

A SYSTEMS VIEW OF EMERGENCY RESPONSE TO HURRICANE ANDREW

By

John C. Pine
Associate Professor
Louisiana State University
Baton Rouge

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A Systems View of Emergency Response to Hurricane Andrew

Natural disasters have posed a great challenge to state and local officials. Despite extensive planning and response efforts, local communities experience significant property damage and the loss of human lives from natural disasters. Organizations have made broad strides in overcoming complex problems; many of the strategies to cope with difficult problems by viewing the situation from a broader perspective and analyzing the problems from a systems approach. The basis of the following analysis of Hurricane Andrew is drawn from research on systems and organizations. It is used to understand a complex problem and identify effective emergency management efforts.

A systems approach views a problem from a broad perspective. This perspective shows that a system is a set of interrelated parts that are interdependent. The effect of the interaction of the parts of the system determines the outcome.

Systems are present in many forms including societies, machines, animals, and the human body. Physical systems are the most basic, biological systems are more complex, and social systems are the most dynamic and complex (Barnard, 1938). Local emergency management operations are part of a complex social system and thus can be analyzed using systems theory.

Response to natural disasters is complex and requires more than the expertise of one person or organizational unit. Systems theory suggests that a broad view is needed to understand the parts of the emergency management system and how the parts interact. When the systems theory is applied to a community facing the dangers of a natural disaster, it provides a model that is helpful in understanding how emergency management officials can plan for and respond to catastrophic events. The following analysis provides an illustration of the systems approach as it applies to emergency management efforts in dealing with Hurricane Andrew. It is intended to explain the components of the emergency management system and how the application of the systems approach can help improving planning, response, and recovery efforts.

This research project was sponsored by the University of Colorado's Natural Disaster Research and Applications Center, with funds provided by the National Science Foundation. A single local government unit was selected so as to analyze the application of the systems approach at local level. The county (parish) was used for this analysis since the Federal Emergency Management Agency and state governments use counties as the basis of local emergency management efforts. Matching funds

John C. Pine is an Associate Professor with the Public Administration Institute, College of Business Administration, and the Louisiana Agricultural Experiment Station at Louisiana State University in Baton Rouge.

are provided to counties (parishes) in order to establish and maintain emergency management organizations. Iberia Parish was selected for this study because of its proximity to the path of Hurricane Andrew.

Hurricane Andrew

Iberia Parish lies on the Gulf Coast of Louisiana southeast of Lafayette, 138 miles west of New Orleans, and 75 miles southeast of Baton Rouge. The Inland Coastal Waterway weaves through the southern part of the parish and past Avery Island, the home of Tabasco Sauce. The parish includes numerous scenic gardens, bird sanctuaries, beautiful antebellum homes, and other historic landmarks. Numerous oil field service operations are in the parish because of its close proximity to off shore oil operations.

New Iberia is the largest city in the parish with a population of 32,000. Jeanerette with a population of 7,250 lies ten miles southeast of New Iberia on the boarder of St. Mary Parish. Delcambre is 18 miles southwest of New Iberia on the edge of Vermilion Parish. Loreauville, with a population of 1,000 is in the northeastern section of New Iberia Parish. State highway 90 crosses the parish and provides a main link from Morgan City south of Iberia Parish and Interstate 10 to the north. State road 182 and parish road 674 follow highway 90 through the parish. Iberia Parish is lies on in the Gulf of Mexico and includes Marsh I+wand, a large refuge supported by the Russell Sage Foundation.

Hurricane Andrew, one of the strongest storms affecting the mainland of the United States, landed in Florida and then moved into Louisiana in the early hours on Wednesday, August 26. Just three days earlier, Andrew hit South Florida causing over \$20 Billion in damage and claiming 15 lives. The storm caused four fatalities in the Bahamas. With winds over 150 mph, the storm caused over \$125 million in damage in Iberia Parish, and resulted in one fatality in the parish. The fatality occurred several days after the storm when a utility worker from Jeanerette was killed while working on a downed power line in a rural area of the parish. Iberia Parish schools suffered over \$7.5 million in property damage; over 950 homes or 5% of the parish were destroyed by the storm. Over 95% of the homes in the parish received some damage.

As a result of the destruction in Florida, Iberia Parish President Craig Romero asked residents on Monday morning for a voluntary evacuation. The warning was mainly for low lying areas of the parish. The parish president's warning came two days before Andrew would hit Iberia Parish. Romero's warnings evolved from meetings with local law enforcement and emergency management officials concerning the potential impact of the storm.

"It isn't a mandatory evaluation yet, but the prediction is we could be hit soon. We want to take this seriously and to take every precaution (Romero)." (Quoted from the Daily Iberian #199, August 24, 1992)

The comments from the Parish President reflected the systematic efforts of local agencies to analyze the hazards presented by the storm and prepare the community for response and recovery efforts.

Andrew crossed Florida and entered the Gulf of Mexico early Monday morning. By 8:00 am the national Hurricane Center predicted that the storm was heading for the Gulf Coast between Mobile, Alabama and Port Arthur, Texas. Iberia Parish emergency management director had followed the path of Andrew through Florida and on Sunday August 23rd reviewed the current emergency operations plan and prepared preliminary plans for the storm. The United States Weather Service projected that the storm would head northwest of Florida into Louisiana. Contact was made by noon Monday with the State Office of Emergency Preparedness (OEP) to coordinate local and state preparedness efforts.

These early efforts to review parish emergency plans and contact the state OEP proved very helpful for the briefing that would be held on Monday morning with local parish, city, and town officials. A review of the local plan enabled the local emergency management director to anticipate how Iberia Parish would be affected by an evacuation of the City of New Orleans which was to be announced later that day. Coastal residents in Houma and Morgan City might be encouraged by local officials to choose an evacuation route through Iberia Parish using Highway 90.

Preparation for the Storm

On Monday morning, the parish President and emergency management director met with elected officials from the parish, City of New Iberia, Jeanerette, Delcambre, and Loreauville, as well as staff from the sheriff's office, fire service, public works, and the American Red Cross. This group would form an executive team and used throughout the storm to provide leadership to the parish during the crisis. Evacuation plans were discussed including a voluntary evacuation for all mobile home residents and especially for low lying areas of the parish south of Highway 90 and 14.

Although evacuation announcements could be considered premature, crowded highways were considered a potential problem. A distribution system for sand and bags was explained, including how parish jail trustees, public works employees, police, firemen, and volunteers were to be organized. Contact with the media was initiated by parish officials to ensure that residents understood how the storm might affect the parish and what resources were available to minimize property damage. Facilities for the media were arranged in the parish courthouse.

The Monday morning meeting was significant in many ways for it allowed parish officials to begin adapting their emergency plan and response to the storm. It brought together public response agencies and encouraged staff to consider, in a rational atmosphere, what could be done to prepare for the storm. Key groups composing the local emergency management system were involved including police,

fire, public works, the Red Cross, local schools, health care, utilities, and the media. Plans for the next meeting of the executive team were made.

It is critical to recognize that the media was viewed as a part of the system. The newspaper, radio, and television organizations were viewed as an effective communication link to the citizens of the community.

The executive team was joined at the Monday afternoon meeting by school officials to discuss using school facilities as shelters. As a result of these discussions the Red Cross opened the first shelter on Monday evening. The lack of trained shelter managers would hinder opening future shelters. School officials determined that parish schools would be closed on Tuesday. Arrangement for a Tuesday morning executive meeting were made and briefings were held for the media to explain the recommendations for evacuation, shelters, sandbags, and school closures.

Tuesday, The Day before the Storm

The executive team met at 8:00 a.m. Tuesday to discuss the implications of the revised forecast for Andrew. It was confirmed that the path of the storm was leading directly for the Louisiana coast. The executive team agreed to order a mandatory evacuation of the area south of Highway 90 and 14. In addition, a voluntary evacuation was to be recommended for areas that flood during heaving rains and for all residents of mobile homes. Arrangements for an additional shelter were finalized for the Loreanville area. Opening the shelters in Jeanerette and New Iberia were delayed because of the lack of trained shelter managers. The emergency management director noted that many potential volunteers had evacuated the parish and were not available to assist with the shelters. A special needs shelter was opened by the Red Cross for the elderly and those with special needs. Family or friends of those special residents were required to be at the shelter to provide care. Non-special needs residents would not be allowed at this designated shelter. Meetings with emergency response agencies were scheduled to discuss pre and post storm strategies and rules. The next meeting for the executive team was set and a briefing for the media was held.

The emergency management director stressed to the executive team that communication with residents of the parish could have been more direct through an "all channel message system" on the local cable system. Although local radio stations and newspapers were used extensively to communicate with residents of the parish, it required coordination and in some situations lead time.

The Big Jam

At the conclusion of the Tuesday morning executive meeting, parish officials learned of a traffic jam on Highway 90. By noon, the highway was a 50 mile long parking lot. The traffic jam was primarily caused by traffic lights in Lafayette. Assistance from state agencies was obtained to change the traffic signals to allow the

traffic on Highway 90 to move continuously through the signals to Interstate 10 and 49. The traffic flow was moving without blockages within 2 hours.

An additional traffic problem was identified for those residents south of Highway 90 who were trying to get into the evacuation flow. The traffic problem was communicated to parish residents; they were encouraged the use alternative routes.

A meeting with police, emergency medical, and fire service personnel was held late Tuesday morning to discuss pre-storm preparations including pre-positioning equipment, reporting procedures, and testing communication equipment. Final arrangements for flat bottom boats, chain saws, generators, water, emergency supplies, and rescue equipment were made. Contingency plans were discussed including how agencies were to respond if communication with the parish emergency operations center was severed.

The Tuesday morning traffic jam evolved from the evacuation of residents not only from Iberia Parish, but also from residents in St. Mary's and Vermillion Parishes. This situation pointed out the interdependence of the area transportation system and the serious traffic problems that could result if communities along major evacuation routes failed to recognize how the traffic flow in one community could impact traffic flow in other communities. Regional planning would be essential for effective response in this and future disasters.

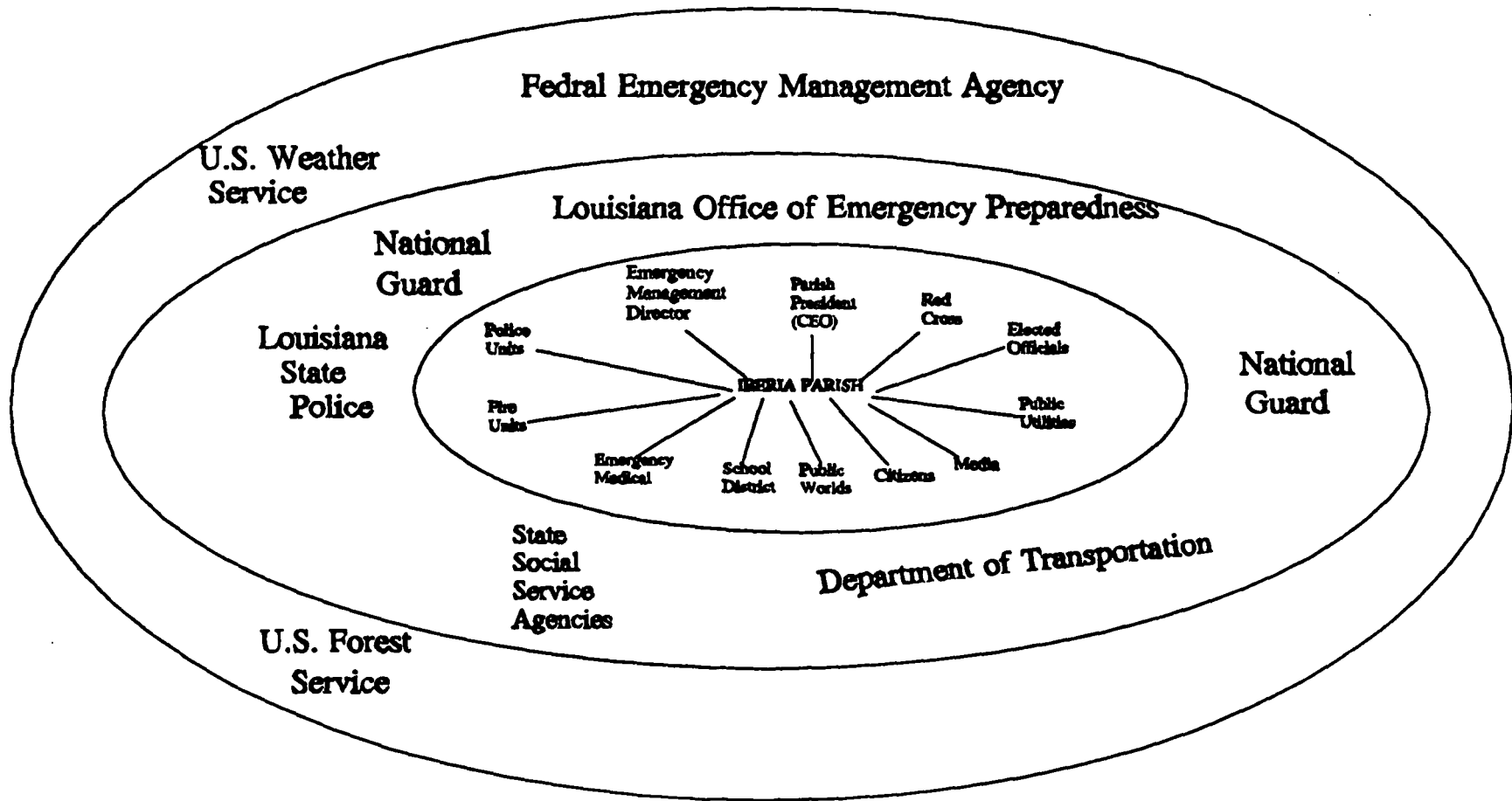
By Tuesday afternoon, shelters were beginning to reach capacity. Plans were made to open an additional shelter. Strategies were discussed on how to communicate with residents concerning available space at the shelters. At 4:00 p.m. a final executive meeting was held to provide a status report on preparations for the storm. Plans for pre-positioning police, fire, public works, and rescue units throughout the parish were explained. After the storm, the public works dump trucks would be some of the most versatile means of transportation in areas affected by high water and fallen trees.

The Emergency Management System

Systems theory suggests that three elements are present. These elements include (1) inputs: material, labor, information, and capital; (2) transformation; the process of providing the service (planning, response, and recovery actions); and (3) outputs: limited property damage from flooding, few fatalities as a result of early warnings and effective evacuation. The systems perspective looks at diverse groups, individuals, formal or informal organizations, attitudes, motives, interactions, goals, status, and authority.

There are two basic types of systems: closed systems and open systems. Closed systems are not influenced by and do not interact with their environment. Closed system thinking stems primarily from the physical sciences and is applicable to

Emergency Management System



mechanistic systems. Machines tend to be closed since they may not be affected nor interact with their environment.

An open system involves the dynamic interaction of the system with its environment. Systems theory maintains that everything is related to everything else. Social systems fall within the open system classification. These systems are in a dynamic relationship with their environment and receive various inputs, transforms these inputs in some way, and exports outputs.

The open system is in continual interaction with its environment and achieves a steady state or dynamic equilibrium while still retaining the capacity to work. The survival of the system, in effect is not possible without continuous input, transformation, and outputs. The system is thus in a continuous process of recycling and requires sufficient input in order to transform resources and create effective outputs.

Parts of the System

Emergency management efforts in Iberia Parish evolved from the recognition that it would take a team effort. This team composed the elements of the emergency management system. Diagram #1 shows that the emergency management director, elected and appointed officials, police, fire, public works, rescue units, schools, the media, utilities, medical, and the Red Cross units, as well as volunteer resources were all part of the planning and response in Iberia Parish. The outcomes were not based on individual effort but were coordinated in a cooperative interdependent manner.

A good illustration of this team effort can be seen in law enforcement units working together. Many law enforcement units in the parish were involved including the parish sheriff, the City of New Iberia, and police from Jeanerette and Delcambre. Officers from State Police Troop I also provided assistance.

Fire units included the paid staff of New Iberia, as well as rural volunteer fire districts, Jeanerette, Delcambre, and Loreauville. A fire coordinator for the parish volunteer units provided extensive communication with the fire districts and the central command system within the City of New Iberia.

The system also included electric, gas, water, and phone utilities. Gulf States Utilities, CLECO, and Teche Electric Cooperative worked closely with the parish after the storm to restore public utilities to the community. Although Louisiana Water Company and Louisiana Gas experience limited service problems, they were available to the parish executive team and other utilities.

The parish has two hospitals and Acadia and Regional Ambulance. These health units worked with the parish to provide needed emergency medical service. The five private nursing homes could have been more involved in emergency planning activities. They operated almost exclusively outside the network of emergency

operations in part because they were not viewed as an emergency resource. Parish officials noted after Andrew that the nursing homes could have been more involved in pre-storm planning. They could have been significant resource.

The parish school system provided needed shelters. Five shelters for residents from Iberia and surrounding parishes were opened in the schools. The school district was also prepared to provide transportation if needed. The local American Red Cross chapter was critical in organizing and providing operational control for many volunteer response and recovery services including managing the shelters.

The media proved to be a very critical communication link between emergency management officials and residents of the parish. The local media included a cable television system from Lafayette, KATC TV3, KLFY TV 10 broadcasting stations, and KANE and KDEM radio in New Iberia. These units provided extensive public service announcements and news updates. The Daily New Iberian newspaper provided detailed coverage of preparation for the storm and followed the progress of the parish in recovering from Andrew.

As the storm's eye moved toward the central Louisiana coast, news crews from CNN, Houston, Atlanta, Baton Rouge, and New Orleans arrived in New Iberia. Reporters from "48 Hours" and "Street Stories" were also on the scene. The parish community welcomed the out of town media. Having crews live with the parish resulted in a higher level of confidence in the community as a whole.

Parish, city, and town public works units not only hauled sand, tree debris, but the big public works trucks were able to get out early Wednesday morning, to allow public officials to do a damage assessment of the parish. Many residents recognized the driver of one parish dump truck as Craig Romero, the Parish President. The trucks not only provided extensive visibility but the high wheel base allowed the trucks to go into areas where pickup trucks could not proceed.

Emergency management includes local, state, and federal components. State government agencies are a subsystem of the federal effort. Local government operations are a part of the state system. The Louisiana Office of Emergency Preparedness was involved in several important ways in preparing for Andrew. State staff were in contact with Iberia Parish officials as early as Sunday August 23rd to discuss how assistance could be provided to the parish. Extensive efforts were taken early at the state level to be in a position to assist local governments. As an illustration, the National Guard had been activated on Tuesday, August 25th so they would be ready if needed on Wednesday. State officials provided critical information to the parish concerning an announcement for the evacuation of New Orleans. A failure to coordinate such an evacuation with parishes near New Orleans could have caused traffic problems for all communities in south Louisiana.

In addition to assistance prior to the storm, the Louisiana Office of Emergency Preparedness had organized the Southeast and Southwest Hurricane Task Forces.

Iberia Parish, as a member of the Southwest Task Force, had met in May and June with surrounding parish officials to discuss problems associated with natural disasters affecting the coastal area of Louisiana. As a result of these meetings, transportation routes were viewed as a part of the emergency management system. Parish resources were coordinated and plans on how the evacuation would be carried out were discussed. Informal relations between parish and state emergency management officials were enhanced by the regional planning efforts. An example of this cooperation, was provided when the St. Martin Parish Emergency Management director volunteered to provide shelters and transportation when the roof of an Iberia Parish shelter was damaged during the storm. Although the assistance was not needed, the coordination and cooperation between parishes was present.

The community as a whole can be considered a part of the local emergency management system. In many instances members of the community provided help in facilitating the evacuation of families from Andrew's path. Volunteers helped prepare homes and businesses for the storm. They shared resources and provided suggestions on evacuation sites. For about 10 days, the public agencies, community and business organizations, set aside differences to restore their community.

Interface and Sentiment

Transactions between parts of the system result in relationships and sentiments by the people involved. Following the disaster public officials throughout Iberia Parish stressed that a mood of cooperation prevailed in the community. Few complaints were made. This positive sentiment may be a reflection of local or regional culture. This sentiment reflects values of self reliance and pride in taking care of "their community." Public officials stressed that this spirit of cooperation existed prior to the storm and during the recovery period.

The sentiment of cooperation and positive outlook in Iberia Parish is reflected in the comments of the Iberia Parish Emergency Management Director, Henry Bacque.

I think as an entire community, we should feel very proud. The real devastation could have started long after the storm left the area. But the people here and if should not surprise anyone would let him go. They did not whine or cry about what happened. They did not criticize the way relief was distributed. They just dig themselves in and taking care of their own. I am not just talking about Iberia Parish. I'm talking would St. Martin, St Mary;, East Baton Rouge, St. Martin, and St. Mary (McCaleb).

It may be hard to explain, but volunteers flooded into south Louisiana from all over the United States, some with food, water, and ice. All were ready to lend a hand where they were needed. Ten police officers from North Charleston arrived to provide

assistance to local law enforcement units. The local emergency management director noted that:

These volunteers gave us more than the food that they brought, they gave us friendship and caring and the will to move on. And these volunteers were encouraged by our people too. I don't know how many came up to me and said that it seemed our people were as concerned about their well being and comfort as they were about their own."

The Contingency Approach

Management is not based on simplistic principles. The effectiveness of any organization is based on many variables. The contingency approach suggests that outcomes vary depending on the combination of these factors. Actions of local officials are influenced by many factors including the size of the community, the local economy, the type of organizations available at the local level and their internal resources, the local culture, and geographic considerations. South Louisiana is quite different from other areas of the United States. The economy is based on both oil and gas, as well as agriculture. The people although diverse have a common cultural background and identity.

Bernard Challot noted in an article for the New Iberian that "It already (Andrew) had battered Dade County, Florida into submission and sent a number of communities reeling. Just ahead for the two fisted knockout artist was a match-up with underrated Louisiana." The Mayor of New Iberia, Bobby Bodin, said that what happened in Iberia, St. Mary, St. Martin, Terrebone, Lafouche and other parishes robbed Andrew of some of its terrible glory.

We took a severe hit, but bounced back like champions, and you've got to credit the people with that. It strains belief to realize what has been accomplished since the storm struck. It's a real testament to the pride and the work ethic of the people here.

The Iberia Parish Emergency Management Coordinator, Henry Bacque said:

"They didn't ask anyone to help them clean up their yards, they went out and did it. And when we asked them to do certain things in a certain way, they didn't criticize it. They did it (McCaleb)."

What worked in Iberia Parish to prepare and respond effectively to Andrew appears to be both the organization and leadership of parish officials as well as strong commitment by the community to helping others in need and to help themselves. The team approach used by the parish facilitated the coordination and cooperation of critical groups needed in the response and recovery. This integrated emergency management effort could be replicated by other jurisdiction and might be helpful in enhancing their planning, response, and recovery efforts.

Conclusions

The emergency planning and response efforts in Iberia Parish demonstrated that planning involves a process and results in an effective plan and response efforts. Emergency operations plans of the parish were a great start in the planning process. The plans helped identify where to look for resources and provide structure in preparing for a specific emergency situation.

Planning in Iberia Parish was viewed as a team effort and was created and directed by the parish chief executive officer and the emergency management director. Extensive input was solicited from key agencies at both the local and state level. It was then enhanced by effective decision making by leaders from the parish, the City of New Iberia, and the small jurisdictions in the parish.

These agency leaders worked to make tough choices for the community and allow police, fire, public works, school, and red cross units to coordinate their efforts. In addition, agency leaders were encouraged by the parish president and emergency management director to view Andrew in a broader perspective and look beyond the immediate situation. The executive team was encouraged to identify potential problems and not over react when fire stations ran out of sand bags. They were able to take the broader view in looking at the parish as a whole, not putting one jurisdiction over another, and looking beyond the boundaries of the parish. In the future, if St. Martin Parish comes in need, Iberia Parish will remember the offer to help during Andrew and take the extra step to lend a hand.

When local emergency management officials face the threat of natural disasters, they are involved in a situation that is dynamic, inherently uncertain, and frequently ambiguous. The local emergency must take actions that can reduce uncertainty and carry out a plan that maintains flexibility.

The view of emergency management as a system suggests a very special role for management. The local emergency manager and agency leaders must deal with uncertainties and adapt the organization to new and changing requirements. Emergency manager involves linking various parts of the system at the local level. The parts of the local system are like a network of mutually dependent parts. The basic function of management is to align the elements of this network into a functioning system. The emergency manager builds the framework to mold the parts into a whole.

REFERENCES

Barnard, Chester I. The Functions of the Executive. Cambridge, MA: Harvard Univ. Press, 1938.

Chaillot, Bernard. "City takes stunning blow; roars back after Andrew," The New

Iberian. New Iberia, LA: October 1, 1992.

Johnson, Richard A., Fremont E. Kast, and James E. Rosenzweg. The Theory and Management of Systems. New York: McGraw Hill, 1963.

Kast, Freemont e. and James E. Rosenzweig, Management: Systems and Contingency Approach, New York: McGraw Hill, 1985.

McCaleb, Dan. "Hurricane meets its match," The Daily Iberian. New Iberia, LA: October 1, 1992.