Natural Hazards Observer

Volume XL · Number 6

August 2016

Heritage, History, and Humanity:

Learning from the Past to Protect the Future?

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The mission of the Natural Hazards Center is to advance and communicate knowledge on hazards mitigation and disaster preparedness, response, and recovery. Using an all-hazards and interdisciplinary framework, the Center fosters information sharing and integration of activities among researchers, practitioners, and policy makers from around the world; supports and conducts research; and provides educational opportunities for the next generation of hazards scholars and professionals. The Natural Hazards Center is funded through a National Science Foundation grant and supplemented by contributions from a consortium of federal agencies and nonprofit organizations dedicated to reducing vulnerability to disasters.

Observer cartoons are drawn by Rob Pudim.

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St. Louis No. 1 Cemetery in New Orleans following the aftermath of Hurricane Katrina in 2005. Established in the late 1700's, St. Louis Cemetery No. 1 is the oldest existent cemetery in New Orleans and is still the site of several burials a year. The cemetery is the final resting place of many prominent New Orleans families, particularly the Creole population.

WELCOME TO the August issue of the *Observer*. This month we focus on cultural heritage, how we can protect it, and what we can learn from past cultures in terms of resilience, adaptation, and mitigation.

Just last week we were reminded that the world's cultural heritage is vulnerable and that we must work harder to protect sites of cultural and historic significance. In the early hours of August 24, a 6.2-magnitude tremor shook central Italy, killing at least 159 people and devastating a number of small medieval towns north of Rome. The town of Amatrice—popular with tourists in the summer months—was hit hardest and completely reduced to rubble. Nearby Accumoli—equally picturesque—was also severely damaged. The tragedy highlighted Italy's shortcomings in terms of disaster preparedness and strict building standards. Due to extensive illegal construction practices in Italy, the latter are notoriously difficult to implement. As a result, many buildings are constructed using low-quality cement and inadequate supporting iron rods (Aloisi 2009; Mesco and Legorano 2016).

Along with these newer buildings, centuries-old monuments also collapsed during the latest tremor, including two historic churches in Amatrice. Protecting such treasures against the risk of earthquakes is no easy task. This was painfully clear on September 26, 1997, when two consecutive earthquakes hit central Italy.

During the aftershocks, the vault of the 11th century Basilica of St. Francis in Assisi collapsed and severely damaged frescoes by the famous Italian artist Giotto. The church—which is the final resting place of Saint Francis—had been strengthened in the 1950s and wooden beams supporting the roof were replaced by heavy reinforced concrete. After the 1997 quakes, experts concluded that the vault had collapsed because the stiff concrete beams did not absorb the impact of the quake the way the wooden beams would have (Castellano and Infanti, 2005).

The restoration of the Basilica that followed after the quake included the use of innovative materials and techniques like shape memory alloy devices and shock transmission units to prevent future earthquake damage (Castellano and Infanti 2005). The restored Basilica was added to the UNESCO World Heritage list in 2000.

Threats posed to UNESCO World Heritage sites by environmental and manmade hazards are a central concern of heritage conservationists. Many efforts have been made to protect our cultural heritage in recent years. On a global level, UNESCO launched the Strategy for Risk Reduction at World Heritage Properties in 2007, an initiative designed to include heritage sites in national disaster reduction policies, as well as applying DRR principles to World Heritage property management (UNESCO 2016).

Publications about the risk faced by heritage sites and the ways to manage that risk are legion. What is lacking, according to author James Mitchell, are publications about UNESCO World Heritage sites that serve as examples of hazard engagement. His article looks at 47 of such sites and analyzes lessons that can be learned from past cultures' responses to natural hazards and disasters.

While it is true that the impact of disasters on our cultural heritage has become a popular research subject, that doesn't mean there are comprehensive disaster response plans in place to protect them.

For example, many cemeteries—which are vulnerable to a myriad of disasters that include flooding, land erosion, tornadoes, wildfires, and earthquakes—are not sufficiently prepared for natural hazards. Authors William Lovekamp, Gary Foster, and Steven Di Naso argue that because cemeteries have historical, spiritual, emotional, and cultural value, their preservation is especially important. The loss of cemeteries can be tantamount to the loss of communities, as well as their histories and identities. This comparison rings true especially when communities have declined so much that only cemeteries remain. In their article, Lovekamp, Foster, and Di Naso examine the challenges of disaster planning for cemeteries and discuss the benefits of cemetery mapping using GPS, and explorative geophysical methods such as ground penetrating radar and electromagnetic induction.

Planning ahead for disasters is also vitally important for libraries. Since the dawn of the Information Age, the role of public libraries in the community has changed significantly. Today, libraries are hubs of information that provide a wide variety of services, including access to computers and the Internet. Especially in the aftermath of disaster, many people rely on their local library's services to request aid, find missing family and friends, file claims, and begin rebuilding their lives. Libraries also serve as a safe haven from the chaotic storm of displaced lives. In light of all this, author Miriam Kahn writes that it is essential for libraries to have well-thought-out and effective disaster response plans. Her article presents a set of clear guidelines about how to write such a plan.

This issue's articles show that to protect our museums, libraries, cemeteries, temples, and other places of cultural significance we must look at and learn from the past. When we combine these valuable lessons with modern knowledge we have a chance to preserve these irreplaceable sources of inspiration and human identity for future generations.

Enjoy your *Observer*!

Elke Weesjes, Editor

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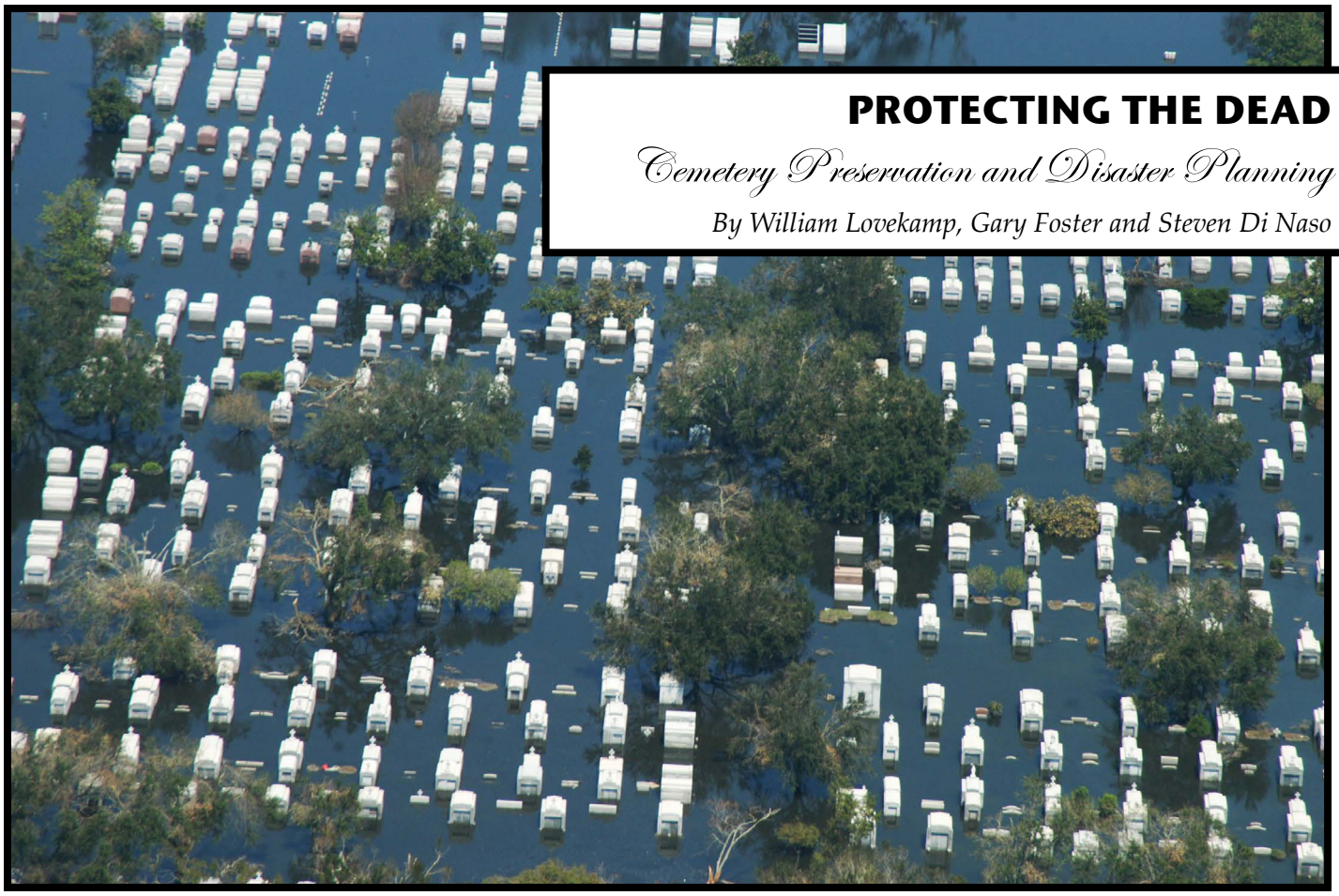

PROTECTING THE DEAD

Cemetery Preservation and Disaster Planning

By William Lovekamp, Gary Foster and Steven Di Naso

Fig. 1 - At a distance, a flooded cemetery seems serene, belying the destruction wrought. This is a New Orleans cemetery in the aftermath of Hurricane Katrina in 2005 © FEMA

HURRICANE KATRINA caused more devastation than any other disaster in U.S. history, including roughly $125 billion in damages (Amadeo, 2016). The losses that this Category 5 hurricane inflicted on August 29, 2005, extended well beyond fiscal accounting and included heritage and history. More than 1,500 graves sites were destroyed, displaced, or dislocated by wind and flooding. From Diamond Cemetery, established in 1800 in Plaquemines Parish, New Orleans, caskets were scattered far and wide, many deposited on adjacent properties and in streets. Five five months later, the search for displaced bodies continued. For families, the anguish of loved ones missing from their graves was renewed by having to rebury them, as if they had died again (Cornish, 2006). Diamond Cemetery and many other cemeteries in the region still bear the scars of Katrina 11 years later, and will never be as they were, though cemetery restoration is technologically feasible.

Separate from the ravages of Katrina, gravestones are routinely repaired, restored, and reset, and occasionally entire cemeteries are returned from the ravages of benign neglect or vandalism. Gravestone and cemetery preservation and restoration have become important areas of cemetery studies. Cemeteries as cultural landscape are as vulnerable to the impacts of disasters as community infrastructures, though little attention has been given to the potential devastation of cemeteries by disasters.[1] Such damages have been increasing due to impacts of climate change, such as flooding and land erosion. The solvency and ability to restore cemeteries depend on regularly updated disaster plans in tandem with electronic/technological surveys kept current. The importance of cemeteries to communities justifies the effort.

The value of cemeteries as archives of community history is well established and enhanced by their omnipresence.[2] Communities too small to have had town halls or public buildings, libraries, post offices, elected officials, or written minutes and records, have had cemeteries. Sometimes they have been the only remaining record of a community's existence. Cemeteries possess institutional importance as the "last great necessity" (Sloane, 1991: xxii) in society. First, cemeteries (historic and active) are culturally significant; they represent familial and community identity, a matter of importance in losses wrought by disasters. Second, cemeteries are historically significant, providing anchors and continuities for communities. Third, cemeteries are emotionally significant as places to nurture and continue relationships with the past; restoring sacred spaces is vital for the emotional recovery of communities. Some minority communities (e.g., African American, Hispanic, Native American) that firmly embrace traditions and histories are particularly sensitive to the loss of sacred spaces. As representations of communities and their histo-

1 For an earlier version of this paper, see Foster, Gary S. & William E. Lovekamp. 2015. "Disasters and Cemeteries: A Clarion Call for Matters of Grave Urgency." *Association of Gravestone Studies Quarterly* 39(3):14-19.

2 Harriet Martineau (1838) was the first to view cemeteries as important sources of information, archiving cultural values and beliefs, and socio-demographic insight in the absence of vital records and statistics.

Fig. 2 – Even close up, the damage seems "wet," but minimal. This is St. Louis No. 1 Cemetery in New Orleans, following the aftermath of Hurricane Katrina in 2005. © FEMA.

Fig. 3 – Once waters recede, the devastation becomes apparent, even at a distance. © FEMA.

ries, burial grounds embody the spirit and essence of those who lived and died in those communities. As such, these sacred places enable reconstructions of community, even in the absence of traditional records and documents.[3]

Clearly, cemeteries, historic and active, need to be preserved. Cemeteries should not have to be old to be cultural resources. Further, they are businesses, private or public, profit or nonprofit. Most businesses would be negligent if they operated without insurance against all kinds of losses, and insurance is a cost of doing business. Cemetery disaster planning is a kind of insurance, and like any insurance, it is reluctantly purchased, with the hope that there is never a claim submitted. The loss of cemeteries can be tantamount to the loss of communities, as well as their histories and identities. This comparison rings true especially when communities have declined so much that only cemeteries remain. The need to protect and ensure cemeteries is a matter of cultural preservation and responsible business management.

Cemetery impacts

The Federal Emergency Management Agency (FEMA) has an expansive digital library of photographs that document the various impacts of disasters. The library hosts photographs of damage to cemeteries. Ironically, cemeteries are regarded as permanent. For instance, grave space is sold, not rented (as in Europe), and the adage "cut in stone" implies permanence. However, the photographic evidence[4] reveals both their impermanence and unimaginable devastation. The geographical location of cemeteries determine the types of disasters to which they are most susceptible, e.g., hurricanes in gulf coast states and wildfires in California. Damage can include deposition of soil, sand, and litter, gravestone displacement, gravestone damage, erosion, disinterment of caskets—sometimes with displacement far from original location—spalling and thermal fracturing of stones.

Undeniably, water produces an incredible force, weighing about 1,700 pounds per cubic yard. It can displace 1,500 pounds for foot of flood water (Chicora Foundation, Inc., 2013). In 1993, the Missouri River flooding displaced about half of the 1,500 grave sites in Hardin, Missouri. The flooding associated with Hurricane Floyd, in 1999, displaced over 200 caskets from cemeteries in North Carolina. In 2005, Hurricane Katrina's flooding displaced hundreds of caskets in Mississippi, Alabama and Louisiana. During Texas Hurricane Ike in 2008, flooding displaced caskets and opened vaults in cemeteries. In 2012, Hurricane Isaac's flooding displaced hundreds of caskets in Braithwaite, Louisiana, some as far as a quarter-mile. When burials are displaced from graves and disassociated from gravestones, they have to be identified by forensic pathologists at considerable time and expense, sometimes without success (Chicora Foundation, Inc., 2013). Contemporary caskets are manufactured with serial numbers, but there is no singular standard or requirement for funeral homes to utilize those numbers in any identification system. Hurricanes Katrina and Rita illustrate this point, as many coffins lacked identification. Some coffins from the 1960s and later were identified because they contained burial scrolls with names of the deceased, and some were identified by serial numbers and hand-drawn maps. However, others had to be identified by rosaries, scars, pacemakers, x-ray evidence or by visual identification or DNA match (Koppel, 2005).

Responsibility for recovery and identification is also sometimes problematic depending on the age and location of the exposed human remains. In some states (e.g., Illinois), human remains less than 100 years old are the purview of coroners or medical examiners. Those more than 100 years old are the purview of the Illinois Historic Preservation Agency. Mass disinterments, which may be the result of disaster events, especially in active cemeteries, are generally the responsibility of Disaster Mortuary Operational Response Teams (DMORT) of the Department of Health and Human Services (Chicora Foundation, Inc., 2013). The ambiguity regarding the recovery of human remains underscores the importance of having disaster plans that could identify and delineate those responsibili-

3 For examples of reconstructing communities from cemetery data, see Foster, Gary S. and Craig M. Eckert. 2003 "Up From the Grave: A Socio-Historical Reconstruction of an African-American Community from Cemetery Data in the Rural Midwest," *Journal of Black Studies* 33: 468-489. Foster, Gary S. and Michael Gillespie. 2013. "Yuma Territorial Prison Cemetery: Cold Cases of Grave Importance," *Illness, Crisis, and Loss* 21(1): 29-49.

4 We are grateful to the Federal Emergency Management Agency for public download, reproduction and distribution of photographs through their Multimedia Library. http://www.fema.gov/media-library# Credit: FEMA News Photos.

Fig. 4 – Upon closer examination, and after the waters recede, the magnitude of the cleanup that awaits becomes obvious. © FEMA.

Fig. 5 – While the winds of tornados can reach velocities that can topple stones and destroy mausoleums, the greatest threats of destruction come from toppling trees and blowing debris. Vegetative debris has been blown onto the end of the gravestone that now needs cleaning. The family name on the stone is fitting and appropriate. © FEMA.

ties prior to implementation (see figs. 1, 2, 3, and 4 for devastation by floods).

Tornadoes can also cause significant damage to cemeteries and as winds from an EF1 tornado of even one-hundred miles-per-hour can have a pressure of 25 pounds per square foot, yielding wind loads of thousands of pounds on structures and other large objects (Chicora Foundation, Inc., 2013). This force can topple trees and blow debris as large as vehicles and structures. It can even completely strip the ground of all monuments such as headstones, footstones, corner markers or other important ground features. For instance, the 2011 New England tornado cluster spawned six tornadoes, the most severe of which was rated EF3. Several cemeteries suffered damage. For example, 19 stones were damaged at the Norcross Cemetery, and 20 were damaged at the North Main Street Cemetery in Monson, Massachusetts (Stabile, 2011). In nearby Wilbraham, the Adams Cemetery sustained significant damage (McLaughlin, 2011; see figs 5, 6, 7, and 8 for damage caused by tornadoes and high winds).

Among natural disasters, earthquakes, wildfires, mudslides, and others also have ravaged cemeteries (Chicora Foundation, Inc., 2013). Mudslides, associated with earthquakes or torrential rains, and with a density of 1.5 tons per cubic yard potentially moving at more than 30 miles per hour, can cover or dislodge gravestones, carrying them in the current for at least hundreds of yards (see Fig. 9).

Heat can wreak havoc on cemeteries. Wildfires, covering many square miles, can exceed temperatures of more than 1,400oF. This thermal shock can cause gravestones to crack, spall, and explode. High temperatures can melt aluminum and bronze markers. Further, soot discolors permeable stone. Roughly 45 states have moderate to high risk of earthquakes, and the potential damage to monuments and mausoleums is significant. The 1906 San Francisco earthquake damaged more than 75 percent of the monuments in Colma's Holy Cross Cemetery (Chicora Foundation, Inc., 2013). (See fig. 10 for cemetery damage by earthquakes.) We believe that the FEMA photographs we use and additional photographs in their media library document the damage that can be done to cemeteries and provide evidence to support our assertion that proactive, disaster-planning measures are warranted. The photographs illustrate cemeteries as physical space and material culture. Less obvious is the damage to and loss of cemeteries as cultural space and community history. Once again, without a disaster plan, the long-term impacts can be much worse and the ability to recover can take much longer.

Disaster planning

The challenges of disaster planning for cemeteries vary by location or geography. Different geographic locations are susceptible to different types of disasters. Federal agencies (FEMA, National Oceanic and Atmospheric Administration, U.S. Geological Survey, American Society of Civil Engineers, United States Department of Agriculture, Occupational Safety and Health Administration), as well as state, county, and municipal emergency-management websites, can identify those threats.[5] Cemetery operators should evaluate the risks to which their property most vulnerable. However, such assessments must be conducted according to the specific conditions and characteristics of each particular cemetery. For instance, dead, diseased, and old trees are susceptible to hurricanes, tornados, and high-wind events. Dense brush and vegetative litter are vulnerable to wildfires. Low-lying topography with poor drainage is susceptible to flooding. Monuments that are unstable or leaning more than five degrees from perpendicular. Many conditions can be addressed beforehand to minimize damage in the event of some disaster, and it is necessary to evaluate conditions in the context of hazards in order to inform and guide the development of effective plans.

Active, contemporary cemeteries, often for-profit businesses, may utilize state-of-the-art management technologies such as Geographic Information Systems (GIS). GIS combines geographic (spatial) data with information (non-spatial) data, and is used to collect, store, edit, manage, query, and display information visually, typically as various types of maps. A cemetery GIS would include information (spatial data) such as headstones, footstones, and

5 For example, consult www.acdc.noaa.gov/stormevents/;msc.fema.gov/webapp/wcs/stores/servlet/ FemaWelcomeView?storeId=10001&catalogId=10001&langId=-1

Fig. 6 (top)– Downed trees can topple and break gravestones, dislocating them from their original gravesites. © FEMA.

Fig. 7 (left) – Uprooted trees can expose burials and compromise graves, requiring reinterment. © FEMA.

plot corner markers, as well as planimetric features, such as roadways, utilities, and landscaping. Other information (non-spatial, or aspatial data) may include burial records, obituaries, death certificates, photographs of headstones and other cemetery peripherals, or any other form of digital records that may be associated with interments.[6] Together, these data constitute a robust, powerful tool for the management of cemetery information, and can exist in both digital (e.g., on a server) and non-digital formats (printed maps), and are the archives of the modern-day sexton.

Having a digital inventory of any cemetery is valuable. Having a spatially accurate representation of its monuments and infrastructure is even more valuable. The use of Global Positioning Systems (GPS) and Total-Station methodologies[7] to map marked graves, and explorative geophysical methods such as GPR (Ground-Penetrating Radar) and Electromagnetic Induction (EMI) for mapping unmarked graves is not uncommon. Such technologies are expensive to acquire, are often labor-intensive, and require considerable expertise, training, and education. However, implementation of such technologies assure the ability to comprehensively reconstruct the cemetery in its entirety.

The various technologies employed must be appropriate to the characteristics and geographic setting of the cemetery. For example, some Differential Global Positioning System (DGPS) methods require connection to a base station using cellular, spread spectrum, or Ultra High Frequency (UHF) radio, and in the absence of one of these components (e.g., an area with no cellular coverage), the use of survey-grade GPS is precluded. Similarly, trees and tree canopy can be problematic, as heavy canopy will impede acquisition of the GPS signal. For cemeteries completely bounded within a forested area, multipath errors (reflection of the GPS satellite signal) will be a significant source of error in horizontal measurement. Alternatively, however, GPS ephemeris collected (GPS coordinates measured at a stationary point) over extended occupational periods in such environments can facilitate cumulative establishment of survey-grade horizontal and vertical control for use with other non-GPS methodologies, such as use of a Total Station, for mapping all cemetery and planimetric features.

The objective of cemetery mapping is to establish the exact (not relative) location of each interment in a cemetery using real-world (non-arbitrary) planar coordinates, and to capture digital photography (when applicable) of each gravestone. A cemetery GIS model links the photographs and other pertinent (aspatial) interment information to its spatial compliment—the headstone or marker. An accurate grave location is not dependent on its relative proximity to adjacent graves, as may be the case in cemeteries mapped using arbitrary coordinates, or in absence of an accurate Cartesian coordinate system altogether. If the locations of adjacent graves were lost or destroyed, relative locations would be meaningless. Any burial location mapped with survey-grade GPS (1–2 cm accuracy) represents a singular, unique location on the surface of the earth that can be relocated independent of other monuments.

Area colleges and universities with GIS centers may be valuable resources in offering advice, consulting, and even

6 The authors have been working on a long-term preservation project of this kind in the Great Smoky Mountains National Park.
Lovekamp, William E. and Gary S. Foster. Cemetery and Gravestone Inventory of Cades Cove. United States Department of the Interior, National Park Service, Great Smoky Mountains National Park Study # GRSM-01120, Permit # GRSM-2012-SCI-1120. Start Date July 20, 2012 – End Date December 31, 2016.
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7 A total station is a combination of two instruments in one; an EDM (an instrument for electronic distance measurement), and a theodolite (an instrument for measuring angles). When combined, these two instruments are known as a Total Station, and they can be used to measure x,y, and z coordinates of a location on a planar grid system.

Fig. 8 – Uprooted trees can expose burials and compromise graves, requiring reinterment. © FEMA.

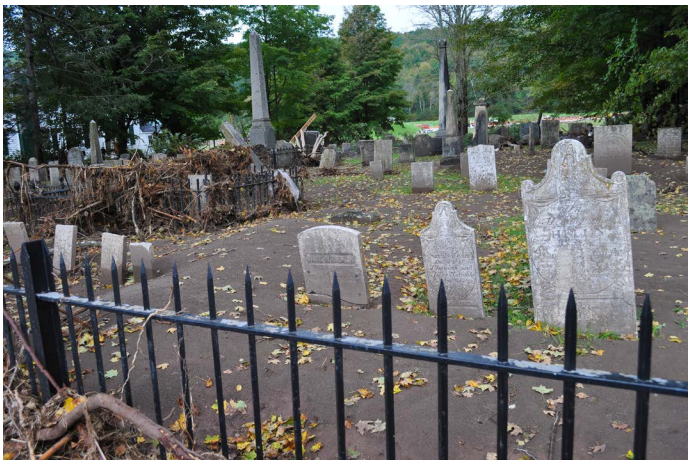

Fig. 9 – Mudslides and floods deposit an overburden of silt and mud that is best removed by the techniques of archaeological excavation. The use of skid loaders and frontend loaders can be too imprecise and aggressive, disturbing the original surface of the cemetery. © FEMA.

services, either gratis or fee-for-service. An additional incentive for universities' involvement might be students having access to the cemetery, a hands-on learning lab for the use of GIS and field-mapping technologies. Alternatively, private companies offer GIS services, and many municipalities routinely contract for a variety of their services. Initial inquiry might be made of city managers, planners, or disaster-plan coordinators and officers to identify such companies. The imagined expense is probably less than the actual expense, and the actual expense is, in the end, far less than the cost of doing nothing. GPS and/or Total-Station surveys of very large cemeteries can be completed in a matter of days to weeks.

The digital or virtual construction of the cemetery, once amassed, may be stored on a server, and conveyed to cemetery administrations for access or archiving on their computers. However, the conventional wisdom is to not store electronic data, including the cemetery reconstruction and its disaster plan, only on computers at or near the cemetery. The adage "don't place all of your eggs in one basket" has merit; multiple copies, hard and electronic, should be distributed and stored, near and far. Disasters have no respect or regard for cemeteries, nor for computer servers in their path. In 1917, a tornado swept across the Midwest, destroying the sexton's office at the Dodge Grove Cemetery in Mattoon, Illinois. Most of the paper records were destroyed, and had they been electronic records on a single computer in the office, they would have been lost, too.

Summary recommendations

Disaster plans and the electronic/technological surveys that enable the reconstruction of cemeteries are two distinct but interrelated documents and efforts. Even a fully developed and comprehensive plan cannot restore and preserve the cemetery without an accompanying (electronic) model of the cemetery, and an electronic reconstruction becomes a vulnerable and futile document without a disaster plan. Additionally, some of the most at-risk cemeteries are those that reflect the most extensive history and heritage of a community. They are often small, secluded, inactive, and infrequently maintained without sexton or administrator, and without any means of support. They are just there, located in a dense forest or an overgrown field. In such a state, the completion of an electronic survey and reconstruction, and an accompanying disaster plan, initially seem challenging. However, such cemeteries possess assets that active cemeteries cannot purchase -- namely, the asset of historical interest and place. With advocates such as local historical and genealogical societies that will make the case of preservation and protection compelling, university and college history departments and GIS centers may be more persuaded to make services available. If the goals of electronic surveys and disaster plans can be clearly articulated, such cemeteries become candidates for community and corporate sponsors. Such cemeteries would be dependent upon volunteers to activate and implement a disaster plan, just as they are dependent upon volunteers to create the disaster plans, with all efforts dedicated to ensuring the integrity of history and heritage. Contemporary, active cemeteries will be expected to remunerate GIS services. They might consider writing a line item into annual budgets for GIS services or consider a GIS specialist as part of their staffing plans.

Cemetery disaster plans and the GIS surveys upon which they are based are a kind of insurance against a claim ever having to be filed. They are also investments. For active cemeteries, GIS surveys are an alternative means of precisely monitoring the inventory of occupied and available lots. And for inactive, historic cemeteries, GIS surveys document and replicate the cemeteries electronically. Such surveys, once in place, allow disaster plans to be implemented, and they enable a literal and physical reconstruction of cemeteries. That, in turn, protects cemeteries as cultural resources and intellectual real estate. With the documentation of GIS surveys and disaster plans in place, cemeteries impacted by disasters may qualify for federal (FEMA) grants in their recovery and reconstruction efforts. Absent those proactive precautions, cemeteries, active and inactive, will experience losses that can be accurately estimated in dollars, but culturally and historically will be incalculable.

After a disaster we often attempt to recreate a sense of normalcy. We do this by searching through rubble and trying to find anything that is of value to us. Sometimes we

Fig. 10 – Earthquakes fracture and topple stones, and compromise or damage public and family mausoleums © FEMA.

find photographs, important family heirlooms, a child's favorite toy or teddy bear, or other family possessions that help us cope with the emotional devastation of the disaster, and to recover. In other situations, protecting or having the capacity to rebuild a cemetery or replace a loved one's headstone may be what helps us recover, as cemeteries are a vital connection between past and present[8]. As a cemetery CEO, sexton, genealogist, local historian, passionate taphophile, or family member, the only thing worse than having to implement a disaster plan is having no plan to implement.

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8 Neither the Association of American Cemetery Superintendents nor the National Association of Cemeteries (trade associations) reference disaster plans or electronic/technological surveys on their websites, suggesting both are currently beyond the purview and scope of their missions.

Authors

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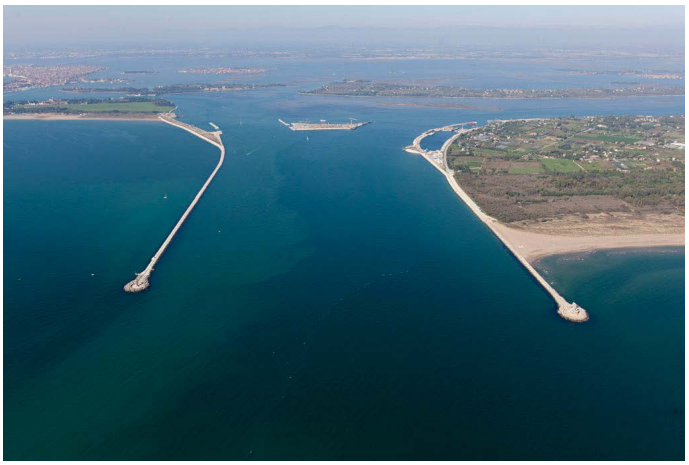
Celebrating Hazard Cultures

A Missed World Heritage Opportunity?

By James Mitchell



IN AN ERA MARKED by a steady increase in climate-related natural disasters, we are forced to look in previously unexplored directions for effective adaptive responses to hazards. For example, in the past decade, Western scientists have begun to value the complementary role that traditional indigenous knowledge can play regarding adaptation and response strategies. Looking at past cultures for inspiration is an extension of this trend. Indeed, we can learn many lessons from the ways past cultures sought to prevent, avoid, and reduce hazards.

A valuable source to find some examples of how humans have adjusted to hazards is the United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage List, which expresses humanity's commitment to conserve places that we value above all others.

In 2014 there were 47 sites of hazard engagement on this list. Considering the fact that this is only a meager 5 percent of the total number of World Heritage sites, the list does not reflect the full range of how humans have adjusted to their environments. We must do more to facilitate the conservation of human responses to natural hazards and disasters.

The tale of such responses is worth telling because it demonstrates many successes. It also illuminates the dynamics of risk assessment and management in different habitats occupied by different cultures, by employing different cognitive routings, different mixes of coping measures, and different regimes of regulation. The history of how humans engage with natural hazards presents a diversity of experiences that we can exploit to achieve a better fit between society and nature in the decades ahead. Adjustment to hazard is not just a practical matter of ensuring the security of heritage sites; it has been, and will continue to be, one of the master tasks of civilization. Given this degree of salience in human affairs, it is instructive to examine how sites of human engagement with natural hazards are represented on the current World Heritage List.

These 47 sites illustrate adjustments made by individuals or groups to risks posed by extreme natural events. These adjustments include behavioral and material responses to risk. They include religious taboos, systems of formal record-keeping and inquiry, indigenous warning networks, site abandonments, relocation of high-value investments, institutional arrangements for mobilizing mass action during emergencies, as well as careful management of protective natural vegetation and landforms, hazard resistant folk housing, and structural engineering works.

Most sites of human engagement with hazards focus on earthquakes and floods. Storms and droughts, two other hazards that have had great cultural importance (Perez, 2000; Mulcachy 2008; Hoffman and Smith, 2002), have received far less attention. They account for 10 percent and 6 percent, respectively, of the hazard-engagement sites. The remaining 16 percent provide limited information about adjustments to volcanoes (10 percent), frost (2 percent), landslides (2 percent) and erosion (2 percent). It is not clear why earthquakes and floods are showcased as culturally significant hazards. One possibility is the central role they have played in creation and rejuvenation myths of previous civilizations. Certainly these hazards can comprehensively demolish or sweep away buildings and smother cultivated lands, thereby obliterating existing signs of human endeavor and rendering fruitless previous efforts to inscribe our presence on the landscape—a particularly unsettling prospect for organizations that wish to preserve evidence of human agency.

While it is vital that more sites of human engagement with hazards are recognized for their educational value and added to the List, several plausible explanations exist for the current underrepresentation of such sites.

Firstly, it is important to consider that adjustments to hazards can continuously reconfigure landscapes (e.g., several sites in the Netherlands), thereby making it difficult to identify those that meet the test of authenticity, an important criterion in the Heritage Site designation process. (Schoorl 2005). Secondly, natural disasters have long had a disproportionate impact on poor and marginalized communities, not groups that have had power to imprint their identities on larger cultural landscapes (Morgan and Barrett 2006). Finally, it should be noted that there is tension between nominations that members of state interest groups make and those made by expert interest groups in the heritage site nomination process. As Meskell (2013) notes, technical advice offered by scientific experts has often been rejected or circumvented by state (i.e., national government) representatives in World Heritage Site decision-making bodies. Rössler (2006) remarked: "With rare exceptions, for the most part inscribed in the past five years, the World Heritage List is skewed and unrepresentative of the totality—and hence the universality—of human cultural development and achievement."

None of these issues poses insurmountable problems for the selection of more World Heritage sites of hazard engagement. Indeed, such sites are usually excellent examples of the conditional nature of how humans choose to

Images opposite page: (clockwise from top left)

Fig. 1. Santa Cruz de Mompox, Colombia © Armando Calderón 2010. Founded in 1540 on the banks of the River Magdalena, Mompox played a key role in the Spanish colonization of northern South America. From the 16th to the 19th century the city developed parallel to the river with the main street acting as a dyke. The historic centre of Mompox became a UNESCO heritage site in 1995.

Fig. 2. Kinderdijk, Netherlands © David van der Mark, 2015, The windmill pumping complex in Kinderdijk is situated in a polder at the confluence of two main rivers. To drain the polder, a system of 19 windmills was built around 1740. The group of mills has been a UNESCO World Heritage site since 1997.

Fig. 3 Nabatean Cities Negev, Israel, Open Domain 2005. The four Nabatean towns of Haluza, Mamshit, Avdat and Shivta in the Negev Desert are situated on the Frankincense route from south Arabia to the Mediterranean, which flourished from the 3rd century BC until the 2nd century AD. These cities, a UNESCO site since 2005, are examples of the way the harsh desert was colonised for agriculture through the use of highly sophisticated irrigation systems.

Fig. 4 Mose Barrier Project Venice, Italy Open Domain 2012. The MOSE project protects the city of Venice and the Venetian Lagoon from flooding. Its mobile flood gates temporarily isolate the lagoon from the Adriatic Sea during high tides. Venice and its lagoon have been a UNESCO World Heritage site since 1987.

Fig 5. Kaiping Diaolou, China © ToisanHeritage, 2015. Kaiping Diaolou and Villages feature the Diaolou, multi-storey towers (built during the early Qing Dynasty in the 1920s and 1930s) used as watchtowers and temporary refuge during flood. The towers became a World Heritage Site in 2007.

Fig. 6. Joya de Cerén, El Salvador, © Hectorlo, 2015. Joya de Cerén was a pre-Hispanic farming community that, like Pompeii and Herculaneum in Italy, was buried under an eruption of the Laguna Caldera Volcano c. AD 600. Underneath the layers of volcanic ash, 18 structures were identified. Rammed earth construction was used for the public buildings and the sauna, and wattle and daub (which is highly earthquake resistant) for household structures. Joya de Cerén became a UNESCO Heritage site in 1993.

Fig. 7. Tower of Hercules, Coruña, Spain, Open Domain 2011. The Tower of Hercules is an ancient Roman lighthouse on a peninsula just outside of Coruña. The tower, a UNESCO Heritage site since 2009, is the oldest existing lighthouse in the world and is a prime example of a seismic-resistant construction.

COUNTRY	SITE	HAZARD(S)	ADJUSTMENT
Canada	Grand Pré	Flood	Reclamation and water management
Chile	Churches of Chiloe	Flood and storms	Sheltered and raised sites
Chile	Valparaiso	Earthquake and flood	Mitigative reconstruction[1]
China	Dujiangyan	Flood	Floodgates and channels
China	Kaiping Diaolou	Flood	Refuge towers
China	Honghe Hani	Drought	Water retention terraces
Colombia	Santa Crux de Mompox	Flood	Barricade walls
Croatia	Dubrovnik	Earthquake	Mitigative reconstruction
Ecuador	Quito	Earthquake	Mitigative reconstruction
El Salvador	Joya de Cerén	Earthquake	Mitigative construction
France	Canal du Midi	Flood	Canalization
France	Loire valley	Flood	Stone cut flood markers
Germany	Dessau-Worlitz	Flood	Dike
Greece	Mycenae and Tiryns	Earthquake	Mitigative reconstruction
Guatemala	Antigua	Earthquake and flood	Relocation
Hungary	The Puszta	Flood	Water regulation system
India/Bangladesh	The Sundarbans	Cyclones	Shelter belt
Iran	Bam	Earthquake	Mitigative reconstruction
Israel	Negev	Drought	Water management system
Italy	Venice lagoon	Flood	MOSE barrier project
Italy	Val di Noto, Sicily	Earthquake	Mitigative reconstruction
Italy	Aeolian Isles	Volcano	Evacuation
Italy	Mount Etna	Volcano	Research/scientific data
Italy	Cinque Terre	Floods and landslides	Terraces
Japan	Mount Fuji	Volcano	Religious shrine
Lithuania/Russia	Curonian spit	Erosion and flood	Sand stabilization works
Mali	Djenné	Flood	Refuge mounds
Mauritius	Le Morne	Cyclone	Relocation of village
Mexico	Guanajuato	Flood	Water management infrastructure
Mexico	Hospicio Cabañas Guadalajara	Drought, flood, and frost	Relief project
Mexico	Oaxaca	Earthquake	Mitigative construction
Netherlands	Schokland	Flood	Abandoned and reoccupied site
Netherlands	Defense Line, Amsterdam	Flood	Flooding as a defensive weapon
Netherlands	Kinderdijk-Elshout	Flood	Windmills and dikes
Netherlands	Wouda Pumping Station	Flood	Steam pumps
Netherlands	Amsterdam canal ring	Flood	Water management system
Netherlands	Beemster polder	Flood	Drainage and reclamation system
New Zealand	Tongariro National Park	Volcano	Religious shrine
Nicaragua	Ruins of León Viejo	Earthquake	Relocation
Nicaragua	León Cathedral	Earthquake	Mitigative construction
Peru	Cuzco	Flood	Canalization
Peru	Lima	Earthquake	Mitigative reconstruction
Peru	Arequipa	Earthquake	Mitigative reconstruction
Solomon Islands	East Rennell	Cyclones	Climate change study laboratory
Spain	Tower of Hercules	Earthquake	Seismic-resistant building
USA	Hawaii Volcanoes National Park	Volcano	Monitoring and risk warnings
Venezuela	Coro	Cyclone	Mitigative reconstruction

[1] Mitigative construction or reconstruction: Building or rebuilding that includes measures to reduce future risks or impacts of natural hazards.

engage with environmental uncertainties. Their authenticity is time-related and reflective of the negotiated choices made by different groups that have a stake in the outcomes at different times. More inclusive decision-making processes easily help avoid underrepresentation of sites that are meaningful to poor or underprivileged groups. Getting state officials and scientists to agree on site choices may be a more persistent challenge, but one that can be resolved by having clear rules about procedures for resolving disagreements.

From Homo Faber to Homo Cognito

When we further examine the sites of human engagement with hazards, it is remarkable that engineering measures dominate the portrayal of hazard adjustments. Those measures most often come in the form of flood and drought-reduction devices, such as walls, gates, dikes, terraces, cisterns and canals as well as disaster-resistant buildings. Human agency is in the hands of Homo Faber, a technology-wielding species intent on controlling hostile physical environments. Just over two-thirds of the sites feature some type of structural engineering response to risk. Examples of protective structures include: the flood barricades of Mompox, Colombia; the Kinderdijk windmill pumping complex in the Netherlands; the flash-flood harvesting system of Nabatean cities in the Negev region of Israel; and the as-yet-uncompleted MOSE moveable barrier project that is intended to protect Venice against aqua alta from the Adriatic Sea. Specific types of hazard-resistant buildings are exemplified by the following constructs: flood refuge towers (Kaiping Diaolou, China), earthquake resistant wattle and daub housing (Joya de Ceren, El Salvador), and other kinds of earthquake-adapted structures (Oaxaca, Mexico). Many larger urban settlements, especially in Latin America, were also extensively reconstructed in the wake of a disaster, with a view to making them resistant to future extreme events (e.g. Ariquipa, Peru; Dubrovnik, Croatia; Lima, Peru; Quito, Ecuador; Valpariso, Chile).

A second, but much smaller, group of hazard engagement sites involves nonstructural adaptations that rely on informing humans about risks and acting in receipt of that knowledge (27 percent). Some of these places are distinguished by the richness of the historic record of hazard events that can be found there, or by the opportunities they afford for scientific study of ongoing risk processes and the development of public warning systems (e.g. Mount Etna, Italy; Hawaii Volcanoes National Park, USA). Other sites show: judicious selection of risk-minimizing locations for buildings and settlements; warning and evacuation in the face of acute threats; and abandonment and permanent relocation to safer places. Additionally, they illustrate ways to accommodate extreme natural processes rather than try to control them. For example, residents of coastal communities in the Ganges-Bhramaputra Delta (Sundarbans of India and Bangladesh) and the sandy shores of the

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Fig. 8. Arequipa, Peru © Martin Garcia 2010. The historical center of Arequipa became a UNESCO Heritage site in 2000. Located at the foot of three volcanoes, Arequipa was founded in 1540. Despite numerous natural catastrophes, including several major earthquakes, most buildings in the historical center of the city have been repaired many times and rebuilt to endure the geographic environment without losing their typology or their ornamental characteristics.

Fig. 9. Dubrovnik, Croatia © Marcus Saul 2013, Dubrovnik, the 'Pearl of the Adriatic', situated on the Dalmatian coast, became an important Mediterranean sea power from the 13th century onwards. Although severely damaged by an earthquake in 1667, Dubrovnik managed to preserve its beautiful Gothic, Renaissance and Baroque churches, monasteries, palaces and fountains. The city's historic center became a UNESCO Heritage site in 1979.

Fig. 10. Antigua, Guatemala © Jasperdo, 2012. Built 1,530.17 m above sea level in an earthquake-prone region, Antigua Guatemala was founded in 1524 as Santiago de Guatemala. It was subsequently destroyed by fire caused by an uprising of the indigenous population, re-established in 1527 and entirely buried as a result of earthquakes and an avalanche in 1541. The third location, in the Valley of Panchoy or Pacán, was inaugurated in March 1543 and served for 230 years. It survived natural disasters of floods, volcanic eruptions and other serious tremors until 1773 when the Santa Marta earthquakes destroyed much of the town. At this point, authorities ordered the relocation of the capital to a safer location region, which became Guatemala City, the county's modern capital. Some residents stayed behind in the original town (see picture) which became referred to as "La Antigua Guatemala".

Fig. 11. Schokland, The Netherlands, © Jayjay 2009. Schokland was a peninsula that by the 15th century had become an island. Occupied and then abandoned as the sea encroached, it had to be evacuated in 1859. However, following the draining of the Zuider Zee in the 1920s, it has formed part of the land reclaimed from the sea. Schokland has vestiges of human habitation going back to prehistoric times. It symbolizes the heroic, age-old struggle of the people of the Netherlands against the encroachment of the waters. The remains of dykes and terps located outside the present island reflect the former contours of the island and the land that has been lost over the course of time. Also located outside the present island, but within the boundaries of the World Heritage property, are more than 160 archaeological sites with remnants of prehistoric occupation. A church and church ruins, residential and commercial buildings, barns, a former harbour, and land division patterns (both old and new) go to complete the story of Schokland.

southern Baltic Sea (Curonian Spit, Lithuania/Russia) both owe their survival to stewardship of vegetative shelterbelts and barrier islands that have protected fishing and farming communities. Examples include flood markers of the Loire valley in France, flood refuge mounds of Djenne, Mali; storm-sensitive sites on which the churches of Chiloe, Chile, were founded; earthquake-relocated buildings of Antigua, Guatemala; and the twice-relocated village of cyclone-plagued Le Morne, Mauritius. All of these provide vivid examples of how humans can learn from and adjust to acute environmental perturbations without having to construct large-scale "hard" engineering measures.

Finally, humans engage the spiritual dimensions of natural hazards at a small number of sites (5 percent)—most notably Tongariro National Park in New Zealand and Mount Fuji in Japan, but also Hawaii Volcanoes National Park in the United States. These are places of high religious salience for indigenous cultures and are also at risk to active volcanism. Sometimes the existence of religious taboos has served to discourage human settlements from locations near the volcanoes, thereby serving to reduce risk. Donovan (2010) provides a discussion of similar beliefs of people living near Indonesia's Mount Merapi.

The heavy emphasis on structural engineering and building modifications as preferred adjustments mirrors a long-running bias that many human cultures have held,

Clockwise (top left):
Fig. 12. Grand Pré, Canada © Charles Hoffman, 2009. Situated in the southern Minas Basin of Nova Scotia, the Grand Pré marshland and archaeological sites constitute a cultural landscape bearing testimony to the development of agricultural farmland using dykes and the aboiteau wooden sluice system, started by the Acadians in the 17th century and further developed and maintained by the Planters and present-day inhabitants. Grand Pré has been a UNESCO World Heritage site since 2012.
Fig. 13. Hortobágy Puszta, Hungary © Gerdragon, 2005. The cultural landscape of the Hortobágy Puszta consists of a vast area of plains and wetlands in eastern Hungary. Traditional forms of land use, such as the grazing of domestic animals, have been present in this pastoral society for more than two millennia. From the middle 19th century, water regulation systems were set up to control flooding of the Tisza River. This resulted in the partial draining of former wetlands, which were converted to grasslands or arable farming. Hortobágy Puszta was added to the World Heritage list in 1999.
Fig. 14. Djenné, Mali © Devriese 2003. Inhabited since 250 BC, Djenné became a market centre and an important link in the trans-Saharan gold trade. Its traditional houses, of which nearly 2,000 have survived, are built on hillocks (toguere) as protection from the seasonal floods. Djenné together with Djenné-Djeno were designated a World Heritage Site by UNESCO in 1988.
Fig. 15. Bam, Iran © OXLAEY 2014. Bam is situated in a desert environment on the southern edge of the Iranian high plateau. The origins of Bam can be traced back to the Achaemenid period (6th to 4th centuries BC). The existence of life in the oasis was based on the underground irrigation canals, the qanāts, of which Bam has preserved some of the earliest evidence in Iran. The 2003 earthquake caused the collapse of various sections of the Governor's Quarters and the upper parts of the defence walls. Notwithstanding, much of the lost fabric was from modern restorations. The materials found at the older levels are well preserved and have now been revealed.
Fig. 16. Curonian Spit, Lithuania/Russia © Kontis Šatūnas, 2008. Human habitation of this elongated sand dune peninsula dates back to prehistoric times. Throughout this period it has been threatened by the natural forces of wind and waves. Its survival to the present day has been made possible only as a result of ceaseless human efforts to combat the erosion of the Spit, dramatically illustrated by continuing stabilisation and reforestation projects.
Fig. 17. Flood diversion tunnels, Guanajuato, Mexico © AlejandroLinaresGarcia, 2010. To reduce persistent flooding of this 16th century city that was founded by the Spanish, officials decided to blast river diversion tunnels under the city's hilly setting in the early 19th century. When a dam eventually sent the river around the city, it found itself blessed with a system of low, dry tunnels into which it poured its surplus traffic instead.

Clockwise (top left):

Fig. 18. Mount Fuji © Midori, 2010. The beauty of the solitary, often snow-capped, stratovolcano, known around the world as Mount Fuji, rising above villages and tree-fringed sea and lakes has long been the object of pilgrimages and inspired artists and poets. The inscribed property (added to the UNESCO list in 2013) consists of 25 sites which reflect the essence of Fujisan's sacred and artistic landscape.

Fig. 19. The Churches of Chiloé, Chile © Srikanth Jandhyala, 2014. The Churches of Chiloé in Chile's Chiloé Archipelago, built in the 18th and 19th centuries, were constructed entirely of native timber with extensive use of wood shingles. The materials were chosen because they are known to resist the Archipelago's humid and rainy oceanic climate. In total 16 churches were designated UNESCO World Heritage sites in 2000.

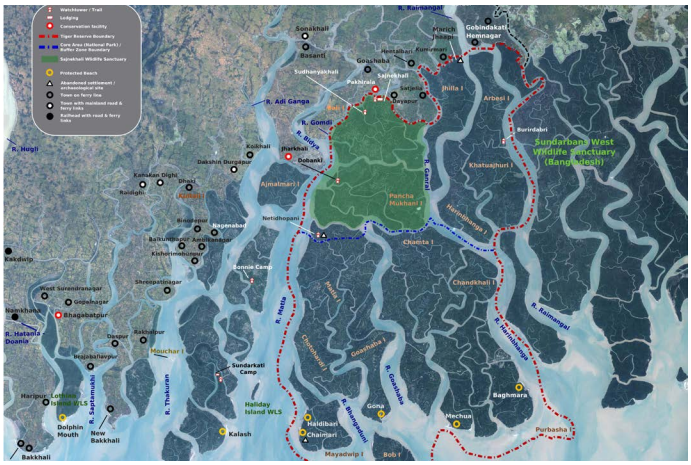
Fig. 20. Dessau-Worlitz Gardens, Germany, © H.-U. Küenle, 2010. The Garden Kingdom of Dessau-Wörlitz is an exceptional example of landscape design and planning of the Age of the Enlightenment (18th century). An island on the artificial Wörlitz Lake features Europe's only artificial volcano. When Leopold III went on a grand tour of Europe in the 1760s, he was captivated by the smoldering Mount Vesuvius when he was in Naples and the newly discovered town of Pompeii. Twenty-two years later, the German royal set about bringing a piece of Naples to Germany; he had his architect build a brick inner building nearly five stories high and cover it with local boulders. At the top, a hollow cone was made and contained a high chamber, complete with three fireplaces and a roof that contained an "artificial crater" that could be filled with water. He then constructed a lake around the volcano and invited his friends to watch an eruption. The gardens became a UNESCO site in 2000.

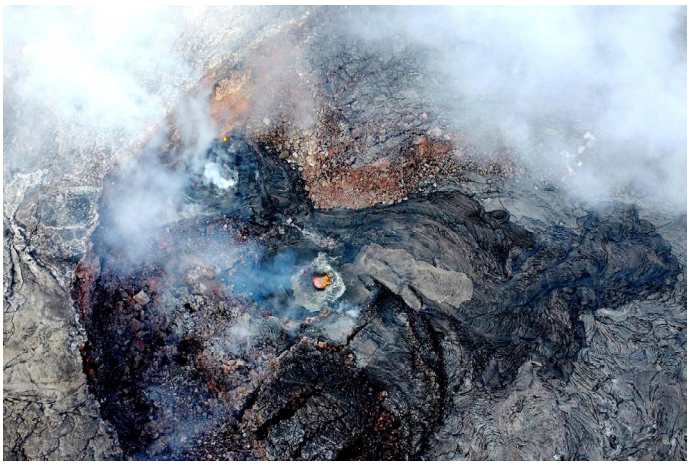
Fig. 21. Ir. D.F. Woudagemaal, Lemmer, The Netherlands © Uberprutser, 2012 The Ir. (engineer) D.F. Woudagemaal, opened in 1920 by Queen Wilhelmina, is the largest still operational steam-powered pumping station in the world. It was built to pump excess water out of Friesland, a province in the north of the Netherlands.

especially in the West, toward technological fixes for hazards. Though the value of these fixes has often been considerable, they have also been criticized for failing to live up to expectations and for lulling humans into believing that they are protected against all future events instead of just the subset of events that fall within design specifications. The prioritizing of engineering technologies as hazard- management tools reflects both a characterization of nature as separate from humanity, and of disasters as outcomes of natural risks that are inflicted on unfortunate humans who bear little or no responsibility for their creation.

This view has weakened considerably in recent decades as scientists, most prominently the geographer Gilbert White (Hinshaw 2006), have revised notions of causation to include a greater role for human agency (Mileti 1999; MacDonald et al 2012). Disasters are now widely regarded as joint products of natural risks and human vulnerabilities. Further, the human contribution to disasters is not simply a function of decisions about exposure and protection that render us more or less likely to suffer loss. We humans are also expanding our capacity to change processes that generate environmental risks. The apotheosis of this discourse is human-caused climate change, a phenomenon now accepted by the bulk of the world's scientific community.

An expansive interpretation of human agency has helped to broaden the range of risk-reduction measures that are available for use. Public policies are shifted away from a dominant emphasis on technological fixes toward a mix of adjustments that adds many anticipatory measures and non-structural alternatives. These include risk educa-





Clockwise (top left)

Fig. 22. Sundarbans, India/Bangladesh Open Domain 2008. The Sundarbans mangroveforest lies on the delta of the Ganges, Brhamaputra and Mghna rivers on the Bay of Bengal. The site is a complex network of tidal waterways, mudflats and small islands of salt tolerant mangrove forests. The Sundarbans provides sustainable livelihoods for millions of people in the vicinity of the site and acts as a shelter belt to protect the people from storms, cyclones, tidal surges, sea water seepage, and intrusion. The area has been a UNESCO site since 1987.

Fig. 23. Dujiangyan, China, © Keso S. 2012. The construction of the Dujiangyan irrigation system began in the 3rd century BC. This system still controls the waters of the Minjiang River and distributes it to the fertile farmland of the Chengdu plains. In 2000, Dujiangyan became a UNESCO World Heritage Site.

Fig. 24. Tambomachay, Cuzco Peru. © Diego Delso. Situated in the Peruvian Andes, Cuzco developed, under the Inca ruler Pachacutec, into a complex urban centre with distinct religious and administrative functions. It was surrounded by clearly delineated areas for agricultural, artisan and industrial production. Tampu Mach'ay (see image) is an archeological site consisting of a series of aqueducts, canals, and waterfalls that run trhough the terraced rocks. The city of Cuzco became a UNESCO World Heritage site in 1983.

Fig. 25. Hawaii Volcanoes National Park, Kilauea © Neal Wellons, 2015. Two active volcanoes on the Big Island of Hawaii, Mauna Loa and Kilauea, are located within Hawaii Volcanoes National Park. These volcanoes were and still are sacred to the Ancient Hawaiians, who would travel to their summits to make offerings during eruptions. Kilauea is the home of the volcano goddess Pele. As the most active, non-explosive volcano in the world Kilauea is also of great interest to volcanologists. The park became a UNESCO site in 1987 and is a unique example of significant island building through ongoing volcanic processes. It represents the most recent activity in the continuing process of the geologic origin and change of the Hawaiian Archipelago.

tion and information systems, conservations of ecosystems and environments that provide risk-reduction services, social networks that mobilize grassroots capacities for action and increase human resilience, hazard-sensitive land-use regulations, and insurance schemes that incorporate risk-reduction features (e.g. Grunfest 2000; Wood et al. 2012). These alternatives have the advantage of treading more lightly on the physical environment, reducing levels of exposure to loss, redressing inequities in the burden of hazard, mobilizing at-risk populations to act in their own defense, and offering prospects of greater resilience and sustainability in the long term—all objectives that are difficult to achieve by structures and reactive means alone.

Almost all the above measures have antecedents or analogs in previous eras. Some are more emergent, ephemeral or transitional, while others more long-lasting. Some are more rigid, while others more flexible. Some may require the skills of experts and high technology, but others are reliant on the mobilization of grassroots social capital. Differences in risks and sites as well as differences in populations and the choices they are willing to entertain existed in the past, creating a dynamic human ecology of hazard. In seeking to conjugate human responses to contemporary environmental hazards, policymakers and environmental managers face a diverse and ever-growing set of alternatives that they could adopt.

Insofar as many of these neglected measures often leave slight traces on the landscape, it is imperative that discussions of their importance be inserted into educational materials that explain World Heritage Sites—both those that are threatened by natural risks and those that illustrate human coping with risks. For example, in China and Japan vast efforts were devoted to protect structures against fires both natural and man-made, not just by placing fire-

Fig. 26. Forbidden City, China, © See-ming Lee, 2014. Copper and iron vats were part of the fire-fighting equipment in the Chinese Imperial palace. They were filled with water to be used to douse fires. From October to February every year, the vats were covered with quilts to prevent water freezing, and on very cold days they would be heated by charcoal fires. The oldest vats were cast during the Hongzhi reign period (1488-1505) of the Ming Dynasty. Each of the Ming Dynasty vats has two simple iron rings. The Qing Dynasty vats (pictured) have two beast-shaped bronze rings, a big belly and a small mouth. The Palace has a total of 308 copper and iron vats of various sizes.

fighting resources in strategic locations (as in the Forbidden City, a UNESCO site since 1987), but through social organizations of neighborhood volunteers with designated duties as fire watchers and fighters. The superstructure of hazard-susceptible buildings was, in effect, sustained by many formal and informal, non-structural, social and other human-centered means—means that presently get short shrift in informational programs associated with existing Heritage Sites.

Celebrating a more complete cultural heritage

Humans create the vulnerabilities that natural risks exploit. Likewise, the ability of humans to carve out "livability niches" in uncompromising or hostile environments has not only shaped many of the world's landscapes in distinctive ways but also has conferred valuable lessons about our capacity for adaptation in the face of uncertain future risks. It is, therefore, sign of intellectual progress that the human role in shaping hazard is now recognized in programs of cultural heritage conservation, such as the World Heritage List. Further, it is also a sign of progress that human adjustments to hazard receive equal billing with other kinds of cultural achievements.

It is high time that the gaps on the World Heritage Site List discussed in this article are closed. Only then can we celebrate a more complete cultural heritage, one that could serve as a stimulus to improve how humans manage hazards.

Note: All captions were written by Elke Weesjes based on the UNESCO World Heritage Site Web site: http://www.unesco.org.

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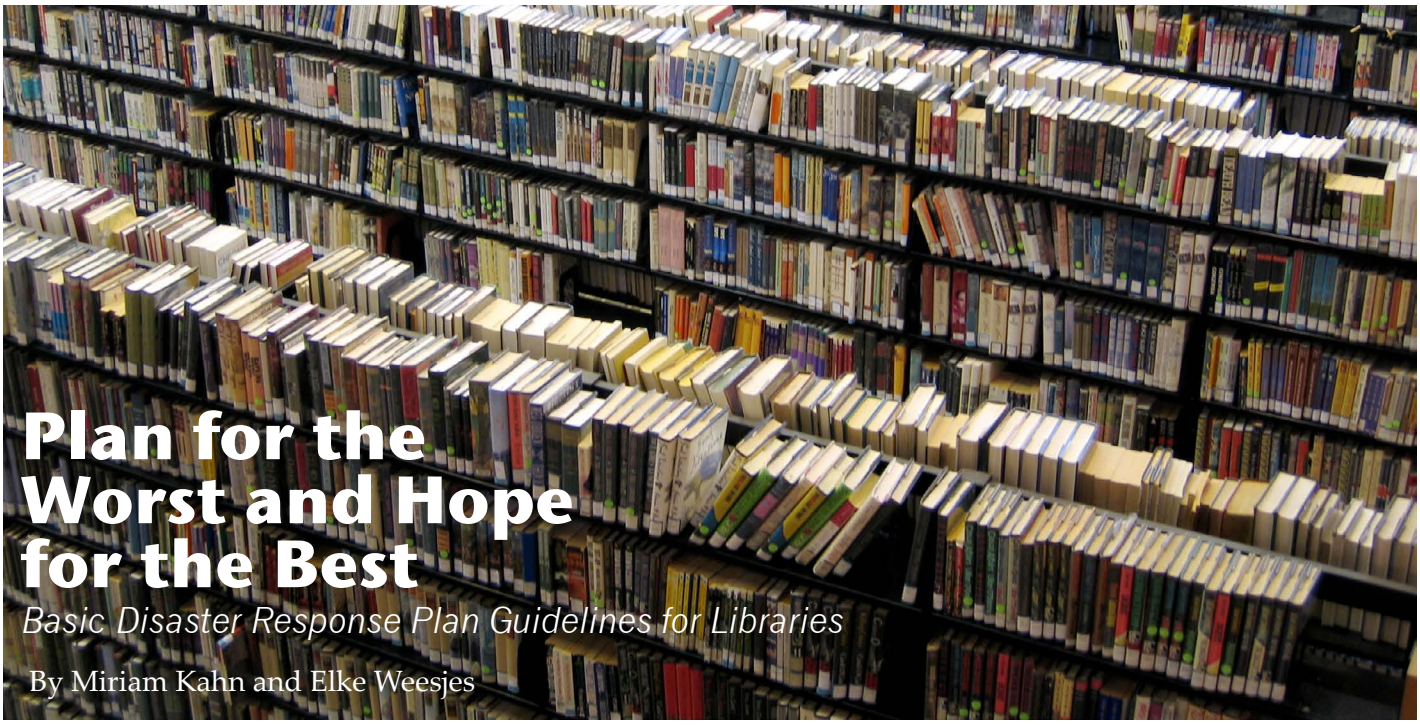
Mitchell has chaired the National Academy of Science ad hoc committee on the International Decade for Natural Disaster Reduction and the International Geographical Union Study Group on the Disaster Vulnerability of Megacities. He is a fellow of the American Academy for the Advancement of Science, a member of the International Research Committee on Disasters, and founder of the international journals Global Environmental Change and Environmental Hazards.

Recent publications include an assessment of risk governance in the world's largest cities; an advocacy piece on an expanded role for natural hazards education in UNESCO's World Heritage site program; and papers on local recovery from Super Storm Sandy and the co-production of storm surge risk information. He is currently completing a project supported by the Robert Wood Johnson Foundation and the Pew Charitable Trusts that explores the utility of Health Impact Assessment in the process of post-disaster recovery and preparing a paper on ways to grow the hazards constituency.



Plan for the Worst and Hope for the Best

Basic Disaster Response Plan Guidelines for Libraries

By Miriam Kahn and Elke Weesjes

Boston Public Library © Jan David Hanrath

IN 1966 THE ARNO RIVER IN FLORENCE, Italy, flooded its banks. Millions of valuable artworks, manuscripts, and rare books were damaged and destroyed when water inundated the city's museums, historic churches, and libraries. The flood was a wakeup call for cultural institutions worldwide and it formed the impetus for a more organized disaster response for cultural property. Changes, however, didn't occur overnight. In the United States, for example, during a 1976 Library of Congress planning conference, one of the speakers, Stephen Salmon (at the time executive director for Systemwide Library Planning at the University of California, Berkeley) noted that almost all American libraries were glaringly unprepared for disasters. Salmon called for a more proactive approach (Silverman 2006).

In the intervening four decades, successive generations of professionals have improved the practices of preservation, conservation, and restoration. In addition, an increasing number of cultural institutions have created disaster-response plans.

Since the dawn of the Information Age, the nature of public libraries has changed significantly. Libraries have capitalized upon new technologies and forged partnerships with both community groups and government agencies to provide a wide variety of services, including access to computers and the Internet. A 2010 report stated that in one single year, 77 million Americans age 14 or older (32 percent) took advantage of Internet access in a public library. If it weren't for libraries, according to the authors, "millions of Americans would not have reliable Internet access in a digital age when a connection is often needed to complete school assignments, apply for jobs, or secure government services" (Becker et al. 2011).

This role as a hub of electronic information becomes even more essential in times of emergencies. In the aftermath of disaster, many people rely on public library Internet access to request aid, try to find missing family and friends, file Federal Emergency Management Agency and insurance claims, and begin rebuilding their lives. Libraries also serve as a safe haven from the chaotic storm of displaced lives.

For all these reasons, it is critical that library services be rapidly restored after disasters. To ensure an effective response and to minimize interruptions, libraries need to prepare for disasters.

Today, just over half of all libraries in the United States have a disaster-response plan in place.[1] Many of these plans are unfinished due to understaffing, internal complacency, and bureaucracy. Subsequently, when a disaster strikes, incomplete or untested plans are often put into practice and only amended or revised in the aftermath, when the damage has been done.

While the situation in the United States has definitely improved since Salmon's alarming statement, there is still plenty of room for improvement. Many libraries struggle to design plans and keep them current. In order to jumpstart the disaster-planning process at libraries that do not have a plan or have an inefficient plan in place, Miriam Kahn has written a number of comprehensive guidelines that can be used as a tool.[2]

The most common library disasters involve flooding—caused by broken water pipes, hurricanes, cyclones, tropical storms, torrential rains, and flooding of nearby bodies of water. As such, Kahn's guidelines—also useful for other cultural institutions—focus especially on water damage.

Disaster planning

Disasters come in all sizes. Sometimes disasters affect a

1 This percentage is based on Miriam Kahn's personal experience working with libraries.

2 This article is based on: Kahn, Miriam. 2012. Disaster Response and Planning for Libraries, Third Edition, American Library Association.

small part of a building, sometimes the entire building, and in the most extreme and tragic times, the entire community. To respond quickly and efficiently, libraries must plan and prepare for whatever comes their way. Every size of disaster involves the same basic procedures, so it makes sense to start with a small-scale or localized plan and build on that. A well-thought-out disaster-response plan will decrease the amount of time it takes to implement disaster-recovery procedures, and it should decrease the loss of materials and contents while increasing the recovery rate.

So, where to start? First, libraries have to select a disaster-response team and a team leader. This leader can't be the director; he or she has other responsibilities and will be busy communicating with administration, insurance companies, and disaster-response companies. Once the disaster-response team is formed, it is useful to create identification cards and obtain matching vests or T-shirts for team members. After all, in the chaos that follows disaster, it is critical that the public and outside first responders can identify members of a library's disaster-response team.

The next step is conducting a building survey. The purpose of such survey is to look for evidence of past disasters--for example old water damage, which should be easy to find, as well as areas of the library that are potential disasters. As part of the building survey, team members should draw a basic floor plan that locates emergency exits, fire alarms, fire escapes, and fire extinguishers, and identifies rooms according to their purpose or contents. Ultimately, this floor plan would show where the first- and second-priority collections (further discussed below) are located for removal and recovery. Library staff may not be able to enter the building and might have to show firefighters or a disaster-response company where the most vulnerable and valuable items are that require removal and treatment. Such a comprehensive and detailed floor plan is especially important.

Next, library departments must prioritize their collections based on their mission and their services to patrons and clients. This phase of the planning process is often the most difficult one. The process looks at the library's collection—besides paper-based collections this also includes non-print and non-paper collections (such as photographs and audiovisual materials); computers and their associated magnetic media; and office, administrative, and institutional records—for unique and irreplaceable items in an attempt to determine in what order items should be rescued and recovered should they be damaged in a disaster. Once such items are identified, it is also essential to examine how each department's collection fits into the mission of the institution as a whole. In the case of a large-scale disaster, where the entire building is affected, the disaster-response team will have to know which departments are more crucial to the institution's mission in order to rescue what they can.3 Based on all this, a prioritization checklist—reviewed at least once a year—can be formulated.

It is important to recognize that the increased dependence of libraries on computers, data, databases, telecommunications, websites, e-mail, data-sharing services, and other technological advances requires heightened diligence in disaster response and contingency plans. A specific information systems disaster-response plan should both stand alone and be integrated into the general disaster-response plan for the library. In addition, the liaison of the information systems disaster-response team should be included in all phases of disaster planning.

The next step in the planning phase is designating jobs to specific disaster-response team members. These jobs include:

- Creating a contact list with local and regional[4] suppliers of packing and shipping products and services (including a freezer- or cold-storage facility); preservation consultants and conservation facilities[5] that specialize in disaster response; disaster- response/drying companies; security companies; contractors; and office equipment rental companies.
- Designating a place where the disaster-response team can gather if the building is damaged or inaccessible. Select one location on, and one location off library grounds.
- Identifying temporary office space (for administration and non-public services) and empty storefronts and shopping centers in a nearby community. The latter are perfect locations for temporary library and archive sites, and off-site storage.
- Reviewing the insurance policy. This should be done

3 A disaster does not mean the institution will get a completely new collection. Very few if any institutions have the insurance to cover the cost of purchasing an entire collection. The only time an institution may have the opportunity to do so is when the building burned to the ground or lost in a flood.

4 Local companies and businesses can be contacted in case of an isolated small-scale disaster, if a whole community is affected, their regional counterparts should be contacted.

5 It is important for the person or company providing assistance to be familiar with the collection and the institution's policies. The outside consultant or company is not emotionally tied to the collections and is therefore capable of presenting choices and options where the staff's emotions and attachment to materials may rule. Consultants provide additional assistance by recommending disaster response/drying companies and others who specialize in conservation of the unique, fragile, and non-print or nonpaper items in the collections. Conservation centers also provide conservation of specific items that require specialized treatments. Such items should have been identified during the prioritization phase. Conservators can also provide you with guidelines for removal and stabilization.

at least once a year. The team member tasked with this job should also make sure to ask the institution's insurance company if there are procedures that must be followed for a successful claim.
- Updating the building survey and prioritizing recovery decisions. Like the insurance policy, the survey should also be reviewed at least once a year.
- Putting together or purchasing a basic disaster-response kit.
- Finding out who is responsible for stocking and maintaining the first-aid kits, which should be checked regularly.
- Creating a communication plan. Discuss with the public information or communications officer how the library will inform non-staff workers of the disaster and decide who will handle the different aspects of the communication. Create a basic press release for the public and a script for informing staff of where to go and who will be needed when.

Disaster response

The above disaster-response planning is performed when all is sane and quiet, and decisions are made in a rational, carefully considered manner. However, these plans are activated when all is chaos, amidst conflicting demands to restore services, collections and access to building. When it comes to dealing with the disaster, no matter what shape the disaster response plan is in, the disaster-response team should follow the plan. After the disaster is over, libraries should revise the plan to take into account issues encountered during the crisis.

Phase one: responding to notification of the disaster

The first steps in phase one of the response entail are as follows: calling for help, evacuating people from the building (whenever possible—some disasters such as earthquakes and tornadoes require people to stay inside or proceed to a tornado shelter), activating the disaster-response team, and meeting at the previously selected location. Those in charge should close the building or the damaged area to the public, shut the water off, and find out if the other utilities are on or should be turned off.

Some sample immediate-response procedures are:

If there is a fire, a team member should pull the fire alarm and evacuate the building. Proceed to assemble the staff at the designated meeting place. Confirm that all people, including all staff members, have left the building. Notify the police and fire department if there are missing staff members. Do not re-enter the building.

In case of natural disasters, team members must follow the directions from the emergency management agency announcements. For tornadoes, proceed quickly to tornado shelters in basements and ground-floor rooms without windows. In the case of hurricanes and flooding, there are usually warnings issued ahead of time, so team members should instruct maintenance staff to board up the windows, turn off computer systems, make certain data backup is complete and stored off-site away from the potential disaster area, and let staff know where to report when the hurricane of flood has passed. If those inside the building cannot leave safely, they have to go to the shelters and wait for the storm to pass.

Once everything is safe, the disaster-response team leader should brief the team about the situation. Review the responsibilities of the team and call in additional staff as needed.

Phase two: assessing the situation and damage

This phase of the disaster-response plan begins when the building or area is safe to enter. First, the disaster-response team needs to assess the damage. This entails walking through the damaged area to see what really happened while making a list of the areas that require pack-out, cleanup, or removal to storage. In addition to the disaster-response team, the information systems team should be called in to determine the extent of damage to the online public access catalog, circulation systems, website, and all electronic resources. Next, team members should brief the director of the library about the situation and activate the previously created communications plan. Together they must decide if the building or area needs to remain closed, and if so, estimate for how long. Finally, the team should assemble the necessary supplies to begin recovery and cleanup and contact the appropriate outside assistance, such as the conservation consultant, drying or disaster-response company, the insurance company (to notify that a disaster occurred).

Phase Three: Beginning to Rescue and Recover Collections

This phase kicks off with the removal of standing water and debris. Once most of this is cleared, team members should review the prioritization checklist, its previously established criteria as well as the collection policy and mission statement for the institution. They should not change the criteria or prioritization at this time. After all, decisions made under stress or when emotions are high are not always rational and justifiable.

Team members and those involved with the recovery process can use photography or video to document the damage for the insurance adjuster. If the damage is extensive they can ask the insurance company to send an adjuster who specializes in water damage claims. Copies of the floor plan can be used to prioritize recovery operations, indicate the wet items to be removed for packing and where the packing area will be. Team members should make notes of the types of damage (water, soot, debris) to different areas of the collection and the types of cleanup necessary when the recovery phase begins.

If there is structural damage to the building, such as a hole in the roof, broken windows and or holes in doors and walls, the damage should be listed. The team member responsible should contact the previously selected security company to protect the building from unauthorized persons. He or she should also ask maintenance staff to board up the damaged windows and doors and call the construction company to cover the holes in the roof. The latter must be done immediately, since the roof is a prime candidate for additional damage to the structural integrity of the building and an avenue for mold infections.

When the outside contractors for assistance with response and recovery are contacted, the disaster-response team member designated as the liaison and another assigned

staff member should get together with the contractor to:

- Review the priorities for recovery and the "to do" list.
- Walk through the damaged area again.
- Schedule frequent--at least daily--meetings with the contactor.
- Document all meetings, conversations, telephone calls, and e-mail messages.
- Provide written instructions for all changes to bid and get prices before approval of changes.
- Approve all changes in writing.

The liaison should monitor the activities of the contractor and his/her staff: how they are handling the collection and how they are cleaning the building and collection. Your conservation consultant can help with this.

Next, individuals involved in the recovery of the collections should begin to pack the water damaged or smoke damaged items for freezing or air-drying. Freezing books buys time to dry and clean the building and assess the scope of damage and loss of collections. Air-dried books will swell and distort while drying and may need to be rebound professionally before returning them to the shelves.

The dry and undamaged items must be moved into storage or a temporary access area if a large portion of the area or building was damaged. This will prevent secondary damage from increased levels of moisture and relative humidity. If it is impractical to move the undamaged items to another location, then set up fans and drop the temperature in the damaged area. Air movement and decreased temperature will lower the chance for a mold outbreak.

Irreparably damaged items and debris should be discarded as soon as possible, so they no longer contribute moisture to the building and other materials. This includes wet ceiling tiles, and loose carpet squares. Similarly, wet curtains, area rugs, and furniture should also be removed to decrease the moisture in the area. These furnishings can be professionally cleaned and dried before storing them in a safe place, until the environment (temperature and humidity) is stabilized and the building is clean and dry. All of the above will decrease a chance for a mold outbreak.

It is important to note that stabilizing the environment should be a first priority. Most people assume you raise the temperature to dry a structure. Unfortunately, if you do so, you increase the risk of mold infection in the building and HVAC system. It also is essential to close off the space between the suspended ceiling and the true ceiling to keep dust and debris out of the HVAC system and thus the entire building.

Regarding computer equipment, all damaged or wet items must be cataloged and identified before they can be removed for cleaning, repair, and recertification. Undamaged computer equipment can be moved to a safe location, but the team member responsible for this must coordinate with the information systems' disaster-response plan. Last but not least, a team member should check with the insurance adjuster to determine criteria for replacement of computers and restoration of service.

If the facility's maintenance staff are available to dry and clean the building and move the collections, it is useful to have a disaster-response team member act as liaison to answer questions. He or she can provide some basic training and information about handling wet materials and packing boxes. In addition, consultants can give all personnel a quick refresher in handling and packing wet books.

Once the response and recovery operation is underway, it is important to notify the press as to the scope of the disaster, how long the library will be closed or partly closed, how to contact the institution, and whether donations or assistance is needed. To maintain a cohesive message to the public, it is important that the designated spokesperson or public relations officer from the institution is the only person speaking directly with the media.

In the case of a wide-area disaster, where the building or surrounding areas are destroyed or untenable, the library needs to relocate to another branch—if the library is part of a branch system—or a (preselected) location altogether.

When the disaster has only affected an isolated area, the director can choose to reopen the library. In this case, the team should determine how to get the undamaged materials to patrons while keeping them out of the damaged area. While being repaired, the relative humidity and temperature of the damaged area should be checked to confirm that the HVAC system is keeping the environment stable.

Crisis counseling and disaster plan modifications

During the response and recovery phases, adrenaline is surging through library workers' staff' veins, making emotions run high, a symptom of physical and mental stress. Sometimes the stress manifests itself in an inability to function, a feeling of guilt and a drop in morale. To address and monitor the psychological impact of a disaster, a library director can arrange for grief or crisis counselors to meet with staff. Once the situation has returned to normal, staff members can talk with these counselors in groups or individually to process their experiences.

This is also the time to bring together staff, disaster-response team members, and outside contractors to discuss and analyze the disaster and its aftermath in practical terms. It is important to answer questions and evaluate the response plan for its strong and weak points and to modify the plan accordingly. For example, during the bombing of the Murrah Federal Building in Oklahoma City in 1995, the windows of the Metropolitan Library shattered. The disaster-response team members discovered their first-aid kits were inadequate for dealing with anything more than a small cut or a minor injury. Their first task upon evaluating the disaster-response plan was to upgrade the first-aid kit to include more supplies to deal with medical emergencies.

In terms of such revisions, the person in charge should avoid making the plan so specific that it only covers the previous disaster. He or she should keep the disaster-response team's roles and responsibilities generic, while considering additional activities to make recovery faster and more efficient.

It is clear that disaster-response planning is a lot of work and because of ever-changing circumstances, such as renovations, reorganizations, and new or leaving staff, the job is never done. In order to be effective, the plan needs to be revised and updated regularly. Nevertheless, all these efforts pay off. Designing a plan and following it through with it will ensure that a library staying in business rather than fails to reopen.

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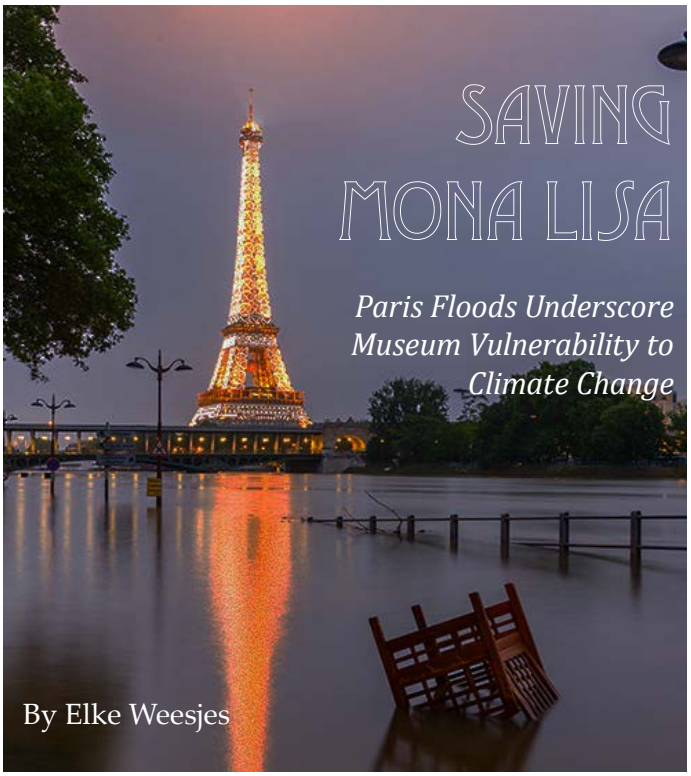

Paris © Loïc Lagarde, 2016

IN EARLY JUNE, a slow-moving storm system caused widespread flooding across Europe, killing 19 people in four different countries and causing large-scale evacuations.

It wasn't only residents that were evacuated—in Paris, where the Seine rose 20 feet above normal levels and inundated much of the city's historic center, artwork was also scuttled as museums scrambled to move their world-renowned collections to safety (Durando, 2016)

The staff of the Louvre and Orsay museums, home to famous works such as da Vinci's Mona Lisa and Degas' Little Dancer of Fourteen Years, moved a total of 35,000 pieces from basement levels to upper floors.

"For the museums, even if fortunately there isn't any flooding of storerooms as of today, there is an automatic process [when the river rises] above 5.50 meters (18 feet) to move works in the deepest storerooms higher," *Reuters* quoted Paris deputy mayor Bruno Julliard as telling *France Inter* radio on June 3 (Lough and Azzous, 2016).

Fortunately, only the Orsay museum suffered—very minimal—water damage.

"There were small infiltrations in the basement but we are not up to our ankles in water," Orsay museum spokeswoman Amélie Hardivillier told the *New York Times* on June 6. "All of the artworks were evacuated on Friday, so there is no damage" (Blaise, 2016).

The Louvre and Orsay—which both reopened on June 8, five days after their emergency closure—were well prepared after holding a dry run of their respective emergency flood plans earlier this year. The Louvre plan requires art to be moved from lower levels to higher levels of the museum within 72 hours of the 18-foot rise mentioned by Julliard. For the Orsay, it's 96 hours.

Rising sea levels and increased storm frequency are threatening museums worldwide

Pérez Art Museum © Dan Lundberg, 2014

While it's comforting to know that emergency procedures are keeping the great artworks of Paris safe, France is far from the only place where cultural artifacts are threatened by flood.

Rising sea levels and increased storm frequency are threatening museums worldwide and, subsequently, it is now their duty to play a more active role in safeguarding cultural heritage from the impact of climate change.

In the case of older museum buildings like the Louvre and the Orsay, this can mean putting in place elaborate evacuation plans that mobilize hundreds of specially-trained volunteers to prevent water from entering by building sandbag dams and blocking air ducts. Newer buildings, such as the Whitney in New York City and the Pérez Art Museum in Miami, Florida, have been able to incorporate flood prevention into their construction.

IF WE DESTROY OUR PLANET, WE DESTROY NOT JUST OUR CURRENT WAY OF LIFE BUT THE HUMAN HERITAGE ITSELF

Halfway through its construction, the new Whitney building was hit by Superstorm Sandy and more than five million gallons of water flooded the site, *The Atlantic* reported (Whitaker, 2016). The disaster was a wake-up call for Whitney architect Renzo Piano, who hired naval engineers to create a custom flood-mitigation system for the building following the storm. One of the features of this innovative system is a 15,500-pound water-tight door, similar to those on U.S. Navy Destroyers.

"Buildings now have to be designed like submarines, " Piano's assistant Kevin Schorn, told *The Atlantic* (Whitaker, 2016).

The Whitney is now protected against a flood level of 16.5 feet (seven feet above the water level during Sandy) and can withstand an impact from up to 6,750 pounds of debris.

The architects of the Pérez Art Museum, which was completed in 2013, also incorporated flood prevention. The three story structure was elevated about eight feet above sea level, has standby generators in case of a power failure, hurricane resistant glass, a porous-floored parking garage and rain gardens, both of which were designed to capture rain water and funnel it into the ground water system, thus reducing local flooding.

In recognition of these and other architectural achievements, the Pérez Museum received a Leadership in Energy & Environmental Design (LEED) Gold Rating for its innovative, durable, and sustainable design.

For museums worldwide that struggle with the impacts of climate change, the Pérez serves as a model of how to withstand those impacts, not only by being environmentally sustainable, but also by actively minimizing contributions to climate change. And that is becoming increasingly important if we want to preserve our cultural heritage, said English art critic and *Guardian* writer Jonathan Jones.

"[The flooding in Paris] is not just a bizarre consequence of a bit of bad weather. It is a stark warning that civilization can only survive in harmony with nature," he writes. "If we destroy our planet, we destroy not just our current way of life but the human heritage itself – the high points of civilization will be forgotten, drowned, ruined, effaced" (Jones, 2016).

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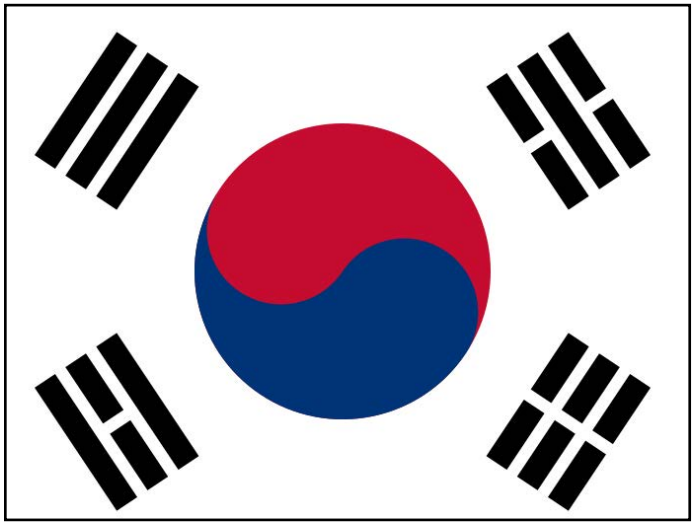
Our Shop

Readers explain their Organizations and Projects



Disaster Risk Reduction, Korean Style

By David Kasdan and Kyehyun Kim

IN 2010, THE REPUBLIC OF KOREA took a significant step toward the global effort for disaster risk reduction with the Incheon Declaration and Regional Roadmap and Action Plan (REMAP). Emerging from the Fourth Asian Ministerial Conference on Disaster Risk Reduction, this initiative focused on mainstreaming disaster risk reduction (DRR) and climate change adaptation into development. South Korea does not suffer nearly as many natural hazards as its regional neighbors, yet it has made a commitment to DRR that capitalizes on its strengths for broader benefits.

South Korea's motivations and credentials supporting the REMAP are intertwined, as the country is an embodiment of rapid development that continues to find new ways to use and share its expertise. The technological and industrial capacities of the country have resulted from targeted public-private partnerships across sectors, including automotive engineering, ship building, consumer electronics, biotech, higher education, television, music, cosmetics, and even baby products. The government is now encouraging a nascent disaster risk reduction technology industry through the Ministry of Public Safety and Security Global DRR Technology project. This initiative will enable Korea to position itself as forerunner in DRR tools, such as weather monitoring devices, comprehensive emergency notification systems, GIS-integrated flood controls, and disaster response drones.

What is unique about this effort is the paradigm employed. Several times in the past decades, the government has proposed campaigns aimed at assuring global leadership in a particular industry. It then provides encouragement to domestic companies to realize its designs through favorable legislation, special exemptions, or other facilities that assist private sector partners in doing the heavy lifting for national interests. This is based on the chaebol (large family-owned conglomerates) model that helped South Korea rise from one of the poorest nations on earth to an economic powerhouse in a few decades, as seen by the widespread projects done by such companies as Hyundai, Samsung, and Lotte.

In the context of DRR, South Korea has a budding industry of small and medium enterprises making devices and systems that have direct application to the objectives of sustainable development and climate change adaptation. It has now identified an opportunity to leverage this industry and export its DRR technology to its neighbors, who are among the United Nations International Strategy for Disaster Reduction (UNISDR) targets for sustainable development efforts (e.g. Indonesia, Bangladesh, and Mongolia). It is a winning situation in several respects—developing countries get access to new DRR technology; global needs for DRR and climate adaptation are met; and South Korea develops an international commodity in an upcoming industry while affirming itself as a significant player in international affairs .

While Korea is relatively safe from many of the hazards that concern the UNISDR, it does realize that its economic interests are closely related to the welfare of its regional neighbors

The MPSS's Global DRR Technology project has the support of the UNISDR, domestic companies, and research institutions. As a public-private partnership, the project aims to coalesce around the UNISDR push to apply technology to mitigate disasters as outlined in the Sendai Framework for Disaster Risk Reduction 2015-2030. The project speaks directly to the Sendai Framework's target to "substantially increase the availability of and access to multi-hazard early warning systems and disaster risk information and assessments," as well as the priority for action that calls for "investing in disaster risk reduction for resilience." While Korea is relatively safe from many of the hazards that concern the UNISDR, it does realize that its economic

interests are closely related to the welfare of its regional neighbors. Thus, Korea has indirect – but nonetheless significant – concern with research and development in DRR technology.

The substance of the Global DRR Technology site (www.pr4gdm.org) is a mix of product listings, interactive forum, case studies, and informational references. Several international conferences and workshops have been held to determine the needs of customers and enhance the web site in ways that will allow South Korea to share this DRR technology. If an emergency management agency official in Viet Nam wants to find an integrated flood control system, then the web site has a search function that would allow her to select an appropriate product from a South Korean company. If a public safety minister in Nepal seeks comparative policies to identify best practices for evacuations, then the Web site can provide a repository of such information with a few mouse clicks.

The Global DRR Technology site is arguably unique; other DRR sites provide information to visitors, but do not have opportunity to interact or contribute to its content. The Global DRR Technology site encourages a higher level of engagement with discussion forums, case-based learning modules, and direct links to product manufacturers. Site visitors can also contribute their own policy, research, or notifications of DRR technology developments. Furthermore, the site includes such useful features as videos of product installation and usage, as well as academic case studies that assess the effectiveness of the products. While it is still in its infancy, the site is continually adding content and improving functionality. Korea is investing a considerable effort into the Global DRR Technology project with government funding, academic research, and private industry product development. The hope is that South Korea can be a source of help for other countries to cope with disaster risk and climate change through DRR Technology advancements. For more information, navigate to www.pr4gdm.org.

Authors

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Call for Submissions

The *Observer* invites readers to submit items of interest for publication in upcoming issues. The *Observer* is undergoing a makeover and many more exciting changes are in the pipeline. Throughout this process we would love to hear from you. All comments and suggestions are welcome.

Our mission is to close the gap between scientists, policy makers, and practitioners by providing coverage of disaster issues, recent disaster management and education programs, hazards research, political and policy developments, resources and Web sites, upcoming conferences, and recent publications. We are looking for papers and field reports that help narrow the aforementioned divide. In additon we are looking for book reviews that contribute to the debates and dicussions in the field of disaster research.

The deadline for the next issue of the *Observer* is September 25, 2016.

Please send items of interest to
Elke Weesjes
elke.weesjes@colorado.edu.

Blackout (2015)
Length: 60 min
Director: Callie T. Wiser

By: Elke Weesjes

On a sweltering evening in July 1977, lightening struck a Consolidated Edison substation in Yonkers, New York, setting off a disastrous chain of events that resulted in massive power failure in New York City and much of neighboring Westchester County. Seven million people plunged into darkness and when the lights went out, all hell broke loose. Neighborhoods from East Harlem in Manhattan to Bedford Stuyvesant in Brooklyn were devastated. Shops were looted, windows were smashed, and cars and buildings were set on fire. Since then, many have identified the blackout of 1977 as New York City's darkest hour.

How can we explain such a social phenomenon? This question is central to *Blackout*, a part of the new PBS documentary series, "American Experience."

Blackout is a thoughtful and well-balanced documentary that brings together eyewitness accounts and archival footage. First responders, Con Ed employees, journalists, local residents, and shop owners tell their stories of what happened when the lights went out. Eyewitness experiences vary wildly based on location—some remember violence, chaos, and despair, while others remember spontaneous gatherings, singing, and neighborhood barbecues.

One of the eyewitnesses interviewed in *Blackout* is Kevin Zraly who was working as a wine steward at Windows On the World on the 107th floor of the World Trade Center at the time. He recalled watching how the lights went off borough by borough. Zraly's boss provided sweaty customers (the air conditioning had stopped and the city was experiencing a heat wave) with free champagne and instructed the band to keep playing by candlelight.

In the absence of television or radio announcements, the diners were blissfully unaware of the rapidly escalating situation on the other side of the East River. In central Brooklyn, the first shops were looted within 30 minutes, according to local resident, Chris Vanager. He remembered hearing bumping noises outside of his apartment and when his mother opened the front door, they saw neighbors coming up the staircase with television sets, refrigerators, and record players.

Police officer Patrick Marshall, who was on the street at the time, recalled people everywhere, hundreds per block. While Con Ed frantically tried to get the power restored—a difficult task hindered by the fact that the energy restoration plan hadn't been updated since 1965—police officers and fire fighters were instructed to do the best they could. Without an overview of the situation (no one knew exactly how widespread the blackout was) and clear instructions, it wasn't easy said Marshall, who tried to stop the looting. "We had sticks," he said. "We had our hands. You'd grab people and just toss them out. We were so outnumbered, we'd push them back as far as we could. After a while there was, what can you do? It was insanity."

Many of Marshall's colleagues had been laid off due to large-scale cuts in public services. While the 1970s was an economically troubled time for the United States in general, New York City—where unemployment rates soared to 12 percent in 1975—was hit particularly hard. At the time of the blackout, the city was on the brink of bankruptcy and had been forced to adopt a number of austerity measures. Alongside firefighters and police offers, tens of thousands of other city workers had also been laid off. The effects were visible. The city, once famous for its bright lights and endless opportunities, was now known for widespread crime, burned out buildings, piles of garbage bags, graffiti, unemployment, and homelessness.

"When a population is neglected for so long, and then they keep cutting your social services, your education, your hospitals, your fire departments; it's going to boil, and sooner or later, something is going to come out of that," said Brooklyn resident Ernesto Quiñonez, reflecting on the night of the blackout.

The blackout provided the heat needed to go from boiling to boiling over. The event lasted 25 hours, during which there were 1,000 major fires, 3,176 arrests, 132 policemen injured, and 1,576 businesses looted or set on fire.

Brooklyn sporting goods storeowner Elzora Williamson and her husband were victims of the looting.

"We thought of it as more than a store," Williamson said. "We taught the young people how to open a bank account, how to fill out the forms."

When the Williamsons arrived at their store on the night of the blackout, they saw those same people looting their property. That night, the couple lost $350,000 worth of merchandise. They eventually reopened the store, but according to Williamson, it was never the same again.

Why do rioters destroy their own neighborhood?

Other shop owners, many without any insurance, lost faith in their communities and left. Their stores remained vacant for years.

"My neighborhood stayed that way for probably 15 years," Vanager said. "New Lots Avenue (in the East New York neighborhood of Brooklyn) never opened back up again. Everybody that lived there, those mom-and-pop stores, they just shut down and they left."

Being forced to live with the consequences of the damage raises the question of why rioters chose to destroy their own neighborhoods. Of all the people interviewed in *Blackout*, only Quiñonez attempted to answer that question.

"You can't hit your mom because she's your mom, so you hit your little brother," Quiñonez said. "Something like that is what was happening. You couldn't go after

these politicians that were killing your neighborhood, so you went after your little brother. You went after each other."

This answer is only partially satisfying and unfortunately, *Blackout* does not further investigate the issue. While the reasons that people riot and loot are diverse, in the past fifty years several social experiments have tried to determine why disenfranchised individuals would destroy their own community knowing that they still have to live there the next day.

Situational Anonymity

In 1969, Stanford psychologist Philip Zimbardo observed that certain environments "convey a sense of transient anonymity in those who live or behave in their midst." People who live in such circumstances are deindividuated[1] and do not have a sense of community, according to Zimbardo. When deindividuated people are unable to impact their environment constructively, they often resort to violence and destruction instead.

To demonstrate how situational anonymity is related to vandalism, Zimbardo conducted an experiment in Palo Alto, California and in the Bronx in New York City. The psychologist felt that—unlike in the Bronx—in Palo Alto community spirit thrived, people cared about the physical and social quality of their lives, and had access to resources to work at improving both.[2] He instructed his teams to place abandoned cars (in good condition but without license plates and hoods slightly raised) in both places.

In the Bronx, within 10 minutes, passersby stripped the car of its battery, radiator, and the contents of the glove box. In the next 24 hours, the tires, seats, and dashboard parts were removed and when there was nothing left of value to strip, random destruction began.

In Palo Alto the car was not vandalized. Quite the contrary happened. A concerned citizen closed the hood when it started to rain a few days after the car was abandoned. Additionally, when the team drove the car back to the Stanford University campus a week later, three local residents called the police and reported that an abandoned car was being stolen.

According to Zimbardo, this experiment's main message is that "conditions that make us feel anonymous, when we think that others do not know us or care to, can foster antisocial, self-interested behaviors"(Zimbardo 2007).

When we try to apply these lessons to the situation in New York City in 1977, we can see that the neighborhoods that suffered the most destruction were also the neighborhoods that had been the most neglected. Members of these communities felt anonymous, silenced, and robbed from an identity. Consequently, they did not experience these neighborhoods as their own.

Blackout emphasizes that residents of these neighborhoods fell into three categories: 1) criminals who quickly took advantage of the darkness and lack of police presence, smashing the first windows and stealing large expensive items, 2) people who wouldn't normally steal, but decided to take advantage of the opportunity to loot stores because "everybody was doing it," and 3) people who did not loot at all. Since these people and their motives were wildly different we can't know the underlying reasons for their behaviors. It was clear, however, that many looters that night were both angry and impoverished, according to Quiñonez.

"It was the neighborhoods that had been neglected that rioted, and it was basically people who were poor and hungry," he said. "The media paints it as 'Look at these criminals, it's race!' but it's not so much race as it is class. Black people didn't go after white people. Latinos did not go after the Italians. It was more about class. We didn't have, so we went, not even after those who had, we went after their stuff! It's an expression of anger. It's an expression of neglect, and it's an expression of need."

Other people in *Blackout* also point at an element of excitement.

"Looting is a complicated thing. People do it because they're greedy, because they need stuff," says historian Joshua Freeman. "It's also sometimes fun. It's the people at the bottom being on the top for a moment, and they know it's only for a moment, but who's going to stop you? […] That can be a thrill."

The fact that all of these different motives are discussed in *Blackout* is refreshing. After all, not every rioter is a protester with a political agenda. Some are criminals; others are thrill seekers or opportunists.

While Manhattan recovered from the blackout as soon as the power came back on, the same can't be said for Central and East Brooklyn. New Lots Avenue wasn't the only street where shops remained boarded up for the next 15 years. For instance, Broadway—once 4.5 miles of thriving economic and social activity—became one of the many streets to turn desolate and dangerous.

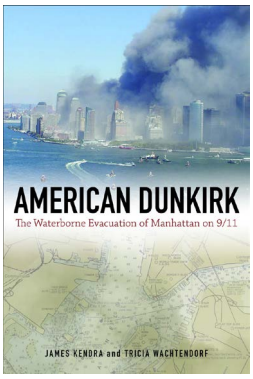
The final nail in the coffin was the crack cocaine epidemic that began in the mid-1980s and destroyed whatever was left of these already vulnerable communities. As such, it seems inaccurate to state that the black out of 1977 was New York City's darkest hour. Perhaps for parts of Manhattan, in other boroughs however, such as Brooklyn and the Bronx, it was only just the beginning of an even darker period characterized by gang violence, drugs, family homelessness, and AIDS.

REFERENCES:

Zimbardo, Philip. 2007. *The Lucifer Effect. Understanding How Good People Turn Evil,* Random House, New York.

1 Deindividuation: the immersion in a group to the point that one loses a sense of self-awareness and feels lessened responsibility for one's actions.

2 Zimbardo's book that discusses this experiment, *The Lucifer Effect* (2007), does not provide any context as to why he felt that people in the Bronx did not care as much about the physical and social quality of their life.



American Dunkirk: The Waterborne Evacuation of Manhattan on 9/11
James Kendra and Tricia Wachtendorf, 2016
ISBN: 9781439908211 (paperback)
182 Pages $24.95
Temple University Press

By Elke Weesjes

This book about the unplanned yet successful waterborne evacuation of hundreds of thousands of people stranded in lower Manhattan after the collapse of the Twin Towers on September 11, 2001 was published just in time for the 15th anniversary of the 9/11 attacks.

The authors, James Kendra and Tricia Wachtendorf, both directors of the Disaster Research Center at the University of Delaware, began their study of the multi-organizational response immediately after the attacks. When they arrived in New York City on September 13, 2001, their emergency management contacts allowed them access to response meetings, operation centers, staging areas, and even ground zero. While in the field they became particularly interested in the creativity and improvisation of those involved in maritime response operations in the immediate aftermath of the disaster.

A year later, they began an interview project and spoke to 100 people directly or indirectly involved in the waterborne evacuation, including mariners, waterfront workers, harbor pilots, Coast Guard officials, and emergency response workers. These interviews were supplemented by 18 interviews that are part of an oral history project at the South Street Seaport Museum in Manhattan. In addition, the authors reviewed hundreds of photographs, newspaper articles, news accounts, e-mails, and video footage. They used these sources of information to triangulate the information they heard in their interviews. With this approach, they have brought together the most comprehensive dataset available on the waterborne evacuation and their book, *American Dunkirk*, is a careful analysis of this dataset. In this book, of particular interest to students and faculty of emergency management, the authors weave together the voices of ordinary people who did extraordinary things under challenging circumstances. They then use this research to criticize the Incident Command System (ICS) and suggest a new approach to disaster management.

A Dunkirk-like operation?

For those who aren't World War II history buffs, it might be useful to briefly discuss the Dunkirk evacuation of 1940 (a discussion unfortunately absent from *American Dunkirk*).

During the early stages of the Battle of France (1940-1944), Allied troops in Dunkirk found themselves surrounded by the German Army. A window of opportunity to get out of this precarious situation presented itself on May 24, 1940 when Hitler ordered German forces to cease their advance on the French port. A day later, British Prime Minister Winston Churchill ordered the British Expeditionary Force to evacuate troops to Britain.

Since the docks in Dunkirk harbor were too badly damaged to be used, the Royal Navy searched nearby shipyards for suitable boats that could transport soldiers from the beaches to destroyers and other large vessels docked further out at sea. In addition, they put out an emergency call for citizens to make their vessels available. That call was heeded by hundreds of boat owners, some of whom also volunteered their services as captains. During the eight-day evacuation operation that followed, troops were ferried from the beaches to larger ships by a makeshift flotilla of 861 merchant marine boats, fishing boats, lifeboats, and even recreational vessels. Altogether, more than 336,000 British, French, Belgian, Dutch, and Polish soldiers were rescued.

Unfortunately, Hitler's halt order only lasted for three days. By May 27, German heavy artillery were firing high-explosive shells into Dunkirk as Luftwaffe bombs reduced the town and its surroundings to rubble. More than 230 vessels were destroyed and approximately 5,000 soldiers and 1,000 civilians were killed.

While the parallels between the evacuation events are evident—for example, both operations brought boats of all descriptions together to save thousands of people—there is also a glaring difference. The Dunkirk evacuation was centrally organized, while the evacuation of lower Manhattan was much more spontaneous. And that improvised, creative, and self-organized nature is exactly what is central to *American Dunkirk*.

"We just wanted to help"

The authors describe how, after the first plane struck the north tower of the World Trade Center complex, many local mariners acted independently and took it upon themselves to navigate their boats towards the disaster area to pick up evacuees and drop off supplies and emergency personnel. Some of these mariners sought permission from the Coast Guard, which initially instructed vessels to stand by. By the time the Coast Guard issued a request for all available boats to participate in the evacuation, the operation was already in full swing. In fact, the authors state that approximately two-thirds of the people they spoke to hadn't heard the official call (radio channels were flooded and many operators switched their radios off) before responding or were already responding or preparing to respond when they did hear it.

At the time of the attacks, there was no official plan for a waterborne evacuation of Manhattan in place. Instead, the effort was ad hoc and emergent.

"We moved about 30,000 people on our six boats," the book quotes Peter Cavrell, senior vice president of sales and marketing for Circle Line, as saying. "It wasn't any kind of coordinated effort. We just started doing it."

Other mariners that were interviewed also said no one directed them. They "just wanted to help" and "did what they had to do."

What unfolded in the next few days was rather re-

markable. No significant accidents occurred during the evacuation, even though evacuees were boarding vessels that weren't designed for passengers from locations that weren't meant for transferring people and conditions were stressful and uncertain. The authors describe the evacuation as "an example of individuals and organizations learning and acting under conditions of extreme environmental stress: forming new relationships, suspending existing procedure and developing new ones, and making decisions based on ever-shifting and ambiguous information."

With seeming effortlessness, the mariners involved in the evacuation took on the roles of emergency responders and those roles evolved with the changing needs at ground zero. First their vessels carried passengers. Then they brought medical teams, dogs, food, water, and even body bags. On the evening of September 11, dinner cruise boats were loaded with gurneys to make a triage and treatment area. These boats also served as dining halls and rest stations for exhausted firefighters and rescuers. According to the authors, all of these activities stemmed from moment-to-moment interpretations of what was happening in the environment and what could be done with the people and resources available.

So what made these improvised activities effective? A first requirement, according to the authors, was a strong local network and a sense of community. Mariners in the New York harbor belong to a close-knit group who are familiar with each other's strengths, weaknesses, and capacities. A second requirement was a deep understanding of the local environment. Many mariners who were involved in the evacuation had years of experience and knew the Manhattan waterfront and waterways well. Along with this experience, came a myriad of skills and traits, which mariners aptly deployed during the evacuation operation.

Some of those traits are especially worth mentioning. The authors note that in the maritime community there is a strong imperative toward rescue. In fact, at sea shipmasters are compelled by statute to help vessels in distress if they can do so without serious danger to their own vessel. This means members of the maritime community are used to taking risks to help others. Another trait that proved useful during the response operation is mariners' hypervigilance and attention to detail. They are taught to be watchful and alert for the unusual, because at sea, overlooking a seemingly small detail (such as not securing cargo properly or attending to a rattling sound in the engine) can have serious consequences.

The final requirement, according to the authors, is a willingness to bend the rules and procedures whenever necessary. The testimonies brought together in *American Dunkirk* emphasize that the mariners who responded did not take unnecessary risks. Instead they took risky actions with "a calculated awareness of the consequences of breaking the rules versus the urgency of the situation."

A newish concept of disaster management

Kendra and Wachtendorf conclude that all of the above observations point to a particular concept of disaster management, a concept that sees "plans as tools rather than scripts" and "tilts more toward effectiveness than efficiency and encourages the affected population to improvise and be creative." This challenges the Incident Command System, the concept that currently prevails in the United States. ICS is a standardized hierarchical approach to the command, control, and coordination of emergency response.

Based on their evacuation research, the authors propose an approach that redefines disaster activities as allied modules instead of a fully connected network. In doing so, they draw on the Emergent Human Resources Model (EHRM), which describes the involvement of disaster response participants as "flexible, malleable, loosely coupled, organizational configurations." The authors take this idea one step further by arguing that these "loosely coupled configurations" don't respond to one single event, but rather to individual pieces of this event. And this approach is what makes an improvised disaster response possible and manageable.

Kendra and Wachtendorf are not alone in their criticism of the ICS's command-and-control aspect; many other social scientists also find it unsatisfactory. First responders and emergency managers, however, tend to be strong supporters of ICS—primarily because they are often held legally and morally accountable for their responses, according to the authors. Taking this into account, they suggest that ICS might be fine for "those organizations that can be captured reasonably within its structure." Nevertheless, they also recognize that there are organizations that cannot be forced into that model and to address this issue they propose an open ICS like system that functions in concert with an EHRM model.

It's a shame *American Dunkirk*—which is an excellent case study of the waterborne evacuation of Manhattan and makes a strong argument for the need for planning and organizational improvisation in disaster—didn't come out sooner. Still, its release on the 15th anniversary of the 9/11 attacks is a powerful way to remember the heroic and selfless roles played by mariners in the evacuation operation.

Natural Hazards Observer
ISSN 0737-5425
Printed in the USA.
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Conferences

September 7-8, 2016
Global Disaster Relief Summit
Aid and International Development Forum
Washington, D.C.
Cost and Registration: Prices vary, open until filled

This summit will explore disaster relief management logistics, operations, and technology with an emphasis on global expertise and cross-sector engagement. Topics include emergency procurement, data for disaster resilience and response, aid worker safety, disaster response teams, emergency communications, and connectivity and technology frameworks.

September 8, 2016
Disaster Health Education Symposium
The National Center for Disaster Medicine and Public Health
Bethesda, Maryland
Cost and Registration: Free, register before September 1

This symposium will look at the latest practice and research in disaster medicine and public health and focus on promising advancements in education and training. Topics include innovations in teaching, emerging infectious diseases, community advancements, and lessons learned.

September 10-15, 2016
National Weather Association Annual Meeting
National Weather Association
Norfolk, Virginia
Cost and Registration: $509, open until filled

This meeting will focus on strategies to better communicate and improve the science used for forecasting. Topics include effective school presentations, weather and social media, television meteorology, satellite products for improved forecasts, Storm Predictions Center risk communication strategies, tidal forecasts, flood modeling, and advances in severe weather detection and warning.

September 15-17, 2016
Public Health Law Conference
The Network for Public Health Law and American Society of Law, Medicine, and Ethics
Washington, D.C.
Cost and Registration: $295 before August 16, open until filled

This conference will explore strategies to achieve public health equity. Topics include the social determinants of health, the Flint Water Crisis, the implications of climate change on public health law, immigration and health, and homelessness and public health.

September 28-30, 2016
International Zika Virus Conference and Workshop
Nordtree
Washington, D.C.
Cost and Registration: $1,995, open until filled
This conference will examine methods to prepare for, monitor, and respond to local and travel-related cases of Zika. Topics include recommendations for vector control agencies and public health professionals, pregnancy and birth defects, vaccine candidates, interstate and federal collaboration, tribal preparedness strategies, prevention and education, and travel restrictions.

October 5-6, 2016
AHEPP Annual Conference
Association of Healthcare Emergency Preparedness Professionals
Las Vegas, Nevada
Cost and Registration: $675, register before September 29

This conference will explore issues of importance in emergency healthcare. Topics include emergency preparedness for healthcare facilities, workplace violence in among healthcare professionals, hospitals helping communities through a disaster, measuring healthcare emergency programs, cybersecurity, and long-term care facility evacuation.

Call for Articles

HazNet - Inspiring Resilience

HazNet, the magazine of the Canadian Risk and Hazards Network, is looking for articles from practitioners, researchers and students for its November edition which focuses on Inspiring Resilience, the theme of the 2016 CRHNet Annual Symposium which will take place in Montreal. The editor is particularly interested in articles exploring resilience in Indigenous communities: emergency preparedness, disaster resilience and climate change adaptation in FIrst Nation, Métis, and Inuit communities in Canada and learning from Indigenous people of the world.

Please direct any questions and submit your article by September, 30, in electronic MS Word compatible format to editorhaznet@gmail.com and lily.yumagulova@gmail.com

Earlier submissions are encouraged to ensure space for the article.

Author's guidelines: 800–1,000 words, with relevant graphics and/or photographs, a three-line biography (with a photo) and 140 character (not words) summary of your article (for social media distribution). *HazNet* is a general interest publication (please avoid academic language). Please review full submission guidelines here: http://haznet.ca/how-to-contribute/

Call for Papers

From the Management of Crisis to the Governance of

Risk: Time for a Paradigm Shift?

You are invited to participate in the upcoming conference From the Management of Crisis to the Governance of Risk: Time for a Paradigm Shift? The conference will take place from January 9 until 11, 2017, at the conference center of the China Institute for Reform and Development in Haikou city, Hainan province, China. Authors of accepted papers are offered full conference registration fee waiver and free food. Papers on the following topics are invited:

- Challenges of risk regulations in different emergency management systems;
- The contributions that theories on resilience and high reliability organizations can make on the development of the risk and regulation systems;
- To what extent existing emergency management systems can learn lessons from past crises and turn these lessons into risk/safety management practice;
- The roles the accountability system may play in the lesson-drawing process after crises.

By September 30, 2016:

- Confirm your participation via this address: https://www.surveymonkey.com/r/7NBWMPWn
- Submit a short proposal to luxiaoli@tsinghua.edu.cn outlining: the title of the paper, a short description of the contents of the paper; the research method and empirical materials to be used (if applicable); and name, affiliation, and contact information.

Mobile Cultures of Disaster Conference

You are invited to participate in the Mobile Cultures of Disaster Conference which will take place from March 22 to 24, 2017 at the University of South Australia, Adelaide, Australia.

The aim of the conference is to bring together prominent academics, specialists and policy analysts across the world to investigate the cultural and mobile aspects of disasters. The conference principally seeks to stimulate research on how disasters are mobile and cultural phenomena. It asks participants to consider how disasters circulate around various parts of the world. This refers to the ways in which disasters involve movement and cultural exchange in terms of how they are managed, experienced and socially constructed. Submission of abstracts that bear upon at least on of the following research questions is invited:

- How can some disasters, such as the 3.11 triple disaster in Japan, be conceptualized as 'mobile' social breakdowns?
- What are some of the methodological challenges related to studying 'disasters' on the move?
- How do global transformations in mobility (from mass travel to social media) impact upon disaster management/recovery and cultural understandings of disasters?
- In what ways do disasters involve cultural interchange?
- What role do ICTs and other communicative technologies play in the experience and management of disasters?
- What forms of 'mobility' and/or 'immobility' can be linked to disasters?

Abstracts of no more than 200 words should be send to Eric L. Hsu (eric.hsu@unisa.edu.au) by October 17, 2016.

There are no registration fees for the Mobile Cultures of Disaster Conference. For more information see: unisa.edu.au/disastersconference2017.

Superheroes Wanted!

Ready NY Kids Program

As part of New York City's Ready New York preparedness campaign, the Ready New York for Kids program is designed to empower and educate children about the importance of planning and preparing for emergencies. The program works in partnership with the Department of Education and other partners (Boy Scouts, Girl Scouts, Department of Youth and Community Development, etc.) to bring preparedness into the classroom and other venues by conducting assemblies and workshops. Ready NY Kids is seeking one undergraduate or graduate student to assist with community outreach efforts with a focus on public speaking. The program is also seeking two candidates to fullfill the role of superhero, Ready Girl. Ready Girl leads presentations for children throughout the city, interactively teaching them the importance of emergency preparedness. Responsibilities Project/Intern include:

- Conduct emergency preparedness presentations to children attending public/private schools, summer camps, and after school programs (assemblies and workshops)
- Present at venues throughout the five boroughs. Assist with program evaluation and development of new presentation tools.
- Attend monthly meetings for program and agency updates and evaluation.

All presenters will be compensated $50 per presentation.

For more information on the Ready New York program, visit www.nyc.gov/readyny.

Interested Applicants: Email resume and cover letter to: jobs@oem.nyc.gov.

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Support Center Operations—Provide support for core Center activities such as the DR e-newsletter, Annual Workshop, library, and the Natural Hazards Observer.

Build the Center Endowment—Leave a charitable legacy for future generations.

Help the Gilbert F. White Endowed Graduate Research Fellowship in Hazards Mitigation—Ensure that mitigation remains a central concern of academic scholarship.

Boost the Mary Fran Myers Scholarship Fund—Enable representatives from all sectors of the hazards community to attend the Center's Annual Workshop.

To find out more about these and other opportunities for giving, visit:

https://hazards.colorado.edu/about/contribute

Or call (303) 492-2149 to discuss making a gift.

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