



**ASSOCIATION FRANÇAISE POUR LA PRÉVENTION
DES CATASTROPHES NATURELLES (AFPCN)**

Conférence-débat du 23 février 2006
Organisée sous l'égide du conseil scientifique de l'AFPCN

LE CYCLONE KATRINA : QUELLES LEÇONS POUR L'EUROPE

Dossier complémentaire
Programme
Résumés des interventions

Salle de Conférence du Ministère de l'Ecologie et du Développement Durable
20 Avenue de Ségur, 75007 PARIS
De 9h à 18h00

INTRODUCTION

Une conférence-débat : *Le cyclone Katrina, quelles leçons pour l'Europe ?* est organisée à Paris le 23 février dans le grand amphithéâtre du ministère de l'Ecologie et du Développement durable par l'Association française pour la Prévention des catastrophes naturelles*.

Cette manifestation se tiendra six mois après l'invasion par les eaux de la ville de La Nouvelle-Orléans, et quatorze mois après le tsunami qui a ravagé les côtes de l'océan indien. L'objectif est d'en tirer des enseignements pour la prévention et la gestion du risque d'événements similaires en France ou dans d'autres pays européens. Il existe en Europe de nombreuses zones basses et peuplées qui sont d'ores et déjà sous la menace d'une irruption dévastatrice d'eaux venant de la mer ou de rivières. Le changement climatique, la géodynamique du sol, l'affaiblissement des barrières et les accumulations de populations, font que les risques vont s'aggraver. Il est temps d'en prendre la mesure et d'en tirer les conséquences.

Pour confronter la situation européenne à celle des bords du Mississippi et des côtes de la Louisiane, la conférence a été structurée autour de deux grandes questions :

- comment réaliser des alertes et des évacuations efficaces ?
- comment aménager ces zones en fonction de leur vocation naturelle, des réalités sociologiques et d'infrastructures constamment adaptées ?

Cinq experts** viendront des Etats-Unis exposer les réflexions qui sont en cours. Les tables rondes et le débat feront intervenir, à côté des personnalités françaises, des responsables des Pays-Bas, d'Angleterre, d'Allemagne et de Suisse***.

Madame Nelly Olin, ministre de l'Ecologie et du Développement durable et Monsieur Michel Jarraud, secrétaire général de l'Office Météorologique Mondial ouvriront la conférence.

* AFPCN, 19 avenue du Maine. Contact : 0145498836 - afpcn@engref.fr

** Institutions d'origine : Federal Emergency Management Agency, US Department of Defense, Association of State Flood Plains Managers, Universités du Texas et de Caroline du Nord.

*** La gestion de risques massifs en montagne a aussi des enseignements à fournir.

Programme :

8h45 - Accueil des participants

9h15 - Ouverture par Madame Nelly Olin, Ministre de l'Ecologie et du Développement Durable.

9h30 - Allocution de Monsieur Michel Jarraud : Secrétaire Général de l'Organisation Météorologique Mondiale.

Première session sous la présidence de M Yves Dauge, sénateur, maire de Chinon et président de l'AFPCN.

9h45-11h00

Katzer Kristen

Science Officer at the American Embassy

Dr Nancy Walker

Former senior official in the U.S. Department of Defense.

The involvement of the security sector in the management of a catastrophic event.

Professor Mike Lindell

Hazard Reduction & Recovery Center, A&M University, College Station - Texas.

"Hurricanes Katrina and Rita : Scientific Surprises and Policy Failures"

11h15-13h00 - Table ronde 1 : Préparation à la crise, alerte et évacuation

L'information donnée quelques jours auparavant sur les menaces d'origine météorologique se précise progressivement ; initialement les messages recommandent la vigilance, puis à un moment donné ils transmettent une alerte avec des consignes précises qui peuvent commander l'évacuation de certaines zones.

Comment la décision de l'alerte se prend-elle ? Comment est-elle préparée par l'étude des mesures d'accompagnement en fonction des scénarios possibles ? Quelles sont les dispositions notamment la mobilisation des moyens de transport ? Quels refuges mettre à disposition ? Comment prendre en compte les populations les plus vulnérables ?

Comment préparer la population, gérer l'information, éviter la saturation des réseaux ? Comment agir envers ceux qui n'ont pas accès à ces consignes ou ne leur obéissent pas ? Comment améliorer l'acceptabilité de l'évacuation ? Faut-il prendre des mesures coercitives et à quel moment ?

Quelle coopération entre autorités publiques, responsables de services civils et militaires et plus généralement l'ensemble des acteurs ?

Animateurs : **Régis Guyot**, Ministère de l'Intérieur, préfet, directeur de l'INHES et **Philippe Boullé**, AFPCN.

Participants à cette table ronde autour de Mike Lindell et Nancy Walker.

Walter Ammann, Suisse, Planat

Gilles Barsacq, Ministère de l'Intérieur

Matthijs Kok, Pays Bas, Civil Engineering Delft, directeur de HKV Consultants

Yves Le Trionnaire, Direction de l'Eau, Ministère de l'Ecologie et du Développement Durable (MEDD)

Jean Pierre Mac Veigh, Météo-France

Eric Morvan, représentant du maire d'Arles

13h00 : **Lunch sur place**

Après midi

Sous la présidence de Monsieur Christian Kert, député, rapporteur de l'OPECST, vice-président de l'AFPCN.

14h30-15h50

Brigitte Leoni

The International Strategy for Disaster Reduction

Ms Pam Pogue

Présidente de l'ASFPM (Association of State Flood Plains Managers) - USA

Hurricanes Katrina and Rita : Using Mitigation to Rebuild a Safer Gulf Coast.

Professor Philip Berke

Université de Caroline du Nord ; Department City and Regional Planning,

"New Orleans: A Resilient City or An American Pompeii?"

15h50-17h30 - **Table Ronde 2 : Gestion des risques et aménagement**

Quelle destination donner aux zones sujettes à des aléas rares mais d'une très grande intensité, notamment celles qui peuvent être envahies subitement par les flots (côtes basses, notamment deltas, soumis à des risques de tempêtes ou de tsunامي, plaines situées en dessous du niveau de grands fleuves lorsqu'ils sont en crue...). Quelles vocations privilégier, quels choix faire entre les partis d'aménagement ? Comment gérer les risques lorsque le peuplement est déjà dense et que l'aléa tend à s'accroître (dépôts alluvionnaires, subsidence, aggravation des crues due au changement climatique, menace de tempêtes plus violentes...)?

Et comment intégrer les ouvrages de protection dans cet environnement évolutif, assurer leur maintenance ? Quel usage faire des modèles de scénarios de rupture en cas d'aléa extrême ? Doit-on diffuser ces scénarios dans la population pour préparer celle-ci aux évacuations éventuelles ? Enfin comment penser à l'avance la reconstruction pour que les décisions prises immédiatement après les événements soient judicieuses?

Animateurs : **Nicolas-Gérard Camp'huis**, Agence de l'Eau Loire Bretagne et **Jacques Theys**, DRAST, Ministère de l'équipement.

Participants à cette table ronde autour de Philip Berke et Pam Pogue.

Gilles André, IAR Benfield Group

Noël Godard, MEDD, Direction de l'Eau

Brian Lee, Royaume Uni-ACNDR

Bernard Picon, président du Comité scientifique Rhône

Peter Platte, Délégué permanent de l'Allemagne à l'UNESCO

17h30-17h 45

Clôture par Pierre Roussel, chef de l'Inspection Générale de l'Environnement.

18h00 **Cocktail**

Programme :

8.45 am - Welcome to Participants

9.15 am - Opening address by Ms Olin, Minister of Ecology and Sustainable Development

9.30 am - Keynote Address by **Michel Jarraud, Secretary General, World Meteorological Organisation (WMO)**

First Session Chair : Mr Yves Dauge, Member of French Senate, Mayor of Chinon and Chairman AFPCN.

9.45-11.00 am

Katzer Kristen

Science Officer at the American Embassy

Dr Nancy Walker

Former senior official in the U.S. Department of Defense.

The involvement of the security sector in the management of a catastrophic event

Professor Mike Lindell

Hazard Reduction & Recovery Center, A&M University, College Station - Texas

"Hurricanes Katrina and Rita : Scientific Surprises and Policy Failures"

11.15 am-1.00 pm - **Round table 1: Alert, Crisis Management and Evacuation**

The information bulletins released a few days before a severe weather threat become gradually more detailed and precise as the situation evolves. At the beginning, they may take the form of a general early warning alert. Later, the message may be upgraded to a warning, eventually with precise instructions on how to evacuate certain areas.

How is the decision to evacuate made? How is it prepared for? Has there been a preparatory study of support measures and procedures to ensure efficient implementation of the evaluation order? And if so, what scenarios are involved?

How will transportation be organized? What refugee centres will be used? What provisions will be made for the most vulnerable populations?

How can the population be best prepared? How can communication be managed so that network saturation is avoided? What measures should be taken if people do not listen to instructions or do not obey? How can they be helped to accept the need for evacuation? Should force be used, and if so, when?

What kind of cooperation can be envisaged between public authorities and civil or military services? More generally, how can cooperation be established among all parties concerned?

Facilitators : **Régis Guyot**, French Ministry of the Interior and **Philippe Boullé**, AFPCN.

Participating with Mike Linden and Nancy Walker in the Round Table discussion :

Walter Amman, Switzerland, Planat

Gilles Barsacq, French Ministry of the Interior

Yves Le Trionnaire, Water Division, Ministry of Ecology and Durable Development (MEDD), France

Matthijs Kok, Civil Engineering Netherlands, Delft, director of HKV Consultants

Jean Pierre Mac Veigh, Météo-France

Eric Morvan, representative of Mayor of Arles, France

1.00 pm : **Lunch in conference venue**

Afternoon Session presided by Mr Christian Kert, member of the French House of Representatives, Vice-President AFPCN

2.30-3.50 pm

Brigitte Leoni

The International Strategy for Disaster Reduction

Ms Pam Pogue

Chair of Association of State Flood Plains Managers (ASFPM) - USA

Hurricanes Katrina and Rita : Using Mitigation to Rebuild a Safer Gulf Coast.

Professor Philip Berke

University of North Carolina, Department of City and Regional Planning,

"New Orleans : A Resilient City or An American Pompeii?"

3.50-5.30 pm - **Round Table 2: Risk Management and Land Use Planning**

How to manage risks in densely populated areas in which hazards do not occur frequently, yet, when they do occur, are of enormous magnitude? Such areas include, for example, settlements which are below sea-level or floodwater level.

More particularly, what options are there for zones which have been protected from hazards by an infrastructure which is adequate for most circumstances but which will collapse when the hazard is severe.

How a debate on disaster scenarios be conducted calmly and objectively?

How can action and rebuilding after the disaster be best envisaged? How can the rebuilding of society begin? How can greater cooperation be encouraged in the pooling of technical, social and financial resources?

Facilitators : **Nicolas-Gérard Camp'huis**, AELB (Loire Basin Association) and **Jacques Theys**, DRAST, French Ministry of Equipment.

Assisting Philip Berke and Pam Pogue in the Round Table discussion :

Gilles André, IAR Benfield Group

Noël Godard, Water Division, MEDD, France

Brian Lee, Chair UK-ACNDR

Bernard Picon, President of Comité Scientifique Rhône

Peter Platte, Deputy Permanent Delegate from Germany at UNESCO

17.30-17.45 pm

Closing Address Pierre Roussel, Chief of General Inspection of Environment.

18.00 pm Cocktail

Interventions

Robert Dry

Science Counselor, US Embassy

Et

Kristen Katzer

KatzerKM@state.gov

Science Officer at the American Embassy

Résumé

First and foremost, on behalf of the United States Government and the people of the United States, we would like to thank the French government and French citizens for their assistance to the victims of Hurricane Katrina.

Hurricane Katrina was an important learning experience for us. We realize that the US has been criticized for how it handled the situation, within the US government as well as outside. Nevertheless, it was a unique disaster and forced us to reassess how we respond. Ninety thousand (90,000) square miles of the Gulf Coast region were impacted by this storm. This resulted in seven hundred and seventy thousand (770,000) displaced persons and an estimated one hundred and eighteen (118) million cubic yards of debris. This extreme devastation was the costliest in U.S. history and uncovered many emergency management problems that need to be corrected.

Secretary Chertoff of the Department of Homeland Security recently outlined steps for 'reengineering' the Department of Homeland Security and FEMA. Moreover, he has already initiated plans to address the problems Hurricane Katrina highlighted.

First, DHS is working on a unified and integrated, incident command center to include local, state, and federal representation. DHS must increase its operational capability to respond to disasters. This means updating our technologies and processes to remain current with the most up-to-date systems available.

The Department of Homeland Security will also strengthen FEMA by revising the logistics system. The communications system will also be updated by calling on the specialized skills of different agencies within the Department, particularly the Coast Guard and Customs and Border Protection. Better communication capabilities that provide real-time information will enhance FEMA's ability to inform decision makers and give feedback regarding needed resources.

In the aftermath of a disaster victims register for support. This includes requesting repairs to houses and property, relocation expenses, and shelter assistance. FEMA will also begin the process of upgrading the claims management system to deal with a greater number of claims at any one time. The updates will include the 1-800 number and the website. Improving the technology will help in providing assistance to those people displaced and/or made homeless by a disaster faster.

FEMA's workforce is made up of roughly 2,000 permanent employees and the rest are deployed on a voluntary basis in order to respond to a disaster. FEMA must expand its permanent workforce in order to increase the capabilities of the agency. These employees must also be given the most advanced technologies and processes to enhance their skills and capacity.

All of these changes that Department of Homeland Security Secretary Chertoff proposes will foster new technologies and systems that will give FEMA the opportunity to better respond to large scale disasters, natural and man-made.

FEMA regrets it was unable to attend this conference. However, FEMA believes in and understands the value of sharing lessons learned and best practices. Since Hurricane Katrina, FEMA has had the great opportunity to host members of the French government in Louisiana and we welcome further dialogue. Best wishes on a successful conference.

Acting Director of International Affairs, Casey Long

The involvement of the security sector in the management of a catastrophic event.

Docteur Nancy Walker

walkernancyj@gmail.com

Former senior official in the US Department of Defense

Biographie

Nancy Walker is President of AfricaNet, a new, independent, international institute, focusing on human security and security sector governance in Africa, and serving as a professional development resource to civilian, military, and civil society leaders throughout the continent. At the request of African institutions and officials, AfricaNet programs emphasize long term professional relationships to further security cooperation and deepen understanding of modern security challenges. In early 2004, Dr. Walker resigned from United States government service after almost 15 years to pursue her professional passion for Africa. She also works with the UN Office for West Africa, the UN Office of the Special Advisor on Africa, the International Peace Academy, Femmes Africa Solidarité, and other organizations. Dr. Walker is internationally recognized for expertise in African affairs and security policy, strong leadership, creative and strategic thinking, dynamic public speaking, and personal commitment to U.S.-Africa relations.

Dr. Walker spent ten years in leadership positions within the Department of Defense on African security issues, peacekeeping policy, and security policy. From 1999 through August 2003, Dr. Walker served as the founding Director of the Africa Center for Strategic Studies. Under her guidance, the Africa Center became highly respected for its quality programs for senior civilian, military, and civil society officials from Africa, Europe, and the United States, on subjects including civil-military relations, security strategy, peace operations, health and security, disaster management, conflict prevention, leadership development, and professional networking.

Previous assignments include Director of the Office of African Affairs within the Office of the Secretary of Defense, where Dr. Walker designed and managed defense policy and programs in sub-Saharan Africa. She also served as the United Nations Branch Chief in the Office of Peacekeeping Policy in the Pentagon focusing on logistics, contracting, and communications. She was the German and NATO Analyst at the U.S. Information Agency's Office of Research. Prior to government service, Dr. Walker had a diverse career as a political producer for German television, policy consultant to the International Institute for Women's Political Leadership, editor, public opinion survey researcher, and defense analyst for an investment bank.

Dr. Walker holds a bachelor's degree from Harvard and Radcliffe Colleges and doctorate in politics at Oxford University (Nuffield College), where she was a Rotary Foundation Ambassadorial Fellow. She worked in Germany as a Robert Bosch Foundation Fellow for American Leadership. Dr. Walker completed the MIT Seminar XXI in national security policy. She is a member of the Council on Foreign Relations, the Women's Foreign Policy Group, Women in International Security, the American Council on Germany, the American Political Science Association, and the World Affairs Council. Dr. Walker is a sought after lecturer, public speaker, and facilitator. Dr. Walker speaks fluent French and German and conversational Spanish.

Nancy Walker serves on the International Advisory Board of the Geneva Center for the Democratic Control of the Armed Forces (Geneva, Switzerland) and on Board of Directors of the U.S. Committee for the United Nations Development Program (Washington, DC). She received the Meritorious Civilian Service Award from the U.S. Department of Defense and the Commander of the Order of the Lion from the Republic of Senegal. Nancy Walker and her husband, an international economist, have a daughter (14) and a son (13).

Hurricanes Katrina and Rita : Scientific Surprises and Policy Failures

Professor Mike Lindell and Carla S. Prater

MLindell@archmail.tamu.edu

Hazard Reduction & Recovery Center, A&M University, College Station - Texas.

Biographie

Dr. Michael K. Lindell has a graduate degree in Social Psychology from the University of Colorado (1975) with a specialty in disaster research and has completed hazardous materials emergency responder training through the Hazardous Materials Specialist level. Dr. Lindell has over 30 years of experience in the field of emergency management, during which time he has conducted a program of research on the processes by which individuals and organizations respond to natural and technological hazards. In addition, he has had extensive experience in providing technical assistance to government agencies, industry groups, and private corporations in development of emergency plans and procedures.

Much of his research, especially that supported by the National Science Foundation (NSF), has examined the processes by which affected populations respond to warnings of the imminent threat of a natural or technological hazard. This research has been conducted in communities affected by hazards as diverse as flooding, volcanic eruption and the release of hazardous materials. He has been involved in four studies around Mt. St. Helens, examining perceptions of risk immediately prior to the May 18, 1980 eruption, evacuation during the major eruption and adjustment to the long term threat. In addition, he directed two nationwide surveys for the Department of Energy that examined public perceptions of risk associated with technological hazards. He recently completed a five year longitudinal study investigating factors that affect households' adoption of earthquake hazard adjustments. His current NSF-supported research is developing an evacuation management decision support system (EMDSS) that combines a capability for real-time evacuation modeling with a hurricane tracking system. The EMDSS is currently beginning usability testing and will then be used for research and training on hurricane evacuation decision making.

His organizational research, also supported by NSF, has looked at the effects of disaster experience and the community planning process upon the development of adaptive strategies for promoting emergency preparedness. A continuing series of studies has examined factors contributing to the success of Local Emergency Planning Committees (LEPCs) in developing plans for hazardous materials releases. These studies have examined the effects of external/contextual and internal structural factors on the climate within LEPCs, member outcomes (e.g., attendance, effort and turnover intentions), and organizational effectiveness. Other research studied hazardous materials handlers' experience with hazardous materials releases during the Northridge earthquake as well as their subsequent adoption of hazard assessment, hazard mitigation and emergency preparedness actions for future earthquakes.

Professor Lindell also has had extensive experience in providing technical assistance to government agencies, industry groups and private corporations in developing emergency plans and procedures. During seven years as a contractor to the Nuclear Regulatory Commission, he reviewed numerous emergency response plans and evaluated organizational performance in more than forty full-scale emergency exercises at nuclear facilities. In the course of these emergency exercises, he has observed organizational response in all major onsite (Control Room, Technical Support Center, Operations Center), near-site (Emergency Operations Facility and Emergency News Center) and offsite (county and state EOC) facilities. He has participated in the development of designs for emergency operations centers by providing human factors assistance to the NRC and DOE, developing or reviewing the design of seven emergency operations centers for these agencies and directing the design of the NRC Headquarters Emergency Operations Center. He also served on American National Standards Institute/American Nuclear Society and International Atomic Energy Agency committees that

developed criteria for the design of emergency response facilities at nuclear power plants. During recent years, he has provided technical assistance to the Texas Governor's Division of Emergency Management, directing the inspection of hurricane evacuation shelters, conducting a needs assessment for hazard analysis materials, performing a survey of coastal residents' hurricane evacuation expectations, assessing local communities' vulnerability to hurricane impacts, and providing evacuation time estimates for coastal counties.

Dr. Lindell has served as an adjunct faculty for the Federal Emergency Management Agency's National Emergency Training Center, lecturing on disaster psychology and public response to warning. He also has been an instructor in other workshops federal agencies have sponsored for state and local emergency planners throughout the country, and appeared as a panelist in conferences on protective actions in hazardous materials emergencies. In addition, he has been a consultant to five of the Department of Energy National Laboratories on a variety of topics in the area of emergency preparedness and response.

In work for private industry, he wrote a planning guide for protective action decision making in a nuclear power plant emergency for the Atomic Industrial Forum and developed an emergency response plan for Smith/Klein Chemical company. He also evaluated the emergency plans and exercise performance of the Long Island Lighting Company's Local Emergency Response Organization, and presented his findings as an expert witness before an Atomic Safety and Licensing Board. More recently he has evaluated local emergency preparedness for accidents involving the transportation of hazardous wastes to a facility proposed by GAF Chemical and fixed site facilities in Porter County Indiana. He also conducted emergency preparedness training sessions for communities around the Indian Point nuclear power plant.

Professor Lindell has made over 120 presentations before scientific societies and short courses for emergency planners, as well as being an invited participant in workshops on risk communication and emergency management in this country and abroad. He organized and chaired an American Society of Civil Engineers Specialty Conference on Hazardous Facilities, served on the ASCE Task Committee on Natural Disaster Reduction, and served twice as Secretary of the Executive Committee of the ASCE Council on Natural Disaster Reduction. He co-chaired the organizing committee for a conference on protective action decision making in nuclear power plant accidents, and was a member of the steering committee for a similar conference on protective action decision making in chemical emergencies. He recently participated in the NSF Assessment of Research and Applications on Natural Hazards, serving as a member of the committee on Preparedness and Response, and chairing the committee on Adoption, Implementation, and Evaluation of Hazard Adjustments. He has served seven times as a consultant to the International Atomic Energy Agency in developing planning guidance for response to nuclear and radiological incidents, has made three presentations in National Academy of Sciences panels, and is currently a member of two National Academy of Sciences panels—*Disasters Research in Social Sciences* and *Assessing Vulnerabilities Related to the Nation's Chemical Infrastructure*. Professor Lindell has written extensively on emergency management and is the author of 70 technical reports, 70 journal articles and book chapters, and six books/monographs. His most recently published book is on risk communication in multiethnic communities. He is completing an introductory textbook on emergency management under contract to the Federal Emergency Management Agency that will be published by John Wiley & Sons. Another textbook on community emergency planning will also be published by Wiley. Professor Lindell will become the editor of the *International Journal of Mass Emergencies and Disasters* in the summer of 2006.

Résumé

The 2005 hurricane season, remarkable for an unparalleled number of named storms (27 in total) was most notable for Hurricanes Katrina and Rita. Hurricane Katrina, killed nearly 1500 people—making it the deadliest U.S. hurricane in 80 years and the third deadliest in U.S. history. Most of the deaths occurred in New Orleans after some of the levees that protected the city collapsed, but there also were deaths in southern Mississippi and Alabama. Hurricane Katrina caused approximately \$75 billion in damage, the costliest disaster in U.S. history. The total economic effect, which includes indirect losses due to business interruption, is about twice that high.

Hurricane Rita struck an area on the Louisiana/Texas border, but caused fewer deaths because evacuations were initiated earlier and compliance was higher than for Katrina. Rita caused less destruction (about \$10 billion) than Katrina because it struck a less densely developed area.

We are just beginning to analyze data we have collected on household response to Katrina and Rita, but preliminary information is available from agency reports and news media accounts. These are organized within the framework of Lindell and Perry's (1992; Lindell, Prater, and Perry, in press) typology of emergency response functions—emergency assessment, hazard operations, population protection, and incident management.

Emergency assessment

This function is performed mostly by the National Weather Service, especially the National Hurricane Center (NHC) and its local forecast offices. Both storms were tracked well and information was disseminated in a timely manner to federal, state, and local authorities and to the news media. For Hurricane Katrina, the NHC issued a *Hurricane Watch* at 10:00 AM CDT on Saturday, August 27 and a *Hurricane Warning* at 10:00 PM CDT that night. The hurricane eye made landfall on the Louisiana/Mississippi border about 11:00 AM on Monday, August 29. For Hurricane Rita, the NHC issued a *Hurricane Watch* at 4:00 PM CDT on Wednesday, September 21 and a *Hurricane Warning* at 11:00 AM CDT on Thursday, September 22. The hurricane eye made landfall near Sabine Pass, on the Texas/Louisiana border about 4:00 AM on Saturday, September 24.

Population protection

Local authorities in New Orleans were extremely late in issuing an evacuation order for Hurricane Katrina—28 August, the day before landfall—even though they had decided to order the evacuation nearly 30 hours earlier. The delay appears to have been caused by issues that should have been resolved by pre-impact planning. Many households evacuated successfully, in part because some of them left before the official evacuation order. However, many households remained in the city because they lacked transportation. Indeed, approximately one-third of the households in New Orleans either had no personal vehicle or lacked one that was reliable enough for a trip out of town. After the city flooded, many of those who remained were forced out of their homes and into the Superdome and Convention Center. However, neither of these facilities was stocked with food and water or had emergency generators. U.S. Coast Guard helicopters were immediately active in search and rescue operations, which later continued with the support of Urban Search and Rescue (USAR) teams from other states. As victims emerged from the impact area, they were transported to mass care facilities throughout the country. The distribution of evacuees was extremely variable, with tens of thousands sheltered in Houston, Dallas, and San Antonio. Other households were sent as far as Minneapolis and Salt Lake City—thousands of miles from home. Some households were separated and took weeks to reconnect with family members in other cities. Medical care was a serious problem during the storm and immediately afterward. The staff of some nursing homes abandoned their patients before the hurricane struck and some of these patients drowned when the city flooded. A few hospitals remained in operation during the emergency, but few people in the city could reach them. Finally, access into New Orleans and other impact areas was tightly controlled in the storm's aftermath. Even counties

with minimal damage (St. Charles and Jefferson, west of New Orleans) prohibited re-entry until a week later.

Evacuation orders for Hurricane Rita began to be issued on 21 September—three days before landfall. Houston’s Mayor Bill White urged residents of “low lying areas” to evacuate, but this was an extremely ambiguous warning given the city’s very flat terrain. Evacuation traffic management was extremely problematic because the number of evacuees (estimated to be 1.6 million) greatly exceeded projections (about .5 million). The high traffic volume led to severe traffic jams on Thursday, two days before landfall. The most obvious problems were on freeways running north and west from Houston but the most dangerous traffic jams were on highways northeast of Houston. Here, early evacuations from Houston clogged the roads, delaying evacuations from the Beaumont/Port Arthur area where the hurricane eventually made landfall. However, the traffic problems were resolved on Friday when inbound freeway lanes were reversed to carry outbound traffic. Evacuation transportation support was generally good, with transit dependent, nursing home occupants being evacuated before the storm struck. The large number of evacuees substantially complicated the reception and care of victims. Many evacuees appear to have stayed with friends and relatives, and others filled hotels and motels for hundreds of miles. This led to a very heavy demand for space in public shelters, which were also overloaded. Search and rescue efforts were small but successful after Rita because of the small population in the impact area. Medical care was generally better than in Katrina because hospitals and nursing homes were evacuated before storm, but 24 nursing home residents died when their bus caught fire.

Hazard operations

Hazard operations were begun to repair New Orleans’ damaged levees as soon as the flooding began. In addition, a massive amount of extra-community resources flowed to the impact area to clear debris and restore infrastructure (electric power, water, sewer, transportation, and telecommunications). Similar activities were initiated in damaged areas of Mississippi and Alabama. Unfortunately, these operations were slowed by poor coordination. In one case, FEMA rejected useful personnel and equipment from another federal agency. In another case, a USAR team reported having some of their personnel walk to grocery stores in nearby towns to obtain the food and water for the unit.

The news media and federal government focus on Katrina victims led many Rita victims’ to complain about “Rita amnesia”. Nonetheless, post-Rita hazard operations appear to have been more effective than those after Katrina simply because the most severely damaged towns in the impact area were small (Cameron Louisiana, which was completely destroyed, had a population of only about 10,000; the largest town with major damage, Lake Charles, had only 72,000 people). Consequently, debris removal and infrastructure restoration were more easily accomplished.

Incident management

Agency notification and mobilization of emergency facilities/equipment was mixed. As noted earlier, the Coast Guard began search and rescue operations as soon as the sky cleared. Perhaps the greatest failing in this area was inadequate staffing of police and evacuation buses in New Orleans and airport baggage checkers in Houston. Logistics and external coordination were serious problems in Hurricane Katrina, as were communication and documentation. Agencies at local, state, and federal levels did not have accurate information about the situation or about the response of other organizations. The mayor of New Orleans claims to have requested federal assistance on Monday but it did not even begin to arrive until four days later. The delay appears to have been due, in part, to disputes between the state and federal governments about which level of government was in charge. Within the federal government, FEMA (the agency usually in charge of disaster operations) was replaced by the military. Agencies at all levels of government have released few internal documents to date (even to Congressional oversight committees currently investigating the incident), so it is difficult to assess their analysis/planning, internal direction and control, or finance/administration. Public information was generally good, mostly because the news

media provides extensive coverage of both hurricanes. Indeed, television coverage seems to have been a major source of information to emergency response organizations. Reporters accurately described the deplorable living conditions in the New Orleans Superdome and Convention Center, as well as the massive traffic jams out of Houston. However, they also transmitted unsubstantiated rumors about violence and grossly exaggerated the amount of crime in New Orleans.

Conclusions

These two hurricanes revealed one scientific surprise, but many policy failures. The only significant scientific surprise was the extremely early and widespread evacuation from Hurricane Rita. The Hazard Reduction & Recovery Center's evacuation analyses for the Texas Governor's Division of Emergency Management estimated that about 500,000 persons in the hurricane risk areas of Galveston, Harris, and Brazoria counties would evacuate. As Hurricane Rita approached the Texas coast, an estimated 2.4 million people evacuated. This appears to be due, in part, to local authorities warning "anyone in low-lying areas should evacuate". Houston is extremely flat, many areas of the city had flooded during Tropical Storm Allison four years earlier and, of course, many people were frightened by the death toll in New Orleans just a few weeks earlier. The resulting evacuation shadow was the largest seen since the Three Mile Island nuclear power plant accident 26 years earlier and the first of its size associated with a natural hazard (Lindell & Perry, 1983).

The policy failures were more pervasive, especially in New Orleans. Meteorologists and emergency managers had long considered a hurricane strike on that city to be a realistic worst case scenario because the city is mostly below sea level, a high proportion of its population below the poverty line, and has a history of ineffective government. Numerous publications, including the local newspaper, had featured articles discussing such a major hurricane strike. Nonetheless, many policy makers claim to have had no advance knowledge of this possibility.

Moreover, a year before Hurricane Katrina struck, the city of New Orleans and state of Louisiana conducted an emergency exercise whose scenario was quite similar to the events that unfolded during the storm. The exercise was considered to be a success—quite unlike the failed response during the actual event. The disparity between the exercise and the event is probably due to three factors. First, the exercise event appears to have been less severe than the actual event. Second, there is no evidence that those who ran the actual response (the city mayor, state governor, and FEMA Director) participated in the exercise or any of the planning and training that preceded it. Third, most of the problems in the actual event were with agencies, organizations, and population segments that did not participate in the exercise.

These problems were compounded by severe organizational problems in FEMA, whose director had minimal professional experience in emergency management. Unfortunately, only one of FEMA's directors (James Lee Witt 1992-2000) actually had experience as an emergency management coordinator and FEMA's capabilities had been declining since his departure. Its problems were compounded by the agency's absorption and reorganization within the massive Department of Homeland Security, where anti-terrorism programs have been given priority over natural and technological hazards programs.

This event raises some significant issues for the governance of federal systems in market economies because local real estate developers, in collaboration with local politicians, have the legal, political, and economic power to create hazard vulnerability in the course of profitable development. However, they have only shared (in the case of the politicians) or no (in the case of the developers) responsibility for the consequences. The U.S. federal government has little authority to intervene before a disaster to improve local hazard mitigation and emergency preparedness, yet is expected to pay the bills for response and recovery. It is unclear if Congress will act to change this situation.

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Table 1. Emergency response functions

Emergency assessment

Regional threat detection and emergency classification
Hazard monitoring and environmental monitoring
Population monitoring and assessment
Damage assessment

Population protection

Protective action selection
Population warning
Evacuation transportation support
Evacuation traffic management
Impact zone access control and security
Reception and care of victims
Search and rescue
Emergency medical care
Hazard exposure control
Environmental surety

Hazard operations

Hazard source control
Protection works
Building construction practices
Contents protection practices

Incident management

Agency notification and mobilization
Mobilization of emergency facilities/equipment
Communication/documentation
Analysis/planning
Internal direction and control
Logistics
Finance/administration
External coordination
Public information

TABLE RONDE 1

Walter Ammann

ammann@mail.slf.ch

Suisse, Planat

Biographie

Directeur de l'Institut Fédéral Suisse pour l'étude de la neige et des avalanches (SLF) et du Département de la recherche Risques Naturels au WSL.

Mr Amman est un Ingénieur diplômé de Polytechnique de Zurich (1983) ; il a maintenant 30 ans d'expériences dans la recherche et l'industrie et s'est spécialisé dans la gestion intégrée du risque et sa mise en œuvre dans des situations de risques naturels diverses.

Du fait de sa position en tant que Directeur de SLF et du département de recherche sur les risques naturels à WSL, Mr Amman possède une expérience particulière dans le développement de projets de recherche et la coordination des finances et des personnes de différents pays en matière de risques naturels.

Yves Le Trionnaire

yves.le-trionnaire@ecologie.gouv.fr

Ministère de l'Ecologie et du Développement Durable - Direction de l'Eau

Résumé

Le ministère de l'écologie et du développement durable a lancé la réorganisation du dispositif de surveillance des crues le 1er octobre 2002. Cette réforme faisait suite aux missions de retour d'expérience consécutives aux divers épisodes de crues catastrophiques que la France a connues depuis 1988.

Ces missions ont mis en évidence 2 lacunes majeures du dispositif de surveillance : l'information dispensée par le dispositif mis en place en 1984 (fourniture de hauteur d'eau à différentes échelles de mesure) est difficile à interpréter par le public et elle ne permet pas d'anticiper suffisamment les phénomènes.

La réforme en cours poursuit donc un double objectif :

Faciliter la compréhension de l'information par le public par la mise en place d'une procédure de vigilance « crues » inspirée de la vigilance météorologique et destinée à susciter une attitude de vigilance active et remplacer l'attitude active qui consiste à attendre que le préfet transmette une alerte.

Permettre une meilleure anticipation par la généralisation de l'utilisation des outils de prévision afin de donner le temps aux acteurs de la sécurité civile d'organiser la mise en œuvre des dispositifs de secours.

Cette réforme s'accompagne d'une réorganisation des services qui vise à remplacer les 52 services d'annonce des crues organisés en 70 sites opérationnels en 22 services de prévision des crues aux moyens humains et financiers renforcés susceptibles de mettre en œuvre ces nouvelles procédures.

La procédure de vigilance est actuellement en cours d'expérimentation dans 10 départements. Cette expérimentation sera étendue à l'ensemble des départements le 1er mars prochain. Elle sera mise en œuvre de manière opérationnelle à compter du 5 juillet prochain.

Matthijs Kok

m.kok@hkv.nl

Pays Bas, Civil Engineering Delft, directeur de HKV Consultants

Biographie

Dr. M. Kok is an expert in flood risk management. He has been involved in many research projects to assess the probability of flooding and to assess the economic damage and the number of victims. At this moment he is involved in assessing the causes of flooding and the assessment of the damages of the flooding in New Orleans.

He is part time working at Delft University of Technology and is Director Research & Development of HKV Consultants.

Jean Pierre Mac Veigh

jean-pierre.macveigh@meteo.fr

Météo France - Délégué pour l'Outre Mer

Biographie

Directeur Délégué pour l'Outre-Mer de Météo-France

Ingénieur en chef des Ponts et Chaussées

Parcours professionnel :

- Directeur Régional Adjoint de Météo-France à La Réunion (1988-1990)
- Directeur Interrégional de Météo-France en Nouvelle-Calédonie et Wallis et Futuna (1990-1996)
- Directeur Interrégional Nord de Météo-France (1996-2001)
- Directeur Commercial et de la Communication de Météo-France (2001-2004)

Résumé

La procédure de vigilance a été mise en place en 2001 en France après l'analyse des tempêtes meurtrières de décembre 1999.

Cette analyse a été menée en collaboration étroite entre Météo-France et les autorités chargées de la protection civile. Ceci est essentiel.

Elle a conduit au lancement de la nouvelle procédure en octobre 2001.

Les idées maîtresses sont :

- * le système ne donne pas des alertes mais fixe le niveau de vigilance à adopter
- * l'information est disponible en permanence, elle permet de développement de la culture du risque
- * l'Information doit être donnée sans délai, simultanément au public et aux autorités et bien entendu gratuitement
- * les phénomènes doivent être anticipés suffisamment tôt (jusqu'à 24 heures à l'avance)
- * les prévisions doivent être suffisamment fiables pour éviter les erreurs et les fausses alertes (échéance limitée à 24 heures)
- * l'information doit être simple et facilement compréhensible. Une échelle de 4 couleurs a été retenue avec un pictogramme par phénomène
- * le niveau est déterminé par la Carte de Vigilance deux fois par jour et pour chaque département
- * les phénomènes doivent être qualifiés pour le public (un vent de 95 Km/h ne veut rien dire, un vent qui agite les fils électriques, si)
- * Les phénomènes dangereux doivent être suivis en temps réel et l'information doit être diffusée de même (bulletins de suivi)
- * Pour susciter l'adoption d'un comportement prudent, il est nécessaire de donner des conseils de comportement

La procédure a acquis une grande notoriété. C'est une réussite.
Elle fait l'objet d'une évaluation régulière et d'une amélioration continue.
Son extension à l'Europe est envisagée.

Eric Morvan

e.morvan@ville-arles.fr

*Représentant du Maire d'Arles - Direction Générale des Services Techniques - Responsable du
Serveur Vocal d'Alerte et de Secours et des Plans d'Alerte*

Résumé

Depuis la crue du Rhône du 3 décembre 2003 qui a causé une inondation importante sur la Camargue et le Languedoc, en particulier sur un quartier au nord de la ville d'Arles, avec des hauteurs d'eau ayant dépassées par endroit 1,80 m et nécessité l'évacuation de 7 000 personnes, la Ville d'Arles s'est dotée d'un service de vigilance météorologique et d'un système d'alerte à la population.

I La vigilance et la surveillance

Cette vigilance météorologique est assurée depuis 2004 via un mini-site internet dédié spécifiquement pour la Ville d'Arles.

Outre la carte de vigilance publique Météo-France, nous avons accès aux cartes satellites canal visible et canal infrarouge ainsi qu'aux cartes radars composites (précision 2km*2km) et local (précision 1km*1km) avec une visibilité sur l'ensemble du département des Bouches du Rhône et ses environs proches.

Une prévision sur 72h00 est fournie avec un pas de 3h00.

En cas d'épisode dangereux ou susceptible de le devenir le centre départemental de Météo-France nous envoie un météoflash par fax, e-mail, et téléphone sur une liste pré-établie. Cela fait passer le service de la vigilance à la surveillance de l'évènement.

Exemple : Pour un phénomène pluvieux important pouvant amener des pluies torrentielles (courantes dans le sud de la France) une cellule d'évaluation légère se met en place afin de déterminer les risques et les mesures à prendre (astreinte du personnel municipal, déploiement de pompes d'épuisement de grandes capacités sur les points noirs de la commune, préalablement recensés)

La ville surveille également le comportement de son fleuve Rhône. Les débits sont régulièrement relevés et affichés dans le site internet de la ville dans le cadre de l'information préventive à la population.

Un syndicat, créé après les crues des années 1990, le SYMADREM assure l'entretien et la surveillance des digues du Rhône et de la mer. Initialement sur la rive gauche cette compétence vient d'être étendue récemment à la rive droite côté Gard.

Suivant le niveau atteint par le fleuve et en dépassement de seuils d'alerte prévus dans le Plan d'Alerte et de secours risque Inondation la Ville d'Arles met à disposition du SYMADREM du personnel municipal afin d'assurer une surveillance constante et précise des digues (jusqu'à 150 personnes)

II L'information et l'alerte à la population

Comme moyen d'information à la population la ville utilise un serveur vocal depuis fin 2004. Ce serveur vocal est installé sur une plate-forme externalisée par sécurité et la majorité de la population y est inscrite, répartie dans des listes par quartiers (18) ou catégories particulières comme les écoles, les ERP, la cellule de crise à convoquer (+ de 80).

Ces personnes peuvent être informées ou alertées via l'internet, le téléphone filaire ou mobile vers tous les moyens de médias existants. Et ce pour 3 000 personnes par ¼ d'heure. Ces listes peuvent être couplées à un SIG et un GPS de précision va être acheté cette année pour effectuer des relevés de surfaces des zones inondées et les relayées directement sur le SIG pour le Poste de Commandement et la Cellule de Crise.

Interventions

Hurricanes Katrina and Rita : Using Mitigation to Rebuild a Safer Gulf Coast

Pamela Pogue

pam.pogue@ri.ngb.army.mil

Présidente de l'ASFPM (Association of State Flood Plains Managers) - USA

Biographie

Pam Pogue has been involved in multi-disaster natural hazard mitigation, coastal zone management and watershed management programs, policies and issues since 1987. She is currently working at the Rhode Island Emergency Management Agency as the State National Flood Insurance Program (NFIP) Manager and the State Program Manager for Hurricanes and Earthquakes. Her work has primarily been in developing state, county and local hazard mitigation strategies and hazard risk and vulnerability assessments, organizing and facilitating statewide and regional workshops on the NFIP and coastal construction issues for building officials, insurance, real estate agents and lenders.

In June 2005, Pam was elected Chair of the Association of State Floodplain Managers. The Association of State Floodplain Managers is an organization of professionals involved in floodplain management, flood hazard mitigation, the National Flood Insurance Program, and flood preparedness, warning and recovery. ASFPM has become a respected voice in floodplain management practice and policy in the United States because it represents over 8,000 members that are flood hazard specialists of local, state and federal government, the research community, the insurance industry, and the fields of engineering, hydrologic forecasting, emergency response, water resources, and others.

Her experience in working with the private sector in hazard mitigation issues includes establishing public and private partnerships to address hazard mitigation issues between various Rhode Island cities and towns with utility companies, insurance adjustment agencies, the Red Cross, Bryant College Small Business Development Center for Excellence and the National Service Organization, VISTA. Ms. Pogue was extensively involved with the Rhode Island Disaster Recovery Information Exchange (RIDRIX), the sole purpose of this organization was to assist businesses in issues associated with disaster recovery, hazard mitigation and business continuity planning. Additionally, during the summer of 2003, Ms. Pogue developed and delivered a Business Continuity Planning and Hazard Mitigation Course in Hawaii with Hawaii Civil Defense and the Hawaii Coastal Zone Management Program to Pacific Island resorts, major corporations and island businesses.

The National Oceanic and Atmospheric Administration (NOAA) Coastal Services Center provided funding for Ms. Pogue to travel to Maui, Hawaii during the summer of 2000 to work with County officials to develop a comprehensive multi-hazard mitigation plan and an extensive training program for county staff, stakeholders, constituents and the private sector's tourism industry. The culmination of her various efforts was the implementation of the Maui County Mayor's and Maui County Council's Executive Order establishing 14 points of criteria in order for Maui Hawaii to be designated as a "Disaster Resistant" showcase community. The Maui County multi-hazard mitigation plan has been used as a model by the other four Hawaiian counties and Pacific states and territories.

Prior to her work in hazard mitigation and watershed management, Ms. Pogue completed a national assessment on the effectiveness of the Coastal Zone Management Act in providing coastal public access to the shore for the National Oceanic & Atmospheric Administration. She has also worked with Rhode Island's 29 coastal communities in developing and implementing harbor management plans, providing training for municipal officials on watershed management and in 1992, she completed the first statewide public access guide for Rhode Island.

From 1986-1988 she was the Town Planner for the Town of East Greenwich, Rhode Island. Ms. Pogue received her B.A. from Georgetown University, in Government and Economics and her M.A. in Marine Affairs from the University of Rhode Island.

Ms. Pogue resides in East Greenwich with her two children Emily and Christopher.

New Orleans: A Resilient City or An American Pompeii?

Professor Philip Berke

pberke@email.unc.edu

Université de Caroline du Nord ; Professor of Land Use and Environmental Planning, Department City and Regional Planning ,

Biographie

Philip Berke is sub-contracted to PUCM. He is a Professor in the Department of City and Regional Planning, University of North Carolina at Chapel Hill, USA. His research and teaching focus on land use and environmental planning, including methods for assessing plan quality. He has authored and co-authored five books on land use and environmental planning (e.g., P. Berke and T. Beatley, *Planning for Earthquakes: Risk, Politics and Policy*, John Hopkins University Press, 1992; P. Berke and T. Beatley, *After the Hurricane: Linking Recovery to Sustainable Development in the Caribbean*, Johns Hopkins University Press, 1997). His research has been supported by the United Nations Division of Humanitarian Affairs and the US National Science Foundation and like agencies.

Résumé

Let me be clear about how I view recovery in New Orleans. As an urban environmental planner I have certain tendencies. I naturally look to the future when thinking about cities. I attempt to envision the future of a city in two- and three-dimensional places. Like others in my profession I aspire to the ideal of resilient and sustainable cities able to survive shock, and bounce back better and more prosperous than ever.

It is my intent in this talk not to portray New Orleans as a lost city. New Orleans will be rebuilt because cities are resilient. As Laurence Vale and Thomas Campanella indicate in their book, *Resilient Cities* (2005), during the last 300 years every city throughout the world that have been devastated by natural or human induced disasters have been rebuilt. Witness the rebuilding of earthquake-devastated cities like San Francisco and Tokyo, fire scorched Chicago and London, and the war ravaged Hiroshima, Warsaw and Berlin. Vale and Campanella indicate that the only exception is the city of St. Pierre on the French island of Martinique. National prestige, legitimacy of governments, and mobilization of capital investments are powerful forces that drive reconstruction. So are a deep attachment to place of disaster stricken populations and their demands to return to normal life.

No doubt, New Orleans will rebuild. In a talk given at the Center of the American South at the University of North Carolina (December 12, 2005), historian Lawrence Powell of Tulane University referred to New Orleans after Hurricane Katrina as a possible “American Pompeii” (the source of the title of this paper). He asks:

“...will its [New Orleans'] recovery result in one of those ‘lost cities’ that have been restored solely as sites for tourism and myth? Will this quirky and endlessly fascinating place become an X-rated theme park, a Disneyland for adults? Is it fated to be the place where Orlando, Florida embraces Las Vegas? That's the American Pompeii I apprehend rising from the toxic sludge deposited by Lake Pontchartrain.”

Just as worrisome is whether New Orleans will be unrecognizable after Katrina. Will the population be whiter, wealthier, smaller, and less diverse? With the massive evacuation in the days following Katrina, the city lost much of its African American roots that is the source of a great deal that is authentic in American culture.

In this talk, I will focus not only on the devastation caused by Hurricane Katrina's on New Orleans' built environment, but also on the massive social (and cultural) impacts. The social vulnerabilities of disaster stricken populations are largely ignored in hazards and disaster research and practice because they are so hard to measure and quantify, and because highly vulnerable populations

almost always lack the political power to be heard. Social vulnerability is partially a product of social inequalities – those societal factors that create the susceptibility of various groups to harm, and in turn affect their ability to respond, and bounce back (resilience) after a disaster (Cutter 2005). However, social vulnerability goes much further than harm from a disaster. Social vulnerability involves the basic provision of health care, education, the livability of places, and accessibility to jobs, decent housing, and other quality of life indicators.

New Orleans Before Katrina

Rich Culture Heritage and Historic Built Environment

When we think about rebuilding New Orleans, we must think about how the past might guide the re-visioning of the city's uncertain future. To recount the history of a storied city like New Orleans is too complex and varied to discuss in a single lecture. Let me try to give a few snapshots that convey New Orleans' history, rich culture, whimsical, party-oriented atmosphere, and warm seductive charms so unique to American culture.

The city's residents leap at the chance to throw a party, invent a festival, dance in the streets. Take the case of celebrating the end of summer. For many generations New Orleanians have celebrated the end of long hot and humid summers in mid-October with "Captain Sambola's Annual Shooting of the Straw Hat." It is an act of homicide on straw hats. The custom is to fire 100 guns so that all straw hats will suffer the penalty of being shot.² In no other city could Jazz music have evolved but the culture of New Orleans. I have heard about a new form of art that is rising to some popularity in the city, "Toxic Art," made of junk from the mounds of debris in the streets. I'll bet that when the last truck load of debris is hauled out of the city, someone will hire a brass band and put together a some type of fun-filled Mardi Gras parade.

New Orleans was one of America's great melting pot cities, a multicultural metropolis. Why did New Orleans emerge as a mecca of American culture? During the first half of the 19th century, New Orleans was inhabited by Irish and German, with significant ongoing additions from France and West Indies, plus a many from China, Denmark, Sweden and many other countries. New Orleans was not an Anglo-Protestant culture, as was dominant in New York City, Philadelphia, Baltimore or Boston. It was a Gallic, Latin Culture with very different notions about work, leisure, and race. By the late 19th century, neighborhoods of Italians, Germans, blacks, and Creoles were thoroughly mixed together. There was a sizable Franco-African population: free people of color, Afro (and White) Creoles, who spoke French and practiced Catholicism.

Perhaps Hurricane Katrina revealed a driving force behind the creation of this multicultural mecca. The forces of water and nature caused human settlement to hug the banks of the Mississippi River for more than 200 years. Through natural sediment deposits from regular spring flooding that overflowed the banks of the river natural levees were formed. Waves of immigrants settled along the top of these banks. Today the natural levees have been crowned with earthen berms up to 50 feet in height.

Because of this thin strip of habitable land, during the 19th century the population of New Orleans was squeezed together. In a salt-and-pepper patterns upper-class people were next to laborers, Irish next to German, Black next to white. New Orleans never had the ethnically- and racially-pure enclaves until modern suburbanization began the process of segregating subdivisions based on class and race.

Fortunately, the culture of New Orleans did not permit construction of high-rise tenements, or even cramped row houses, to house the working class, as happened elsewhere in urban America at the time. New Orleans turned to import from Africa by way of Haiti: the "shotgun house," 12 feet wide by 100 feet long. Indeed, the rich traditions of New Orleans have given the world these pink and green Creole houses. Between 1850 and 1910 local contractors and artisans built these structures by the thousands. Neighborhoods were created with an assorted architectural gingerbread.

² The case of Captain Sambola's Annual Shooting of the Straw Hat was drawn from Laurence Powell's presentation at the Center for the American South, University of North Carolina, Chapel Hill, NC, December 12, 2005.

Everything happened out of doors during the hot, humid nights. During evenings people sat on front porches of their shotgun houses. Recall that neighborhoods were in close proximity and that they did not form into ethnic enclaves. *New Orleanians lived together in a culture that has always prized performance, self-display and dancing.* As a result, the residents couldn't help but create a complex culture, a gumbo stew filled with food like etouffee and andouille, sidewalk festivals, and musical affairs. Everything happened outdoors on display. Marching bands and jazz funerals were friendly competition that captured the spirit of New Orleans. It is hard to imagine the hybrid American art form called jazz to have originated in any other city but New Orleans.

Many of the neighborhoods were obliterated by Hurricane Katrina.

Economic Decline, Race and Poverty

Before Hurricane Katrina, New Orleans was one of the most troubled cities in America. The gulf between races and classes widen. Starting in 1890 a series of Jim Crow laws were enacted by legislatures filled with white supremacists that separated blacks and whites on public transportation, as well disenfranchised blacks from property ownership and the right to vote. Racially mixed symphony orchestras, steel bands, sporting events and marriages ceased to exist.

The separation of race and class widen in the 1950s and 1960s. Migration from rural impoverished areas to New Orleans (and many other American cities) was followed by white flight from urban areas to more suburban communities. High rise apartment complexes for public housing were constructed to cope with black population influxes and in a pattern repeated throughout America, the housing was invariably located in the most undesirable areas (along noisy/dirty transportation corridors, reclaimed low-lying flood prone land, or next to industrial facilities). Employment opportunities were limited for inner city residents as jobs moved outward from the central cities to the suburbs, or overseas as the process of globalization reduced even further the number of low skilled jobs. The most impoverished residents lived in squalor conditions concentrated in certain neighborhoods.

Since 1990, the New Orleans region has experienced slower population growth than the nation as a whole, while the city has steadily lost population. *On every social indicator the city scores are miserable.*³ Sharp racial concentrations and high concentrations of poverty, inner city decay, and economic decline all challenged the city. The city had developed large, isolated neighborhoods of very poor black residents. The metropolitan area of New Orleans was the sixth poorest in the nation. It is last, or nearly so in children in poverty, illiteracy, infant mortality, and school dropout rates. It is easy to imagine that children have little hope for the future when forced to live under these deplorable conditions.

It is against this backdrop of the spatial distribution of population groups in cities and the differential access to resources that we can best understand the Hurricane Katrina disaster. *Can a diverse New Orleans be rebuilt without reproducing the awful inequities of the pre-disaster past?*

Safe Development Paradox

For most of the 20th century, federal policy for hazardous areas produced what urban planning scholar Ray Burby (2006) calls a *safe development paradox*. The paradox makes hazardous lands safe for urban expansion, but has the unintended effect of contributing directly to disasters. The basic idea is that land exposed to natural hazards can be profitably used if steps are taken to make it safe for human occupancy.

To protect urban development the federal government has been subsidizing urban development in dangerous areas in two ways. One way has been financial support for the construction of seawalls, dams, and levees and beach re-nourishment. This approach justifies increased levels of development that might not otherwise take place without protective structures. The likelihood of catastrophic losses increases when the structures fail to protect development in the event of a cataclysmic storm like Katrina. The second way is generous disaster relief payments, income tax write-offs for lost property, and the 37-year old National Flood Insurance Program (NFIP), which

³ The facts for the discussion on indicators in this talk were drawn from two studies that summarize pre-disaster conditions in New Orleans (The Bookings Institution 2005 and Logan.

often does not charge high enough premiums to cover storm losses. NFIP now faces a massive deficit due to more than \$22 billion in claims from Hurricane Katrina that will require massive infusion of money from the federal Treasury (Crenshaw, Washington Post, 11/19/05, A8).

New Orleans history with flooding illustrates the *safe development paradox*. Given this high level of risk of the city to hurricanes and floods, Congress authorized federal assistance for levees and to drain 9,600 acres of low-lying wetlands to accommodate new urban development. Levee construction was designed to protect virtually all of New Orleans from hurricane surge flooding up to a 1 in 200-year recurrence interval (equivalent to a category 3 hurricane). Despite the danger, the improved levee system justified additional federal funds for construction of a major interstate highway (extension of I-10) through the heart of the eastern area which made the area readily accessible for intense development. During the 1970s (after Congress authorized the levees and enacted the National Flood Insurance Program), these extremely dangerous low-lying areas experienced rapid urbanization that included over 29,000 housing units with an additional 22 housing units between 1980 and 2000 (Burby 2006). Thus the construction of an improved levee system and availability of flood insurance gave a sense of security to thousands of households that this area was safe.

In almost complete denial of the pending buildup for a catastrophe, the city adopted a policy to encourage more development. In the city's 1999 *New Century New Orleans Land Use Plan* (1999, p. 201), the city planning commission stated:

...there are extensive opportunities for future development of the vacant parcels that range from single vacant lots to multi-thousand acre tracts. Long term, these development opportunities represent not only population increases but also significant potential employment for the city.

Ironically, just six years later, the entire area of urban growth the city had been promoting and the federal government protecting for 40 years was entirely under water. *The devastation by Hurricane Katrina and the flooding of New Orleans could be viewed as an expected consequence of federal policy.*

Sinking Coastal Marshlands: America's Soft Underbelly

New Orleans can't be rebuilt along old boundary lines demarcating the city because the city is sinking. The coastal marshlands, one of the most complex ecosystems on earth, formerly buffeted hurricanes moving up the Gulf Coast. But these marshlands have been disappearing at an alarming rate, forty-square miles per year, and the rate is accelerating due to sea level rise. This loss is especially worrisome in terms of hurricane surge - for every two or three miles in width the height of hurricane surge can decline by one foot (U.S. Army Corps of Engineers 2004). Thus the steady loss is increasingly exposing the city to even greater risks.

The Mississippi River's land producing powers that deposited sediment along the marshlands that absorbed storm surges and protected New Orleans have been cutoff by a complex system of levees. Without water flow and natural sediment replenishment, the land outside the levees dries and sinks under its own weight.

New Orleans After Katrina

The voices of progressive reform, and of can-do American resilience, from President Bush to the citizens of New Orleans, are sending upbeat signals of rapid recovery. During the weeks after Hurricane Katrina made landfall, we heard a continuous stream of media messages that New Orleans will bounce back, be bigger, and be better than ever.

Standing in the backdrop of a darkened neighborhood, the French Quarter, after the levees were breached and floodwaters poured into the city, *Bush declared, "The work that has begun on the Gulf Coast region will be one of the largest reconstruction efforts the world has ever seen"* (New York Times, 9.16.05). Bush's words are victorious and motivating. They are necessary to inspire the hard work and to gather together the financial resources essential for rebuilding. But his words also reflect the agendas of many politicians whose legitimacy have been questioned or even obliterated by incompetence of government response during Katrina's aftermath. These words represent the

ambitions of commerce for a rapid return of businesses to normal operations and for the modernization of a deteriorated industrial base.

Taking the view that the disaster opened windows of opportunity for economic revitalization is an important dimension of disaster recovery. New Orleans' infrastructure has long been in need of repair. Archaic sewage, water and stormwater drainage utilities have plagued New Orleans for generations. While the city has its delight in whimsy and love affair with pleasure, Katrina laid bare its problems that are in desperate need of attention.

However, we must be careful in separating "opportunity" from "opportunism," especially if we take a narrow view premised on commercialism. How cities recover depends on whose vision of the future gets rebuilt, and whose benefit. It depends on what we mean by "recovery." What are we to make of heated comments of a member of Congress in Washington, D.C., representing a prosperous area of Baton Rouge which is the state capital of Louisiana? "We finally cleaned up public housing in New Orleans. We couldn't do it, but God did."

But the poor and largely black citizens of New Orleans are not in a position to contest the views of the powerful and wealthy. It is there homes that have been destroyed by an overwhelming majority. If the post-Katrina city were limited to the population previously living in areas that were undamaged by the hurricane – that is, if nobody were able to return to damaged neighborhoods – *New Orleans is at risk of losing more than 80% of its black population* (Logan 2006). This means that policy choices affecting who can return, to which neighborhoods, and with what forms of public and private assistance, will greatly affect the future character of the city.

At issue is whether an authentic New Orleans can be rebuilt, with its cultural heritage that makes the city unique. *Can a diverse New Orleans be rebuilt without reproducing the deep inequalities of the pre-disaster past? Can a rebuilt New Orleans shed itself of the deplorable conditions of poverty?* I want to believe in the opportunistic voices that call for a more resilient New Orleans – a city that is more economic vital, more diverse and more socially equitable, but I am not encouraged by recent events.

Plans for Rebuilding and the Local Government Paradox

Hurricane Katrina opened a window of opportunity for creating more resilient communities. Windows are moments of opportunity when a problem has become urgent enough to push for change of entrenched practices (Birkland 1997). But windows typically do not stay open for long after a disaster. The urgency of residents to get back to their homes coupled with pressure by business owners to return to normalcy builds quickly after a disaster and is amplified by a substantial inflow of capital for reconstruction. A community should be ready with solutions when a window opens whilst the importance and priority that local officials assign to hazard threats are temporarily elevated.

To take advantage of an open window a community should have a pre-disaster mitigation and recovery plan in place long before a disaster strikes. A recovery plan is a policy document that guides short-range emergency and rehabilitation actions (temporary housing, damage assessment, debris removal, restoration of utilities, re-occupancy permitting, reconstruction priorities) and long-range redevelopment decisions (building moratoria, re-planning of stricken areas, relocation of housing to safer sites). A well-conceived plan conveys a sense to the public that local officials with recovery responsibilities are organized and in charge because they had the foresight to carefully consider the issues and contingencies throughout the recovery process. Further, by involving and consulting residents in all phases of planning, the pre-disaster recovery planning process helps create a knowledgeable constituency that is more likely to support redevelopment policies and programs that take affect once a disaster strikes. An effective process of recovery planning should include all affected stakeholders who have a voice in how their community is to be rebuilt instead of a powerful few dictating the course of action.

In the case of mitigation, a pre-disaster recovery plan can identify potential sites free of hazards that could serve as relocation zones for developments in hazardous areas that are likely to be significantly damaged during a disaster. Where hazard areas have significant cultural or economic advantages for redevelopment that cannot be foregone, a well-conceived recovery plan can reduce potential losses by including provisions that guide redevelopment to the least hazardous parts of building sites, and modify construction and site design practices so that vulnerability is minimized.

Given that the incidence of disaster losses is primarily local, one would expect that pre-disaster planning to avoid losses would be a high priority for local government officials. However, the *local government paradox* is that local governments have little incentive to be pro-active toward potential future disasters and thus few give serious attention to prepare plans for disaster mitigation and recovery. Unfortunately, New Orleans like many communities throughout America has given very limited attention to preparing plans for disaster recovery and mitigation.⁴ Both the *safe development paradox* discussed above and the *local government paradox* contributed to the flooding of New Orleans. These paradoxes are increasingly becoming widely recognized. An October 2005 analysis by the Brookings Institution Metropolitan Program indicates:

Federal policies and investments in flood protection facilitated development in dangerous locations...and failed to discourage floodplain development...(T)he traditional federal deference to state and local land-use planning has meant that federal spending on levees and other protections has been unaccompanied by sensible restrictions on subsequent construction...At the same time, the availability of subsidized federal flood insurance for new development in flood plains...also represents a failure of Washington to take the lead in discouraging communities from building in harm's way. (Brookings Institution Metropolitan Program, 2005, 23, 25)

Burby (2006) cites several examples of decision-making in the New Orleans area that clearly illustrate the *local government paradox*. These examples point to a lack of local government concern about hazards, and even resistance to proposals to protect their communities from storms because they did not want to pay their share of federal projects:

- The Orleans Parish Levy Board lobbied the Corps of Engineers for protection to the level of a 100-year, rather than 200-year, hurricane after the local share of the cost of the Lake Pontchartrain and Vicinity Project had escalated many times beyond original estimates.
- The levy district also opposed hurricane protection floodgates at the mouths of the city's drainage canals, which led to the construction of the walls along the canals that failed in Katrina.
- In the early 1980s the Federal Insurance Administration (FIA) launched a lawsuit for over \$100 million against New Orleans. The FIA contended the city caused it to pay excessive flood insurance claims by failing to maintain levees and failing to enforce elevation requirements for new construction, which then led to buildings being flooded and their owners to seek compensation from the federal flood insurance program. The courts ruled in the FIA's favor and ordered the parishes to improve their levy maintenance and enforcement practices.
- The City of New Orleans did not update its 1970 comprehensive plan for almost thirty years. When it got around to this in 1999, its *New Century New Orleans Land Use Plan* made absolutely no mention of the extreme flood hazard facing the city, ways of mitigating the hazard through land use or building regulations, or how the city might recover from an event such as Hurricane Katrina.

Given the lack of pre-disaster planning in New Orleans, local officials have had to act quickly and hastily to prepare a disaster recovery plan – not a good recipe for effective planning. In the months after Katrina made landfall, two different recovery plans were prepared for New Orleans' Bring New Orleans Back Commission – the commission consists of a representatives of many neighborhoods and stakeholder groups, and was established by the city's Mayor Nagin to guide the city's recovery. The policy choices included in these plans had dramatic potential affects on who can return, and to which neighborhoods they can return. Given that both plans were hastily planned and offered only minimal citizen participation, it is not surprising that both plans were widely opposed.

⁴ In those cases when local governments give attention to planning, the plans that are produced are frequently of very low quality (Godschalk et al. 1999).

The first plan was produced in November 2005 and prepared by the Urban Land Institute (a Washington, D.C. think tank) at the request of the commission. The most important recommendation of the plan was illustrated on a color coded map which divided the city into three investment zones:

- areas to be rehabilitated immediately (located on the top of the natural levees);
- areas to be developed partially; and
- areas to be re-evaluated as potential sites for mass buyouts and future open spaces (dangerous, low-lying areas where many low income minorities settled).

But whose land should be returned to open (green) space? The zone, “Areas to be re-evaluated...” are the lowest lying parts of the city that should be bulldozed. The assumption here is that it should be the culturally rich locations like the Ninth Ward – home of the jazz musician, Fats Domino. The housing stock in the Ninth Ward is 85% resident-owned-and-occupied by members of the black and white working class. The ULI plan is entangled with tradeoffs between equity and environmental risk. The plan was bold by stating that certain interests should be sacrificed for the collective good. But whose interests?

Not surprisingly, the city’s black elected officials and residents strongly opposed the ULI plan because they believed that many black neighborhoods were unfairly stratified on the last category slated for redevelopment. The *New Orleans Times Picayune* newspaper reported, “Those maps are causing people to lose hope...Those who once fought for equal access to education and public facilities may be forced to fight for equal access to relief and restoration” (Frank Donz, November 29, 2005).

A second plan was produced in January 2006, commonly referred to as the Nagin Plan after the mayor. The Nagin Plan basically followed the ULI plan but with one important distinction – it allowed residents to commit to returning to their neighborhoods between January 2006 and May 2006 even if these neighborhoods were in low lying flood zones. If a sufficient number committed then the city would provide the facilities and services. The Nagin Plan is in doubt as the city building inspection department have continuously and consistently overruled demolition orders of destroyed homes. City officials have allowed random development to occur throughout the city at a pace of over 500 building permits issued every day, totally to over 6,000 rebuilding permits as of February 5, 2006 (Adam Nossiter, New York Times, p. 1).

The local government paradox is prominent in New Orleans after Katrina. How can we in America overcome this lack of local government concern to plan for future disasters? How can the city’s diversity be restored without reproducing the inequities of the past?

Lessons from Katrina: A Plan for the Future

We can only hope that Hurricane Katrina, America’s most devastating storm in a century, will wrench us to our senses in building more resilient places. The revelations of inadequate recovery responses to Hurricane Katrina’s aftermath are failures in disaster recovery planning and failures in the overall disaster response system at the local, state, and federal levels of government. The failures are also about weak social support systems for America’s impoverished – the largely invisible inner city poor. Adopting better rebuilding policies and planning can be undertaken in a reasonable amount of time (months to years) through changes in policies that provide incentives for redevelopment in hazardous areas, organizational restructuring, and training. Adopting better policies that address poverty and extremely distressed inner cities of America require much more time, resources, and the political will to redress deeply entrenched social inequities that have been sustained for more than a century and show little signs of dissipating.

Reform Federal Disaster Policy

The nation needs a more sustainable approach and a reformed federal-state-local relationship for recovery planning and mitigation. I offer several recommendations. *First, more emphasis should be placed on land use planning in hazardous areas.* The federal government sets standards for wetlands, air and water quality - so why not critical land use principles? To be eligible for federal disaster aid and mitigation funds, local governments must produce a land use element as part of their mitigation plans. The land use element must comply with a checklist of steps that specify risk avoidance opportunities that rely on land use planning. Examples include:

- high hazard sending zones where development is to be relocated to low hazard receiving

- zones;
- risk avoidance opportunities linked with other local land use concerns such as greenway or beachfront acquisitions that overlap hazard zone areas; and
- stream buffer setbacks that could limit development for water quality purposes and at the same time extend development limits beyond the 100-year floodplain (note that significant damages consistently occur outside the 100-year food boundary).

The last two examples also would allow for piggybacking mitigation onto more established and higher priority land use issues to be accounted for in local government decision making. Thus, by incorporating mitigation into other land use decisions, mitigation is advanced. States would also have a role in setting land use standards that fit hazard conditions in each state, and in providing technical assistance to communities.

Second, federal policy should focus on performance-based environmental risk reduction targets. The federal government sets performance standard targets for air and water quality -- so why not critical environmental risks posed by natural hazards? In threatened drainage basins like the Chesapeake Bay basin state and local governments are required to prepare nutrient reduction plans to achieve specific pollutant reduction targets within a specified timeframe. Given that any community in America will demand aid in an emergency, the federal government should also require every community to produce a meaningful performance-based mitigation and recovery plan. Progress toward a meeting the performance target should be monitored on a regular basis. Plans should be adapted if targets are not met. If a community persists in not meeting targets, then it would be ineligible for public disaster assistance aid and mitigation funds. FEMA and states could offer technical assistance to communities on how to conduct risk assessments and monitor changes in risk.

Third, require local governments to pay a greater share of public infrastructure costs through insurance. Currently, the federal government pays for 75% of all local infrastructure damages through public assistance funds. One option is for local governments to purchase infrastructure insurance. Just as private homes and businesses are insured local governments could insure infrastructure. The premium should be aligned with the level of risk across hazard zones. Many communities have created stormwater utilities with fees based on the amount of impervious surface per residential and commercial properties to pay for stormwater infrastructure, and stream protection and restoration projects in order to meet EPA water quality standards under Phases 1 and 2 of the Clean Water Act. It is plausible for these communities to create new utilities or rely on existing ones as a means to cover disaster costs. Another option would be to establish special assessment zones that would levy property taxes in accordance to degree of risk. The additional taxes could pay for infrastructure insurance.

While federal policy for disaster recovery and mitigation planning needs major reform, and state and local governments must play a more significant role in accepting the risks posed by development in hazardous locations, any change will not be effective without meaningful consultation and participation of all citizens in recovery decisions and plans that will affect them. This is especially the case for impoverished citizens who deeply mistrust government plans and planners.

Build Community Social Infrastructure

Another crucial recommendation to improve disaster recovery planning and advance more resilient communities entails the federal government requiring communities take community building and citizen participation seriously. I refer to community building in the context of social capability (or social infrastructure), not the physical infrastructure of the city. When citizens start to grasp the more resilient and sustainable alternatives for living with hazards, they mobilize and begin to insist that elected officials make decisions leading to long-term resiliency. Active citizens who are deeply involved in planning are important so that aggrandizing real estate interests don't control the recovery process.

A crucial aspect of grassroots participation requires that outside aid delivery organizations (public and private) treat disaster stricken people as participants in the recovery process, rather than helpless, poor victims. Specific approaches need to be employed in which those with a stake in recovery planning can help develop a bottom-up ability to rebuild. There are plenty of working- and middle-class people who want to return and help rebuild New Orleans. They have the commitment, and if lacking in skills, they should be given the opportunity to participate.

To illustrate these approaches, we draw a recognized community-based disaster recovery planning effort in an underdeveloped island state of Montserrat in the Caribbean between 1989 and 1994 (Berke and Beatly 1997). Although the setting is different from the Gulf Coast, parallels can be drawn given that both places have significant poor and disadvantaged populations that were disproportionately affected by the disasters. After hurricane landfall, a collaborative recovery effort evolved between an international nongovernmental organization from Canada, an intermediary NGO (non-government organization) from the region with long standing external ties to foreign donor organizations, and a local community action group. The Canadian NGO sought to provide housing recovery assistance after Hugo by establishing a cooperative arrangement with the intermediary NGO which had been involved in community development work in a local community for several years before the disaster. The arrangement involved the Canadian NGO providing funds to the intermediary for undertaking reconstruction activities in the community. The intermediary, in turn, worked with the community action group to initiate a new housing assistance program. The intermediary NGO trained local people and provided funds to temporarily employ local people to undertake reconstruction activities. The Canadian NGO also supplied the program with building materials and logistics for transporting the materials. The accomplishments of this program were substantial, with numerous training workshops on carpentry and structural strengthening techniques, dozens of homes rebuilt, and many others were repaired. Of greatest significance were the long-term development accomplishments. The local visibility and sense of importance of the community action group were raised considerably due to its reconstruction work. The voluntary participation of local people in group activities was also much higher. This strengthened the community action group's capacity to undertake several development projects not directly related to disaster recovery (e.g., new farming practices, building a community center, and improving potable water distribution systems).

According to Briggs (2004), efforts like this one suggest leverage principles for developing more effective participation in the recovery process. Serious application of these leveraging principles should be required in any local recovery planning process. Communities should demonstrate that they have complied with the principles to be eligible for disaster aid and mitigation funds from the federal government.

These principles are fourfold. *First, apply classic lessons in grassroots organizing in new ways to encourage participating and leading new and renewed civic institutions that tackle critical disaster recovery problems.* In Montserrat, the local community action group was an important local institution, but it was somewhat limited in resources and capability to deal with the demands of recovery. The disaster opened a window for the local action group to engage local people, and the nonprofit intermediary created links to an outside organization with resources to provide aid. Disasters make clear that we need ways that connect people to immediate problems they need resolved and recognition that these problems are linked to wider social concerns.

Second, help people acquire new civic skills, with special attention to those with low status in the communities. The Montserrat effort included training and other support to help participants with little formal education, and acquire and practice civic skills. In a current project supported by the Federal Emergency Management Agency, MDC (a community building nonprofit organization in Chapel Hill, NC) (see MDC 2005) and the Center for Urban and Regional Studies of the University of North Carolina at Chapel Hill (see CURS-UNC 2005) are partnering in an effort to work with seven disadvantaged communities after Hurricane Isabel that struck the East Coast in 2003. The goal of this project is to support these communities to better cope with hazards and disasters through strategies that seize opportunities in the event of a disaster, reduce poverty, and build inclusive and collaborative ways of doing things. The intent is to create a "community building curriculum" designed to aid disadvantaged communities to cope with threats posed by hazards. The curriculum is designed to teach in ways that support adult learning. Key modules are to include how to: build an emergency planning team; develop leadership capacity at the individual, interpersonal, organizational and community levels; conduct a hazard vulnerability assessment; carry out visioning exercises; and link visioning to planning and implementation.

Third, build more extensive networks to accomplish disaster resiliency goals. Formal organizational ties, such as those among nonprofit community groups like churches and self-help economic development cooperatives, and between those groups and external organizations (non-profits, and state and federal government agencies), are vitally important. Networks should relay

important information and also be capable of endorsing (or vouching for) those with limited access to funds for rebuilding, political influence, and other disaster assistance resources. In the Montserrat case, the intermediary group provided a key set of links between a local action group and an external aid organization with no history of working together. The intermediary served as an active broker of attention, commitments, and agreement among key participants.

Fourth, build new norms – a culture that values and enables collective action. Actions to build community capability to take action must include cultivation of norms of mutual aid, broadly defined community responsibility and public engagement, and working through differences – helping to address the threads of mistrust, parochialism, and exclusion. In Montserrat, one of the most basic norms was that of cooperating and learning, rather than acting individually. The overarching thrust of the effort was to help build powerful new habits among individuals in the community that emphasized working to integrate community development efforts with long-range disaster recovery efforts. Another norm reflected the local action group's origins in grassroots engagement, which now entailed engaging non-experts in thinking through recovery and development needs, and making resource allocations.

Building stronger norms of collective action does not necessarily mean making every decision by committee. Instead, incremental collective steps and steady progress in building networks can lead to a buildup of confidence needed to take bigger, more comprehensive actions aimed at recovery and mitigation planning over time.

In sum, restoring critical infrastructure, preserving and rebuilding a city's urban architectural fabric is critical to full recovery, but efforts must also be made to repair a community's torn social fabric—a process which fundamentally entails reconnecting severed familial, social and religious networks of survivors at a grassroots level. In this article, we underscore the fact that cities, towns and villages are more than the sum of their buildings and infrastructure. They are a tapestry of human lives and social networks that are essential to the heart and soul of the place. Peer into a truly resilient place and you are assured of finding resilient citizens, citizens who have forged bonds in the face of catastrophe and carried the day.

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TABLE RONDE 2

Gilles André

Gilles.Andre@benfieldgroup.com

IAR Benfield Group

Présentation de la Société

Le Groupe Benfield a été créé en 1997 à la suite de la fusion entre les sociétés de courtage de réassurance britanniques Benfield et Greig Fester, puis du rachat du courtier nord-américain EW Blanch en 2001. C'est un groupe indépendant de près de 1700 employés dans le monde entier dont le chiffre d'affaires 2005 est d'environ EUR 450 millions. Benfield est un groupe coté à la Bourse de Londres depuis 2003. Bien que son activité principale soit le courtage de réassurance, le groupe développe une large gamme de services et de conseils aux assureurs et aux réassureurs s'appuyant sur un savoir-faire unique et les outils les plus innovants du marché. Il comporte plus de trente bureaux dans le monde entier.

Biographie

Gilles ANDRE est docteur en géographie physique spécialisé dans le risque naturel. Il a enseigné 5 ans à l'Université Paris 7 parallèlement à ses fonctions d'ingénieur R&D au sein de la Société Geoscience Consultant. Aujourd'hui, il est responsable de la modélisation des Risques Naturels au sein du service R&D de la société Benfield.

Résumé

Notre intervention à la table ronde 2 (Gestion des risques et Aménagement) cherchera à donner un point de vue éclairé d'un courtier en réassurance sur les méthodes utilisées pour estimer les conséquences économiques des risques naturels et sur le rôle potentiel des assureurs dans la gestion des risques et l'aménagement du territoire. Cette intervention s'articulera donc en deux parties :

1. Le rôle d'un courtier en réassurance dans la quantification des risques.

A l'interface entre l'assureur et le réassureur, le courtier a parmi ses principales missions d'estimer au mieux les risques encourus par une compagnie d'assurance vis-à-vis d'un péril naturel. Son travail consiste donc à modéliser les expositions des assureurs face aux risques « tempête », « grêle », « inondation », « séisme » et autres événements naturels et / ou technologiques. Pour ce faire, nous développons un ensemble de modèles probabilistes qui cherchent à reproduire le plus fidèlement possible les phénomènes naturels susceptibles d'engendrer des dégâts sur un territoire. Ces modèles ayant un fort appétit en précision géographique, nous sensibilisons les compagnies d'assurances à une meilleure connaissance et localisation de leurs polices. Ce travail de sensibilisation entrepris depuis la fin des années 90 porte ses fruits dans la mesure où un certain nombre de compagnies d'assurances sont capables de fournir des informations au niveau de l'adresse même de chaque risque, et mettent en place des procédures de suivi des cumuls et de gestion des risques.

2. Le point des assureurs dans la gestion des risques et l'aménagement du territoire.

La question qui peut se poser est de savoir comment les compagnies d'assurances peuvent intervenir en tant qu'acteur dans l'aménagement du territoire et la mise en place de politiques de prévention et de réduction des risques. Dans un système de mutualisation des risques, l'assureur répartit son risque sur l'ensemble de ses assurés. En matière de risque naturel, l'assureur couvre des périls à faible fréquence et forte gravité, susceptibles d'affecter un grand nombre de polices. Seule la notion de cumul aura un intérêt pour lui. L'assureur se doit par conséquent de ne veiller qu'à une bonne mutualisation dans l'espace et le temps. De ce fait, même si toute catastrophe naturelle a un coût pour les assurances et ce malgré l'intervention du régime d'indemnisation des

CatNat, les assureurs ne sont pas incités directement à s'engager dans le débat sur la réduction des risques via les politiques d'aménagement du territoire. Inversement, dans un système ne reposant pas sur la mutualisation des risques, les assureurs seront beaucoup plus sensibles à la quantification individuelle des risques qui deviendrait, alors, un critère de tarification des primes (cf. bonus / malus en Auto). Dans ce cas, nous pouvons considérer qu'ils agiraient indirectement sur les politiques d'aménagement du territoire, dans la mesure où ils se réserveraient le droit d'augmenter ou de baisser le prix d'une police d'assurance en fonction de sa localisation et du niveau d'exposition aux risques. En conclusion, nous pouvons dire que le système actuel de mutualisation des risques associé au régime des Cat Nat, ne représente pas une incitation majeure pour les assureurs à rentrer dans le débat de la gestion des risques naturels dans la phase de prévention. Cependant, il n'est pas à exclure que ces derniers trouveront un intérêt à débattre sereinement, dans le cadre d'un partenariat privé / public, de la prévention, la gestion des risques et de l'aménagement du territoire en tant qu'outils de réduction des risques, comme ils l'ont déjà fait pour les risques liés à la santé ou encore aux accidents de la route.

Professor Brian Lee

brian.lee@port.ac.uk

The UK Advisory Committee for Natural Disaster Reduction

Résumé

This presentation will start with a review of the wind and storm surge conditions that actually occurred at the time that Hurricane Katrina made its landfall on August 29th 2005. From this review it is apparent that the storm surge on the Mississippi coast was comparable with that of the Indian Ocean tsunami in December 2004. It is also worth noting the admission by the US National Hurricane Centre on December 20th 2005 that actual wind speeds at landfall were lower than those claimed at the time.

The talk will then present an overview of current building and infrastructure conditions in urban New Orleans and in the Mississippi Gulf coast area. Recovery is clearly proceeding at a remarkably slow pace and much evidence still exists which demonstrates the impact of the storm on the physical and engineering infrastructure of the region.

Bernard Picon

bpicon@wanadoo.fr

Président du Comité scientifique Rhône

Résumé

Cet article a pour objet de montrer comment l'inondation de la Camargue gardoise et d'une partie urbaine d'Arles en 2003 a engendré des remises en cause et de nouvelles dispositions réglementaires, gestionnaire, sociales, symboliques, scientifiques, concernant les crues du fleuve en favorisant l'émergence de nouvelles transversalités à tous les niveaux.

L'inondation généralisée du delta du Rhône en 1856 avait débouché sur une mesure exceptionnelle : la construction des « Chaussées de Grande Camargue » sous l'égide de l'état. Leur gestion fût confiée à « l'Association des Chaussées de Grande Camargue ». Cette association regroupait les propriétaires privés du delta du Rhône. Leurs cotisations et les pouvoirs de chacun dans cette association étaient proportionnels à leur surface cadastrale (statuts de 1883). Socialement, le delta étant une région de grandes propriétés agricoles, on peut dire que la protection du delta par rapport aux crues du Rhône était confiée à ceux qui en bénéficiaient en premier lieu, les propriétaires fonciers. Le système pouvait être qualifié de censitaire.

De surcroît, pendant les 150 ans qui ont séparé cet épisode des inondations de 1993, 1994 et 2003, l'île de Camargue, a été désignée sur un plan plus symbolique comme « espace naturel ».

En 1927, la Réserve nationale de Camargue est née et sa gestion est confiée à la Société nationale d'acclimatation de France, devenue depuis Société Nationale de Protection de la Nature. L'apparition de cette réserve contribue à doter l'ensemble du delta d'une très importante image d'espace naturel ; cette image se forge progressivement jusqu'à aboutir en 1970 à la création du Parc naturel régional qui concerne 86 000 hectares, qu'ils soient agricoles, saliniers ou protégés.

De plus, à la charnière des XIXe et XXe siècles, les poètes du mouvement félibre érigent sur un plan plus culturel la Camargue en symbole territorial de résistance à l'extérieur. La résistance des milieux lacustres à la pénétration humaine symbolise pour eux la résistance de la culture et de la langue provençale à l'uniformisation supposée de la nation. Les poètes, les savants, les gardians les pêcheurs et les gitans sont mobilisés au sens propre du mot, dans « la nation gardiane » qui, codifiée dans ses moindres détails, deviendra rapidement une originale tradition culturelle. Ce mouvement de résistance culturelle s'exprimera en termes militaires et bien que s'opposant aux grands propriétaires, confortera l'insularité camarguaise en faisant une terre de traditions. « En Camargue, il faut bien se le dire, deux ennemis acharnés sont aux prises. D'un côté ce que l'on veut appeler le progrès avec son cortège de machines et de destructions, ses nivellements, ses défrichements, ses digues, ses soldats (les riches qui se sont emparés du sol) ; de l'autre la Nature, la terre vierge, mère des taureaux et des chevaux sauvages, des flamants, des mirages, des légendes, de la poésie avec ses soldats aussi (moins riches d'argent, mais plus riches de cœur et de mémoire), les poètes, les savants, les gardians, les pêcheurs et les gitans ». *Marquis Folco de Baroncelli-Javon 1922*. Au milieu des années 60, la politique de « zonification » du territoire contribue à désigner le delta du Rhône comme « coupure verte ». Le schéma Baroncellien d'une Nature menacée par les opérations de mise en valeur agricoles et industrielles sera repris en 1964 par André Malraux, Ministre de la Culture qui plaidera pour la création d'un Parc National. « La Camargue, telle que nous la connaissons, est actuellement avec toutes les richesses naturelles qu'elle contient encore, en voie de disparition rapide, en raison de nombreuses atteintes qu'elle subit de la part des touristes, et du fait de la riziculture, de l'exploitation du sel et de l'action du feu ». *André Malraux, lettre au Ministre de l'Agriculture, 22.12.1964*. La nécessité de la coupure verte sera évoquée par Olivier Guichard, Ministre de l'Aménagement du territoire en 1965, époque où l'on aménage touristiquement la côte du Languedoc Roussillon à l'ouest et la zone industrialo-portuaire de Fos sur mer à l'est. « L'inclusion de la Camargue dans le plan régional de Fos présente le grand avantage de n'établir aucune solution de continuité sur la côte méditerranéenne entre les opérations de Fos et celles du Languedoc-Roussillon ». *Lettre d'Olivier Guichard au préfet, 25.06.1965*. Cette prise de position d'Olivier Guichard débouchera sur la désignation du delta du Rhône comme Parc Naturel Régional en 1973. A partir du moment où l'espace camarguais est administrativement et politiquement naturalisé, l'écologisme ambiant trouvera là de quoi alimenter ipso facto le mythe de la Nature sauvage miraculeusement préservée. « La Camargue, delta du Rhône, est un haut lieu de Nature. C'est actuellement le dernier grand espace Naturel intact de toute la côte méditerranéenne ». (PNRC Carte d'occupation du sol : introduction, 1992). Ainsi la Camargue a été désignée par les investisseurs du XIXe siècle comme une colonie hexagonale, par les félibres comme une terre de traditions et de libertés, par les politiques des années 70 comme une coupure verte, par les naturalistes comme une terre sauvage (Picon, 1988).

Les inondations et les ruptures de digues d'octobre 1993, janvier 1994, en précipitant les eaux du Rhône dans l'île de Camargue ont alors révélé quatre décalages normatifs, sociaux, symboliques et scientifiques liés à cette situation héritée du siècle précédent et qui peuvent être considérés comme des facteurs aggravant de la crise :

Sur le plan normatif, les statuts gestionnaires de 1883, hérités de l'inondation de 1856, faisaient toujours force de loi et étaient complètement inapplicables dans un contexte socio-économique en mutation rapide. La Camargue n'était plus seulement une île agricole mais un milieu complexe fait d'intérêts agricoles, saliniers, résidentiels, touristiques et de protection de la Nature. Dans ce contexte, le système censitaire privé et agricole de gestion des digues ne fonctionnait plus depuis longtemps et leur état de délabrement, pointé par le rapport DAMBRE, en résultait.

Sur le plan social, cette inondation a eu pour conséquence de noyer des lotissements habités par des populations modestes qui, mobilisées au sein d'une association de sinistrés, devenue ultérieurement association des camarguais, a d'abord dénoncé le système de gestion en réactivant une sorte de

symbolique de lutte des classes puisqu'ils étaient exclus de l'entretien des digues qui incombait principalement aux propriétaires fonciers. Les « gros » ayant noyé les « petits », ils ont revendiqué une gestion publique des digues du Rhône via un « syndicat mixte » qui était déjà la règle sur la rive gardoise du petit Rhône (rive droite). Aucune brèche majeure ne s'étant déclarée sur cette rive, la gestion publique fût admise par toutes les parties prenantes comme la bonne solution.

Sur le plan symbolique, l'île de Camargue qui avait été progressivement désignée comme « dernier milieu naturel intact » de la côte méditerranéenne française menacé d'un grand nombre d'agressions humaines apparut soudain, dans les médias, comme un milieu humain menacé de catastrophes naturelles. Alors que l'on se protégeait d'incursions industrielles, résidentielles ou touristiques présentées comme catastrophiques, c'est un objet naturel, l'eau du Rhône qui a déstabilisé le delta. De milieu naturel menacé de risques humains, le delta a basculé dans la représentation d'un milieu humain menacé de risques naturels.

La production symbolique d'un espace naturel avait gommé la réalité d'un polder agricole et salinier à risque. Il ne faut pas oublier que le centre du delta est à moins un mètre cinquante au dessous du niveau de la mer et que les bourrelets alluviaux placent le Rhône au dessus de la plaine.

L'idéologie dominante nourrie de l'idée que la Nature est forcément bonne et belle et que l'homme est malfaisant, avait aussi contribué à « l'oubli » des digues du Rhône et a donc constitué aussi un facteur aggravant du risque.

Scientifiquement, enfin, de très nombreuses publications naturalistes forcées le trait en contribuant à construire la Camargue comme « terre sauvage ».

La réponse gestionnaire à la double catastrophe de 1993-94 a été la constitution d'un syndicat mixte de gestion des digues d'abord appelé SYDREMER en 1997 puis SYMADREM en 1999 quand la région PACA et le conseil général des Bouches-du-Rhône ont rejoint le syndicat.

La compétence du SYMADREM portait sur la seule protection de l'île de Camargue (rive droite du grand Rhône, rive gauche du petit Rhône et digue à la mer). Le mythe territorial restait vivace.

En même temps, face à la revendication émergente d'une gestion globale des inondations du Rhône, les pouvoirs publics voulaient une étude hydraulique complète, l'étude globale Rhône qui fût confiée à l'association « territoire Rhône » composée de tous les Conseils Généraux riverains du Rhône.

En décembre 2003, une nouvelle inondation du Rhône aval va mettre à mal une nouvelle fois ce dispositif de protection par rapport aux crues mais aussi l'exceptionnalité camarguaise.

L'inondation, comme par un fait exprès contourne très précisément l'île de Camargue et le territoire du Parc Naturel Régional.

Elle inonde les 6 000 habitants de la plaine du Trebon au Nord d'Arles et des milliers d'hectares en Camargue gardoise.

Les brèches, dans le remblai SNCF de la voie ferrée Tarascon Arles censée faire digue, et dans la digue de la rive droite du petit Rhône se trouvant hors du périmètre de gestion du SYMADREM. Ce constat fait à nouveau voler en éclats un dispositif pourtant vieux de moins de dix ans.

D'abord, s'il justifie le rôle du SYMADREM (aucune brèche ne s'est déclarée sur son périmètre de compétence), par contre, il remet en cause définitivement, concernant les risques, la sanctuarisation de la seule île de Camargue qui avait présidé au périmètre dévolu au SYMADREM.

Le delta sur le plan géomorphologique, est bien plus étendu que le territoire du Parc de Camargue. Il commence au Sud d'Avignon et il s'étend à l'Ouest et à l'Est de l'île.

La réponse gestionnaire a été rapide et les compétences du SYMADREM ont été étendues jusqu'à Beaucaire au Nord et à la rive droite du petit Rhône. Il aura fallu trois catastrophes pour comprendre que le fleuve se désintéresse des segmentations symboliques des territoires.

Sur le plan social, le même constat a finalement émergé et les sinistrés, pour assurer leur défense et pour devenir partie prenante de la gestion des inondations ont créé une « confédération des riverains du Rhône », « l'association des Camarguais » n'ayant plus de sens au vu de la géographie de la dernière inondation.

L'ampleur des dommages aux biens et aux personnes et les difficultés administratives, politiques, juridiques, sociales pour y répondre de façon concertée et sur le long terme a d'autre part marqué les limites de l'étude globale Rhône rendue en 2003.

A ce remarquable travail hydraulicien sur le fonctionnement du Rhône et sur les points faibles concernant la prévention, il manque tout l'immense volet de la complexité sociale économique législative de la prévention des risques tant sur le plan de la vulnérabilité que de l'aléa.

La réponse à cette dernière segmentation entre le social et le naturel a été la prise en compte globale et transversale du risque inondation sur l'ensemble du bassin à traiter comme phénomène socio – naturel : en 2003 est nommé un préfet de bassin (avec cette juridiction découpée par la Nature, on est bien entré enfin dans un indispensable processus de gestion non segmenté et socio-naturel).

Le préfet du bassin a pour mission de mettre en place « une stratégie globale de réduction des risques d'inondation du Rhône et de ses affluents ».

Cette stratégie s'appuie sur un dispositif complexe : comité de pilotage, équipe technique, équipe pluridisciplinaire, comité scientifique et les comités territoriaux de concertation auxquels les Conseils Régionaux adjoignent les « Etats Généraux du Rhône » pour intégrer les préoccupations des riverains. Ce dispositif a pour objectif de traiter de façon conjointe le Rhône amont, moyen et aval en jouant sur des solutions techniques qui ne passent plus seulement par les endiguements comme ce fut le cas en Camargue après les inondations 1993-94.

Réduire l'aléa et la vulnérabilité passe par la prévention, la cohésion, la solidarité amont, aval mais aussi la gestion de l'eau, et des sédiments, les zones d'expansion de crues etc.

Pour aller jusqu'au bout de cette tentative de globalisation, il est apparu que la prise en compte du risque inondation ne pouvait pas rester isolée ni se faire au détriment des autres fonctionnalités du fleuve et de ses affluents. Toujours sous l'égide du préfet de bassin, un « plan Rhône », sur le modèle du « plan Loire » déjà existant est en train de voir le jour en 2005.

Ce plan Rhône associe la question des inondations avec celle de l'écologie et de la biodiversité, de la navigation, de la production énergétique, du tourisme et des loisirs etc. pour l'ensemble du bassin.

Pour conclure, il semble bien qu'à propos d'un objet spécifique, les inondations récentes du Rhône, les réponses gestionnaires sociales et symboliques aient progressivement été amenées au même travail de déssegmentation imposé aux scientifiques par l'irruption récente de la question environnementale et des risques naturels. Si les scientifiques tentent d'y répondre par le développement de l'interdisciplinarité entre sciences de la Nature et sciences de la Société, les gestionnaires et les acteurs sociaux ont répondu, d'inondation en inondation, par les remises en cause administratives, territoriales, juridictionnelles, techniques et symboliques qui s'imposent dans le sens d'une plus grande transversalité : cette brève interprétation de la période récente en témoigne.

La Camargue, quant à elle, abandonne un peu de son statut mythique d'exception naturelle et rentre dans une définition scientifique et interdisciplinaire plus concrète : celle d'interface socio-naturelle fleuve – mer.

Robert Dry
Science Counselor, US Embassy

Et

Kristen Katzer
KatzerKM@state.gov
Science Officer at the American Embassy

Résumé

First and foremost, on behalf of the United States Government and the people of the United States, we would like to thank the French government and French citizens for their assistance to the victims of Hurricane Katrina.

Hurricane Katrina was an important learning experience for us. We realize that the US has been criticized for how it handled the situation, within the US government as well as outside. Nevertheless, it was a unique disaster and forced us to reassess how we respond. Ninety thousand (90,000) square miles of the Gulf Coast region were impacted by this storm. This resulted in seven hundred and seventy thousand (770,000) displaced persons and an estimated one hundred and eighteen (118) million cubic yards of debris. This extreme devastation was the costliest in U.S. history and uncovered many emergency management problems that need to be corrected.

Secretary Chertoff of the Department of Homeland Security recently outlined steps for ‘reengineering’ the Department of Homeland Security and FEMA. Moreover, he has already initiated plans to address the problems Hurricane Katrina highlighted.

First, DHS is working on a unified and integrated, incident command center to include local, state, and federal representation. DHS must increase its operational capability to respond to disasters. This means updating our technologies and processes to remain current with the most up-to-date systems available.

The Department of Homeland Security will also strengthen FEMA by revising the logistics system. The communications system will also be updated by calling on the specialized skills of different agencies within the Department, particularly the Coast Guard and Customs and Border Protection. Better communication capabilities that provide real-time information will enhance FEMA’s ability to inform decision makers and give feedback regarding needed resources.

In the aftermath of a disaster victims register for support. This includes requesting repairs to houses and property, relocation expenses, and shelter assistance. FEMA will also begin the process of upgrading the claims management system to deal with a greater number of claims at any one time. The updates will include the 1-800 number and the website. Improving the technology will help in providing assistance to those people displaced and/or made homeless by a disaster faster.

FEMA’s workforce is made up of roughly 2,000 permanent employees and the rest are deployed on a voluntary basis in order to respond to a disaster. FEMA must expand its permanent workforce in order to increase the capabilities of the agency. These employees must also be given the most advanced technologies and processes to enhance their skills and capacity.

All of these changes that Department of Homeland Security Secretary Chertoff proposes will foster new technologies and systems that will give FEMA the opportunity to better respond to large scale disasters, natural and man-made.

FEMA regrets it was unable to attend this conference. However, FEMA believes in and understands the value of sharing lessons learned and best practices. Since Hurricane Katrina, FEMA has had the great opportunity to host members of the French government in Louisiana and we welcome further dialogue. Best wishes on a successful conference.

Acting Director of International Affairs, Casey Long

Peter Platte

unes-2-unes@pari.auswaertiges-amt.de

Délégué permanent de l'Allemagne à l'UNESCO

Biographie

Diplômé en économie de l'Université de Freiburg et post graduation en relations internationales à l'Institut de Hautes Études Européennes à Strasbourg.

Diplomate de carrière avec des postes à l'étranger en Inde, au Brésil et en France.

De 1996 à 2000, Peter Platte est coordinateur international de l'aide humanitaire au sein du Ministère des Affaires Étrangères à Bonn et de 2000 à 2004, il est Vice Directeur de la Section d'Aide humanitaire au MAE.

Il a développé la stratégie pour la prévention des catastrophes naturelles au sein du MAE, à organiser EWC II en 2003 et est également l'auteur du livret "Les catastrophes sont-elles inévitables ?" ("Are disasters inevitable ?")

