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**Large-Scale Rooftop Search and Rescue:  
The Experience of Hurricane Katrina**

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*This article examines issues arising in large-scale rooftop search and rescue operations, in this case following Hurricane Katrina. Few events in the U.S. disaster experience have provided the background or means to prepare for the scale of airlift required following Katrina. Unique characteristics of this event created new challenges, and agencies were operating with little coordination. Observations and recommendations regarding communications and similar means of dealing with these large-scale events are described.*

**Keywords:** Search and Rescue, Hurricane Katrina, disaster, airlift rescue

**Introduction**

Emergencies are circumstances for which every unit of government makes preparations. Automobile accidents, fires, and hazardous material spills are examples of situations for which procedures are rehearsed and response is practiced. Depending on one's definition, however, disasters and catastrophes are special circumstances that cannot be dealt with by common measures that are used on daily basis (Dynes 1983). Large floods are special occurrences that would fall in this category, having a wide range of unique factors that create a demanding technical rescue operation (Glassey 2006). Preparedness for disasters is a more complex process, and includes activities such as devising, testing, and implementing disaster plans, providing training for responders, and communicating with the public and others about disaster vulnerability (Mileti 1999).

This paper examines the challenges that were faced by four different search-and-rescue (SAR) teams in the immediate aftermath of Hurricane Katrina. Our research sought to gain a better understanding of the responses to large-scale rescue operation in a major urban environment—New Orleans in the flooding after the storm passed. One of

the more distinctive aspects of this event was the scale—the sheer number of individuals needing rescue from rooftops. While there are many instances each year of riverine or flash flooding that have involved a rooftop (or treetop) rescue, those typically involve just a few cases of airlift response. Multiple thousands were stranded on rooftops following Hurricane Katrina, a scenario for which few have planned.

We address these issues in the following four sections. The first section introduces the issues and examines the research context together with current research in the field. The second segment of the paper describes the methodology and components of this study. The third section discusses the results with subheadings of scale, coordination and communication. The final section relates the findings of this study to broader issues in disasters and emergency management and brief recommendations are described, as well as potential areas of future research.

### **The Research Context**

Hurricane Katrina and the flooding associated with the levee failure in New Orleans created a new and unique situation for emergency response rescue teams. Hurricane Katrina and its effects can be considered a catastrophe because Quarantelli (1997) frames catastrophes as a social crisis where there is a complete disruption of social life and the community no longer functions in any normal sense. This definition fails to capture the complexity of the issues and activities involved. Quarantelli and Perry (2005) have recently updated the definition for a disaster in their book *What is a Disaster* which brings together various experts in the field to define the term. Perry (2005) offers a summation of term “disaster” from the contributors of the book as an event that is disruptive, inherent in social time as a socially based event, and is not based on any particular agent that is entwined with change. The widespread devastation caused by the flooding in new Orleans produced an exceptional circumstance along with a substantial breakdown in social order. The entire city was inundated with water, forcing thousands to escape to the roofs and attics of their home. Those people stranded in their homes and on their rooftops required assistance because the topography of New Orleans created a situation in which flood waters would not naturally recede, as would ordinarily be the case in communities located above sea level. Many of those stranded on rooftops or in the attics were elderly, and further were faced with dangerously hot weather and contaminated flood water.

In an Urban Search and Rescue (USAR) operation, the goal is to locate and deliver aid to the victims as soon as possible in a race against a retreating survival window (Lau, Huang and Gissanayake 2005). Katrina was a nontraditional USAR environment, as USAR usually more commonly involves collapses of concrete or wooden structures where crush syndrome and other issues are important. Due to the scale of the event and

the amount of flooding, many different organizations were involved in the rescue operations. The rescue efforts, at least in the first hours and days, were not controlled or coordinated, and proceeded in such a fashion as to save as many people as possible in the shortest amount of time. The United States Coast Guard (USCG) was a primary actor in the airlift and rescue operations, which to a large degree were helicopter-based. The USCG trains, and is operationally prepared, for this kind of rescue effort. In this case, however, it was a much larger scale than anything previously experienced. The USCG reported on their “Katrina Response” website (no longer active) that there were more than 29,000 total airlift rescues, although it was unclear if this was for all citizen movement (including transport to shelters), and whether it also included multi-agency efforts. The USCG is generally recognized as an expert in SAR because of their standardized training at SAR school, and their extensive use of helicopters for at-sea rescue procedures (Noble 2001).

In the Katrina response, rooftop rescues were performed in boats and helicopters by several different agencies in both coordinated and uncoordinated fashion. It should be noted that helicopter rescue, USAR, and water rescue are all related but each requires a different set of skills, knowledge, and abilities. Rescuing individuals from rooftop by boat and helicopter was not limited to people who were trapped in their homes, but was also used to evacuate and relocate many from the hospitals in New Orleans (Rodríguez, Trainor and Quarantelli 2006).

Innovations in technology have significantly impacted SAR since the mid-twentieth century. One rescue device, first used in the 1940s, is the helicopter (Nocera 2000). Some 60 years later, helicopters played a vital role in saving countless lives in rooftop rescues in New Orleans. Helicopters are important because of their ability to travel great distances in a short amount of time (as emergency medical care response times are critical) and due to their mobility and flexibility. Studies have shown that risk of death may be decreased if medical attention is provided in the first six hours after a disaster (Schultz, Koenig and Noji 1996). Another SAR advance is the use of tilt wing aircraft, which allows travel at twice the speed of a helicopter to transport the critically ill for medical attention (USCG 1997). The USCG also makes use of other technologies that aid in SAR, such as night vision devices and advanced sensors that can detect life forms.

Not all rooftop rescues take place with helicopters, as was seen in the case with the New Orleans flooding. The effectiveness of boat rescue became apparent for those stranded on rooftops. Boats were especially practical for rooftop rescues in New Orleans because of hazards that were faced by helicopters in urban areas, such as electrical and telephone wires, and large trees. Flood rescues are high-risk operations, as one study from the Centers for Disease Control indicated that ten percent of the fatalities in the Hurricane Floyd flooding were rescue workers (Glasse 2006). The traditional SAR use

for helicopters has been at sea where there are relatively few hazards, other than the elements of nature.

In major disasters, there are three types of responders that carry out SAR operations (Dynes 1970). The first set, which usually lacks training, are local residents, family members and other civilians who happen to be in the area (Drabek et al. 1981). These individuals could be referred to as an emergent group because they have no predisaster existence, assist in the situation only because of their proximity to the event, and usually disband after the event (Dynes 1970). Experience with disasters has shown that this first set of responders will conduct SAR whether trained or not, and will continue to do so until told (or forced) by authorities to discontinue their activities. Problems can arise when there are well-intentioned and motivated volunteers who arrive and seek to assist. Without advance planning, these untrained volunteers may create management problems by diverting resources to supervise their activities (Quarantelli 1997). Fritz and Mathewson (1957) and Barton (1969) identify the arrival of personnel and materials to a disaster site to assist in response as *convergence*. More recently, Watchendorf and Kendra (2004) describe convergence as the mass mobilization of volunteers who assist with disaster recovery efforts, which is typical after a major catastrophic event. The issue of multiple volunteers assisting in SAR efforts in New Orleans did occur as non-traditional agencies that had access to boats became involved in the SAR operations, such as state fish and wildlife agencies or fire fighters who had personal fishing boats and were not trained to perform water rescue decided to volunteer in the rescue efforts without being mobilized. Although such volunteers lack training in disaster response and recovery they may bring certain capabilities that are not present at the disaster site, and their immediate assistance is of some benefit to critical situations (Watchendorf and Kendra 2004). It is difficult to evaluate how well these volunteers performed and if they created problems with rescue efforts or its management. We believe it is likely that by taking quick action these individuals did save lives and that these circumstances would be in line with Watchendorf and Kendra (2004) in that these volunteers were of some benefit to a critical situation.

The second set of those conducting SAR are professional emergency responders—such as police, fire, and emergency medical personnel—who follow a more systematic approach to SAR than do untrained volunteers (Drabek et.al. 1981). These professional emergency responders conduct their operations in established organizations that can rapidly mobilize with adequate plans (Dynes 1970). In most, but not all, cases these professionals have had training in basic SAR techniques but are neither trained nor equipped for highly specialized SAR operations.

The third set of responders comprises specialized SAR professionals. The professionally-trained rescuer may have an extensive background in rescue techniques, possibly including specialized rescue training such as swift water rescue, mountain rescue

or similar competencies. There are also trained units that will respond in the case of a large event, in the form of FEMA-sponsored USAR units.

In part because of the levee failure, this disaster became a major catastrophe bringing countless numbers of organizations to assist in the SAR efforts. The Incident Command System (ICS) is one way to administer these rescue efforts. Irwin (1989) has described ICS as a systematic process for managing multiple and diverse resource. ICS came about as a result of some disastrous fires in southern California in the 1970's and the response to those fires. Irwin (1989) identified problems that emerged with the response to the fires in Southern California that included lack of common organization, poor on-scene and inter-agency communications, inadequate joint planning, lack of valid and timely intelligence, inadequate resource management, and limited prediction capability, all of which would apply to the rescue operations in Hurricane Katrina. Wenger, Quarantelli and Dynes (1990) are critical of the ICS and its ability to manage disaster response. Lutz and Lindell (2008) offer another shortcoming of ICS and its capacity to handle volunteers, leaving gaps in response efforts (Lutz and Lindell 2008).

Buck, Trainor and Aguirre (2006) argue that for ICS to be an effective tool in disaster response, training, shared experiences, and many years of public service need to be present to build the confidence and trust need for the system to work within an interagency approach. However, there are major difference between coordinating within an organization and coordinating between organizations. Significant problems emerge when well-trained organizations face a massive event, such as when the New York Fire Department responded to the World Trade Center Attacks on 9/11 but were not well integrated with other departments (Buck et al. 2006). These authors argue that if ICS had been used, resources would have been utilized more efficiently and effectively. That conclusion is open to debate as the 911 operations were massive in scale, and the authors admit that any coordination between organizations would have been difficult because of the enormity of the event.

This prior research raised questions about the scale of the rescue effort, or how many people were rescued? Moreover, there were questions about issues that were faced with coordination among the SAR units from different local, state, and federal government agencies and the interoperability of communications among these SAR units. Answers to these questions were examined in context to the established literature and other available documents.

### **Method**

Data collection was qualitative and primarily based on a series of interviews with five different organizations taking place over a two-day period in October of 2005. The research team received Institutional Review Board approval prior to entering the field and

conducting interviews. The interviews were recorded and then transcribed. In addition, the research team examined news accounts, local reporting, web sites and documents, reports and related materials. Emergency response officials from the state of Louisiana who took part in the SAR effort were included in the study. The participants of the study had varying levels of contribution to the SAR efforts, which ranged from high-level tasks, such as coordinating response, to voluntarily aiding in the search operations. Teams that were interviewed included emergency responders who had personally performed rescues by boat and by helicopter. Agencies that were interviewed included the City of Zachary (LA) Fire Department, City of Baton Rouge (LA) Fire Department, the Louisiana Department of Wildlife and Fisheries, the Slidell (LA) Fire Department, and a USCG helicopter rescue unit stationed at the Belle Chase Naval Air Station in New Orleans.

### **Results**

#### **Numbers and Scale**

Due to the chaotic and severe nature of this disaster it was difficult to precisely identify the number of individuals rescued by the SAR teams. The Louisiana Department of Wildlife and Fisheries, along with its partners, estimated that on the first night of the incident more than 1,500 individuals were rescued from their homes and, in total, there were approximately 21,000 individuals rescued. The Baton Rouge Fire Department estimated that they were able to rescue close to 500 people on the day they arrived on the scene with six boats. After a grid pattern had been established on the following day they were able to roughly save 250 people. USCG helicopters flew around the clock for five to six days straight. Crews would work for 6 or 7 hours then switch-out with another crew, saving more than 71 people per day (per crew) and several pets. In total, the USCG website reported that there were 12,533 saved by air rescue (USCG website dedicated to tracking Katrina response, no longer active). Keeping track of the numbers was complicated because there were many organizations involved in the SAR, and because things were so chaotic that the rescuers themselves lost track of numbers. The Zachary Fire Department estimated that, among all the firefighting organizations that were taking part in rescue efforts coordinated by Louisiana State University's (LSU's) Fire and Emergency Training Institute during the first day, between 400 to 500 people were rescued. The Slidell Fire Department did not keep track of number of the people that they helped rescue. This was the only group that was interviewed that stayed within its jurisdictional boundary and did not deploy to New Orleans. The reason was primarily that they were a small department whose community experienced extensive damage, and the firefighters' homes were affected, as well. This is an important aspect to consider of this rescue operation because of the magnitude of the numbers of people that were involved.

It is critical that planning address “worst case” scenarios for large-scale disasters and rescue operations so that, when the time comes, time and resources are not wasted trying to devise an operational strategy.

### **Coordination**

The organizations that were interviewed had only limited coordination during rescue operations. The Baton Rouge Fire Department tried to establish some level of coordination with the Louisiana Office of Public Health. The first priority of the Office of Public Health, however, was to evacuate University Hospital and Charity Hospital. According to the Baton Rouge team, the Office of Public Health did not require the services of Baton Rouge Fire Department for the hospital evacuations. There was some coordination among the Baton Rouge Fire Department, Louisiana State Police, and New Orleans Fire Department. Members from the Zachery Fire Department worked under the direction of the LSU Fire and Emergency Training Institute. Initially, however, individual members from the fire departments went on their own initiative to help with rescue efforts. The Louisiana Department of Wildlife and Fisheries coordinated with several other state wildlife agencies including Texas, Kentucky, Missouri, Minnesota, Tennessee and South Carolina to conduct boat rescues.

Respondents reported there was minimal planning for rescue operations. Preparation was limited for these organizations because of the enormity, scale, and urgency of the situation. People were stranded in homes and on roofs throughout New Orleans, and rescue teams had to concentrate efforts on using boats to save people stranded on rooftops and in attics. Urgency was particularly high in the initial period after the storm when the rising flood waters from the failed levees made the situation critical, and many of those who were affected were the most socially vulnerable. An official from the Louisiana Wildlife and Fisheries offered his rationale for not planning a coordinated approach:

Our role was not to sit back and assess. A lot of those things were not done; I’m talking about meeting, planning, and laying out framework on the next day. We didn’t do all of that. We didn’t sit around with two-hour briefings in the morning. Our goal was to get as many boats on water to save as many people as possible.

The statement has the appearance of an excuse to rationalize deficient planning on the part of the Wildlife and Fisheries. Based on the interview it was difficult to ascertain whether that was truly the case. Their lack of experience in SAR may have led them to believe that by not planning they would save time and therefore be able to rescue more people. The sense of urgency was shared by many others who were interviewed. Officials

from the Zachary Fire Department offered similar comments. The USCG performed rescues with a somewhat similar perspective, in that their strategy was:

See people on roofs, get them to safety. Everywhere we flew, you'd see groups of people. The Department of Defense would come in and start taking control and they would have methodical control and started assigning grids. The Coast Guard did not do grid systems. We just looked for people.

Rescuing people based on visual identification was a common method reported by rescue officials who were interviewed. Anyone visually identified was rescued from the roof tops with boats or helicopters. Members of Baton Rouge Fire Department also relied on sound and would listen for people who were calling for help. Technology, such as global positioning satellites and geographic information systems were minimally used in these search operations.

Night-vision goggles were useful tools for rescues during night time. Rescue crews from the USCG would search for people at night by using their goggles and searching for indications of life, such as flashlights, candles, flare guns, or reflective tape. After a few days of the "sight approach" for rescuing people, the SAR teams evolved a more planned and coordinated approach. For example, the Baton Rouge Fire Department began to work with the New Orleans Police Department and used maps to create a grid pattern, and mark off areas that had been covered by either of the departments. According to the Zachary Fire Department, uncoordinated rescue operations continued for two to three days until the emergency operations command center was able to set up a meeting. Baton Rouge Fire Department also noted that coordination was difficult to establish because all of the local parish Emergency Operations Centers were gone. Planning and coordination had to come from state level down, which was a different model from previous experience.

### **Communication**

There were multiple issues and concerns regarding communication among the organizations interviewed. Communication problems were a recurring theme among all those interviewees, and it was recognized as a shortcoming by the different SAR teams. The problem was that there was little, if any, communication among the various organizations, making all of the efforts challenging. In some instances the issue was lack of interoperability, but the problem was much more complicated than that. The interviewees who were involved in the rescue operations in some cases did not feel the need to communicate with one another, especially those perceived to have different

agendas. There were also turf battles that made communicating difficult between organizations.

One example demonstrating this communication failure was the lack of coordination between the USCG conducting aerial rescues and Louisiana Fish and Wildlife conducting boat rescues. Due to their operation on different frequencies, there was no radio communication between the two organizations. On multiple occasions, “prop wash” from the helicopters compromised the boat rescue efforts. If there was light, hand signals were the only means of coordination, and were insufficient in many instances. Communication problems also existed within organizations. The Baton Rouge Fire Department reported that when its responders were in the field conducting operations, they were unable to communicate with their command center. Fire department radios were important but the volume of message traffic was so great that, according to the Baton Rouge Fire Department, the system was unable to function correctly because of the overloaded radio frequencies and telephone circuits.

Hurricane damage also impaired communication, as the Slidell Fire Department reported the storm had taken out its antenna. Communication infrastructure had been disrupted by either the hurricane-force winds or from the storm surge, and in the case of New Orleans, the flooding from the failure of the levees. Personal communication devices, such as cellular phones, proved to be very important in this critical situation.

The USCG believed that other forms of communications were vital to their SAR operations. Text messaging was an important communication channel and the only way to establish contact as many of the other methods of communication failed for several of the interviewees. According to the USCG, text messages from stranded victims were the only means of locating them for rescue. Cell phones worked immediately after the storm but the situation changed as, according to the Zachery Fire Department, cellular phone capacity was overloaded and calls were unable to go through. Communication was disrupted according to the USCG, as main phone lines, cell towers, and radio towers lost power. Other backup options, such as satellite phones and walkie-talkies, played an important role.

### **Implications and Recommendations for Practice**

For the organizations that were interviewed, the failure of communication was an apparent and critical shortcoming. The Louisiana Department of Wildlife and Fisheries believes that interoperability is a key concept that should be strengthened so different organizations will be able to communicate and coordinate during a crisis. Being able to communicate during a catastrophe is important. One way of achieving this, according to a Wildlife and Fisheries official, is to increase the capacity of a network so that system does not fail when there is high load demand. Advocating for an increase in network

capacity may make sense and is a straightforward proposition. The issue is somewhat more complex than that, however, as any increase will have an associated cost. In some cases the increases in cost would outweigh the occasional spike in demand that would be placed on the system. A secondary, but still pressing issue, is who would provide the funding.

Officials from the Zachary Fire Department also believed that interoperability should be a main priority for improving operations during a disaster. Interoperability would allow for multiple sets of agencies, such as local firefighting operations, state agencies, and the USCG to have the ability to communicate with one another. Although interoperability solves a hardware issue, further effort is needed to address administrative issues that arose during the rescue operations. Issues that prevented communication between organizations such as turf battles need to be addressed prior to any major disaster event. It may be that a key factor is strong local leadership, and that it could facilitate greater coordination between the various responding organizations. The mayor of New York City provided strong leadership and despite some problems, was able to develop some solutions to responding to the World Trade Center collapse (Buck et al. 2006).

Standardization should be an important factor when training people for SAR because its importance was demonstrated during the New Orleans SAR operations. USCG personnel were able to work smoothly because of their own organizational SAR procedures, as many people were brought from different USCG installations to work with one another. Interviewees from the USCG stated that standardization tests occur every six months, and during rescue operations in New Orleans it was critical for their success to conduct missions “by the book”. The importance of the training they had received became clear, as it enabled quick and efficient SAR sorties (trips). The Baton Rouge Fire Department also recommended standardized training, but added that there should be a level of specialization for SAR teams to specific areas such as New Orleans that have unique characteristics, such as being below sea level. The Baton Rouge teams believed that rescuers that are faced with special circumstances should be trained with the use of boats and have their equipment stored in locations that would not be affected by possible flooding. Flooding in a below sea-level environment is different from flooding in a floodplain valley because the waters will not recede on their own. Rescuers in floodplain valleys will also experience major currents from the moving water, while this was not the case for Hurricane Katrina.

The Zachary Fire Department officials recommended that disaster response should be systematic and that there should be a standard approach, similar to a response for hazardous material incidents. The Baton Rouge team also thought that a more organized field structure and set standards also would improve rescue operations. Standardization along with a uniform systemic approach in SAR would allow SAR teams from across the

country the ability to work efficiently with one another. The Slidell team recommended that more of its members receive special USAR training. Similarly there should be additional efforts to standardize approaches for incorporating volunteers into SAR operations. Several of the groups that were interviewed left their jurisdictions without being officially mobilized. The situation creates problems as additional resources have to be dedicated to managing volunteers (Quarantelli 1997). Advocating for an increase in standardization is a simple recommendation, however as Lutz and Lindell (2008) indicate this would entail training for nonroutine emergency responders, which would be an additional cost. Nonroutine training expenditures are typically at the lower end of budget prioritization, and the issue remain as to who would bear the costs associated with the training.

An aspect of the response that worked well from the rescuers' perspective was flexibility. While this may seem contradictory to some of the responses with respect to standardization, flexibility was identified as being very important to all the organizations. While there was general agreement that standardization was critical, there was also recognition that there need to be some room for flexibility when the situation demands it. Organizations need to have some degree of freedom to allow adaptive responses to the circumstances and situation. For one organization it was important that they did not follow the formal procedure of documenting every step of the rescue operation because that would have taken a considerable amount of time. Members of the USCG and Fish and Wildlife who were interviewed believed that this freedom allowed many people to be saved and contended that this sort of flexibility worked well.

The issue of standardization arising in the interviews (as well as multiple other sources) has implications for research and practice in many sectors. Standardization was a factor that worked well for the USCG because it allowed different teams from across the country to work with one another. SAR teams from both the Baton Rouge and Zachery Fire Departments believed that there was something to be desired with respect to standardization. Drabek (1985) discussed this issue of standardization in the mid 1980s and 20 years later the problem is yet evident during operations for Hurricane Katrina. A goal for improving effectiveness in response should direct focus on the development of appropriate standards and procedures for large scale, multi-agency response events but also allow for some flexibility when drastic event require immediate action. Specific actions need to be taken so that there can be a more organized field structure and set standards. Actions need to be taken by all organizations such as Wildlife and Fishers and Fire Departments to adopt some sort of a system, such as an ICS, and develop ways to incorporate volunteers into SAR operations.

It would be advantageous to promote a national dialogue and planning efforts that involve as many stakeholders as possible at all levels—including federal, state, and local organizations-- to develop shared approaches to large-scale SAR. Communication should

be one of the highest priorities. Communication failure during SAR efforts in Hurricane Katrina illustrates the need for improvement between the various response organizations. Planning and exercising needs to be a continual process, as it tends to be true that just because plans have been developed for a community, it does not mean operations will run smoothly and successfully (Dynes 1983). The chain of command and a directional flow of communication have to be established at a regional level and the groups involved with SAR need to have had the opportunity to have worked together. Establishing a prior relationship is particularly important in events such as a large-scale flood, because no plan will ensure a successful rescue if personalities collide and people are not able to communicate with one another (Glasse 2006). Issues with lines of authority (turf battles)—who is in charge of what—need to be addressed so that they do not jeopardize rescue operations. One way of improving communication would be to conduct multiple annual training operations in which federal, state, and local officials would have the opportunity to work with one another. The ongoing activity would foster closer organizational relationships, and hopefully improve concerns with communications between organizations.

Additional research would assist practitioners in identifying the best models of large scale coordination. The role of drills and exercises, namely those at the regional, state, and multi-state level (of which there are very few) has yet to be fully examined with respect to increasing response effectiveness. Rather than just raising the issue of interoperability, more research is needed on the practical and logistical implications of implementing such a system, and what the cost structure might be to achieve it.

### **Conclusion**

SAR teams interviewed for this study faced many challenges because of the scale of the flooding after Hurricane Katrina. The sample size of this study was limited, so our findings are limited by the experiences of these particular organizations. However, we believe that an appreciation of their experiences will help focus additional research in these areas. Despite the limited sample, Hurricane Katrina has provided some distinctive lessons for large scale rooftop rescues and the challenges faced in a crisis. The identified failures in communication, the importance of standardization, and the parallel need for flexibility are all highlighted by the experiences of these organizations.

Given the clear need for help in this disaster, many SAR teams did not wait to get orders to mobilize to New Orleans. Teams immediately set out on their own initiative with personal equipment, such as fishing boats, to help save as many people as possible with very little direction or command. The organizations involved came to help despite media reports of violence in New Orleans. This finding is consistent with decades of disaster research, which clearly indicates that individuals and organizations will continue

to feel compelled to help in disasters. Research and planning must continue to address the best ways in which to facilitate and encourage the effective use of these resources—both professional and volunteer—in preparing for large scale events and “worst case” scenarios.

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