Identify & prioritize actions	3	3	3	2	2	2
Document planning process	2	2	1	1	2	1
Mitigation assistance	1	2	2	3	1	1
Allocate resources	2	1	1	1	1	1
Interagency coordination	3	1	1	3	1	1
Sensitive regulatory information	2	1	1	1	1	1
Site restoration	3	3	3	2	2	1
Evaluate, update plan & inventory	2	1	1	2	2	1
Perform drills	2	1	1	2	1	1

STRENGTHS OF SURVEYED SITES

- A. Sites have sufficient methods to engage the public and get their agenda out into the public sphere.
 - 1. Web-based presence, social media presence, print materials, and preservation community networking all make for a good framework for marketing and promoting historic sites. A word of caution is necessary: need to balance promotion to avoid drowning out the local community's voice.
 - 2. The larger sites and smaller sites within this survey both performed well in this regard.

- B. Sites exhibit very good hazard identification regimes.
 - 1. Determining what the local risks are at any given locale is certainly priority one for any facility manager.
 - 2. All sites, save one, know their major challenges in regard to disasters. The one site (Longfellow) which did clearly identify its hazards lacks a large enough staff and funding pool to fully analyze risks.

- C. Identifying preventative approaches a general strength at most sites.
 - 1. Preparing for disaster is the result of integrating experience and wisdom into the plan. The sites in this survey performed very well in putting into practice the approaches they identified as useful.

- D. Identifying key assets and key infrastructure at sites was adequate.
 - 1. Knowing what resources DRM policies are intended to protect must be the first step in preparing a solid DRM plan. Not knowing the key elements needing protection and preserving in a disaster is a critical failure that will negatively influence the DRM process and outcome.

E. Overall response to disaster is adequate, as are site restoration abilities.

1. Taken as a whole, the survey's sites performed well in regard to identifying and prioritizing actions in response to a disaster. The aftermath of a hazard event is usually chaotic; having response actions delineated in advance is a strong buttress against further failure.
2. The surveyed sites had a mixed performance in terms of staff tasking in a disaster response, and in terms of prioritizing those response actions to prevent further damage their sites. Generally, staff knew what should be done; not all the time did staff know who ought to be doing the work or how it should be done (*vis a vis* training).
3. All but one of the sites has a strong understanding of how to restore their site in the aftermath of a disaster. This was evident from historical data about previous disasters, as well as from interviews and email communications.

WEAKNESSES OF SURVEYED SITES

F. Across-the-board weakness in *greater outreach measures* to assess and harness community support.

1. Without serious community engagement in protecting and assuring historic and cultural resources are stabilized after a disaster, that community's heritage will be at significantly higher risk of disappearing or diminishing.
2. Having strong data about *what* the community values as cultural resources and historically significant assets must inform *how* managers and owners can best plan, fund, and improve their DRM responsibilities.

G. Lacking in assignments delineating *DRM roles* within the staff; training gaps exist.

1. Clear expectations about who shall perform what tasks in an emergency is a significant first step for any organization. Staff awareness of risks and resources to respond to those risks is vitally important.

H. Significant documentation gaps when it comes to capturing the ‘Why?’ of the *DRM process*, and the *infrastructure* categorization.

1. Organizing all of the discussions, decisions, and documentation of the organization’s process toward building stronger DRM policies and practices is an important tool for improving its DRM.
2. Having this information will also improve response time in an emergency—if, for example, each site’s manager has a decision tree and a contact list of first responders (local artifact consultants, local EMS, experts in mold remediation in paprus) an incident’s effects can be significantly reduced.

I. Lack of ability to illicit, or lack of stated effort to pursue, funding from state, regional, and Federal entities offering grant monies and expertise to DRM sites.

1. Organizations must avail themselves of all potential funding options available. There are significant nonprofit and governmental funds aimed at preserving cultural heritage. Each locale will have a blend of private and public entities seeking to partner or sponsor heritage preservation.

J. Not very strong evidence of *partnerships* with other agencies with whom to plan DRM protocols, memoranda of understanding, and even share ideas and improvements for each other.

1. Industry standards and best practices become such when they are successfully implemented at numerous sites with lasting benefits. When agencies and sites with good results from DRM policies share their process and decision making with others, the historic preservation community is strengthened.

K. Serious lack of *updating* within each sites' *DRM plan, inventory of artifacts, and perform quarterly drills* aspects of DRM guidelines

1. An organization must periodically update its DRM plan and resources inventory or it will stand to lose much of what it has set out to protect. With the addition of new facilities and expanded exhibit spaces or landscaped grounds so, too, must the organization capture the location of new assets (archaeological items) and infrastructure (fire suppression; electrical mains; egress and ingress for personnel and emergency equipment) as well as annually reassess the risks present at sites, both from humans and the natural environment.
2. Performing drills and conducting mock-emergency exercises is a good way of assuring staff are cognizant of procedures and assigned roles in the event of an emergency.

RECOMMENDATIONS

As this research paper focused primarily on the risks to property at historic sites, *artifact and structure preservation* in light of the risks present--be they natural, weather or geological events, or of human derivation--must be taken into account regardless of staffing and staff training and available financial resources.

Within this research effort, factors contributing to historic preservation advancement (such as *GIS mapping of past risks events, proper tabulation of inventories, and encouraging appropriate land use policies* to facilitate property preservation) and organizational response to the cycle of planning, mitigation, and response & recovery have been reviewed and considered so as to create a set of recommendations which site managers may use to improve their knowledge of disaster risk reduction.

The essential tool in this effort to reduce risk of disaster is the *emergency or disaster readiness plan*. Inventorying each object and structure of historic importance is a solid first step. Next, the property owner must consider how the *resources available* to them, human and financial, can help to prepare for, respond to, and recover from a hazard event. Local authorities, EMS, and local planning and preservation officials will be part of that network.

Preservation and conservation principles need to be adhered to in order to avoid damage to an artifact or irreversibly compromise the integrity of an historic structure. Maps of artifact locations, emergency evacuation procedures and safe zones, and means of egress to higher ground must be included in an emergency plan. Photos and checklists of cultural resources will aid insurance adjusters and agents in the swift determination of damage extent; photos are extremely useful in the case of theft and

missing items. Checklists will lend valuable assistance in the form of continuity when staff changes occur or new hires come into an organization.

Historic site management teams must be able to reach out to *experts* with specialized training, including a *specialist in risk reduction* who conducts risk audits for historic resources, and a disaster response manager with an awareness of emergency access, people mobility, and/or artifact stabilization measures. Having properly prepared and planned for an adequate response to risk increases the likelihood that what may have begun as a difficult scenario and what may potentially result in a disaster scenario is transformed into a mere nuisance event.

Proper after action *review* and capture of *lessons learned* in the midst of the response effort is critical for improving DRM for historic resources. Integrating the disaster risk management measures with the interpretation of artifacts or the presentation of the site and its structures can effectively sustain cultural heritage indefinitely. Keeping in mind, as well, that conservation and mitigation measures should be implemented with minimal impact on heritage values. Installing an invasive fire-suppression system with arcane, monstrous sprinkler pipes in a fragile historic building would be a disaster posing as a solution. Sensitivity to aesthetics need not cost more; investing a little more at the outset to hire a skilled architect or engineer often can pay real dividends in the long range viability and enjoyment a site engenders with the public.

The *owners, occupants, and users of the site must be consulted and included in discussions* about how to best mitigate hazard events. Community members will best buy-in to authority's suggestions if they sense they have been heard and involved in the protection of a site of local importance. In fact, in most of the research consulted for this paper, the key to best practices lie in the local preparation and integration of locally appropriate and feasible risk reduction measures. The local memory of the extent, duration, and successful reactions to disaster events is indispensable.

When a community experiences a hazard event which may escalate into a disaster event, it can have the affect of intimidating people to the point of paralysis. If the nature of the hazard is harsh enough, hesitation may be the worst enemy to the eventual survival of life and historic property. Action must be taken before a hazard event is realized, in the form of wise planning and allocating appropriate physical and financial resources to address the needs of people and property.

With the ever-present risk of seasonal natural hazard events and unpredictable human actions, it is imperative that historic resource owners and managers reach out to local preservation offices, SHPOs, nonprofits, and other like-minded site owners to educate themselves in disaster risk reduction measures. A properly prepared staff and sufficiently stabilized property (artifacts or structures) is the best defense against a

harsh episode escalating into a chaotic, harmful protracted disaster event etched into memory.

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