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Calamities, Catastrophes, and Cataclysms: Current Trends in International Disaster Risk Management Practices for Cultural Heritage Sites

Abstract
Several initiatives, conferences, and collaborative agreements in recent years have focused on cultural heritage protection in response to climate change and natural disasters. Despite an established network of institutions united in preserving the world's cultural heritage, risk management planning for heritage properties remains in its infancy. This thesis asks what types of risk management for cultural heritage properties are currently being implemented and which organizations are doing this work. A review of disaster risk management activities of international heritage conservation groups reveals that organizations tend to focus their efforts on one of the three disaster phases: advance planning, emergency response, or post-disaster recovery. The reasons for this are directly related to the types of resources the agency or organization can commit to these activities: professional expertise, technical support, funding, local networks, or some combination of these. Recent examples show that collaboration between organizations with different resources but common goals can be successful, as in the case of the Haitian Gingerbread House project undertaken by the World Monuments Fund together with the Prince Claus Fund. Similar partnerships can be initiated before disaster strikes; to facilitate this, a centralized agency recognized by other international relief agencies that is capable of collecting data and coordinating response teams is needed. The most effective form of risk mitigation at any heritage site, however, is the inclusion of risk management procedures into general site management operations; regular maintenance and monitoring alone can substantially minimize damage and loss in unavoidable natural disasters.

Keywords
risk assessment, risk management, natural disaster, cultural heritage, international heritage conservation

Disciplines
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CALAMITIES, CATASTROPHES AND CATACLYSMS

Current Trends in International Disaster Risk Management Practices for Cultural Heritage Sites

Jesse W. Lattig

A THESIS

in

Historic Preservation

Presented to the Faculties of the University of Pennsylvania in
Partial Fulfillment of the Requirements of the Degree of

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_____

Advisor and Program Chair
Randall F. Mason
Associate Professor

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TERMINOLOGY

Climate change is a change in climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods (United Nations Framework Convention on Climate Change; http://unfccc.int/).

Disaster is a serious disruption of the functioning of a community or a society causing widespread human, material, economic or environmental losses which exceeds the ability of the affected community or society to cope using its own resources

Disaster Risk Reduction (DRR) includes all the policies, strategies and measures that can make people, villages, cities and countries more resilient to hazards and reduce risk and vulnerability to disasters. DRR includes disaster prevention, mitigation, preparedness, recovery and reconstruction.

Disaster Prevention integrates all the activities to provide outright avoidance of the adverse impact of hazards and the means to minimize related environmental, technological and biological disasters.

Disaster Mitigation has different meanings for practitioners in the climate change and disaster-management communities, often leading to confusion. For disaster management, mitigation focuses on structural and non-structural measures undertaken to limit the adverse impact of natural hazards, environmental degradation and technological hazards.

Disaster Preparedness activities contribute to the pre-planned, timely and effective response of individuals and communities to reduce the impact of a natural hazard and deal with the consequences of a potential disaster.

Disaster Recovery consists of decisions and actions taken after a disaster to restore or improve the pre-disaster living conditions of the stricken community.

Disaster Reconstruction is the set of actions taken after a disaster to enable basic services to resume functioning, repair physical damage and community facilities, revive economic activities, and support the psychological and social well-being of the survivors.

Hazards are physical events, phenomenon or human activity that can cause the loss of life or injury, property damage, social and economic disruption, or environmental degradation. Hazards have different origins: natural (geological, hydro, meteorological and biological) or due to human actions (environmental or technological).

Mitigation is taking action in the timeframe before a disaster to lessen post-event damage to lives and property. In risk management, many hazards such as earthquakes cannot be reduced, but the risk from that hazard can be reduced, or mitigated, for example by con -

structing earthquake-resistant buildings, or shelves that prevent objects from sliding off. The former is structural mitigation, the latter is non-structural.

Prevention is measures taken to reduce the likelihood of losses. Ideally, these measures would seek to reduce losses to zero, but this often is not possible. Key question: How much prevention do you need to undertake?

Recovery is the process of returning the institution to normal operations, which may also involve the repair and restoration of the building or site.

Response is the reaction to an incident or emergency to assess the damage or impact to the site and its components, and actions taken to prevent people and the property from suffering further damage.

Risk is the probability of harmful consequences or expected losses (deaths, injuries, property, livelihoods, economic activity disrupted or environment damaged) resulting from interactions between natural or human-induced hazards and vulnerable populations.

Sustainable Development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts: the concept of "needs", in particular the essential needs of the world's poor, to which overriding priority should be given; and the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and the future needs.

Vulnerability is the degree to which someone or something can be affected by a particular hazard and depends on a number of factors and processes:

- physical (unstable locations, closer proximity to hazards, fragile unprotected houses)
- economic (no productive assets, limited income earning opportunities, poor pay, single income revenue, no savings and insurance)
- social (low status in society, gender relations, fewer decision-making possibilities, oppressive formal and informal institutional structures, and political, economic and social hierarchies)
- psychological (fears instigated by religious and other belief systems, ideologies, political pressures, mental illness
- physiological (status in life – young, old, adolescent, pregnant, lactating mothers, chronic illness, disability, exposure to sexual violence and harassment, HIV/Aids and other infections

ABBREVIATIONS

ADB	Asian Development Bank
CCFSC	Central Committee for Floods and Storm Control
NCDR	National Council for Disaster Reduction
DNA	Damage and needs assessment
DER	Disaster Emergency Response
DLA	Damage and Loss Assessments
DNA	Damage and Needs Assessment
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
GCI	Getty Conservation Institute
GFDRR	Global Facility for Disaster Reduction and Recovery (World Bank)
IFRC	International Federation of Red Cross and Red Crescent Societies
JCIC-H	Japan Consortium for International Cooperation in Cultural Heritage
MDG	Millennium Development Goals
NGO	Non-governmental organization
PCF	Prince Claus Fund
PRSP	Poverty Reduction Strategy Papers (World Bank)
RENA	Rapid Emergency Needs Assessment
UNDAC	United Nations Disaster Assessment and Coordination team
UNDP	United Nations Development Programme
UNISDR	United Nations International Strategy for Disaster Reduction
UNITAR	United Nations Institute for Training and Research
WB	World Bank
WMF	World Monuments Fund

CHAPTER 1 - INTRODUCTION

This thesis grew out of a daily bicycle commute across a European city still recovering from the devastating effects of war waged sixty years before. As a foreigner, the bombed-out shells of buildings left scattered across the urban landscape was perplexing. My foreign perspective however allowed me to observe ways in which the community clung to these ruins as symbols of resilience and continuity, long after any iota of utility had been erased. When it came time to select a thesis topic, I knew I wanted to explore the conservation of architectural representations of history's difficult lessons. Rather than focus on heritage in conflict, however, prevention offered a more proactive path to these questions. The decision to examine risk management was therefore an obvious choice.

What wasn't obvious at the onset, however, was the disjointed nature of research in this field specific to cultural heritage and natural disasters. Like many emerging niche areas of research, I came to realize that information is plentiful on either general themes borrowed from related disciplines or in the form of highly-specific case studies with minimal potential for broader application. In this way, the topic is plagued by the same internal conflicts as a definition of outstanding universal value is: how are general management concepts effectively applied to unique sites?

This initial question was answered quickly; disaster risk reduction was officially recognized on a global scale when the United Nations General Assembly declared the 1990s the "International Decade for Disaster Risk Reduction." At the same time, an observable shift away from a focus on technological solutions to disasters, to ones with a greater emphasis on identifying and reducing the underlying causes of vulnerability occurred. Disaster preparedness manuals appeared for heritage managers and agencies like the World Bank began to include cultural heritage components in their development programs.[1]

1 See Stovel, *Risk Preparedness for World Heritage Properties*; and Serageldin, et al. *Historic Cities and Sacred Sites: Cultural Roots for Urban Futures.*

More recently, large-scale disasters such as the Indian Ocean tsunami in 2004 and Hurricane Katrina in 2005 have re-ignited an evaluation of the merits of prevention and preparedness while the *Hyogo Framework* in 2005 urged governments and the international community to improve mitigation strategies to minimize social and economic disruption that result from natural disasters.

Risk management planning tailored to heritage properties remains in its infancy despite an established network of institutions united in preserving the world's cultural heritage. Nonetheless, several initiatives, conferences, and collaborative agreements in recent years have focused on cultural heritage protection in response to climate change and natural disasters. This thesis asks what types of risk management for cultural heritage properties are currently being implemented and what organizations are doing this work.

In researching this topic, it quickly became apparent that there is an almost debilitating amount of information out there. Because of its interdisciplinary structure, the number of post-disaster studies is quite large. An initial review of recent conference proceedings, however, showed that the work of agencies typically focused on one of the three areas of the disaster cycle. A more thorough reading of literature on disaster preparedness, presented in Chapter Two, revealed that no one agency has managed to establish itself as a central repository specifically for disaster and cultural heritage information (although the Ritsumeikan University offers an impressive number of case studies). Empirical studies on prevention methods and *ex-ante* comparisons are rare or are not available in English. The highly interdisciplinary field of risk management draws on a large number of other professions such as insurance, finance, and international policy; although all relevant, a review of more than the most relevant texts would exceed the scope of this paper.

In Chapter Three, an explanation of vulnerability and hazards introduces the reader to concepts

and vocabulary typically used in English texts on the subject. In relationship to how natural disasters impact human settlements, the disaster phases and corresponding types of assistance are reviewed.

How these concepts transfer to cultural heritage properties is examined in Chapter Four, which outlines the framework of disaster risk management planning concepts and components.

For this project, a handful of conservation agencies practicing disaster risk management activities were researched and pertinent details collected here. Conservation professionals with extensive field work experience were interviewed. Relevant conference sessions and committee meetings were attended. One site in particular that had undergone pre-disaster preventive treatment was visited; the structures had survived a severe hurricane only a few years following treatment. These organizations and observations are reviewed in Chapter Five.

The short timeframe available for the completion of this project prohibited a more in depth study of intervention examples, funding sources, or any attempt at an ex-ante analysis.

Based on these examples, Chapter Six considers what is working and what remains to be addressed in risk management activities. The field of heritage conservation will continue to adapt to the changing needs of protected sites and their vulnerabilities to the rapid changes in urbanization and building uses. These changes will influence, too, how disaster risk is responded to. No matter how hard the conservation community works together to mitigate disaster impacts, disasters will still happen. But recent events have fueled an increasing interest in disaster risk reduction and the classic risk management process can be applied to cultural property protection. This field of cultural property and natural disasters is complex but efforts on a small scale are rewarding and can be transferred to a larger context. To achieve this, much remains to be studied and evaluated empirically. Chapter Six presents an extensive list of topics that need further research, including suggestions on potential partners for such studies.

CHAPTER 2 - LITERATURE REVIEW

Ancient folklore from around the world is full of vivid stories of the gods taking revenge upon man and earth. Epic tales of phenomena are recounted in the Christian Bible, in Buddhist stories, in the rock art of ancient tribes. Today, newspapers and websites report natural disasters in real-time and the repercussions are observed in world markets. Advances in digital tools for observation and measurement allow us to study complex relationships between events, human behavior, and consequences. The effect of severe natural events have such far reaching consequences and because of the human factor in the impact of extreme natural hazards, the study of disasters and prevention draws on a number of disciplines beyond the environmental sciences. Scholars, policy makers, and engineers as well as historians, military, and humanitarian aid organizations all devote some aspect of their research to understanding contributing factors as they search for some pattern of predictability.

Cultural Resource Management

Heritage conservation itself is concerned with monuments as symbols of resilience and stability – as much cultural as structural – which have withstood not only the effects of human agency, but the impacts of environmental agency as well. The field has been notoriously reactive, responding at the material level to indicators of decay and potential loss of fabric which could threaten loss of historical significance. Recent literature however reveals a trend toward prevention through proactive management of sites -- damage and decay agents are taken into consideration in advance of their appearance. Preventive conservation adds a predictive component to conservation planning and today we find interaction where both academicians and practitioners participate and discuss the issues related to management of existing and potential hazards.

This shift in conservation from a material scale to a macro-scale was in its early stages when

James Marston Fitch wrote "Historic Preservation: Curatorial Management of the Built World."

Published in 1982, but drawing on a long professional career in preservation, Fitch's text calls for the 'holistic approach' that meanwhile has become everyday gospel for preservationists worldwide. Fitch points to the failed outcomes of the mid-century urban renewal as the source of an increasing interest in the rehabilitation of historic urban fabric. Making a case for the profound psychological connection between space, scale, and a visible, physical record of history and human response, he applies Jane Jacobs to the conservation ethos and updates it for a world of increasing global awareness. Preservation, he says, is a participatory field and the management of cultural resources must break away from a 'narrow and compartmentalized' attitude. Fitch also touches on the issue of 'elitism':

> "Historic preservation has been traditionally characterized as "elitist," but this viewpoint is being modified as wider sections of the population begin to understand the cultural values of their own habitat an to demand a role in the formulation of plans for its preservation. This development should by no means be regarded as undesirable. To the contrary, it presents an unparalleled opportunity to correct some of the sense of alienation which is so characteristic of modern society. It affords the opportunity for the citizens to regain a sense of identity with their own origins of which they have often been robbed by the sheer process of urbanization." [1]

In applying theory to practice, he references the consequences of major earthquake events in South America in the 1970s:

> "…The historic centers of these cities are built almost exclusively of mud masonry – mud brick or adobe. Such structures proved to be vulnerable in the recent tremors (even though, statistically, an astonishing percentage of the old buildings have survived for centuries!)
>
> As a result of the recent seismic disasters, some of these countries have enacted national building codes which require earthquake-resistant structures of either steel or reinforced concrete….Such sophisticated structures will obviously be too expensive for the countryside in general, where the peasant will perforce be compelled to continue to build with traditional materials of mud and straw. And even in the cities, it is difficult to see how existing monumental structures can be effectively reinforced with concrete or steel armatures even if expense were no problem.

1 Fitch, p403.

> What seems indicated in such a dilemma is the application of modern research methods to traditional folk practice: in this case, the development of mud masonry reinforced with vegetable fibers. Traditional construction in Peru has always employed some versions of this… Such research is all the more important because mud masonry remains environmentally the optimal material for hot, dry climates and requires no cash outlay for raw materials."

This profound awareness of the interconnectedness of materials, design, planning and contextual sensitivity (location) has since become a guiding principle in contemporary disaster risk management methods.

Bringing "fresh contributions to the debate on preservation management of built heritage," the World Bank held a symposium on the "Preservation of Historic Cities and Sacred Places" in 1999 and published the proceeding in a 400 page volume. Over fifty contributions cover issues such as the governance of preservation management, sustainability approaches to both natural and built heritage, preserving sacred sites, establishing partnerships, and technical applications; one entire chapter is dedicated to rescuing heritage at risk, addressing reconstruction and adaptation examples. Advocates view that loss of monuments or ensembles due to natural disaster exacerbated by accelerated decay resulting from "inadequate safeguards, inadequate inspection procedures, and deferred maintenance – in other words, neglect."[2] Also reviewed in this publication is the poverty-reduction initiative in Fez, Medina in which emergency assistance was awarded by the World Bank for the stabilization of historic dwellings at high risk of collapse. This was a time when disaster preparedness began to receive greater attention from international initiatives such as the *Hyogo Framework*, and conservation and re-adapting architectural heritage was considered to be "good public policy and sound economics." [3] By addressing philosophical, regulatory, economic and technical aspects of heritage in one publication, the World Bank established itself as a solid contributor to heritage management

2 *Historic Cities, Sacred Sites*, p 89. World Bank and Inter-American Development Bank developed an operational approach to appraise economic value of cultural heritage including methods to estimate benefits and costs of heritage projects. For ways in which successful collaboration and partnerships are set up among the array of actors involved in financing built heritage, see in particular p 267, "Establishing Priorities for the Preservation of Historic Cities" – a decision-making model for project investment strategies.

3 Ibid, p 241

in development projects. The text is still referenced in Bank documents dealing with cultural heritage concepts and project components.

Around this time, a new emphasis emerged in management principles on how community, history, and technical expertise can contribute to preserving 'sense of place.' Demas and de la Torre are two resources that address this concept head on, tackling theoretical debates on what to conserve for whom based on methods already in use in geography, economics, and environmental conservation.[4] These themes are echoed in the proceedings of the 2001 US/ICOMOS symposium *"Managing Change: Sustainable Approaches to the Conservation of the Built Environment."* At this event, arguments about what a holistic approach looks like in terms of stewardship were debated among a experts; a clear case is made for the inclusion of public participation and economic and quality of life concerns are connected to a need to better articulate the role of conservation in the management of the built environment in general. These themes continue to underscore present-day efforts of international agencies to include cultural resources in broader emergency planning activities at the municipal and national levels.

In 1993, Jukka Jokilehto co-authored the *Management Guidelines for World Heritage Sites* with Sir Bernard Feilden, published by ICCROM. He is also the author of *A History of Architectural Conservation* (1999) in which he documents the development of the conservation field in multiple regions since its earliest conscious application as a form of maintenance and connection to the past. He looks at twentieth century international debates on what to conserve and discusses the origins of this debate in the historical events and theoretical discussions. Referencing both theoretical arguments and lessons learned in the field, this text is a valuable source on the field's primary phases of development.

Where Jokilehto focuses on the history of the heritage conservation field, John Stubbs' two

4 See Martha Demas, *Principles for the Conservation of Heritage Sites in China*, p72 for an outline of the role of heritage within a greater social context. Also Marta de la Torre (ed.) "Assessing the Values of Cultural Heritage: Research Report" 2002, p123. This report covers the assessment of values and consultations with the stakeholders.

volume work documents the state of the profession today. Stubbs is attempting to address what James Marston Fitch identified in the 1980s as "one of the field's most urgent tasks," – a broad and scientific examination of traditional building. In the two recently published books *Time Honored* and *Architectural Conservation*, Stubbs attempts a comprehensive review of current practices, policies and academic training, drawing on decades of work with the World Monuments Fund as their Director of Field Operations. The two texts are extensive, well-written and Stubbs does not hesitate to discuss the challenges international conservation is faced with due to differing ideas about conservation priorities and capacities. Nonetheless, disaster response and prevention are conspicuously absent; perhaps reflecting less of an editorial decision and instead a the sentiments of a growing group of heritage professionals who see responsible conservation as the best form of risk mitigation.

Conservation Policy

The second half of the 20th century has been characterized as the period of the international conservation movement. Policy documents from this era reveal an effort to establish international standards, institution building and international cooperation on the conservation of monuments; the 1972 World Heritage Convention is a reflection of the attempt to identify and apply universal principles.

Different types of documents establish the framework of the international doctrine. In the case of UNESCO and the Council of Europe, the documents can be 'conventions', which will be ratified by the States and to become legally valid in that particular state. The documents can also be international recommendations, which do not need to be ratified, but are intended to be referenced, for example, when developing new legal instruments.

Architectural conservation charters and legislation establish specialized government agencies to address restoration needs. They also serve to establish international professional standards –

so-called best practices. For example, the conceptual background of the 1972 Convention was to identify, protect, mobilize the international collaboration.[5] Some have pointed to the adverse impact that universal and global standards can have on local values and practices, especially when those practices advanced a primarily Euro-centric perception of conservation. Recent documents such as the Burra Charter, the Nara Document on Authenticity, the China Principles, and the Hoi An Protocols have helped to increase the diversity of conservation philosophies, more accurately reflecting the conservation field.

One such guiding principle is the assessment of heritage values, which is handled in a number of the documents listed above. The Nara Document on Authenticity (1994), for example, addresses the importance of cultural and social values and tangible and intangible heritage, principles which are now finding their way into post-disaster reconstruction theories. The increasing shift to values-based conservation philosophies brought with it stakeholder participation in the decision-making process as seen in the "China Principles."

ICOMOS *Principles for the Recording of Monuments, Groups of Buildings and Sites*

This doctrinal document on recording principles was jointly proposed by ICOMOS UK and ICOMOS France in 1995 and was ratified by ICOMOS the following year. Widely accepted within ICOMOS, it echoes the definition of conservation standards for important monuments and archaeological sites made by the Venice Charter. The *Principles* also relate directly to the Nara Charter when it calls for the need to establish recording principles appropriate to the context within which a site is being conserved. Four sections in total aspects of responsibility, planning, contents of records, and management of those records. In discussing the recording imperative: the preamble references risk exposure of heritage as a reason to document it. Two points are of interest when thinking about rick management procedures:

"Necessity to carry out recording to standards and levels appropriate to the significance of the

5 Jokilehto mentions the issue of enforcement in reference to UNESCO's limitations as international oversight.

cultural heritage…" and "recording as one of the principal means to improve understanding of the values associated with cultural heritage." Given the complexity of risk management and the difficulties for agencies carrying out risk management activities in foreign cultures, these kinds of considerations will guide the holistic nature of the work (as opposed to strict material conservation methods). Ideally these perspectives will improve the quality of management decision-making at all levels of conservation, including in prevention, emergency situations, and reconstruction phases.

The year following the ratification of the ICOMOS Principles, the Kobe/Tokyo Declaration on Risk Preparedness for Cultural Heritage was made following the Kobe/Tokyo International Symposium on Risk Preparedness for Cultural Properties. As the title reveals, the event was about identifying advance preparation measures and emergency activities for the protection of cultural properties from disasters. Organized by the Tokyo National University of the Arts (*Tokyo Geijutsu Daigaku*), it was sponsored by UNESCO, ICOMOS, ICCROM, ICOM, and ICA. The thick volume of proceedings is no longer in print and only available printed format at a handful of archives around the world; this is an unfortunate situation because the proceedings collect in one place in English a comprehensive set of examples of heritage after disaster presented side-by-side with policy review and policy recommendations.[6]

Kyoto Declaration 2005 on the *Protection of Cultural Properties, Historic Areas and their Settings from Loss in Disasters* make seven important recommendation on how to incorporate disaster risk management principles into site management procedures.[7] The suggested actions are neither radical nor visionary but they do emphasize the importance of establishing a relationship between heritage property management, the community context, and municipal emergency preparedness measures. This approach remains highly relevant in present-day in risk

6 "Risk preparedness for cultural properties: development of guidelines for emergency response." 1997 Kobe/Tokyo international symposium proceedings.
7 Adopted at the Symposium "Towards the Protection of Cultural Properties and Historic Urban Areas from Disaster."

management activities.

At the World Conference on Disaster Reduction held in 2005 in Kobe, Hyogo, Japan, the *Hyogo Framework for Action 2005-2015* was adopted. The Framework promotes a strategic and systematic approach to reducing vulnerabilities and risks to hazards by identifying ways to increase resilience of nations and communities to disasters. UNESCO, ICCROM, and the Agency for Cultural Affairs of Japan organized a session at the conference on "Cultural Heritage Risk Management" in which the need to integrate concerns for the cultural and natural heritage into the larger disaster management process was discussed. The Kobe Report summarized the session proceedings. A related seminar focusing on heritage in an urban context took place the week previous was the Kyoto International Symposium 2005 "Towards the Protection of Cultural Properties and Historic Urban Areas from Disaster." It was here that the *Kyoto Declaration on Protection of Cultural Properties, Historic Areas and their Settings from Loss in Disasters* was adopted. These two documents have outlined the trajectory of disaster risk management for cultural heritage properties over the past seven years.

Disaster Risk Management

Disaster Risk Management is a systematic approach to identifying, assessing and reducing the risks of disaster by reducing socio-economic vulnerabilities by addressing environmental and other hazards that trigger disasters. In relation to the social factors that contribute to disaster impact, the discipline has been strongly influenced by research on vulnerability. For example, developing countries are those most vulnerable to and compromised by natural disasters and therefore mainstreaming this issue into development cooperation has become a primary application of disaster risk management and where the majority of background literature is to be found.

Published in 1983, *Disasters and Development* by Frederick Cuny , this book is an important work

on the evolution of principles critical to effective disaster response by international agencies working in developing countries. Cuny effectively outlines disaster impacts, forms of intervention and introduces the fundamentals of planning and preparedness. In particular, he emphasizes the consequences of relief aid when it is applied as a kind of "spot treatment," ignoring the roots of vulnerability and the potential for improved resilience. The Cuny Center, established by Cuny, is a non-profit educational institute that furthers his work on practical solutions for disaster-affected societies.

The Wharton Risk Management and Decision Process Center is another academic institution dedicated to research on risk situations involving health, safety, and the environment in both the private and public sectors. Research draws on disciplines of economics, decision sciences, finance, insurance, and marketing and focuses on how individuals and organizations interact and make decisions regarding the management of risk. Based on field and experimental studies of risk and uncertainty, the Center explores ways in which individuals and organizations can make better decisions regarding risk. Howard Kunreuther is co-director of the Center and has published extensively on the topic. Together with the managing director of the Center, Erwann Michel-Kerjan, Kunreuther has recently written about a "new era of catastrophes," in which the increase in vulnerability to disasters is affecting our ability to recover from them. *At War with the Weather* is primarily concerned with insurance products as risk reduction instruments but several innovative approaches to financing loss related to extreme weather events are explored in depth and are relevant to work in natural disaster preparedness.[8]

The applicability of insurance products is typically better observed in societies wealthy enough to afford risk transfer through financial instruments such as insurance against loss. Catastrophe insurance is one emerging field where very little research exists on its relevance to and benefits for cultural heritage properties.

8 Kunreuther, Michel-Kerjan. *At War With The Weather*. Cambridge: MIT Press, 2009.

More recently, agencies and organizations active in disaster relief projects have begun to publish reports on their activities. Several large-scale international initiatives such as UN's ISDR and the World Bank's GFDRR are primary sources for up-to-date information on disaster reduction projects taking place where cultural heritage properties may be involved. Many region-specific initiatives exist as well, such as the Asian Disaster Preparedness Center, which has produced a handbook designed for disaster managers working at the community level in southeast Asia.[9] This handbook reviews the effectiveness of the disaster management training and public awareness materials collected in the Philippines. Step-by-step instruction on participatory disaster risk assessment and planning, risk management organization training, community-managed implementation and participatory monitoring procedures make this publication is an excellent example of increasing resilience at the community level.

The German Ministry for Economic Cooperation and Development released a report on German activities in the area of natural disasters titled "Disaster Risk Management Contributions by German Development Cooperation." Outlining the concepts of disaster preparedness and emergency response, this publication provides an overview of how a governmental agency participates in disaster situations and can provide the cultural heritage sector with useful examples of where to engage potential partners.

Disaster Risk Management for Cultural Resources

In the early 1980s we begin to see a move in the heritage conservation field away from reconstruction and restoration. Concepts of prevention and mitigation parallel the rise of an environmental movement and an awareness of interrelation between human agency, climate change, and vulnerability to natural disasters.

Conservation practitioners such as Sir Bernard Feilden begin to contemplate the correlation

9 See "Review of Training and Public Awareness Materials," (November 2001), available for download in PDF format at www.adpc.net/pdr-sea/publications.htm. The Asian Disaster Preparedness Center (ADPC) promotes disaster awareness and the development of local capabilities. The agency began as a training provider in 1986.

between resilience of traditional buildings construction and materials in disaster situations. Already in 1981, Feilden demands attention to the special situation of historic buildings in earthquakes. Addressing an audience of architects at an ICOMOS conference in Italy, he argues that governmental regulations are inadequate to deal with the strengthening of historic buildings as these are prepared for new construction techniques, pointing out how historic buildings often have survived multiple earthquakes.

In 1987, Feilden collaborated with ICCROM and the Getty Conservation Institute to produce a handbook called "Between Two Earthquakes." This is one of the earliest calls for the participation of local administrators at all levels to organize preventative measures specific to natural disasters and cultural heritage:

> "…The size of earthquake disasters … gives them a special dimension which involves national (or federal), provincial and local administrations. It is these administrations which can take major steps in organizing disaster preparedness, so saving lives and also cultural property which is irreplaceable ... [They] have the power and the ability to organize preventive measures at all levels of action but it should also be studied by institutions, such as museums and persons responsible for historic buildings, at which level fire precautions Can be used as a basis for earthquake disaster preparedness… The key administrators are those working at a local, district or community level in seismic zones."[10]

Shortly after Feilden's piece, Carl Nelson responds to the damage caused to historic properties in the Loma Prieta, California earthquake and Hurricane Hugo. Nelson is one of the first to breakdown each individual activity: before, during, and after including mitigation recommendations. The publisher, the National Trust for Historic Preservation, is an American organization devoted solely to the preservation of sites and the case studies are therefore specific to the American situation, especially regarding regulation and federal funding. Basic procedures and concepts however can be extrapolated for site management purposes and is an example of how basic training in these concepts is the first step towards improved risk management.

10 Feilden, *Between Two Earthquakes*, 1987.

Following the Kobe Report issued in 1997 by ICOMOS, a survey of fourteen countries was carried out to identify trends in risk preparedness for cultural heritage. The results indicated a significant gaps in general risk management activities. The following year, Herb Stovel authored a piece in collaboration with UNESCO and ICCROM called *Risk Preparedness: A Management Manual for World Cultural Heritage.* The Manual was conceived as practical tool to improve the capacity of World Heritage property site managers at all levels. Building off of Feilden's piece on earthquake preparedness, this manual was a comprehensive guide that addressed a full range of preparedness procedures.

In addition to *Historic Cities, Sacred Places,* the World Bank made additional significant contributions to relevant literature around this same period. Through the Bank's ProVention Consortium program, June Taboroff contributed pieces to multiple publications on risk management in which she argues the case for including cultural heritage in risk management planning.[11] One such publication was a chapter on Cultural Heritage Conservation in the book *Safer Homes, Stronger Communities: A Handbook For Reconstructing After Natural Disasters*. A list of recommendations on how to incorporate heritage properties in reconstruction planning emphasizes collaboration with local planning officials and the community as well.

One of the first in depth studies on the performance of traditional architecture was carried out in the form of a dissertation by Rohit Jigyasu. Specifically, Jigyasu's work used the cases of Marathwada (Latur) and Gujarat in India to studied the consequences of post-disaster rehabilitation. The post-disaster rehabilitation programs carried out at these locations were of unprecedented scale with repercussions of a similar magnitude on the traditional building fabric. Jigyasu critically examines the impact of the reconstruction efforts on reducing existing vulnerabilities through the use of local knowledge, skills and, resources.

Roxanna McDonald is an English architect who wrote *Introduction to Natural and Man-Made*

11 See book two *Managing Disaster Risk*, Chapter 7 and book three *Building Safer Cities: The Future of Risk Management*, Chapter 11 in the Disaster Risk Management series.

Disasters and Their Effects on Buildings in 2003. In McDonald's view, we learn more about disasters when they happen and this experience needs to be applied to disaster reduction; the book does exactly that in a very straightforward style. Through an analysis of case studies of disaster types and their impact on buildings, McDonald has created a simplified catalogue of events, problems, and general technical insights on designing for prevention. Of particular relevance are the multitude of examples of disaster impacts to historic structures in addition to a chapter devoted to the behavior of historic construction systems in disaster situations. Although brief, McDonald's book is an excellent example of what types of information can be collected and analyzed following a disaster and how that information can inform reconstruction and, more importantly, improved prevention.

Robyn Riddett, a member of Australia ICOMOS wrote a piece titled *Risk Preparedness and Cultural Heritage* in 2002 in which she makes the case for emergency response, a topic that is now beginning to receive more attention. In her piece, she explains:

> "Typically disaster plans can only be implemented when the site is declared safe by emergency responders, which can severely delay response and recovery procedures. Ideally conservation professionals should be part of the emergency response team or at least should be informed about access and the heritage value and contents of the place as part of a disaster strategy. Recovery is usually a long-term activity. If appropriate response and salvage procedures have been implemented, the building or site and the collection will be stabilized allowing detailed conservation and rehab to continue over years without further degradation."[12]

Since 2000, ICOMOS has annually published the report *Heritage at Risk,* which is a compilation of information about monuments and sites around the world threatened by natural disasters, armed conflict, uncontrolled urban development and general environmental pollution, as well as by neglect, inappropriate restoration. In 2007, a special issue devoted to cultural heritage and natural disasters included lectures presented at the conference "Cultural Heritage and Natural

12 See *Historic Environment*, Vol. 16, No. 1, 2002, p6.

Disasters — Risk Preparedness and the Limits of Prevention."[13] The Heritage at Risk articles are supplemented here with new articles by additional experts in the field writing on the nature of risk, to what degree site managers can prepare, and what steps the heritage conservation community must undertake in solidarity to promote and deliver risk management methods.

Much has been done to advance disaster risk preparedness in the collections field and an early piece published by the Getty Conservation Institute, *Building an emergency plan: a guide for museums and other cultural institutions,* expanded on Stovel's 1998 piece. Because collections often have monetary vales set, a wider range of insurance products exist tailored to them; this perhaps explains why this is one of the earliest uses of vulnerability and asset analysis. However, similar to Stovel's piece, this publication focuses on emergency response and how to prepare for emergency situations.

Robert Waller also specializes in collection risk management and has published a handful of pieces which very aptly combine qualitative with quantitative assessment methods. Similar to the Getty piece, Waller's focus on collections allows him to reference probability and impact analysis from an insurance perspective. The methods transfer, however, to site-level vulnerability assessment and are very useful in the early stages of the risk assessment process where conservation concepts must be married to administrative decision-making procedures.[14]

International Collaboration

As already shown in several examples above, the international community is exceptionally active in the area of disaster risk management for cultural resources. One agency in particular, however, focuses on the role of international collaboration in risk management.

Japan Consortium on International Cooperation published "Research Report on International

13 Organized by ICOMOS Germany on the occasion of the European Conservation Fair denkmal 2006, in cooperation with ICCROM and the Konferenz Nationaler Kultureinrichtungen (Conference of National Cultural Institutions).

14 See Waller, "Sources of information for cultural heritage risk management" and "Cultural property Risk Analysis model: development and application to preventive conservation at the Canadian Museum of Nature."

Cooperation in the Recovery Process of Disaster-affected Cultural Heritage" which documented a number of countries recently affected by natural disasters and surveyed organizations involved with cultural heritage conservation in those countries. Two extensive reports on these activities are model projects for other organizations and governmental agencies who devote any part of their resources to assisting with disaster response or risk preparedness for cultural heritage properties. The reports focus in particular on possible peacetime activities which would improve the capacity of the Japanese government to assist in disaster situations

As agencies and organizations continue to participate in disaster risk management projects at cultural heritage sites, their published material can be used by others. Just as important is the fact that assessments and report generated by other disciplines such as archaeology, structural engineers, and environmental sciences are useful resources for the cultural heritage field. Opportunities for collaboration require a common ground to facilitate communication between agencies with different types of expertise; published literature is a critical component to enabling that communication.

CHAPTER 3 - DISASTER AND DISASTER RISK MANAGEMENT

Traditionally, man lived in close relationship with nature. Nature and natural phenomena were associated with belief systems and myths, reflected in cultural traditions and patterns of behavior based on fear and respect. In an attempt to understand and control it, man has rigorously studied the natural environment and his place within it. Ancient knowledge handed down from generation to generation is now the basis of empirical study and extensive documentation of patterns and trends. Digital technology meanwhile has advanced levels of observation far beyond the naked eye and some phenomena are now being predicted using these tools.

What is Disaster?

A hazard is a natural process or phenomenon with potentially adverse effects on life or property. Hazards differ in severity, scale, and frequency. Natural hazards include earthquakes, landslides, volcanic eruptions, tsunamis, cyclones, wildfires, and floods. Disasters are the damages that result from human vulnerability to those hazards. This thesis is concerned with the relationship between cultural heritage sites at risk of a disaster and the international agencies that offer disaster risk management assistance, therefore the definition of disaster used here is that of the International Strategy for Disaster Reduction (UNISDR), an agency that serves as the focal point in the United Nations system for the coordination of disaster reduction activities:

> *"A serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts which exceed the ability of the affected community or society to cope using its own resources."*[1]

Natural disasters can be roughly divided into two main categories: climatic disturbances and geophysical events. In the environmental science discipline, one finds hazards categorized as meteorological, hydrological or seismic events. The climatic category includes storms and vari-

1 On its website, www.unisdr.org/we/inform/terminology, the UNISDR has compiled an extensive disaster-specific list of terms available for download in over ten different languages.

ous types of cyclones. Disasters with geophysical causes include above all earthquakes. Seismic movements are also often the cause of volcanic eruptions.

Disasters are classified as either cataclysmic or continuing. In a cataclysmic disaster, one sudden, large-scale event causes most of the damage and destruction and, following this event, there may be significant damage and suffering, however the situation improves soon after. For example in earthquakes, cyclones, and floods, the damage area is usually relatively small. The situation following a long-term, continuing disaster may remain constant or continue to deteriorate over time and the afflicted area may be very large. Continuing disasters include droughts, crop failures, and prolonged armed conflict.[2]

Disaster terminology draws from a number of disciplines; individuals working in the emergency sector may be comfortable with the jargon while others are not, or the meanings may have changed, making it necessary to clarify technical and sector-specific terms prior to initiating risk assessment or intervention activities, even for seasoned professionals. Each sector and sometimes different agencies within each sector can have differing definitions types of disaster, what its origins may be and the degree of impacts. A manual on risk management for cultural heritage published by the UNESCO World Heritage Centre in 2010 used very similar natural hazard typology classification (Figure 1).

Exposure and Vulnerability – How Hazards Trigger Disaster

In discussions on disaster risk management, it is imperative to understand that the hazards themselves are not disasters; two other factors are necessary -- people and their environment subject to the hazard (exposure) and the circumstances that influence the extent of impact on people (vulnerability). Specific to cultural heritage, a hazard is the external source of a disaster and vulnerability is the inherent weakness of the heritage property (due to its location or its specific characteristics).

2 See Cuny, 1983

Vulnerability is determined by a number of economic, social, physical and environmental factors. Examples include building design and strength, social capital, and political access. From this perspective, disaster losses are related to the interaction of these complex systems.

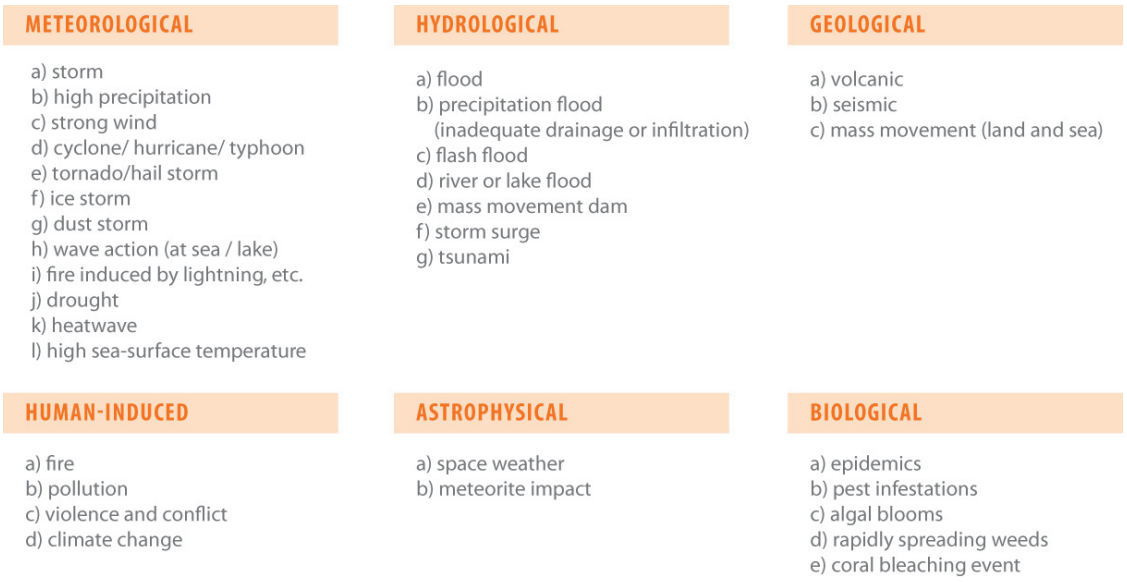

Figure 1. Natural hazard typology classification. Source: UNESCO World Heritage Risk Management Manual, 2010.

One reason for escalated economic and human loss resulting from natural disasters is an increase in the frequency of natural phenomena; debated explanations include global warming, climate change, destruction of ecological balance through irresponsible depletion of natural resources, deforestation, planetary evolution influencing the planet's structure and human behavior.[3] Rapid urban growth is often cited as a primary contributor to a community's vulnerability level; for example settlements in hazardous areas may destroy local ecosystems through draining swamps or building on steep hillsides; as natural runoff patterns are disrupted, flood hazards are increased.[4] For cultural heritage, urban growth concerns often are a significant fac-

3 McDonald, 2003, p3.
4 See Mileti, 1999, Auerswald 2006, and Natural Hazards, Unnatural Disasters, 2010 for discussions on the relationship between settlement patterns, land-use planning, infrastructure concerns, and the impacts of natural disasters.

tor in changes in vulnerability levels.

In a report released in 2010, the German Federal Ministry for Economic Cooperation and Development (BMZ) identified vulnerability factors that influence how disasters impact communities and classified them within four groups of factor: physical, environmental, economic, and social.

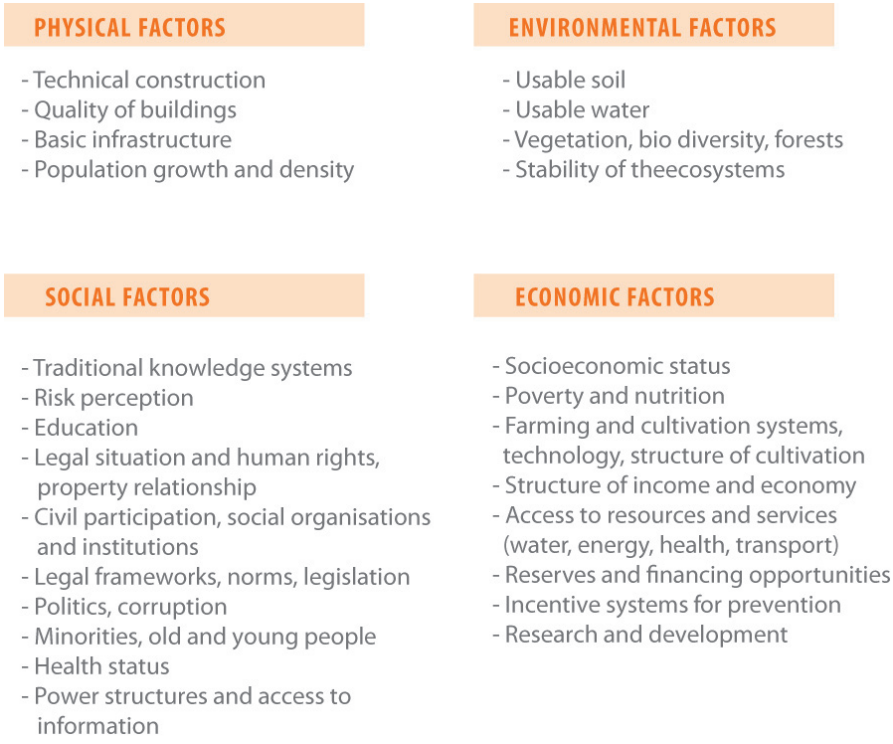

Figure 2. Vulnerability classifications. Source: Federal Ministry for Economic Cooperation and Development (BMZ), Disaster Risk Management. Information Brochure e2010

An example from the report illustrates how population growth and urbanization in cities such as Manila, Mexico City, and São Paulo are overwhelming existing infrastructure and threatening the delivery basic services. When combined with exposure to natural hazards such as earthquakes, volcanic eruptions and floods, these factors make cities particularly vulnerable to natural hazards:

- a higher population density means that potential victim numbers are much higher in cities than in rural areas

- because of the concentration of goods and services in cities, potential economic damage is particularly high
- building methods not adapted to existing risks and the absence or inadequate implementation of disaster-preventive building codes result in increased damage potential; corruption is often the cause of poor implementation of building codes
- economic conditions in the developing world; poverty and social economic pressure often make people more vulnerable as they have to move to unsafe land because there are no alternatives at reasonable cost close to employment opportunities

These observations are useful for conservation organizations considering projects which have a risk reduction component. For example, recent study on the economics of disaster risk mitigation published by the World Bank concluded that even though the exposure to hazards will rise in cities, greater exposure need not increase vulnerability.[5] As techniques and practices evolve to reduce losses stemming from natural disasters, and risk management methods are becoming increasingly more sophisticated, there are opportunities to protect both people and the built environment. Cultural heritage can benefit from these developments.

The Nature of Disaster

Before an examination of prevention and preparedness measures can be undertaken, it is first necessary to consider the characteristics of disaster impact within the continuum of disaster phases. Only by studying the nature of disaster events can emergency managers develop responses akin to the scale of the disaster impact.

Hans-Rudolf Meier reminds us of the meaning behind the word catastrophe: in classical literature καταστροφη, starting with the basic meaning »turning,« denotes various forms of turning around or over that are not yet fixated on negative events, and refers more to the course of turning than to the concrete event, more to the process than the result.[6] In the disaster management field, the catastrophe process is considered to have three distinct phases:

Pre-disaster - "peacetime"
Emergency - initial 72 hours after a hazard becomes active reality and damage is inflicted

5 *Natural Hazards, Unnatural Disasters*, p2
6 In "The Cultural Heritage of the Natural Disaster: Learning Processes and Projections from the Deluge to the »Live« Disaster on TV" in *Heritage At Risk: Special Edition – Natural Disasters*, p24.

Post-Disaster - "aftermath" and "recovery"

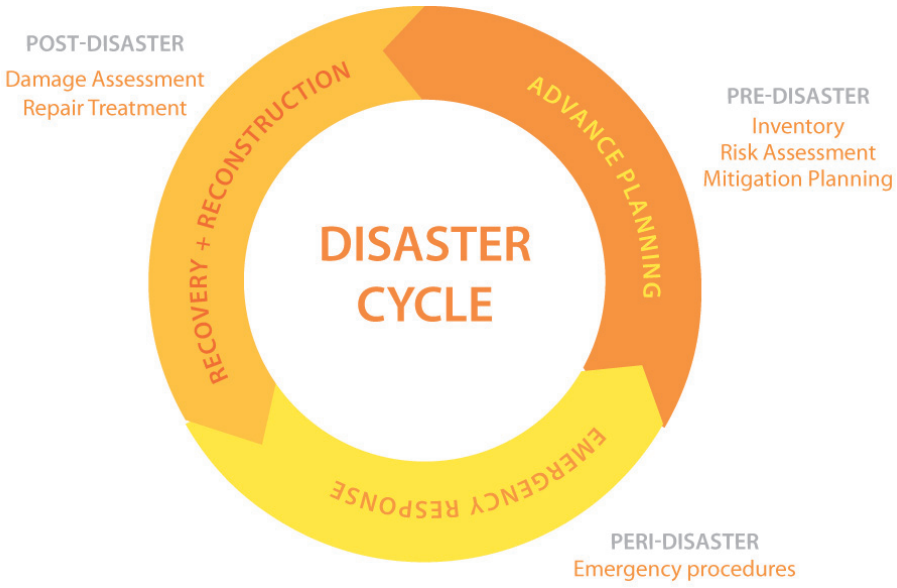

Figure 3. Illustration of the disaster cycle continuum

Within this temporal framework, the following characteristics of a disaster event will influence impact:[7]

- Magnitude — size of event based on a scale, extent of destructiveness
- Frequency — how often these events occur
- Duration — length of time of disaster (i.e. seconds for earthquakes, days for floods)
- Area covered — from local to worldwide/regional
- Distribution — coastal, fault lines, floodplains
- Speed of onset — time elapse between start and moment of peak
- Occurrence pattern — regular like cyclones or random like earthquakes

In addition to these characteristics, disasters have primary and secondary effects, also referred to as direct and indirect losses. Direct losses caused by natural disasters include substantial damage to life and property, infrastructure, cultural heritage, and the ecological systems. Examples of indirect losses are business interruption, loss of production, and loss of services. It is not uncommon for indirect losses to exceed losses due to direct physical damage; this is one reason developing countries for example are affected more severely, often suffering a dramatic

7 McDonald, p9

decline in GNP.

Disaster Response

While disaster events remain difficult to predict, their consequences tend to follow the patterns identified above, revealing trends in vulnerability and types of damage. With reoccurring trends, it becomes possible to study how changes in human behavior or physical (structural) improvements influence the disaster outcomes.

In a 1975 study on natural hazards, White and Haas explain that people deal with extreme natural events either through adaptation in the organization of the social system or through specific and conscious adjustment to reduce costs of or increase net benefits from the hazards.8 An example of adaptation is land-use in flood plains which avoids unprofitable exposure of especially sensitive crops to recurrent inundations.

Adjustment on the other hand is the intentional act of coping with risk and uncertainty of natural events; types of adjustment fall into three categories and each category involves its own set of social benefits and costs:

- Modifying the causes of the hazard, as in seismic-retrofitting in buildings
- Modifying vulnerability, as in prohibiting construction in mud-slide regions
- Distributing the losses, such as with insurance or relief assistance

These ideas still pervade today when we talk about disaster risk and how to management that risk. Since White and Haas' work in the 1970s, disaster risk analysis and management techniques have been extensively studied and written about, developing over time into the field today called Disaster Risk Management.

Disaster risk management (DRM) is a systematic approach to avoiding, transferring, and reducing the adverse impacts of hazard events (adjustment categories). The objective of DRM is to enable people to anticipate disasters and take action to protect life and property. Effective pre-

8 White and Haas, p57.

vention balances resources between risk reduction, risk-sharing mechanisms, and management of residual risks.

The range of DRM activities are related to the temporal phases of a disaster discussed earlier:

Advance Planning	Pre-disaster "peacetime"
Emergency Response	Initial 72hrs following event
Recovery and Reconstruction	Post-Disaster aftermath

Disaster prevention measures cost much less than relief and reconstruction expenditure following a disaster, yet many decision-makers tend to focus on relief and to treat disaster situations in an ad hoc way when they are presented with them. Today most typical strategies are crisis-oriented.

Furthermore, information about natural hazards and disaster reduction techniques is not well disseminated, and planners, project managers and communities do not integrate hazard management into development planning

Risk Management

The study of risk has long been the purview of the insurance profession, which some say is as old as recorded history.[9] Insurance is a transfer of risk in exchange for a payment and is only one form of risk management.

The practice of appraising and controlling risk accurately describes the objective of risk management. Hazard threats can be anticipated and protected against through the identification, assessment, and prioritization of risks. A brief discussion of each of these activities follows.

Identification

Risk identification requires observation of two factors: possible threats exist and probable

9 See for example E.J. Vaughan, *Risk Management*. Chinese traders practiced early methods of transferring risk as long ago as the 3rd millennia BC: wares would be distributed across several vessels to limit loss due to sinking of any single vessel.

causes. Threats may be natural hazards, development related, human agency, or other "detectable phenomena" specific to the location under assessment.[10]

Risk Mapping

Using existing data to illustrate risks spatially, a mapping system is not only as a tool for collecting information but also for synthesizing it. Risk maps help identify, locate, and rescue threatened property in addition to recording the existing state of the site or object. At a larger context scale, maps can be an effective tool in communicating with emergency managers and planning officials. Other important scales to consider include:

- Overall contexts: the country, and the geographical and geophysical contexts;
- Intermediate context: five kilometer radius from the Joya de Cerén site;
- Immediate context: one kilometer radius from the Joya de Cerén site;
- Site scale (property)
- Structures

Assessment

The basis of risk appraisal is a systematic assessment, described by the UNISDR as a "methodology to determine the nature and extent of risk by analyzing potential hazards and evaluating existing conditions of vulnerability that together could potentially harm exposed people, property, services, livelihoods and the environments on which they depend."

Risk assessments (and associated risk mapping) is based on the following components:

- the disaster characteristics listed above
- an analysis of exposure and vulnerability (including the physical, social, health, economic, and environmental dimensions)
- the evaluation of the effectiveness of prevailing and alternative coping capacities in respect to likely risk scenarios (UNISDR)

According to Ball and Watt, once a risk has been assessed, additional information must be collected on the control options available. This information would include the effectiveness of the control options, cost and difficulty of implementation of those options, and whether the mea-

10 MEGA-J program, as defined under "Disturbances and Threats" section. A description of the project in depth can be found at the GCI website: http://www.getty.edu/conservation/our_projects/field_projects/jordan/.

sures themselves have any additional consequences (either beneficial or detrimental). Regarding these additional consequences, Ball and Watt make a very important point:

> "Risky activities are usually knowingly undertaken in order to achieve the associated benefits. A good example of this is car driving which poses an annual risk of being killed of about 1 in 10,000. This is by most standards a very high risk, but it is by and large tolerated because of the benefits of the associated mobility. Thus, risk management is about balanced decision making and this clearly requires consideration of factors beyond those emerging from risk assessment. In the context of historic buildings, it might be about accepting a risk of injury to the public, through visiting an historic site without all modern safety features, in order to preserve authenticity."[11]

Prioritization: DRM Planning

Once threats have been identified and the risks associated with those threats have been assessed, the severity and frequency of those risks can be analyzed in comparison to the capacity of the affected community or property to mitigate or protect against those risks. The outcome of the analysis is a type of matrix in which the impact of the risk is aligned with the effectiveness of mitigation strategies identified. Prioritization of mitigation actions can be selected based on these results. The process of developing priorities through the analysis phase is the foundation of DRM Planning. A DRM Plan consists of the procedures and action plans developed through the process of evaluating possible mitigation strategies. Essentially, a DRM plan consists of the following fundamental components:

- identification and assessment of risks
- tools, techniques and implementation ideas and mitigation, including emergency preparedness and response, recovery, maintenance and monitoring
- an outline or clarification of the target audience and agencies
- procedures for deciding and implementing the appropriate actions for different situations

How these concepts are applied to cultural heritage resources is examined in the following chapter.

11 Ball and Watt, "Risk Management and Cultural Heritage" lecture at ARIADNE 4 – Vulnerability of Cultural Heritage to Hazards and Prevention Measures conference in Prague, CZ, August 18-24, 2001.

CHAPTER 4 - DISASTER RISK MANAGEMENT FOR CULTURAL RESOURCES

In discussing the reasons for DRM planning in the heritage field, Ball and Watt asked in 2001 if the techniques, and the associated research coming from the nuclear, health, and occupational safety industries are transferable in a useful way to the management of cultural heritage. Since posing this question over ten years ago, the heritage field has answered with a definitive "yes."[1]

Six years later it was observed in a special natural disasters edition of the annual *Heritage at Risk* publication that, despite the numerous reports on stabilization and repair of cultural sites in the aftermath of disasters, there was still only limited knowledge and research on active prevention or, more specifically, on the social, economic and technical *limitations* of preventive measures.[2]

The UNISDR"s *Hyogo Framework* however has since initiated a notable shift in the attention paid to disaster preparedness by international agencies that carry out projects on a global scale. Groups such as ICOMOS, the World Monuments Fund, and Ritsumeikan University in Japan now work to develop DRM methods, publish their findings from field projects, and organize or participate in conferences on disaster preparedness.

Disaster and Cultural Heritage

Often historic buildings that have survived natural and man-made calamities over the years are considered safe simply because they are still standing. To some extent this is supported by White and Haas' observation on adaptation: local vernacular architecture and craftsmanship have adapted over the years to meet the specific local conditions as efficiently as possible. Traditional materials and construction methods evolved in response to the stresses of disaster events.

1 Ball and Watt, "Risk Management and Cultural Heritage" lecture at ARIADNE 4 – Vulnerability of Cultural Heritage to Hazards and Prevention Measures conference in Prague, CZ, August 18-24, 2001.

2 Thomas Will, Hans-Rudolf Meier. "Cultural Heritage and Natural Disasters: Risk Preparedness and the Limits of Prevention" in *Heritage at Risk 2007: Special Edition*; p12.

Architectural heritage is a unique case with regards to natural disasters. Old buildings are weakened by every disaster if they are not maintained; ground and site conditions can change over time (for example, when pervious land becomes impervious and water tables change; building use may have changed or been structurally altered in ways that can weaken or alter their structural equilibrium or introduce new hazards (for example, through modernization); and some building materials suffer irreversible morphological changes over time, altering how the structure responds to strain.

Historical research, in fact, should provide clues to the effects of past disaster events at a heritage site. Meier observes that:

> "the disaster is an event whose traces can themselves attain monument value... Traces of disasters and also the way in which the destruction they cause has been dealt with regularly become a part of the monument landscape. They are recorded as a meaningful layer in the cultural heritage, and they can even take on preventive character themselves, at least in the sense of a warning or admonition."[3]

The accretion of repairs can read like a timeline of a building's existence as disaster exposes the cumulative implications of many earlier decisions. A deeper questioning of what happened, and why, could prevent a repetition of disasters and resultant loss.

Disaster Risk Management Planning for Cultural Heritage

Natural disasters in Bam, Iran, or in the Old Fort of Galle in Sri Lanka are high profile examples of the vulnerability of cultural heritage. Disaster risks at heritage sites are a function of the site's vulnerability to potential hazards. The vulnerability of heritage sites to both natural and human-made disasters can be reduced through risk management planning.

The aim of disaster risk management is to reduce disaster risk to a socially acceptable and manageable level. A Disaster Risk Management Plan does this through a systematic assessment of risk and threats combined with the development, implementation, and periodic review of

3 Ibid

mitigation strategies. Six steps have been identified in the planning process:[4]

1. Define the context and scope including a review of site values and significance
2. Perform condition and management context assessments
3. Identify the risks and assess their impacts
4. Identify possible mitigation strategies
5. Evaluate risks and mitigation strategies based on cost and benefit analysis
6. Implement the strategies and monitor performance regularly

Communication and consultation with the different stakeholders is critical to the cyclic planning process to ensure a constant feedback loop between the definition of objectives and the implementation and evaluation phases. These steps are briefly reviewed here.

Inventory

Dr. June Taboroff, cultural resource specialist to the World Bank, has pointed out that, prior to undertaking the risk assessment process described in the previous chapter, an inventory of the properties and structures should be performed. "National inventories of historic places are the keystone of heritage management," she writes, "for the simple reason that knowing what one's resources are is a prerequisite for effective safeguarding."[5] The inventory process not only identifies historic properties but also provides an opportunity to create the benchmark necessary for determining the rate of change occurring at a site.

Scope and Scale of Assessment

The inventory process will clarify the extent of the site and contributing elements which helps to define the scope of the assessment phase. The scale at which the DRM Plan should be undertaken is more difficult to define. Site managers familiar with the site and its existing pathologies can identify the levels at which past damage has occurred. For example, past repairs following an earthquake may have focused on the reinforcement of structural members at the material level

4 Mario Santana, personal correspondence, April 2012.
5 June Taboroff, "Cultural Heritage and Natural Disasters: Incentives for Risk Management and Mitigation" in *Managing Disaster Risks in Emerging Economies*, 2001; p75.

or on post-earthquake fire prevention at the municipality level.[6]

Resources available for later implementation may heavily influence the scope and scale of the assessment.

Site Assessment

Cultural heritage management has benefited from advances in environmental planning. These are evident in the shift in focus from individual monuments to heritage in its wider physical and social context. The site assessment focuses on this physical and social context by recording information about the immediate surrounding environment such as topography, geography, weather patterns, and land uses of neighboring properties.

Ideally, historical context will also be included against which changes can be documented in the analysis phase. Sources of written and graphic documentation might include a bibliographic review, or archaeological reports; a photogrammetric survey is particularly helpful where available.

As a snap-shot of present-day circumstances, the site assessment should include information on organizational and administrative details which influence disaster impact. This might include information on administrative structure, staff capacities or level of emergency training, and financial information relevant to emergency funding. Where possible, information on authorities and governmental agencies involved in emergency circumstances should be recorded in this step as well.

Conditions Assessment

The conditions assessment is concerned primarily with the physical fabric of the structure and its current state of conservation. Demas' identifies three stages of survey process are useful:

6 See Yoongho Ahn, "Study on Disaster Risk Assessment of Cultural Heritage and Road Network Improvement in Historical City." *Journal of Disaster Research*, Dec. 2010.

1) collection of information and historical documentation; 2) visual assessment and condition recording of the current physical condition; and 3) analysis and diagnosis of the condition. The graphic and written documentation collected serves as the baseline site data against which change over time will be monitored.

Identify Risks

What are considered agents of decay in traditional conservation work are the source of sudden, severely accelerated deterioration in the event of a disaster. The identification of risks is therefore somewhat different than in conservation work, which focuses on slower alterations in the fabric. Vulnerability indicators however remain similar for both practices; for example, the World Heritage Operation Guidelines list the following examples of threats:

- Development Pressures (includes encroachment, adaptation, agriculture, mining)
- Environmental pressures (can include pollution, climate change, desertification)
- Natural disasters and risk preparedness (earthquakes, floods, fires, etc.),
- Tourism and visitation
- Residential density within buffer zone

Historical documentation is again very useful for this step; past disasters may have occurred long enough ago in the past for there to be no recollection of the event in a community's collective memory.

The concept of disturbances and threats as related to heritage site management has been in MEGA-J site management software developed by the Getty Conservation Institute. In drawing a relationship between disturbance, threat, and vulnerability, the MEGA-J definition describes risks as "detectable phenomena, whether natural forces or human activities, that appear to predict a future disturbance to a site or element." This definition is particularly useful when identification of the source and scale of a hazard and its potential impact is not immediately apparent.

Risk Profiling and Risk Analysis

Risk profiling is the process of defining the extent of the impact of the threats. This is done using a combination of three factors to indicate the seriousness of the risk. These factors are hazard, control mechanism, and receptor:

- hazard effects are based on the nature and quality of materials in relation to the hazard characteristics (earthquake strength)
- control mechanisms can be structural (seismic retrofitting) or non-structural (staff straining),
- receptor is the site or object

Taken together, these factors illustrate a risk profile for each risk type. A rating of the frequency

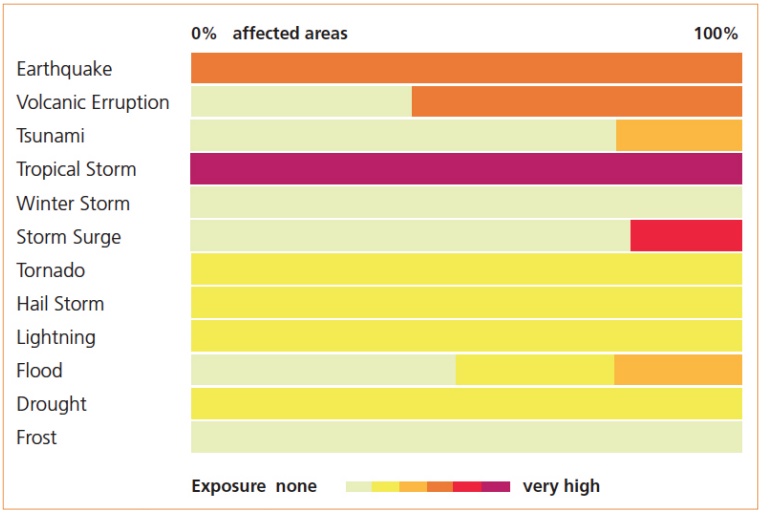

Figure 4. Example of risk profiling diagram. Source: Samoa Post-Disaster Needs Assessment, GFDRR, 2009

and severity of these risks accompanies the profile. A typical method for this process is a ranking matrix in which frequency and severity are ranked on a scale of 1 to 5.[7]

The outcome of this profiling and rating process is a prioritization of the risks, for which mitigation strategies are then developed. Mitigation is a sustained action to reduce or eliminate risk to people and property from hazards and their effects. Activities which will reduce disaster impact can be categorized by pre-disaster preventive actions, emergency response preparedness

7 For a discussion on risk type, and factors associated frequency, see Muething, Waller, Graham, p235.

actions, and preventive reconstruction actions. Mitigation strategizing corresponds with these three disaster phases.

It is important to note that the function of mitigation is different from other emergency management methods because of its focus on long-term solutions to reducing risk as opposed to merely preparing for, responding to, or recovering from their consequences.

Examples of mitigation tools available to site managers and local planners involved in emergency planning include land use regulation, early warning systems, engineering and building codes, insurance products, and new technology such as GIS, remote sensing, etc.

Taboroff identified nine key objectives of mitigation strategies which should serve as guidelines for the individual developing the DRM plan. These objectives are also helpful to site managers or administrators charged with reviewing, evaluating, and revising the DRM plan at later stages. These key objectives emphasize that the disaster plan scale should include the entire physical site, incorporating conservation, significance, and maintenance activities into the preparedness planning and mitigation activities.

Digital Media Tools

As the heritage field continues to take clues from complementary disciplines such as archaeology, environmental science, and social sciences, the range of tools available to observe, record, and document historic structures and objects has increased. In particular, spatial analysis using GIS databases enable managers to consolidate information from a range of disciplines, including natural and social sciences and engineering. This information can assist with the risk identification process as well as mitigation opportunities. Three examples include risk mapping, inventory databases, and real-time internet-based communication portals.

Risk Mapping

Risk mapping in the cultural heritage field is perhaps best known for its wide use in Italy following a number of devastating earthquakes. The process of generating a risk map involves the use of a GIS database to collect location information for cultural properties. This locational illustration is used to display building assessments, evacuation routes, and create disaster prevention plans. Risk mapping also contributes to the efficient rescue of cultural property by helping to identify and locate threatened cultural property, and to record the existing state of the site or object.

A Japanese conservation agency observed during a recent survey of cultural heritage in disasters an example of how risk mapping could have helped in a disaster emergency:

> "Since there was no data clearly identifying the location of cultural property when the 1995 southern Hyogo Prefecture earthquake struck, rescue activities were hampered. A storage facility could not be secured and the location of damaged cultural property that was unknown."[8]

Another example of how digital tools can be implemented in pre-disaster "peacetime" projects is highlighted in a GCI report on conservation management principles at Joya de Ceren archaeological site in El Salvador. Authors Castellanos and Descamps write:

> "A cartography system was an essential tool in identification, risk assessment and defining proposals. Creating maps at different scales allowed us to identify key decision-makers and reconcile their potential needs and expectations... It also promotes concerted actions among public and private sectors, thus avoiding duplication of efforts and implementation of disarticulated actions... "[9]

Project leaders at Joya de Ceren explained that this commitment to digital tools required additional training in CAD (Computer Aided Design software) for participating professionals in addition to purchasing equipment. The investment was considered justified because of the advantages of developing documentation for a cartography system compatible with those currently used for territorial development and planning.

8 The Japan Consortium for International Cooperation in Heritage, 2011, p53
9 Castellanos, Carolina; Descamps, Françoise. 2008, p24.

A number of web-based tools exist or are currently being developed which can applied to disaster mitigation activities. While some tools have been available for several years and are in wide use (for example, Google Earth and Twitter), others being borrowed from other disciplines and are just now being tested for their applicability to cultural heritage priorities. Examples will be discussed in the following chapter.

Implementation of Mitigation Strategies

Implementing mitigation strategies requires the participation and support of a broad spectrum of players outside of the site management and stakeholders. Mitigation involves, among other public and private sector participants, land use planners, construction and building officials, business owners, insurance companies, community leaders and politicians. This is perhaps the one area that has received the least quantitative research and yet is the most important step in the DRM planning process.

One approach to responsibilities and contributions of these participants in risk mitigation activities is the use of a control matrix. This model provides a tool for site managers to consider risk mitigation tactics and decide the method of control. Five types of control -- Avoid, Block, Detect, Respond, and Recover – classify the types of control activities available to combat the perceived impacts of the threats identified in the previous step. A responsibility matrix assigns these activities to capable participants.

An action plan to guide long-and short-term integration of changes in procedures or necessary training modules. This phase also includes a review and revise component which is referred to as "monitoring and control" in which an evaluation of procedures including time frames for the evaluation periods will be determined by the scale of the mitigation measures or timing factors such as tourist seasons.

Evaluate Risks and Mitigation Strategies

A variety of methods exists for the evaluation of risks and proposed mitigation strategies. In general, the evaluation process will provide a framework for the comparison of priorities with feasibility. Similar to other site management decisions, criteria for disaster risk mitigation strategies are often site- and user-specific. The cost-benefit analysis method is one approach suitable for feasibility considerations. Other evaluation criteria relevant to the process of prioritizing mitigation strategies include non-structural factors such as the objectives of the organization, gain or loss of the local community, economic benefits (or losses), and financial, technical, social and other criteria.

Additional Planning Instruments

The components of the Disaster Risk Management Plan summarized here can be applied to any of the three disaster phases depending on scope and timing of mitigation opportunity. The level of planning outlined is most effective when carried out in pre-disaster phases. Emergency circumstances typically require accelerated decision-making among groups not limited to stakeholders, making the level of detail inherent in the components outlined here ineffective. This situation is not unique to cultural heritage properties; risk management is primarily a planning tool as opposed to a recovery tool. Nonetheless, decisions made during the post-disaster phase can have long-term impacts on the vulnerability of a community or property to future disaster events. For example, repairable historic structures risk being demolished when quick and cursory evaluations on the stability of damaged buildings are made without in depth research or deeper consideration. Following their work on the Gingerbread Houses in Haiti, the World Monuments Fund report included the following observation:

> "The rapid damage assessments after a crisis, as well as the influx of international assistance for rebuilding, often lead to hasty decisions about the surviving architectural fabric. Such decisions about what to save and what not to salvage within the built landscape can have irreversible effects on people and environments."

[10]Post-disaster planning can and should incorporate pre-disaster planning objectives. The Post-Disaster Needs Assessment is method specific to the post-disaster phase which incorporates activities useful for both post- and pre-disaster risk management objectives.

Post-Disaster Needs Assessment

A Post-Disaster Needs Assessment functions as a of universal template for assessing net disaster impact and typically includes the reconstruction framework that guides a post-disaster recovery strategy. A unique aspect of the PDNA is that it is led by the government of the affected country with assistance from a multi-disciplinary, multi-agency team from the World Bank, GFDRR, UN Agencies, European Commission, and other relevant stakeholders. The UN requested input from the World Heritage Centre regarding the core principles of disaster-response and reconstruction needs specific to cultural heritage sites. This was generally seen to be a good sign for the future of improved collaboration among agencies working in disaster management. A recent PDNA report prepared following the 2009 earthquake in Samoa includes a section on "Community Infrastructure Religious and Cultural Heritage" which outlines damages and losses, recovery requirements, highlighting specifically damage caused by the tsunami to churches and family grave sites.[11]

PDNA as a policy represents a set of standard operating procedures for the engagement of international development community for post-disaster needs assessments and recovery frameworks. A PDNA report pulls together information into a single, consolidated report consisting of:

- Damage, loss, and macro-economic impacts on the affected economy;
- Impacts on livelihoods, incomes, and human development;
- Short, medium, and long-term recovery and reconstruction needs; and,
- Measures for mainstreaming Disaster Risk Reduction in post-disaster recovery and reconstruction plans

10 World Monuments Fund, *Preserving Haiti's Gingerbread Houses: 2010 Earthquake Report,* p6.
11 *SAMOA Post-Disaster Needs Assessment Following the Earthquake and Tsunami of 29th September 2009*; Government of Samoa, Dec. 2009, p21.

CHAPTER 5 - INTERNATIONAL AGENCIES AND ORGANIZATIONS PARTICIPATING IN DISASTER MANAGEMENT

At the international level a nexus between the two spheres of conservation and policy leading to the implementation of more effective and integrated response and mitigation strategies can be observed. Partnerships have been built across organizations, regions, and academic institutions. Site managers are being trained in emergency procedures and prevention measures. The next steps should focus on getting these managers onto the emergency response team and emergency responders educated about conservation to enable them to make decisions protective of heritage places in the longer term rather than compounding the damage.

When disaster strikes, humankind is quick to respond with help and support for those affected. Several organizations exist specifically for emergency aid in disaster stricken countries, providing medical, technical and monetary support. Following a disaster, heritage property managers will most likely work with emergency response teams, including international organizations, government agencies, and emergency planners. Increasingly, organizations such as the International Committee of the Red Cross, The World Bank, the Getty Conservation Institute and UNESCO are involved in disaster management for cultural heritage.

Both Feilden and Fitch were discussing disasters and preventive conservation in the 1980s. The following decade saw considerable institutional activity, possibly benefiting from the UN-declared "International Decade for Natural Disaster Reduction." At the World Bank, June Taboroff was advocating three main policy messages to improve incentives for protecting historic buildings: [1]

1 Taborff, "International Experience of Disaster Relief and Incentives for Protection of Historic Buildings in Seismic Zones." Lecture at ICOMOS International Conference on the Seismic Performance of Traditional Buildings, Istanbul, 2000.

- Knowledge: Cost effective products and techniques for mitigation and reconstruction of historic buildings need to be developed and used;
- Delivery: Knowledge about reducing vulnerability of historic buildings needs to be transferred from experts to the people affected; and
- Decisions: Policy makers will need to be convinced of the importance of adopting such vulnerability reduction measures.

With each disaster comes a wave of recovery work but also lessons learned and strategies to be reviewed, impacting how disaster management is viewed, valued.

Although approaches to disaster management will differ from site to site because the risks differ, a handful of globally-active cultural heritage organizations collaborate with heritage property managers and other emergency groups to coordinate efforts. Some of these agencies have carried out disaster recovery activities and a few examples of disaster prevention at built heritage sites exist as well. A great number of recommendations have been published from conference proceedings. Despite this work, there is limited empirical research available on before and after scenarios, which would greatly advance preventive methods. A centralized informational resource that collects information about these projects also does not exist, or is piecemeal at best.

Nonetheless we are seeing a shift from recovery-focused efforts to prevention and preparedness at built heritage sites advocated by a generation of heritage professionals sensitive to/aware of the benefits of preventive as opposed to reactive conservation. As policy shifts reflect awareness, more and more agencies are including a disaster preparedness component in their work and mandates. A few notable examples from key international agencies are discussed in this chapter.

organization	pre	peri	post
ICOMOS	x		
ICCROM	x		
ICOM		x	
ICBS (Blue Shield)	x		
World Heritage	x		x
OSSOC GD		x	
World Bank			x
Asian Development Bank	x		
World Monuments Fund			x
Architectes de l'Urgence		x	
Prince Claus Fund			x
Getty Conservation Institute	x		

Figure 5. Organization participation by disaster phase

Within the last ten years, a number of countries and organizations have participated in the recovery process of disaster-affected cultural heritage. However, because there is no centralized informational resource documenting what countries and organizations have done in the past and present, there is a high probability of duplication of effort. For example, in its 2010 report on international collaboration in disaster management, the Japan Consortium for International Cooperation in Cultural Heritage explains how it and the Dutch agency Prince Claus Fund each carried out several projects in Indonesia without being aware of each other's activities until recently. A cooperative relationship would enable sharing information and human networks and a centralized network would assist in identifying similar activities or regions of specialty.

Several agencies within/under UNESCO are charged with/participate in disaster management activities for cultural heritage. In addition to the World Heritage Center, advisory bodies including ICOM, ICCROM and ICOMOS are also discussed in this chapter.

Other key organizations in the international conservation field have helped to increase

international understanding about the importance of cultural heritage protection. These include the Getty Conservation Institute, World Monuments Fund, the Aga Khan Trust for Culture, and the Prince Claus Fund. Former director of Field Operations for the World Monuments Fund, John Stubbs references past collaboration between these organizations and UNESCO which had "impressive results," citing work in the former Yugoslavia and at Angkor since the mid-1990s[2].

Where international and local interests in heritage conservation meet, questions of cultural sensitivity, rights and ownership of the past arise. An international team of conservation experts may save sites but, because what is important to one culture may not be valued in the same way by the other, an approach to local needs from a foreign perspective can have incomplete and unsatisfactory results. It is also highly possible that surviving traditional cultures may have repair and maintenance techniques in place. While the requisite site assessment and historical research should reveal relevant information on these complexities, it is necessary to be conscious of the limitations of external assistance. In his book, *Time Honored*, John Stubbs identifies the four principal situations in which outside help is merited:[3]

- when traditional building repair and preservation techniques are lost and there is a call for outside help in replacing them
- when there is a lack of appreciation of the significance of and commitment to the sensitive treatment of historic resources
- where locals may be overwhelmed by an extraordinary technical challenge or the size of the task
- where significant financial assistance that is not available locally may be needed

These circumstances are concerned with conservation in general and are not specific to disaster situations but nonetheless are relevant for international organizations offering their assistance. Each of the following examples of collaboration have one or more of the above components. Key differences between non-governmental organizations and government agencies are primarily manifested in how these groups reach decisions and manage financial resources. Government agency decisions follow a bureaucratic top-down pattern subject to politics while

2 Stubbs, *Time Honored,* p257
3 Ibid, p262

NGOs are able to make decisions rapidly because projects decisions come from within, from staff or executive committees. Regarding finances, government agencies cannot save or carry forward funds because of budget ceilings and execution deadlines, limiting their flexibility in emergencies. On the other hand, NGOs can save and carry funds over different budget years, and can engage in fundraising activities.

UNESCO, World Heritage program and its advisory bodies

The World Heritage program was established by the Convention Concerning the Protection of World Cultural and Natural Heritage adopted by the General Conference of UNESCO in 1972. Since then, 189 States Parties have ratified the convention. As of 2011, 936 sites are listed; of these, 725 are cultural heritage sites, 183 are natural heritage sites, and 28 are "mixed" properties.[4]

A large-scale campaign to improve site management performance has been initiated to protect the integrity of the World Heritage Convention which defines eligibility of World Heritage sites based on a definition of outstanding universal value. ICOMOS and ICCROM are primarily networks of heritage professionals who advise UNESCO through recommendations, charters, and similar policy documents. ICCROM as a technical advisory group also carries out workshops and courses on various conservation techniques. ICOMOS, as a group of scientific committees, unites experts through a network of specialists. Together the activities they carry out related to disaster risk management are predominantly related to training site managers, lobbying for international policy, and developing and disseminating technical guidelines.

A recent evaluation of World Heritage properties found that many have no plan or procedures for managing risks associated with potential disasters, meaning they are more or less defenseless. The application form for the nomination of a property to the World Heritage list was revised and Article 4 now requires a States Party to include a section on Disaster Risk preparedness procedures and evidence of a Disaster Risk Management plan.

4 UNESCO World Heritage publishes up-to-date program statistics online at whc.unesco.org/en/list/stat

Other disaster management activities undertaken by the UNESCO World Heritage Centre together States Parties, Advisory Bodies and other partners, are policies and practical measures such as technical workshops, resource materials, International Assistance to World Heritage properties as well as the "Strategy for Reducing Risks from Disasters at World Heritage Properties."

The Strategy, approved by the World Heritage Committee in 2007, is a policy document outlining a risk-preparedness strategy to strengthen the protection of World Heritage. The goal is to encourage the inclusion of World Heritage in national disaster reduction policies and to incorporate concern for disaster risk reduction within management plans and systems for World Heritage properties in their territories.

The objectives of the Strategy addresses disaster risk threatening the values or integrity of World Heritage sites and emphasizes "the positive role that the heritage could play in reducing the impact of disasters through the goods and services it provides to communities." The objectives are based on the five main priorities for action defined by the *Hyogo Framework for Action*, the main UN-wide policy on the subject of Disaster Reduction.[5] These are:

- Strengthen support within relevant global, regional, national and local institutions for reducing risks at World Heritage properties;
- Use knowledge, innovation and education to build a culture of disaster prevention at World Heritage properties;
- Identify, assess and monitor disaster risks at World Heritage properties;
- Reduce underlying risk factors at World Heritage properties;
- Strengthen disaster preparedness at World Heritage properties for effective response at all levels.

Under the Strategy, a manual called "Managing Disaster Risks for World Heritage" was published in June 2010.[6] The manual is a product of collective efforts between all Advisory Bodies (ICCROM, ICOMOS, ICUN, and World Heritage Centre) to assist World Heritage management authorities to

5 The UNISDR has compiled extensive information regarding the objectives of and procedures for carrying out the principles identified by the Framework. Informational brochures, Framework summaries, and full text versions are available for download in multiple languages at www.unisdr.org/hfa.

6 UNESCO, *Managing Disaster Risks for World Heritage: World Heritage Resource Manual*, 2010.

better protect their sites. It complements the earlier manual by Herb Stovel "Risk Preparedness: A Management Manual for World Cultural Heritage" published in 1998.[7] Several individuals were involved with the 2010 publication, namely Giovanni Boccardi of the World Heritage Centre, Rohit Jigyasu, president of ICORP, Dinu Bumbaru of ICOMOS, Joseph King, Aparna Tandon, and Gamini Wijesuriya of ICCROM, and Josephine Langley with IUCN.

Using case studies taken from various World Heritage sites, the manual illustrates the process of creating a DRM plan from the perspective of site managers and heritage administrators with an emphasis on the identification, assessment and reduction of disaster risks. Procedures are not analyzed in depth but instead are presented in a bulleted format, highlighting the primary components of the DRM plan. The manual focuses on one approach to managing disaster risks at World Heritage properties and the authors clearly state that it does not attempt to be comprehensive because of the overwhelming number of different site types. Nonetheless, the authors manage to include innovative approaches including the use of traditional knowledge in risk reduction strategies. The 70-page publication is available for download from the World Heritage website.

In addition to the Strategy, the World Heritage Centre co-organizes workshops on disaster risk management for World Heritage properties. The most recent courses were held in Beijing (Dec. 2009), Israel (November 2009), Greece (2008), Cuba (2008) and Japan (2006, 2007 and 2008). UNESCO established its Chair on Risk Management of Cultural Heritage at the Ritsumeikan University of Kyoto in Japan.[8]

Funding through the World Heritage program under International Assistance is also available to States Parties for the protection of the world cultural heritage inscribed, or potentially suitable

7 Stovel , *Risk Preparedness: A Management Manual for World Cultural Heritage*, 1998

8 The Global Center Of Excellence for Education, Research and Development of Strategy on Disaster Mitigation of Cultural Heritage and Historic Cities holds an annual International Professional Training Program in collaboration with the Japan International Cooperation Agency (JICA) Osaka. The course "Conservation and Risk Management of Historic Towns for Cultural Tourism" for heritage professionals emphasizes cooperation between conservation, tourism,and urban planning. See www.ritsumei-gcoe.jp/heritagerisknet.dmuch and www.rits-dmuch.jp/en/project/gcoe/index.html for extensive information on related projects.

for inscription on the World Heritage List. International Assistance has been provided as a form of disaster protection or response in two forms, Emergency assistance and Conservation and Management Assistance

Funding under Emergency Assistance supports activities to mitigate possible negative impact of a natural or human-made disaster or to assess whether or not such imminent danger is present, for example as a result of a major disaster.[9] In the case of damage or loss of heritage following a disaster event, but no urgent risks exist, other forms of assistance are offered, such as Conservation and Management Assistance.

ICOMOS

The International Council of Monuments and Sites is an international, non-governmental organization that works together with UNESCO in the implementation of its Word Heritage program. It is entrusted by UNESCO with responsibility for the study of various doctrinal, technical and organizational issues including the review of nominated World Heritage properties. ICOMOS was founded in Warsaw in June 1965 by the 25 countries having ratified the Venice Charter and cooperates with a number of other international organizations, including ICCROM, ICOM, WTO and the Council of Europe.

The General Assembly meets every three years, is the supreme authority, bringing together all ICOMOS members to decide on program initiatives, budget priorities, and implementation of the agency objectives. The administration is governed by an Executive Committee and an Advisory Committee, made up of the Presidents of the National and International Committees. The agency budget consists of revenue from membership fees, grants, and contracts.

Active disaster prevention is carried out at various levels:

9 Further guidance on the use of Emergency Assistance can be found in Annex 9, "Evaluation Criteria of the Advisory Bodies for International Assistance Requests" of the Operational Guidelines.

Preparedness
ICOMOS seeks to mobilize the expertise and experience of world conservation experts through improved training and documentation, and the establishment of a network of professionals

Immediate assistance
The aim of immediate assistance is to respond quickly to cultural heritage needs in the event of armed conflict or natural disasters, avoiding government interference or red tape.

Awareness-raising
Awareness-raising activities seek to mobilize and use financial, documentary and social resources to foster awareness and readiness.

One priority has been taking stock of the experience gained by experts in the field during crises in order to incorporate this into theoretical considerations on legal or administration nature. This is in conjunction with providing enhanced immediate professional assistance and more effective prevention and protection measures in extraordinary circumstances brought about by natural or man-made disasters.[10]

Activities include drawing up specific action programs and strategies common to both governmental and non-governmental organizations, updating and distribution of technical manuals and conservation guidelines specific to hazard preparedness and general site management. These tools are intended to complement existing documentation as regards the unique needs of cultural heritage at risk.

Marking a shift from reactive to a preventive approach for conservation that seeks to put emphasis on risk reduction and preparedness, the themes for the next three upcoming scientific symposia will focus on risks resulting from natural and human-caused disasters (2012), globalization and uncontrolled development (2013), and loss of traditions and collective memory (2015).

The symposia will consider underlying causes for risks to cultural heritage; tools and methodologies for their assessment; and policies, strategies and techniques for reducing

10 As observed in Council of Europe report on International Organizations and Hazard Management, 2004.

potential threats to the future of cultural heritage aimed at protecting and managing our irreplaceable cultural resources for present and future generations. The symposium, "Reducing Risks to Cultural Heritage from Natural and Human-Caused Disasters" will address these risks and formulate policies, strategies and techniques for reducing risks to disasters through case studies presented on the following themes:[11]

Techniques and Strategies for Mitigating Risks

- Development of appropriate techniques for mitigating risks by considering factors of safety and values;
- Investigation into the traditional materials, skills and knowledge systems which can be used for disaster mitigation how to utilize them in present context;
- Maintenance and monitoring strategies can be adopted for reducing risks;
- How to enhance security and prevent risks of terrorism and theft

Methodology and Tools for Undertaking Risk Assessment

- Identifying various approaches and tools for assessing risks
- Discussing good practices in documentation, inventorying and mapping for recording and analyzing risks
- Methods to communicate these risks to decision makers

Protection during Conflict and Other Emergencies

- What policies, techniques and strategies can be adopted in the times of conflicts and other emergencies
- Identification of international legal instruments including coordination with organizations such as Blue Shield

Planning for Post-Disaster Recovery

- Recommendations on how to avoid hasty destruction of vulnerable materials and structures following a disaster
- Examples of post-disaster damage assessments
- Developing monitoring and evaluation strategies for post-disaster interventions and reconstruction?
- Evaluation of post-disaster recovery and rehabilitation costs
- Engagement of various international and national stakeholders for post-disaster recovery
- Use of intangible heritage [effectively] for post-disaster recovery and rehabilitation
- Awareness-Raising and Capacity-Building for Managing Disaster Risks

11 As outlined in the ICOMOS Call for Abstracts, distributed to ICOMOS members by email on 4.20.2012

- Engaging communities for disaster-risk management of cultural-heritage sites
- Improve capacity of craftsmen, professionals and decision makers for managing risks

Since 2000, ICOMOS has published six semi-annual *Heritage at Risk* reports which identify threatened heritage places, monuments and sites, and present typical case studies and trends. The reports are intended to provide suggestions for managing site-level or global threats to our cultural heritage. Submissions are collected from among ICOMOS National Committees, International Scientific Committees and ICOMOS' world-wide professional network.

ICCROM

One of the Advisory Bodies to UNESCO World Heritage Committee, ICCROM is an intergovernmental organization established by UNESCO in 1956 to assist with maintaining and sharing scientific research and methods on the preservation of cultural property through building a network of exerts and specialized conservation institutes. From its office in Rome, ICCROM actively "[coordinates] the efforts of the international heritage community in promoting data collection and exchange, and in ensuring that local experience and needs are taken into consideration within the international strategy." The organization has always focused on training and technical cooperation, either in the form of internships or specialized courses.[12] Within the last ten years, programs have shifted to include management and regional initiatives in an attempt to "link conservation of heritage with environmental care, economic and cultural development, education and above all with planning," as expressed by Marc Laenen in a 2006 speech. This period has seen the introduction of a series of International Training Courses and a new emphasis on promoting preventive conservation and interdisciplinary research. Due to limited capacity to carry out large-scale research projects, the organization collaborates with other institutions doing similar research.

The emphasis on an "integrated approach" to support interdisciplinary collaboration on

12 Bouchenaki, Dr. Mounir and J. Jokilehto. ICCROM Newsletter 35, October 2009, "From Rome Centre to ICCROM: Milestones on the Path of the International Centre."

conservation work is strengthened by information sharing. The learning center in Rome houses archives as well, with a broad and rich collection in multiple languages.[13]

Primary programs:

- Targeted and applied research – primarily focused on management approaches, increasing stakeholder involvement through awareness raising, some materials-based research.
- Training activities including reducing risks to museum and archive collections, risk preparedness planning for disasters at heritage sites
- Publications
- Global Professional Network of conservation professionals
- Recent activities based on one of two focuses:
- Courses and activities targeted at international audience from all Member States
- Programs tailored to specific geographic regions

Disaster Risk Management projects

Since 2003, ICCROM has collaborated with the Canadian Conservation Institute (CCI) and the Netherlands Cultural Heritage Agency (RCE) on the development and implementation of an international course on "Reducing Risks to Collections and Cultural Heritage" and complementary research, publication and communication activities. Six courses have been implemented to date.

Since 2005, a joint education project of ICCROM, the Getty Conservation Institute and ICOM has been carried out twice, the Teamwork for Integrated Emergency Management (TIEM) is an eighteen month workshop involving 10-12 museums in a region which includes a distance-mentoring phase during which teams implement their disaster risk management plans. Each project culminates into a final review seminar when participants and mentors share their achievements and outline follow-up strategies. Collaboration with other institutions is highly recommended, such as UNESCO or national universities and conservation centers.

A recent course on disaster risk reduction strategies held in Mexico City, Mexico in December

13 The indexed bibliographic references include extensive abstracts as well; this highly specialized library collection hold more than 84,000 items and provides an online database to more than 100,000 references.

2011. UNESCO World Heritage Centre in collaboration with LATAM-ICCROM organized the event with funding from the World Heritage Committee and INAH (Coordinación Nacional de Conservación del Patrimonio Cultural - Instituto Nacional de Antropología e Historia).

The course presented theory and practice through lectures, case studies, and practical exercises. The group of 15+ participants included professionals involved in planning and management of World Heritage sites from the Latin American and Caribbean region and was taught by ICCROM staff and other professionals selected by ICCROM and was conducted in English and Spanish.

Course Objectives

- issues related to managing World Heritage sites, including the issues of disasters and climate change;
- approaches to management planning, taking into consideration the greater participation of stakeholders and the values-led approach;
- strategies for reducing risks from disasters using the 'World Heritage Resource Manual on Managing Disaster Risks for World Heritage'
- promotion of exchange of experiences and information in Latin America and the Caribbean on management systems and strategic planning

While participants are encouraged to fund their own travel and accommodation through their institutions or external sources, occasionally financial assistance is provided to selected individuals.[14]

ICCROM identified Disaster Risk Management Objectives for 2010–2011, which emphasized the capacity to connect expert practitioners with researchers and site managers using the rapidly increasing availability and ease of internet communication: The Objectives also identify a need to integrate disaster risk management with the management of slow and continual risks; specifically the objectives state that the methodologies of risk management and conservation

14 Course application materials state this explicitly, see http://www.iccrom.org/eng/01train_en/01_01events_en.shtml for additional course information materials. In a personal interview with the author, Jeff Cody, director or education programs at the GCI, has observed a general trend in conservation management course participants' level of engagement in the case that little or no funding is offered -- those who choose to participate because they recognize the value of the course information perform better than those who see the course as a paid trip abroad.

planning possibly need to be "updated to reflect common goals and techniques."[15]

These objectives appear to be responding to the feedback from past participants and the requests and interest from potential participants, indicating an interest in the subject matter and training framework from the field in general.

Japan

Several agencies exist within Japan which support cultural heritage preservation, research and policy. The rich history of architectural heritage in Japan is nurtured by these organizations. Here, two organizations are considered which contribute valuable research to the field of disaster management; one, an academic institution, aims to train a generation of engineers sensitive to the unique needs of historic structures. The other acts as an advisor to the Ministry of Culture in addition to organizing workshops on emergency support for cultural heritage in disaster situations.

Ritsumeiken University, UNESCO Research Chair

Global Center Of Excellence Program for Education, Research and Development of Strategy on Disaster Mitigation of Cultural Heritage and Historic Cities

The UNESCO Chair was established in 2006 for the development of an international training program on risk management of cultural heritage. The Center is also working to become an international information network hub for related activities. This is accomplished through the collaboration within different but related fields such as disaster science, civil engineering, architecture, information sciences and the humanities through joint research activities in Japan and elsewhere.

As little academic training exists on the protection of cultural heritage from disasters, the

15 See ICCROM's webpage on Collections and Risk Reduction for a full discussion of the project and collaborating organizations: www.iccrom.org/eng/prog_en/01coll_en/preven-risks_en.shtml.

Center's curriculum is intended to serve as a basis for an advanced international education program. Four research project have been designed to fit this curriculum:

- Assessing the Values of Cultural Properties and their Vulnerabilities (Cultural Heritage and Vulnerability)
- Traditional Procedures for Mitigating Disasters (Historical Disasters)
- Disaster Mitigation Technologies for Preserving Cultural Values (Disaster Mitigation Technologies)
- Comprehensive Planning for Disaster Mitigation, Emphasizing Cultural Heritage (Disaster Mitigation Planning and Policy)

Japanese and foreign students from various scientific and cultural disciplines are recruited and the program requires students to participate in all four of the listed projects. The goal stated by the University is "to produce young researchers in the engineering sciences who will understand the peculiarities of protecting cultural heritage and can conduct R&D, and those in the humanities who also can understand and carry out research on disaster mitigation technologies."[16]

Studies and research performed by students has been published in English, with several articles presented in the *Journal of Disaster Research*. Empirical studies like these contribute greatly to the pool of knowledge available to urban emergency planners and cultural heritage managers alike, providing the quantitative data necessary address issues of uncertainty in decision-making.[17]

Japan Consortium for International Cooperation in Cultural Heritage (JCIC-H)

In response to the growing number of requests for aid made to Japan the Law on the Promotion of International Cooperation for Protection of Cultural Heritage Abroad was enacted in 2006. That same year the Japan Consortium for International Cooperation in Cultural Heritage to support the policy initiatives.

16 Program informational pamphlet, downloaded April 20, 2012: "The Global COE Program for Education, Research and Development of Strategy on Disaster Mitigation of Cultural Heritage and Historic Cities."

17 See "Effective Planning of Road Monitoring Systems for Cultural Heritage Disaster Mitigation," by Keiichi Ogawa, Hiroshi Tsukaguchi, Yoongho Ahn, and Makoto Kawai; "Protection of Cultural Heritage from Post-Earthquake Fire," by Kenzo Toki; "Slope Monitoring System at a Slope Behind an Important Cultural Asset," Kazunari Sako, Ryoichi Fukagawa , and Tomoaki Satomi; "Cultural Heritage Sites in Shiga Prefecture in Danger of Natural Disasters," Yuko Ishida, Ryoichi Fukagawa, Kazunari Sako, Ikuo Yasukawa, and Koji Ikeda.

The Consortium organized its first workshop in 2007, "Emergency Support for Cultural Heritage Affected by Natural Disasters," focusing on the current issues in emergency international support to preserve cultural heritage affected by natural disasters.

A related study on flood damaged heritage in Yemen was published by the Consortium in 2009, which examined how the Japanese government could assist with restoration efforts [based on the project results].[18] As the number of appeals for cooperation from overseas to Japan and actual cooperation cases provided by Japanese experts continues to rise, deciding what measures are required to ensure swift and appropriate international cooperation responding to disaster-affected cultural heritage has become a major issue. Currently the request are handled on a case-by-case basis until a national framework for international cooperation is formally established. To aid in the development of such a framework, the Japan Consortium for International Cooperation in Cultural Heritage was commissioned by the Agency for Cultural Affairs to carry out a study on international cooperation for disaster-affected cultural heritage." Two reports were published which examined various nations receiving or providing related aid.[19]

The first report, "Research Report on International Cooperation in the Recovery Process of Disaster-affected Cultural Heritage," was released in 2010 and compiled information related to five countries (China, Thailand, Indonesia, Iran and Greece) that had experience major natural disasters within the previous ten years and had received assistance from Japan.

The subsequent report, "Research Report on International Cooperation in the Recovery Process of Disaster -affected Cultural Heritage "National Frameworks for International Aid," was published in early 2011. This was an interview-based survey of support frameworks which looked specifically at national and international organizations with experience in post-disaster

18 "Investigation of the Flood Situation in Yemen," February, 2009

19 See the introduction to the *Research Report on International Cooperation in the Recovery Process of Disaster-affected Cultural Heritage* from 2010.

recovery of cultural heritage. Four countries and six international organizations were selected as case studies: France, Italy, the Netherlands, the United States, UNESCO and its Advisory Bodies. The report summarized the survey results, outlining the support frameworks employed by the organizations surveyed.

This year's report highlights a selection of the over 1,500 international cooperative projects related to cultural heritage Japan has carried out. The examples were of a broad variety, including provision of technical equipment, academic studies, value assessments, and restoration and conservation projects, specialist training programs and awareness–raising activities for local communities. Partners included China, Mongolia, Tajikistan, Lebanon, Syria, Peru and Micronesia. Financial assistance opportunities are also reviewed, such as Japan's Official Development Assistance (ODA) funds, ministry and agency budgets, scientific research grants, as well as subsidies from private foundations and funds generated by corporate social action projects.[20]

The sister agency to Center for Cooperation in Heritage is the Center for International Cooperation in Conservation. Focusing primarily on conservation themes, this agency collects, disseminates and utilizes information on conservation of cultural property in other countries, with programs for international research exchanges and cultural property recovery in disaster situations as well as research on conservation materials for restoration planning, and training courses abroad. The Conservation Design Section conducts research on management plans including the effects of regional development and tourism on cultural properties. The Regional Environment Section performs research on natural, historic, cultural and economic environments conducive to conservation work. The majority of the studies available on the Center website were completed within the last ten years. The Center also runs an Archive at its Tokyo office, open to researchers.[21]

20 *Research Report on International Cooperation in the Recovery Process of Disaster-affected Cultural Heritage -- National Frameworks for International Aid*, published by the Japan Consortium for International Cooperation in Cultural Heritage, Tokyo, 2011.

21 Extensive information in English about the Center's research and cooperative activities is available through the Center's website at www.tobunken.go.jp/~kokusen/ENGLISH/center.html.

ICOM

ICOM, the International Council of Museums, is professional network of museums and museum professionals. Per agency statutes, ICOM establishes professional and ethical standards for museum activities, and makes related recommendations, advances knowledge, and "raises public cultural awareness through global networks and cooperation programmes."[22]

While guidelines, handbooks and protocol are important, a critical factor when cultural heritage is threatened is training and effective communication network. For example, Mr. Thomas Schuler, President of ICOM, recounted how his work relies less on best practices or guidelines and instead requires an expert to guide appropriate decision-making and effective network building for the unusual circumstances of emergency response situations.[23]

Mr. Schuler is also head of the ICOM Disaster Relief Task Force, which was established in 2005 at the same time as the Museums Emergency Program was created in collaboration with GCI. In 2011, the task force responded to 27 natural catastrophes, 2 severe accidents, 3 armed-conflicts and 7 civil unrest situations, bringing the agency to it full capacity for response. The agency's work has brought it wide notice, not only within the crisis management field. Although specialists in immediate disaster response activities, ICOM also participates in the other disaster phases with its specialist groups within the agency.[24]

Global Disaster Alert and Coordination Service and ICORP Damage Assessments

During the initial planning phase, there is the risk that information exchange between international responders is limited or strained. Decisions are often based on limited information, inaccurate sources or assumptions and the assistance of other organizations is rarely drawn into consideration. This often results in duplication, gaps, overlap or even inappropriate response, occasionally associated with high costs.[25]

22 The agency statutes are posted on its website, at icom.museum/who-we-are/the-organisation/icom-statutes/2-mission-and-purpose.html#sommairecontent.
23 Personal correspondence with Dr. Thomas Schuler, April 2012
24 Ibid.
25 Zeynep Gül Ünal, interview with author April 4, 2012.

The Global Disaster Alert and Coordination (GDACS) is a cooperation framework between the United Nations, the European Commission and disaster managers working to improve alerts, information exchange and coordination in the emergency response phase after major sudden-onset disasters. It provides disaster managers with disaster information systems worldwide in an attempt to bridge information and coordination gaps in emergency response by providing real-time access to web-based disaster information systems and communications through a platform called "VirtualOSOCC." Disaster maps and satellite images and weather forecast information are integrated in VirtualOSOCC disaster discussions.[26] GDACS collects and organizes several data types: GIS data, maps, media information, field data, satellite imagery. Only disaster managers have access to the website.

Dr. Zeynep Gül Ünal explains that, although GDACS services do not focus on building types, experts from groups such as ICOMOS-ICORP can access the disaster information to begin to design emergency response activity. ICOMOS – ICORP member Dr. Gül Ünal is an associate professor in the restoration program at the Yıldız Technical University and also a search and rescue operations team leader with GEA Turkey and INSARAG.[27] In disaster relief activities in her native Istanbul, Turkey and recently in Port-au-Prince, Haiti, Dr. Gül Ünal has observed the need for search and rescue teams to have access to information on the structural details of heritage buildings. Differing from their modern, typically reinforced concrete neighbors, heritage structures react to disasters in a different manner, making stabilization efforts uncertain if first responders are not familiar with these building types.

Dr. Gül Ünal is also very interested in capitalizing on the opportunity that first responders have to collect basic damage assessment information about near-by affected heritage sites. For example, she explains, search and rescue operations are typically completed within 72 hours of

26 This service is facilitated by the UN Institute for Training and Research (UNITAR) Operational Satellite Applications Programme (UNOSAT).

27 INSARAG is the International Search and Rescue Advisory Group, a network of disaster-prone and disaster-responding countries and organizations dedicated to urban search and rescue (USAR) and operational field coordination.

the disaster event; after this work, it is possible for members like herself with training in architecture and conservation to re-visit noted sites, record general conditions with photographs and basic descriptions, and forward this information in digital format by email to organizations and agencies able to collaborate on recovery work. By using a web-based disaster alert system such as GDACS in conjunction with search and rescue teams on site during the response stage, heritage conservation groups can quickly and effectively gather useful data to determine the next steps to stabilizing and recovering disaster-affected heritage structures.

Fondation Architectes de l'Urgence (Emergency Architects Foundation)

Architectes de l'Urgence or Emergency Architects Foundation is a training program and social aid program coming from France. It is of interest both as a potential collaborator in response and reconstruction projects and as a model for how to integrate professions in emergency relief.

Established in 2001 in response to flooding in Somme, France, the group has worked in over twenty countries on disaster response issues. Although its primary objectives focus on technical aspects of securing housing for populations displaced by disaster, a significant section of their guiding philosophy is based on risk prevention and training urban planning professionals on risk concepts. The group does not focus on heritage conservation specifically, but their expertise, socially-minded objectives, and extensive networking with other disaster aid agencies makes them a good example of technical know-how transfer.

Prince Claus Fund

Established in 1996, The Prince Claus Fund's mission focuses on cultural collaborations and partnerships in locations where limited resources and opportunities for cultural expression or research threaten local cultural heritage. These threats can take the form of conflict, poverty, repression, marginalization or taboos. Since its inception, the Fund has supported 1,600 cultural activities, awarded 165 outstanding cultural practitioners and organizations, and provided aid in

over 90 emergency situations.[28] According to a 2011 survey carried out by the Japan Consortium on International Cooperation for Cultural Heritage, the majority of PCF's funds are subsidized by the Dutch Ministry of Foreign Affairs. [29]

Projects in theater, art, film, sports, literature, and music in Africa, Asia, Latin America, and the Caribbean are supported through five different programs within the agency:

- Prince Claus Awards
- Network Partnership
- Subsidy Applications
- Knowledge Center
- Cultural Emergency Response

CER Cultural Emergency Response

The CER program provides first aid to cultural heritage damaged by man-made or natural disaster. The program began in 2003 as a response to the looting and demolition of artworks in the Iraq National Museum.[30] CER information materials reference the role of hope and consolation in contributing to the restoration of human dignity, continuity and a sense of identity; based on this, CER defines cultural emergency relief as an integral part of humanitarian aid.

Organizations or individuals are eligible to receive funding for the stabilization or restoration of heritage property damaged by or under imminent threat of natural disasters or armed conflict. Support is provided in the form of funding for pre-approved activities. While any region may receive aid, only project proposals in the countries on the list compiled by the Development Assistance Committee (DAC) of the Organization for Economic Cooperation and Development

28 CER Program presentation, ICOMOS General Assembly, Paris 2011.

29 The JCIC-H 2011 survey reported the following fiscal figures for the Prince Claus Fund: "in the 2009 fiscal year, total income was 4,850,807 EUR, which was composed of the following: a 4,053,352 EUR subsidy from the Ministry of Foreign Affairs; a 500,000 EUR donation from the National Postcode Lottery; 283,506 EUR raised from other funds; and 13,949 EUR in interest"

30 The JCIC-H 2011 survey notes that prior to establishing CER, PCF carried out only a few cultural heritage preservation projects until circumstances during the Iraq conflict in the early 2000s initiated PCF to establish a program specifically dedicated to assisting conflict threatened heritage.

(OECD) are considered for CER aid.[31] Therefore, preference is given to individuals or organizations in Africa, Asia, Latin America and the Caribbean.

In some circumstances, CER will utilize existing networks to seek other organizations to collaborate with, including ICBS, ICOM, ICOMOS, IFLA, ICA; CCAAA, ICCROM, World Monuments Fund, and the UNESCO World Heritage Centre.

Proposals must be for emergency aid for material heritage or needs-assessment activities specifically for cultural emergency relief. Funding for relief operations are limited to 35,000 EUR although in exceptional circumstances, larger allocations may be approved by the Board of the Prince Claus Fund in accordance with the recommendations of the Steering Committee. Applications for funding are reviewed by a steering committee of five persons; in emergency situations, decisions can be made quickly, usually within a week's time.[32]

In an emergency situation where information regarding the extent and severity of a disaster or conflict is not available, CER will consider making a small grant to carry out a damage assessment to perform damage mapping and quick intervention planning. In addition to damage assessment missions, basic repair work and simple interventions are also funded.

Four policies guide the project selection process:[33]

- First Aid - Initial stage financial for stabilization measures such as further damage prevention through basic repairs
- Timely Action - relief operations start within six months of the disaster
- Risk Level – Considering how safe conditions are knowing absolute safety may not have been secured
- Role of Indicator - Providing aid for situations otherwise neglected by the international community due to scale, geography, or other reasons

In a presentation on CER projects, project specialist Deborah Stolk emphasized how the Fund's

31 By prioritizing politically and economically unstable countries and regions should be prioritized, PCF focuses its efforts in "Zones of Silence " areas defined as regions where exclusionary practices, war, or unjust governments suppress residents.
32 CER Program presentation, ICOMOS General Assembly, Paris 2011.
33 As publicized on the program's website, www.princeclausfund.org/en/programmes/about-cultural-emergency-response

work is guided by local partners and initiatives in order to support sustainable solutions after the Fund has departed.[34] This method is intended to support more comprehensive reconstruction of an affected region. For example, recovery construction work can create job opportunities for locals and contribute to residents' sense of community; when aid applications are deliberated, a local community participation component is an important consideration.[35]

CER first determines the status of a cultural heritage emergency and then contacts the disaster-stricken region's cultural organizations and cultural heritage experts via PCF and other specialist networks. Once the emergency situation and eligibility for aid are both confirmed, a project manager submits proposals for the emergency aid needed. Application forms are in English, French or Spanish.

The JCIC-H survey of the dutch NGO made several important observations about CER's work. In particular the survey highlighted the program's promotion of awareness of the value of cultural heritage in addition to the serious nature of cultural heritage emergencies by providing assistance for small-scale disasters or those for which it is difficult to generate interest, or low-profile disasters.[36]

In addition to providing information regarding the immediate needs of a community following a disaster event, networks are also of great value for logistical planning and advice relating to the accessibility and safety of disaster-stricken regions is needed for emergency activities. CER can coordinate access and logistical matters through its connections to several organizations such as the Ministries of Foreign Affairs and Ministries of Defense in the Netherlands, and intergovernmental organizations, such as the United Nations and UNESCO.[37]

34 ICOMOS General Assembly, Paris 2011.
35 "Foreword: Culture is a Basic Need," *Prince Claus Fund Journal*, No 14, 2006.
36 JCIC-H Report 2011, p63.
37 CER Program presentation, ICOMOS General Assembly, Paris 2011.

Examples of CER post-disaster projects

Alaverdi Monastery, Georgia

Alaverdi St. George Father Monastery, an 11th century Georgian Orthodox complex located in the Kakheti region was damaged in June 2011 as a result of severe flooding and mudslides

Inundated for weeks with 40 cm of water from the Alazani river, the humid conditions have weakened the building's foundations and damaged the 11th and 15th -16th frescos. An extensive plan to stabilize the murals and the fundaments of the cathedral and to reduce the effect of reoccurring flooding and landslides has been developed by the Alaverdi metropolitan bishop and the Georgian Ministry of Culture and Monument Protection.

CER approved a proposal to reinforce the terrain with gabion retaining walls and develop a drainage system to reduce flood risk, especially this summer when the wet season will start again.

Drametse Lhakang, Bhutan

Drametse Lhakang is a temple in eastern Bhutan that suffered severe structural damage from earthquakes in 2009 and 2011. In collaboration with TEFAF, PCF concluded that intervention is needed to resolve structure issues posing a risk to human safety, restoration work is needed maximize building functions and to prevent the risk of further damage from future tremors, soil erosion or weathering. Preserving the physical structure has been deemed important not only because of its aesthetic qualities but also because it sustains the community and keeps religious practices alive.

World Monuments Fund

The World Monuments Fund (WMF) is a 501(c)(3) public charity.[38] The organization's mission is to preserve the world's architectural heritage of significant monuments, buildings, and sites. It

38 This designation means contributions are tax deductible (to the extent permitted by law).

is governed by a Board of Trustees and has a staff of approximately 20 administrative personnel and a significant number of consultants.

Since its inception in 1965, WMF has worked in over 90 countries on architectural and cultural heritage sites through partnerships with local communities, funders, and governments. The organization's core programs are:

- Advocacy
- Education and Training
- Cultural Legacy
- Capacity Building
- Disaster Recovery

One of its earliest undertakings involved working in Venice after the city's Great Flood in 1966. Since 1996, WMF has published a biannual list of the world's most endangered landmarks: buildings and landscapes of significant cultural value that require urgent attention. Selected on the basis of four criteria -- significance, urgency of the situation, viability of proposed actions, and relevance of the issues to the heritage field at large – the 2010 list is of 93 sites located in 47 countries. The listed sites include a variety of well-known landmarks — Macchu Picchu in Peru — and lesser known sites, such as the rammed-earth Chiktan Castle in India, dating from the 16th century. The Watch list generates publicity for the sites, initiating community or government involvement and sometimes additional funding. Since the program's beginning, $50 million has been raised for endangered sites.

Emergency disaster response, however, is carried out on an ad-hoc basis.[39] "We have responded to several major emergencies because of their magnitude or because of donor interest," explains WMF President Bonnie Burnham, "but funding is generally insufficient for either a sustained effort or a meaningful short-term evaluation of damage and viable short-term mitigation.[40]

In 2010, WMF formed a partnership with the Prince Claus Fund to combine emergency disaster response aid to cultural heritage. Each organization has contributed $500,000 to the initiative,

39 Interview with Erica Avrami; April 2012

40 Quoted by David Sokol in "WMF and Prince Claus Provide Emergency Aid for Threatened Historic Sites," *Architectural Record*: February 25, 2011.

the Cultural Heritage Emergency Response program. In addition to expanding emergency assistance where and when it is most needed, the joint program also seeks to draw attention to the plight of communities and their heritage following catastrophic events. Launched in December 2010, the initiative initially is focusing on four sites.[41]

The Gingerbread Houses in particular are an excellent illustration of the nature of collaboration among conservation agencies and the importance of site management planning in recovery activities. Where PCF response is immediate, WMF focuses on building local partnerships; PCF assistance is funding while WMF aid is primarily capacity-building for site-level conservation work. PCF meanwhile focuses on neighborhood engagement at the community scale. In Haiti, these differences were applied in a complementary manner, thereby increasing the project's reach.

Only three months before the devastating earthquake in Haiti in January 2010, the Gingerbread Houses of Port-au-Prince had been nominated to the World Monuments Watch list by the local Haitian Education and Leadership Program (HELP). Much of the city's urban plan was obliterated by the earthquake, however, the Gingerbread House neighborhood was not; damage was limited and was therefore the first place aid groups coming into Haiti could stay and establish their operations. Nonetheless, there remained the threat of demolition of damaged but repairable houses. In response to this, WMF sent teams to perform damage assessments and to develop technical guidelines for owners of buildings still structurally sound but in need of extensive yet historically accurate appropriate repairs.

Damage Assessment Component of Project

Inventory of Gingerbread Houses in Bois Verna, Pacot, and Turgeau neighborhoods of Port-au-

41 The first three have suffered earthquake damage and the fourth will be flooded following construction of a dam: Gingerbread houses in Haiti from the early 19th century; 12th-century Trashigang Dzong fortress and the 16th-century Dramatse Lhakhang monasteries in Bhutan; 17th-century Lubuak Bareh mosque and the 1903 Gothic Revival St. Leo Monastery in the city of Padang, Indonesia; Petroglyphs in the Diamer-Basha dam area of Pakistan's Indus River Valley

Prince began prior to arrival based on comprehensive oblique aerial photography by Pictometry International Corp. of Rochester, New York. This material was donated to ICOMOS through The GIS Corps of the Urban and Regional Information Systems Association. The GIS Corps provides volunteer GIS (Geographic Information System) services to communities in need, often in response to disasters.

The preliminary damage and repair feasibility assessment of earthquake-damaged houses from both aerial survey and ground inspection included systematic photographic documentation of post-earthquake damage to the neighborhood. During the survey process, the ISCARSAH team worked together with a local team member. The assessment process was also identified as an opportunity for the international team to interact with homeowners. This in addition to two meetings held with homeowners was intended to facilitate a mutually beneficial collaboration through dialogue. The mission report states that over 200 owners and residents attended the meetings, enabling homeowners participation in the recovery process. Local agency ISPAN was particularly effective in generating public participation.

The use of digital media in this project proved useful beyond the site application; an open platform, context- and technology-appropriate database was developed by the assessment team to manage related information, including for example technical details, historic data, ownership information, etc.

CHAPTER 6 - ANALYSIS AND CONCLUSIONS

Observations and Summary of Findings

This review of international conservation organizations and their activities revealed differences between the types of risk management activities typical to each disaster phase.

Agencies that are underfunded or have very limited financial resources but possess an impressive network of professionals and experts are well-equipped to provide disaster management support in the form of training. In these instances, participants may possibly have to pay for their expenses during the training course. Training course content was briefly reviewed here and reflects a balance between conservation and operational mitigation strategies (sometimes referred to as structural and non-structural responses). As a pre-disaster form of risk mitigation focusing on the development of Disaster Risk Management plan, training courses also serve to facilitate the exchange of experience and knowledge between course participants who may be site managers, administrators, or conservation professionals. Courses are being offered more often in a greater range of locations; this may possibly mean that participants come from a smaller radius, thereby improving collaboration potential within a smaller region. Shorter distances in disaster circumstances can improve the speed of aid delivery, regardless if this is in the form of physical supplies or human resources. The Getty Conservation Institute continues to sponsor these kinds of training exercises in collaboration with local conservation agencies.

One of the most effective forms of risk management for cultural heritage sites is maintenance and monitoring. An effective methods for improving maintenance this is through education – site manager training can help those most familiar with a site understand risk indicators, potential consequences, and introduce mitigation measures through illustrations and examples. If site managers can identify weaknesses before they are exploited by severe conditions, then less

invasive and possibly less expensive treatment options can be used.

Training, however, can take many forms: ICCROM has introduced a 'distance-learning' course component, allowing participants to use their site as the course project. GCI and UNITAR focus on training in specific regions where they collaborate with national and international agencies already there and use a course-participant selection process to sponsor participation and improve impact. Universities and academic institutions train their students in the field and the classroom, host conferences or sponsor academic research into policy, methods and social behavior topics.

ICOMOS also participates in pre-disaster activities, however its scientific committee ICORP is primarily involved with administrative and political activities, expanding its expert network through conferences and symposia, or facilitating policy similar to the PDNA initiative, and the translation of informational material into other languages.

Through poverty-reduction and economic revitalization projects, the World Bank and the Asian Development Bank have begun to incorporate cultural heritage components into their projects. In some cases, this involves repairing or improving historical structures or possibly retrofitting buildings.

Four of the organizations reviewed specialize in emergency response work, which in most cases consists of damage assessments and emergency stabilization of damaged structures or in other cases, the retrieval of cultural property or artifacts when circumstances prevent immediate reconstruction or recovery efforts.

ICOM specializes in museum and collections protection and have experience in the securing of these sites and their moveable property during the initial emergency response phase. Because the work of its disaster task force is heavily influenced by the nature of the structures housing those collections, their emergency responders are by proxy sensitive to historic structures and

heritage principles. Architectes de l'Urgence and ISCARSAH are two groups of trained architects and structural engineers participating in the immediate assessment of damages and needs; while Architectes focuses primarily on providing housing to displaced populations, their expertise and capacity should be considered for potential collaboration. ISCARSAH is a committee of ICOMOS specializing in the structural nature of built heritage, following closely the ICOMOS principles the committee authored in 1996. Ideally ISCARSAH should be in a position to collaborate with other disaster relief agencies and receiving authority from the government of the afflicted country. There is room for further research here.

Finally three NGOs provide robust and comprehensive post-disaster recovery and reconstruction assistance: the World Monuments Fund, the Prince Claus Fund, and the World Heritage program. To be considered for assistance, on the World Heritage program requires the site to be a designated World Heritage property. While both PCF and WMF are committed to preserving heritage culture, their mandates differ significantly. This has been identified as a potentially complementary partnership, which has been piloted at the Gingerbread House project in Port-au-Prince, Haiti.

Several of the agencies researched rely on the willingness of their committee or network members to participate if asked; for the most part, only private NGOs have full-time staff who participate in or organize activities.

The surveys carried out by the Japan Consortium on International Cooperation in Heritage on countries receiving aid and organizations and agencies providing aid to cultural heritage in disaster situations are of exceptional value to the conservation profession. By identifying disaster management practices of other countries and what examples Japan's conservation practices can benefit from, this research marks the beginning of a new era in improved, professionally coordinated partnerships between a broader variety of conservation organizations.

Conclusions

The situation at heritage sites is changing as new risks develop through rapid shifts in human settlement patterns and climate change alters weather patterns. At the same time, technological tools rapidly advancing, enabling new forms of measurement, observation, communication and storage and access to vast quantities of information.

Humans have long sought methods to protect themselves and their assets from the unpredictability and destructive forces of natural hazards. Disaster risk management is not a new concept, however as threats change, preparedness methods are changing in response.

The growing attention that DRM planning for Cultural Heritage is presently receiving is due to the convergence of several factors, including environmental awareness, globalization, and a perceived increase in severe threats due to the occurrence of several major natural disasters. When governments and organizations are forced to provide aid to victims of disasters, a call for better preparedness follows. This has taken the form of various policy documents and initiatives within the last ten years. This thesis asks, what of the recommendations has been implemented on the ground?

There is no easy definition to describe where preventive conservation becomes disaster preparedness and vice-versa; this means that many of the precautions available to secure significant sites and their elements from adverse impacts in disaster situations are the same measures which retard the rate of deterioration from less severe agents (erosion, changes in use and value). Comprehensive site management IS the best form of prevention because it includes the basic components of any DRM plan: inventory, assessment, conservation, monitoring, planning (short and long-term). It's the disaster event which demands special consideration and extreme interventions which may alter factors of significance and value.

However, severity, frequency, and immitigability of natural hazards are unpredictable enough

that there is always the chance that destruction cannot be avoided or kept at a scale of human adaptability. Prevention theory says the probability of damage (vulnerability) can be minimized through proactive, preventative measures (risk transfer). Natural hazards are not a threat we can eliminate, but we can be forward-thinking enough to observe our vulnerabilities and try to counteract those at the appropriate scale.

Topics for Further Research

Despite the extent of aid available, several gaps in the field are readily apparent.

The first is the lack of a centralized agency acting as an information clearing house; several organizations maintain their own archives or have published bibliographies of information specific to disaster management, however the type and age of resources collected vary and are not always easily accessible, either physically (location) or digitally (not available). It is also necessary to consider the variety of languages in which this material exists and administrative capacity required to maintain such a resource. Web-based databases are inexpensive to host; the ICOMOS online archive is an example of how this resource could be structured.

A second gap in current activities lies with the differences from site to site in how risks are identified and evaluated. The divergence mirrors differences in contemporary conservation theory; for example, cultural differences lead to variances in what levels of damage or deterioration are acceptable. Further complicating these theoretical differences is the supply of skilled craftsmen knowledgeable in the construction methods and traditional materials typically found in historic structures. Studies are needed on how limited availability of knowledgeable labor influences interventions which may contribute to disaster vulnerability issues.

Ex-ante studies of sites that had some form of preventive measures in place at the time of a natural disaster are urgently needed. The continued proliferation of DRM principles can hardly be justified if their effectiveness remains unstudied and therefore untested or unproven.

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