Natural Hazard Research

DISASTER RECOVERY AFTER HURRICANE HUGO IN SOUTH CAROLINA

by

Claire B. Rubin
and
Roy Popkin

Center for International Science,
Technology and Public Policy
The George Washington University

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PREFACE

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The Natural Hazards Research and Applications
Information Center
Institute of Behavioral Science #6
Campus Box 482
University of Colorado
Boulder, Colorado 80309-0482

SUMMARY

Hurricane Hugo was a catastrophe that caused widespread residential damage, extensive lifeline destruction, and enormous timber destruction in South Carolina. Fortunately, there were relatively few casualties. Hugo was one of the most costly disasters ever experienced in the U.S. in terms of damage to homes, infrastructure, and local economies.

After Hugo made landfall on September 21, 1989, near Charleston, South Carolina, media accounts indicated that there were serious problems in South Carolina's response and early recovery efforts. This exploratory research focuses on public-sector recovery processes in South Carolina. The project team gathered information about the recovery experience in four badly impacted counties and about the state's response and recovery actions.

Problems were found in all four phases of emergency management: preparedness, response, recovery, and mitigation. Some preparedness measures, such as those for warnings and evacuations were effective; however, preparedness was rather narrowly construed. Posthurricane response problems were both organizational and functional. The recovery period revealed significant deficiencies with state and county emergency capabilities and serious problems in two national disaster response organizations, the Red Cross and FEMA. An underlying concern is that most emergency management knowledge comes from direct experience rather than from existing educational and training programs. In addition, serious mitigation planning problems were found with both

hurricanes and earthquakes. Finally, a new explanatory model of recovery and mitigation processes is offered in this report.

This research points out implications for the public, emergency management communities, national disaster service providers (FEMA and the American National Red Cross), and hazards/disaster researchers.

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"That men do not learn very much from the lessons of history is the most important of all the lessons history has to teach."

Aldous Huxley

HURRICANE HUGO

Hurricane Hugo in 1989 was a catastrophic disaster that caused widespread residential damage, extensive lifeline destruction, and enormous timber destruction in South Carolina. Fortunately, there were relatively few casualties. As a result of Hurricane Hugo, four presidential disasters were declared in the U.S. Virgin Islands, Puerto Rico, South Carolina, and North Carolina. Hugo was one of the most costly disasters ever experienced in the U.S. in terms of damage to homes, infrastructure, and local economies.

The U.S. Virgin Islands and Puerto Rico experienced widespread devastation and had problems dealing with this large magnitude event. About two days after Hugo hit the Caribbean, it struck the U.S. mainland near Charleston, South Carolina. Post-Hugo media accounts indicated serious problems in South Carolina's response and early recovery efforts. This project explores reasons why some of the recovery problems occurred.

THE DISASTER

Hurricane Hugo was the strongest storm to strike the U.S. since 1969 when Camille slammed into the Gulf Coast. It was South Carolina's worst hurricane disaster since 1872.

Hugo formed as a tropical depression on September 10, 1989, 12 days before crossing the South Carolina coast. Reaching peak strength with winds up to 160 mph, Hugo was classified as a

category V storm (the highest rating) on the Saffer-Simpson Scale.

A hurricane watch was posted for Puerto Rico and the U.S. Virgin Islands on September 14 and was raised to a hurricane warning the next day. At 2 a.m. on Monday, September 18, Hugo, carrying 140 mph winds and rated as a category IV storm, crossed over the U.S. Virgin Islands. St. Croix was left without power, telephone service, and water, and St. Thomas was heavily damaged. The storm shifted slightly to the north and, on the morning of September 18, hit Puerto Rico with sustained winds of 132 mph, at least one 170 mph gust, and seven- to eight-foot storm surges. The storm weakened after hitting Puerto Rico, but it reorganized on the 20th, increased its forward speed, and headed for the southeastern United States.

By September 21, Hugo regained its category IV strength. Its winds reached 138 mph, and storm watches along the southeastern U.S. coast were upgraded to warnings. Evacuations from Georgia to North Carolina began as the storm headed toward South Carolina with anticipated tides of 12 to 17 feet above normal. Shortly before midnight on September 22, Hugo's eye crossed the coast just north of Charleston. Hurricane force winds of up to 135 mph extended 100 miles northeast and 50 miles south. Power lines and trees were knocked down, boats were washed ashore, and thousands of homes were damaged. A storm tide of up to 20 feet inundated the coast as far north as Myrtle Beach. In McClellanville, a coastal fishing village northeast of Charleston, a school being

used as a shelter flooded to a depth of eight feet. Fortunately, no one drowned. The eye of Hugo passed just east of Columbia—100 miles inland—at 3 a.m., and moved over Shaw Air Force Base near Sumter in Sumter County with winds gusting to 109 mph. Air pressures set an all-time low at Columbia. Almost one-half of the state's 46 counties were affected by the hurricane, and inland counties that expected to be "host areas" for evacuees became, instead, full-fledged disaster areas. By sunrise, Hugo was downgraded to a tropical storm but still reached Charlotte, North Carolina, with 87 mph winds that downed a 50-mile swath of trees and power lines. The storm finally blew itself out in the Appalachians.

South Carolina suffered incredible damage but little loss of life. Thirteen of the 49 deaths directly related to Hugo were in South Carolina. The Red Cross's death toll was somewhat higher but included some fatalities indirectly related to the storm. The amazingly low death toll (Camille caused 256 deaths) was attributed to timely warnings and evacuations. It has been estimated that more than 138,000 people left South Carolina's shorefront areas and islands ahead of the approaching storm.

Red Cross surveys showed that almost 111,000 South Carolina families suffered losses in the storm; the total may be even higher because many additional victims were counted in the months after the storm. According to the Red Cross, 3,307 single-family homes were destroyed, 18,171 sustained major damage, and 56,580 suffered minor damage. More than 12,600 mobile homes and approxi-

mately 18,000 units in multifamily dwellings were destroyed or damaged.

There was also tremendous damage to trees and forests. Fallen trees blocked roads, damaged houses, and pulled down power lines. The state's forest products industry sustained severe economic losses. In some areas it took five weeks or more to restore power. Chain saws and generators became the symbols of disaster recovery and emergency actions. Hugo's total damages were estimated by the National Hurricane Center at more than $9 billion dollars, with about $5 million of that occurring in South Carolina.

The production and distribution of forest products is one of South Carolina's biggest industries, so the loss of about one-third of the state's timber constituted a major part of that industry's estimated $1.04 billion dollar loss. At least 40,000 forest products workers will be out of work for many months, if not years, because of Hugo. The coastal seafood industry also suffered extensive damage. Five canneries and processing plants were destroyed, and 50 shrimp boats were tossed on shore. Manufacturers in eight of the 24 affected counties experienced more than $158 million in plant damages and $750 million in inventory and income losses because of long-term power outages. It is estimated that at least 600 small businesses will never return.

In spite of all this, loss of life was low, and the emergency evacuation and refugee sheltering went well. However, prob-

lems began to surface when South Carolina moved on to recovery from Hugo.

THE RESEARCH

Both members of the research team were on-site in South Carolina shortly after Hurricane Hugo struck the mainland. One researcher was part of a National Oceanic and Atmospheric Administration (NOAA) reconnaissance team, and the other was conducting a Quick Response Grant project supported by the Natural Hazards Center at the University of Colorado. The concerns the researchers had from their early impressions of the problem-filled response and near-term recovery efforts led them to propose this research.

More specifically, the objectives of this research were: 1) to identify issues and problems in the near-term recovery period, 2) to examine the failure of public officials and other recovery managers to benefit from lessons learned in major disasters in other locations, and 3) to determine if there are new realities that make the assumptions and expectations of disaster researchers and emergency services providers inadequate or misguided. A further concern was that effective disaster management knowledge and techniques are known and used by some but are not being well taught or effectively shared.

The project team gathered information about recovery processes in the four badly impacted counties of Charleston, Dorchester, Berkeley, and Sumter, South Carolina, and about the

state's response and recovery actions. Because the four counties studied were in the same state and had experienced the same disaster, South Carolina offered a unique opportunity to study several types of response and recovery efforts that had basic constant variables in common.

The city of Charleston was not studied because the process there was too unusual to be used as an example of a local recovery process. Charleston was a media and agency focal point for most of the response period, the emergency management process was highly politicized there, and the attractions and economy of that city were highly unusual. Furthermore, several other NSF-funded research projects examined Charleston.

Prior to going to South Carolina, the researchers collected a wide variety of background information from secondary sources including agency "after action" reports, agency documents, and newspaper articles. Some people who had been involved in Hugo relief operations were interviewed in person or by telephone to gather their impressions and the names of additional people to interview.

On-site interviews were conducted for three days in the tricounty area around Charleston and for two days in and around Columbia, South Carolina, in May 1990, six months after Hugo made landfall. An interview guide (see Appendix 1) was prepared for interviews conducted with local officials in the four counties, county administrators or elected officials, emergency coordinators, and other persons who had a major role in the response

and recovery activities after Hurricane Hugo. Other interviews were conducted with municipal officials in North Charleston and Summerville, state officials in Columbia, key persons in private organizations, and with FEMA Regional Officials (from Atlanta). Nongovernment interviews included representatives of the Red Cross, Urban League, and local interfaith organizational board members. Additional interviews were conducted in the Washington, D.C., area with Red Cross officials at national headquarters and at Eastern Operations Headquarters. Finally, other researchers (Peter Sparks of Clemson University, Elliott Mittler of the University of Southern California, and Kathleen Tierney of the University of Delaware) who were studying the effects of Hurricane Hugo in South Carolina were also contacted.

In July 1990, the principal investigator was invited to talk about lessons learned (as well as those not learned) from Hurricane Hugo at the annual hazards workshop held by the University of Colorado's Natural Hazards Research and Applications Information Center in Boulder. This report's preliminary findings, primarily the organizational and functional problems, and the new explanatory model contained in Appendix 4 were presented. The conference provided an opportunity to obtain feedback on the report's preliminary findings and to gather additional information about the ongoing recovery process from representatives of government agencies, the Red Cross, and other private interest groups that attended the meeting. In general, the representatives

from South Carolina's governmental agencies, the Red Cross, and FEMA regional staff supported the report's findings.

After the workshop, additional information about South Carolina's recovery activities were gathered from other researchers who had been on site; from conversations with involved public officials at federal, state, and local levels; and from newspaper articles and reports.

PRIOR RESEARCH

Even if a person did not personally visit South Carolina after Hurricane Hugo, one would anticipate from a number of disaster recovery studies, in general, and South Carolina reports, in particular, that recovery from a major disaster would be difficult.

Waugh (1988) presents a basic analysis of emergency management from an intergovernmental relations perspective that provides a cogent synthesis and summary of recent research. His review of a number of important aspects of emergency management, including management responsibilities and capabilities at each level of government, expected implementation problems, and conflicts over land use and building controls, presaged the interorganizational problems after Hurricane Hugo.

Early media accounts and initial afteraction reports about South Carolina's recovery process mentioned governmental and intergovernmental actions often. Key topics were FEMA's roles, functions, and capabilities during disaster response and re-

covery. In South Carolina, a number of issues were raised about FEMA's role and the extent to which its supplemental role was appropriate. These issues were also in the forefront in St. Croix, U.S. Virgin Islands. Related issues included increasing devolution of powers to state and local governments, which in some instances were unaware of their delegated responsibilities, and budget and personnel shortages at all levels of government.

Prior research on disaster recovery includes Rubin et al. (1985), Rubin and Barbee (1985), Bolin (1982), and Tierney (1985). The first two sources mention the importance of effective intergovernmental relationships. Rubin et al. (1985) identified three major determinants of efficient recovery, namely, personal leadership, public management capability, and disaster-specific knowledge. Early indications after Hurricane Hugo revealed serious problems in each of these areas. Tierney (1985, p. 76) noted that "many of the most important lessons in the Coalinga earthquake relate to the need to improve management of post-earthquake recovery." More recently, a reconnaissance team observing the impact and aftermath of the Loma Prieta earthquake reported that "the lack of recovery planning in all jurisdictions is glaringly obvious" (Earthquake Engineering Research Institute 1990, p. 422).

FINDINGS

Specific conditions and circumstances affected the recovery process in South Carolina after Hurricane Hugo. Many of the post-

Hugo emergency management problems were found to be due to pre-Hugo conditions and deficiencies.

Preparedness Problems

Prior to Hurricane Hugo's landfall, the work of several federal, state, and local agencies provided some preparation for the impact of the big storm. The U.S. Army Corps of Engineers, FEMA, and the National Weather Service had gathered data that contributed to hurricane planning and to the use of the SLOSH model that aided in hurricane preparedness along the South Carolina coast. Also, some preparedness exercises had been held.

The National Hurricane Center also provided warnings and preparation information in the few days prior to Hurricane Hugo. Much of the preparedness effort, however, focused on warning and evacuation activities. When Hugo hit South Carolina, the warning and evacuation activities worked well, but, when the storm was over, no one seemed to know what to do next. Unfortunately, very little recovery planning had been done at any level of government. Given the magnitude of the disaster and the widespread damage, the recovery process had to be improvised.

A number of conditions, circumstances, and organizational arrangements that existed before Hugo created problems in its aftermath.

State Structural and Organizational Arrangements

The adjutant general's office handles the emergency preparedness responsibilities for South Carolina. In South Carolina,

the adjutant general is elected independently of the governor. This unique placement of emergency management responsibilities in the state's organizational structure caused major problems after Hurricane Hugo.

A second set of problems resulted from the state's small and marginally funded and staffed Emergency Preparedness Division (EPD). At the time of Hurricane Hugo, there was a small EPD staff (about 36), a small budget, a small Emergency Operating Center (EOC), and a small amount of training for state and county emergency staff.

The emergency social services and welfare functions were housed in the state's Department of Social Services (DSS). It appears that the DSS dealt with schools, agencies for the elderly, and FEMA independently of EPD.

County Government

Because they had small populations, many of the recovering communities and the nonurban counties lacked staff, equipment, and budget to deal with a major disaster. According to a staff member at the South Carolina Municipal League, almost one-half of the 272 municipalities in South Carolina have populations of less than 1,000. Basically, the county emergency management organizations lacked the wherewithal to manage a large-scale reconstruction and recovery effort.

Charleston County, for example, assumed an ability to cope on the part of the incorporated municipalities within the county,

an assumption that did not appear to hold up in actuality. By and large, county emergency managers did not seem to have (or take) responsibility for recovery in the municipalities within their boundaries.

Regarding emergency management capacity in particular, the South Carolina counties appear to have had significant limitations. Even Charleston County, the state's largest and most urban county, lacked sufficient staff, funding, and education/training for hazards and disasters. After the Hugo disaster, the general public perceived significant deficiencies in their county emergency preparedness directors. Of the four counties visited, only Sumter County had an extant recovery plan. Charleston County was developing one but had not finalized or distributed it to the county's municipalities at the time Hugo hit.

There was great variation among the counties regarding knowledge and familiarity with FEMA's roles and functions in disaster response and recovery. (The municipalities, on the other hand, all seemed to have a basic lack of knowledge of FEMA.) There were variations in knowledge of FEMA's supplemental role in response, the state and matching funds program, and other basic operational and procedural recovery effort requirements.

Local Government

At the municipal level, emergency management was an additional responsibility usually assigned to a fire department

official. Most local designees were unaware of their roles and responsibilities during recovery.

Lack of Disaster Experience

Before Hugo, South Carolina had only one declared presidential disaster—for a tornado in 1984—and had no significant hurricane experience in recent decades.

Red Cross Capability in South Carolina

Prior to Hugo, the American National Red Cross knew there were gaps and weaknesses in disaster response capabilities in chapters throughout the state. During the disaster, these deficiencies were compounded by the fact that many volunteers had evacuated inland and were not available for service. After the hurricane, even the Red Cross's regional and national headquarters were constrained in their ability to augment the South Carolina chapters' capabilities (see Appendix 2).

Response Problems

As is true of most postdisaster situations, there were a number of conditional and special characteristics following Hugo that could not be anticipated or imagined. Some of these unusual conditions that hampered the response and recovery processes in South Carolina are described below.

Conditions after Impact

1) Twenty-four counties (about one-half of the state) were impacted, including counties that were as much as 100 miles inland. The damage was very intense and widespread. Some of the

areas that had been designated inland reception centers were actually impact areas.

2) The huge loss of trees had many ramifications: the large amount of debris required unusually extensive removal efforts; the downed trees caused massive damage to power lines and structures; and the tree debris blocked roadways, hampering vehicular movement for rescue and repair efforts.

About 60% of the Francis Marion National Forest was destroyed, and more than one-third of the state's timber supply was lost. This translates into substantial economic losses for the timber industry, job and income losses for workers, and significant ecological losses. The downed timber will continue to pose a significant fire danger for about three years.

3) Massive power outages required weeks to repair. The loss of electric power posed serious hardships to residents and to businesses (small businesses, in particular). Lack of power initially hampered almost all response activities, including FEMA's ability to establish field and assistance centers, and all repairs requiring power tools.

4) Many disaster victims lived in extreme poverty and isolation in some of the rural areas. Service agencies found that providing services and assistance to the rural areas was unusually difficult and time consuming. Hundreds of victims did not seek assistance or become involved in the recovery system until three or more months after the storm hit South Carolina.

Some victims had special needs because of extreme poverty, high rates of illiteracy, physical isolation in rural communities, extreme fear and distrust of government officials, and lack of electronic media for weeks due to power outages. An additional and unusual condition was that some poor, rural blacks lacked land and property ownership records due to "Heirs' Property" form of ownership in South Carolina (i.e., since the Civil War, property in some families has been passed on without written documentation). These factors all contributed to the unusually lengthy and difficult outreach efforts needed to reach victims and determine their needs and eligibility for assistance.

To meet these special needs, Charleston County created seven Hurricane Assistance Centers (HACs) to augment its outreach to victims. FEMA contracted with the Urban League to recruit and train special outreach workers to convince victims to apply for disaster-related assistance. Further, FEMA's Disaster Application Centers (DACs) and the Red Cross Service Centers were kept open for months rather than the usual four to six weeks after a disaster.

5) Unusually rancorous intergovernmental relationships also hindered recovery efforts. Initial reports (mainly in mass media) regarding the aftermath of Hugo in South Carolina indicated serious problems in virtually all horizontal and vertical intergovernmental relationships.

The congressional and mayoral criticism of FEMA began very early. According to media reports, local/state/federal relations

were severely strained. County to state relations were highly troubled mostly because, as described below, two separate communication channels emerged: one for county and state emergency preparedness directors, the second between the governor and city and county elected officials. Charleston County was an exception because county officials stayed within the usual chain of command.

About five days after Hugo hit, U.S. Senator Hollings criticized FEMA publicly and severely, calling the employees "a bunch of bureaucratic jackasses." This statement caused some embarrassment and morale problems for FEMA and its staff who were setting up the Disaster Field Office and the Disaster Assistance Centers. In addition, the public hostility toward the agency made it difficult for FEMA to hire employees locally, a practice common after a disaster.

Charleston's mayor was also outspoken making the early recovery process a media event on the major national news networks and contributing to the highly charged political environment. He also made it difficult for FEMA and the Red Cross to effectively work with the city and its citizens, particularly because of his persistent requests on national media for food and clothing donations.

Problems After Hugo

As a consequence of the conditions and problems described above, many difficulties arose around response and recovery

efforts. This section focuses on the organizational and functional problems that affected the local, county, and state governments' and private agencies' abilities to manage the recovery process.

1) Organizational problems. Organizational problems occurred within every government level and agency involved in the recovery process: federal (FEMA), Red Cross, state, county, and local. These problems included general organizational problems, personnel use and deployment problems, and interorganizational relations problems. The functional problems stemmed from the inability to plan, organize, and deliver goods and services to victims in an efficient, effective, and equitable manner.

A) The state - A two-level network system emerged at the state level that caused serious confusion and duplication for county officials. Typically during a major disaster, the state's Emergency Preparedness Division (EPD), under the adjutant general, sets up an Emergency Operating Center (EOC) and coordinates with county EOCs. The unusual second network appeared a few days after the disaster when the governor set up a separate command post in the State House. From that post, the governor contacted county and city elected officials regarding their needs after the hurricane. As a result of these two networks, serious coordination problems and conflicts occurred between county and municipal emergency managers and political executives.

There were other state-level problems as well. Too few state staff were available to provide enough on-site assistance to cities and counties. The Department of Social Services and the Department of Highways were overwhelmed. The state EPD lacked a systematic process to get mutual aid to impacted counties and could not provide representatives to assist in all of the major county EOCs. In fact, we were told that EPD had only six staff members available to go into the field to assist the 24 counties impacted by Hugo.

Following Hugo, the governor placed responsibility for mitigation and recovery issues under the Public Safety Division director, and a state hazard mitigation officer was hired six months after the disaster.

B) The counties - Relations between the city of Charleston and Charleston County with respect to pre- and post-Hugo emergency preparedness were problematic. Particular problems arose regarding the function of the emergency council, consisting of key elected officials, and the county emergency preparedness staff. The relationships among the elected heads of the Charleston County municipalities and between the elected officials and the appointed emergency preparedness division staff were not clear or effective. Some mayors, including the mayor of the badly damaged community of McClellanville, did not participate in the emergency council meetings just before Hugo struck.

County/city - Some of the counties have several small municipalities within their boundaries. While the county offi-

cials knew they had to provide many basic services for the unincorporated areas, they apparently held back from doing so with incorporated municipalities. As a consequence, several of the small towns that were devastated, like McClellanville, were incapable of either managing and or paying for some of the recovery efforts.

The extent to which Charleston County was involved in recovery efforts within the separately incorporated municipalities of McClellanville and Awendaw seemed to be subject to dispute. A series of issues arose about the inability of these small municipalities to cope with their recovery needs. For example, debris clearance (or lack thereof) was a major issue in the small municipalities for more than nine months after Hugo struck. Charleston County officials did provide services as a last resort to municipalities that could not take care of this problem themselves.

In Dorchester County, the county emergency preparedness director set up an EOC in Summerville because it was the focal point of urban damage and because of available building space. But for the first month of its operation, county EOC staff focused on areas outside the city limits and did not talk to municipal officials, who were assumed to be managing adequately on their own.

County/state - As was described earlier, there were two networks of contacts between the state and county governments. These two networks were not coordinated with each other in the

early days after Hugo, causing significant problems for the counties. In addition, it was evident that the state had not adequately kept the counties informed about FEMA program requirements and procedures.

C) FEMA - Since Hugo had devastated the U.S. Virgin Islands and Puerto Rico before hitting South Carolina, both FEMA and the Red Cross had to send substantial resources, personnel, and other supplies to those places a few days before Hugo hit South Carolina. FEMA had difficulty in opening its South Carolina Disaster Field Office (DFO) (its operational headquarters), due in large part to the power outage, which hampered the agency's ability to initiate computerized relief operations and establish telephone communications. The DFO and Disaster Application Centers (DACs) were opened later than usual, 8-10 days after the hurricane, because of staff shortages and the power outage.

FEMA had additional problems in finding and staffing the DACs to serve victims in the 24 impacted counties. Those problems included recruiting, training, and promptly deploying staff; locating reservists; and finding local hires to operate the DACs. Moreover, its early focus on the Charleston area angered officials in the other 23 impacted counties. Nevertheless, locating the first DAC in the Charleston area did not satisfy Charleston's mayor.

Intergovernmental problems - While some of the problems experienced by each level of government are described above, another set of problems related to strained or frictional inter-

organizational relationships. In the three counties closest to Charleston (the tricounty area), the lack of knowledge about the federal role in major disasters, FEMA's mandated functions, and the complex intergovernmental relationships typical of disaster recovery caused many serious problems.

County officials, in particular, experienced great frustration with FEMA, and they sought federal assistance through political contacts (both in the state and with their congressional delegates) and the news media. This applied particularly to the location and timing of the opening of DACs by FEMA in locations close to the victims. In this highly charged political environment, rancorous intergovernmental conflicts began to occur. An additional factor contributing to the politicizing of the recovery effort was that South Carolina's governor was a Republican and Charleston's mayor was a Democrat. Moreover, the mayor was rumored to be a candidate for governor, and several other impacted counties also had Democratic administrations. The highly charged political environment was counterproductive and made it harder for FEMA and other disaster organizations to operate because it distracted and diverted staff and others away from recovery functions.

Some county officials complained about their dealings with FEMA, claiming that the agency was overdemanding and that the staff was callous to local officials. County officials commented on problems they had with processing Damage Survey Reports (DSRs), a frequent post-disaster complaint. Frustrated county

officials thought that FEMA had "an obsession with accountability."

State officials were not as critical of FEMA as were county officials. FEMA, however, was critical of state emergency management capacity. The specific complaints are contained in the Interagency Hazard Mitigation Team Report (see Appendix C).

Both FEMA and the Red Cross had major response efforts underway in the U.S. Virgin Islands and Puerto Rico and had difficulty determining South Carolina's overall needs for services and personnel after Hugo hit. Both organizations have been criticized for being supply driven rather than demand driven. In other words, both organizations thought in terms of available, existing personnel rather than what resources were needed to do the job. Questions were raised about the performance of both organizations and whether each should plan for the truly catastrophic event or ordinary, anticipated events. The interaction between the two national organizations and their ability to integrate their activities in time of a catastrophic event still need to be examined.

D) Red Cross - The Red Cross had a number of problems in dealing with Hugo and its aftermath. Some were related to the state of disaster preparedness on the part of its chapters in South Carolina, while others were related to a series of organizational changes, including budget constraints and infrastructure vicissitudes in the past decade. In this instance, the impact of Hugo in South Carolina followed the massive hurricane disaster in

Puerto Rico and the U.S. Virgin Islands and, in turn, was followed by the Loma Prieta earthquake in California. This confluence of major disasters put a tremendous strain on a Red Cross response system that had already been weakened by a series of internal changes and fiscal constraints.

The Red Cross was confronted with special circumstances and problems in aiding the disaster response and recovery efforts in South Carolina. The Red Cross usually deals mainly with emergency response rather than with recovery, but given the special needs of the many victims, as described earlier, and Red Cross's prolonged involvement with the rehousing effort, the organization remained active in South Carolina well past its usual length of stay after a disaster. The highlights of the Red Cross's role, functions, and problems are discussed in Appendix 2.

The Red Cross is usually seen by local public emergency managers as the "first line of defense" in major disasters, providing emergency mass care and emergency family assistance for evacuees and the disaster-caused homeless until federal/state programs are in place. Those programs are then supplemented by the Red Cross as needed. Red Cross postdisaster surveys are generally the basis on which the Red Cross and FEMA determine needs for personnel, supplies, and assistance centers. However, South Carolina's Department of Social Services (DSS) is legislatively mandated to implement the state's Emergency Welfare Services plan in time of disaster. The Red Cross, the DSS, and the Department of Education jointly decide on schools to be used

as shelters and when they are to be opened, and this decision seems to be decided by each individual county. The DSS also assists Red Cross with the distribution of food for use in mass care.

The Red Cross's state of preparedness in South Carolina was relatively weak, a condition reportedly known to the Eastern Operations Headquarters, but not a great deal was done to correct the situation. The Charleston chapter's attention was focused on its blood program, and there seems to have been little ongoing Red Cross presence in the smaller communities within its jurisdiction, or for that matter, in Berkeley and Dorchester counties. Further, many of the smaller, rural chapters had chairmen who were also the respective county's emergency manager and did the best job possible wearing two hats until a real emergency arose. In Hugo, some of these chapters responded well, while others responded poorly. Unfortunately, the response in the counties we visited was, as we were told more than once, "disappointing" or did not improve until "the national organization sent someone in to help us." Additional confusion arose become some of the American National Red Cross personnel came from states where their function was the same as that performed by South Carolina's DSS.

The initial Red Cross survey, which was completed shortly after Hugo hit, was the basis for early staffing and other organizational actions and showed that about 39,000 families had suffered losses. A month and a half later, the Red Cross reports

showed 110,875 families had been affected, and ultimately, it was discovered there were even more victims in poor, isolated rural areas. By this time, however, the competing, and indeed, overwhelming, demands of the Hugo relief operations in the Caribbean and the earthquake response in California made it virtually impossible to get enough capable, experienced help to support South Carolina's Red Cross operations.

2) Functional problem areas in South Carolina. The delivery of services and assistance to victims had serious deficiencies in terms of efficiency, effectiveness, and equity. Some of the problem areas follow.

A) Distribution of food and clothing to victims - This is a basic function that should be manageable, but the overflow of donated goods proved seriously burdensome in Charleston County. The huge volume of goods required distribution and paperwork efforts that diverted staff from more important functions. Trailer loads of old clothes and railroad box cars full of perishable commodities, such as orange juice, got in the way of shipments of chain saws and other needed goods. This diversion of disaster personnel was very serious.

The convergence of donated food and clothing was an avoidable problem. The problem resulted from Charleston's mayor's persistent public appeals for food and clothing donations, which may not have been needed by victims. His national appeals contributed to significant roadway congestion and a host of problems

connected with a flood of telephone calls that diverted disaster workers' attention. In spite of specific requests from the Red Cross, Salvation Army, and FEMA officials to stop the requests for food and clothing, the mayor persisted. Ultimately, the Army Quartermaster Corps had to be asked to distribute and dispose of the vast surplus of supplies that were donated. Many people and companies donated goods, services, and money that were appreciated and useful, but for the most part, the clothes and food were not.

Further, many other organizations (such as radio stations, churches, and voluntary groups) set up their own collections, which compounded the distribution problems at the local level. Much of the donated clothing went to landfills or was shipped to other needy places, such as to Puerto Rico.

B) The city of Charleston as a focal point - Charleston was the focal point for goods and for federal and state assistance. Charleston is the state's largest and most well-known city, and its politicians are highly active and vocal. Media coverage focused on Charleston and contributed to its being the center of attention. FEMA opened both its Disaster Field Office and the initial Disaster Application Center (DAC) in the Charleston area. This contributed to the perceived inequities of the focus on Charleston. The results were jealousy, rivalry, and perceived inequity in distribution of goods, funds, and assistance.

C) Lack of emergency management knowledge at the county and municipal levels - The lack of theoretical and experiential

knowledge about hazards and disasters was previously discussed. The lack of experience with hurricanes and the deficiencies of emergency management capability may have contributed to the ad hoc, uncoordinated efforts at the county and local level. They may also partly explain the highly politicized response and recovery efforts. There was a great deal of on-site, situational learning about FEMA, emergency management, and hurricanes in the aftermath of the disaster.

D) Building and construction codes and standards - There is no state-wide building code in South Carolina. Also, many counties do not have building codes or land use controls. In places where building codes exist, they have not been enforced effectively. Both FEMA and Red Cross can only provide funds for structures to be repaired or rebuilt to the predisaster condition, to code, if one applies, or to flood insurance requirements.

Two examples of poor practices were called to our attention.

1) The building that housed the Charleston Red Cross chapter and blood bank was seriously damaged by Hugo and had to be rebuilt. At the time of writing, that building, which houses two critical services, was not being rebuilt to be seismic resistant.

2) In the Copahee area of Charleston County, a cluster of mobile homes located in the flood velocity zone were replaced. Charleston County allowed the mobile home park to be rebuilt, against the advice of FEMA. FEMA offered to assist in finding and paying for an alternate site, but county officials defended their

decision on the basis that winter was coming and the county council was desperate to get housing for people. Private foundation monies financed the rebuilding, and the new mobile homes were placed on concrete pilings. Several officials expressed concern that the rebuilt mobile homes were at risk both from high winds and earthquakes.

In addition, in July 1990, staff members of FEMA's regional office had compiled a 16-page list of potential National Flood Insurance Program (NFIP) violations that they had observed during the rebuilding process in Charleston County alone.

E) Societal needs: housing and personal and community welfare - Lack of responsibility for social welfare responsibility and an incapability of providing for citizens' needs in the postdisaster period were apparent on the part of the four county governments studied in South Carolina. Rarely mentioned were any community development or redevelopment agencies, planning and zoning departments, or housing agencies involved in the recovery efforts. Few such agencies seem to exist or have a major role in South Carolina's county governments. For the most part, planning for and providing for replacement housing for victims was being left to private, nonprofit agencies.

In the four South Carolina counties that were studied, we were not told of any local government involvement in generating low- and moderate-income housing and did not hear of any efforts to subsidize rents for low-income persons who needed to be

rehoused after Hugo. However, state and federal officials did notice this need, which was mentioned in afteraction reports.

Housing construction - Various nonprofit, ad hoc groups (such as interfaith groups and other private, nonprofit foundations) were created to provide repairs and to rebuild damaged homes. Varying capabilities, interests, and selection criteria, and the short-term and transient nature of some of these organizations raised many questions about housing production and maintenance. In general, these organizations augment funds from FEMA's Individual and Family Grant program, the Red Cross, and insurance payments (if any) with labor, materials, and in some cases, additional funds.

Some of these nonprofit groups chose to rebuild houses to a higher standard than the pre-existing conditions in South Carolina—especially if there had been no running water and no electricity prior to Hugo. Some rehoused victims are better off in the short term, but there are concerns that in the longer term they will face added expenses for increased assessment and taxes and utility bills. How will they pay these with a small, fixed income?

In the absence of publicly planned or managed housing, there is total dependence on private organizations—most of which are temporary and made up of noncommunity workers—that select recipients based on variable criteria and determine locations and building standards for themselves. This raises questions about the equity in providing housing assistance to victims.

Personal welfare - Aside from evacuating residents and coordinating the reception and care of evacuees and, to some extent, the postimpact homeless, emergency managers and other local/county officials concentrated on the distribution of bulk relief supplies, debris clearance, road work, and restoration of public facilities. People problems are handled under South Carolina's Emergency Welfare Services that administer their services from the state's health and welfare agency rather than the Department of Emergency Preparedness. Even though the county health, school, and welfare departments participated in providing health services, their efforts were not directed and were only loosely coordinated by the emergency managers. Efforts of county and municipal governments were poorly coordinated, at best. In one county, the emergency manager set up an Emergency Operating Center (EOC) in the hardest hit city but had no contact with city officials for a month. Generally, county emergency managers believed their jurisdiction was only in the areas outside of the municipalities. We found little evidence—except in the area of Emergency Welfare Services—of state coordination. County officials sought support and guidance from counterparts elsewhere, while municipalities worked out their own mutual aid agreements <u>after</u> Hugo hit.

<u>Recovery Problems</u>

The aftermath of Hurricane Hugo provides the opportunity to reflect on problems in all phases of emergency management and to

contemplate the potential problems related to even larger catastrophic disaster events in the future. It also provides a useful opportunity to review the progress (or lack thereof) in the dissemination and utilization of hazards research in the past decade. This review process suggests that many of us may be too optimistic in our assumptions about the state of emergency management knowledge and practice at the state and local levels.

In contrast to what is supposed to happen, reality in the aftermath of a major disaster often is a messy state of affairs. This outcome is not surprising, considering that a major disaster devastates many of the main systems and networks of community life. The reality includes confusion and conflict concerning who should take charge, where the needed resources will come from, what sources of information will be used, what skills are needed to deal with new and difficult problems, and how to work in a pressure environment with countless agencies involved and making demands. The postdisaster environment is highly politically charged because so much is at stake.

These observations are consistent with the recent reflections of Dynes and Quarantelli (1989) on the recovery process. They note that "the emergency period is characterized by hard work, altruism as well as observable accomplishments, and conflict is minimal. By contrast, the recovery period is characterized by conflicting priorities, by issues of equity and inattention."

From a researcher's point of view, reality is the state-of-the-practice one finds when doing field work on-site in communities recovering from a major event. Reality reveals the gap between the state-of-the-art and state-of-the-practice of emergency management in general, and disaster recovery in particular. That gap is of particular interest to this research team. Many disaster programs and assistance requirements often are based on research findings and recommendations, but the requirements may be just words when compared to the reality of what goes on at the state and local level after a major disaster.

Some Recovery Issues

This team's observations of the recovery process in four of the 24 counties in the seven months after Hurricane Hugo, revealed the following issues and concerns.

1) Knowledge about hurricane recovery as a process and as a definable component of the emergency management cycle was slim. There was little interest in the process per se. Only one of the four counties visited had a completed recovery component in its emergency management plan at the time Hugo hit. This deficiency was tied in with the generally low level of knowledge, experience, and functional skills in emergency management.

Of the four counties where we interviewed, three use the restrictive title "Emergency Preparedness Division" and one uses "Civil Defense" as the functional title of the agencies respon-

sible for emergency preparedness and response. The state also uses the title "Emergency Preparedness Division," and the function is one of several assigned to the independently elected adjutant general. In the aftermath of Hugo, state mitigation and recovery activities were being carried out under the direction of the Public Safety Division director, who, for the most part, is under the governor. Some activities were under the purview of the Department of Social Services.

2) Knowledge about emergency management educational resources, documents, and information centers was slight. Further, there was little or no interest in general informational resources on the topic of emergency management, disaster recovery, or mitigation on the part of local officials we met. Their interest in mitigating future hurricanes and/or earthquakes was very low.

Basically, county emergency officials were interested in specific tools or techniques to expedite their return to the status quo and to facilitate federal payments. These included such things as computer-based inventory lists, model contracts with suppliers or contractors, and record keeping techniques for Damage Survey Reports (DSRs).

3) The field research provided new insights into the levels of effort and knowledge needed to effectively accomplish recovery that acknowledges and includes mitigation measures. The difficulties entailed in these processes continue to be significant-

ly underestimated, particularly by those imposing the requirements. A new explanatory recovery model is given in Appendix 4.

General Concerns about Recovery

1) Other researchers have reported on the limited capacity of many communities to plan and manage their recovery from a major disaster. So, too, the absence of recovery planning by state and county government was obvious after Hugo in South Carolina. What appeared to be missing or deficient was:

a) knowledge about emergency management (other than evacuation planning) and, in particular, recovery planning and management. Information was not being received by the people who needed it or was just not being used.

b) integration of emergency management functions into general purpose government activities at the state and county levels. (This observation was made by Grant Peterson, Director of FEMA's Disaster Assistance Program, in a keynote speech at the Natural Hazards Center's annual conference, July 16, 1990, in Boulder, Colorado.)

c) vertical and horizontal integration of intergovernmental and interorganizational relations.

d) connection between activities in the emergency management cycle. The four phases of the emergency management cycle-mitigation, preparedness, response, and recovery-appear to involve activities that in fact are being carried out separately. In some cases, the linkage of activities is not

perceived or acted upon. In other cases, efforts at linkages are thwarted at various levels of government.

2) There seems to be a lack of several important connections that one often assumes will be present. For members of the natural disaster research community in particular, and for some national- and state-level organizations, there may be some overly optimistic assumptions about the understanding and capability of public officials and civic leaders (not to mention press, clergy, and other service providers) regarding known phenomena, behavior, procedures, and needs that are common during and after a major disaster. For those persons and organizations concerned with education and training, the results of Hugo clearly show the great need that exists for better efforts.

3) There is a lack of linkage of mitigation with recovery activities. Following disaster operations, FEMA staff prepares an Interagency Hazard Mitigation Team (IHMT) report, but after Hugo, the agency did little follow-up on progress toward meeting the IHMT recommendations. (this need is discussed in more detail later) Each state that receives a presidential disaster declaration is required to prepare a hazard mitigation plan (Section 409 Plan) within six months after the disaster, but because of the long and difficult recovery following Hugo, South Carolina was unable to complete one for almost a year. Hence, recovery is ongoing with or without attention to federal and/or state hazard mitigation priorities and recommendations.

4) There is a lack of vigor in pursuing mitigation. During the first year of recovery, the research team was aware of only a few, modest local- and state-initiated efforts to improve disaster awareness training and county emergency management capacity. However, these efforts could not find support and funding from FEMA or other sources. In the first year after Hugo, FEMA regional staff resisted their inclusion in the mitigation activities encouraged by Section 404 of the Disaster Relief Act, as amended, which allows for state and local hazard mitigation projects.

At the first anniversary of the disaster, state and local leaders were experiencing great frustration in trying to mount needed improvements of their emergency management capability and mitigative efforts that would be acceptable to FEMA staff in connection with the 50/50 matching monies available under Section 404. FEMA's strict constructionist interpretations of allowable projects were causing considerable problems for those few state and local officials who were trying to foster needed improvements.

5) The lack of connection between knowledge of emergency management functions and of recovery needs is another concern. After a declared disaster, there is little opportunity to get assistance for education and training to improve existing on-site emergency management capability—even though the need is especially high after a major disaster that seriously impacts half the counties in a state.

When some concerned groups in the Charleston area approached FEMA regarding offering public awareness building sessions, FEMA staff referred them to its training academy in Maryland, which requires travel and has a fixed schedule for its sessions. In addition, the one course on mitigation and recovery was offered only twice during 1990. Apparently, little effort was made by the FEMA regional office to provide needed education and training programs within South Carolina in the year following Hugo.

Aside from the lack of responsiveness and the inconvenience of the proposed educational and training course offerings, there was an added irony related to cost. In the course of providing federal assistance that costs hundreds of millions of dollars to South Carolina in the aftermath of Hugo, it would seem reasonable to allocate perhaps tens of thousands of dollars for on-site technical assistance, education, and training. These efforts would, in fact, contribute to the mitigation of future hazard/-disaster events in South Carolina.

6) For researchers, disaster service providers (particularly at the national level), and educators, there are serious questions about the adequacy of how lessons from past disasters are being taught and ultimately learned by public practitioners.

7) Finally, there was little involvement on the part of academic institutions within South Carolina in either providing technical assistance or doing hurricane research. The main exception was two faculty members of the Civil Engineering Department at Clemson University, who provided technical assis-

tance to localities regarding coastal construction standards and building codes, advised state officials, and received a National Science Foundation grant for Hugo-related research.

Mitigation Problems

Hazard mitigation has been defined as "policies and actions taken before an event which are intended to minimize the extent of damage and injury when the event does occur" (Tierney, 1989). In actuality, a significant amount of mitigation occurs after a major disaster has occurred (Rubin et al., 1985; Rubin and Barbee, 1985).

However, mitigation remains poorly understood and difficult to accomplish, and mitigation measures are often expensive and invisible. Consequently, when communities are engaged in mitigation and recovery simultaneously, many tradeoffs may have to be made and many complications may result.

In South Carolina, concern about mitigative measures after Hurricane Hugo was essentially federally driven. This occurred because South Carolina had to deal with state hazard mitigation requirements generated as a condition of the presidential disaster declaration and with state and local obligations as participants in the National Flood Insurance Program. Among the most immediate issues were construction and building standards in coastal and low-lying areas. The enormous scope of the clearance and rebuilding efforts in the months after Hugo struck raised

many questions about land-use and building regulations. These were sensitive issues even in normal times in South Carolina.

If one considers the massive needs and demands for reconstruction and recovery in all areas of community life in the context of the political/economic/public environment in South Carolina, the problems with mitigation that arose during recovery were inevitable. One could predict that such fundamental and inherently political issues—such as land-use controls and the imposition of upgrading of building code and construction standards—would compound and probably lengthen the recovery process. These considerations led to the development of the explanatory model of recovery, described later in this section.

Mitigation Requirements

As alluded to earlier, when there is a major disaster declaration, several federal hazard mitigation requirements and tools come into play during the recovery period. The first is the federal Interagency Hazard Mitigation Team Report (IHMTR). The second is the requirement that the state prepare a hazard mitigation plan (Section 409 Plan) for the hazards in the impacted area. A relatively new device is the use of the hazard mitigation project funds spelled out in Section 404 of FEMA's enabling legislation. In connection with Sections 409 and 404, some monitoring and evaluation activities on the part of federal and state officials will be needed, although the means of so doing are not clear at the present time.

IHMT Report

The IHMT's recommendations are of interest as initial indicators of areas for concern and priority attention in the recovery period. An outline of the key issues listed in the full report is provided in Appendix 3.

In the IHMT report (Federal Emergency Management Agency, 1989) on South Carolina, the team identified "areas that could benefit from implementation of mitigation efforts to reduce the potential of future losses from natural hazards" in the 24 counties included in the presidential disaster declaration. The issues and problems identified are "intended to guide all Federal agencies involved in recovery actions for this disaster."

Although the federal government cannot set the action agenda for state agencies, many of its recommendations "should be addressed by the State of South Carolina, as a condition of receiving FEMA disaster assistance." Given the above requirement, the report determines some of the topics for inclusion in the State Hazard Mitigation Plan (the Section 409 Plan), which must be prepared within 180 days after receipt of the presidential disaster declaration.

Additionally, the report says that many of its recommendations are long-term issues that should be addressed by the state, and that the state also should address the threat of other natural hazards throughout the declared counties. For the southern part of South Carolina, this means seismic risk should be considered along with hurricane-related problems.

FEMA issued the federal Interagency Hazard Mitigation Report in October 1989. By regulation, it is supposed to issue a progress report on the recommendations 60 days later, but, because of the pressures on FEMA regional staff from work connected with six additional declarations since Hugo, they were not been able to prepare the progress report within the stated period.

State Hazard Mitigation Plan

As a condition of receiving a presidential disaster declaration, South Carolina was supposed to prepare a state hazard mitigation plan (Section 409 Plan) for the areas included in the declaration within 180 days of the declaration. Again, due to all the other pressures during recovery, a report was not prepared within the required time period. In fact, it was six months after Hugo before a state hazard mitigation officer was hired and work on the report was started.

These two examples highlight the real world difficulties entailed in meeting mitigation requirements in the postdisaster period. Owing to the pressures of recovery decision making, public officials at all levels of government have difficulties coping with mandated mitigation activities during recovery periods.

Monitoring Recommendations

1) The federal level. The timeliness of report submissions is not at issue here. What is of primary interest is the extent to which the intended planning processes and systematic sets of

actions are taking place as intended by law or regulation. One concern is that FEMA staff and other federal agency representatives with a major investment in South Carolina's recovery from Hurricane Hugo, may not have the time and capability either to review the progress made or to add to or revise their earlier recommendations on actions needed in the near-term recovery period. These concerns become real when FEMA staff are faced with a spate of major disasters during a short time frame and have to function within the federal budget and staffing limitations of recent years.

The IHMT's recommendations affect federal program and assistance efforts and set a preliminary agenda for the state regarding mitigation. Hence a costly and complex recovery process is not being monitored and, perhaps, modified as intended. The realities are that forming a capable and committed team to produce and then continue monitoring the IHMT report is a difficult job for FEMA.

The monitoring and enforcement mechanisms for planning and implementing both the federal hazard mitigation plan and the state hazard mitigation plan remain problematic. While paper requirements exist, the recovery process often proceeds without the systematic attention specified in FEMA's regulations and enabling legislation.

2) State level. One reason for requiring a state hazard mitigation plan is to get state officials to focus on long-term needs of the affected areas and to encourage local officials to

do more than take short-term recovery action. The Section 409 Plan was intended to foster consideration of the long-term implications of recovery actions, with a particular focus on specific measures that will contribute to hazard mitigation.

In South Carolina, some coastal reconstruction issues were in the forefront during recovery, but there also are some issues connected with a second natural hazard, earthquakes. Seismic safety should affect decisions regarding building codes and standards in areas impacted by the hurricane. However, during the 1990 session of the South Carolina legislature, a proposed, state-wide building code was defeated.

During the interviews, city and county officials were asked if they were aware of the earthquake risk in South Carolina. Each respondent acknowledged that there is a seismic risk in South Carolina, but they all replied to the effect that little, if anything, could be done about it. FEMA staff made little mention of the seismic risk and did not push very hard to have the seismic risk considered along with the hurricane risk for the hazard mitigation planning effort. Nor did state personnel express any interest in doing something about the seismic risk. Moreover, the Charleston chapter of the Red Cross did not insist on achieving seismic resistance when it rebuilt its damaged office building. The Red Cross did not set a good example.

New Explanatory Model of Recovery/Mitigation

The circumstances in South Carolina gave rise to a new explanatory model of mitigation in the aftermath of a major disaster (see Appendix 4). On-site research in South Carolina revealed the difficulties of accomplishing mitigation measures during the recovery period, a situation often significantly underestimated by the agencies imposing such requirements. This model attempts to identify the building blocks of an effective mitigation process and to note that progress is usually in stages, each of which may last years.

In South Carolina prior to Hurricane Hugo, the general capacity for recovery and mitigation was at the lowest level (Peak I in the model). As described above, the presidential disaster declaration included requirements for a federal and a state hazard mitigation plan. Although many of the hurricane-impacted counties are also at risk from earthquakes, both the federal and state (draft) hazard mitigation plans have primarily focused only on hurricanes. This may be due to practical limitations on capacity and funding shortly after the disaster, but a single-hazard focus is a narrow interpretation of the legislative intent of the state hazard mitigation plan as well as a short-sighted planning device for both state and federal governments.

In the post-Hugo setting, South Carolina's state and county governments can be said to be making progress; they are moving higher in the first tier (Peak I in the model) of mitigation, in large part driven forward by federal requirements.

Similarly, many of the on-going earthquake hazard awareness efforts in South Carolina have been led by the federal government. During the past year, FEMA's National Earthquake Hazard Reduction Program staff have provided workshops and other educational efforts that focus on South Carolina's earthquake hazard. Both FEMA and the state of South Carolina are dealing with the two hazard agents separately.

The ability to effectively carry out earthquake hazard reduction measures appears to require a Peak III level (Appendix 4, Figure 2) of understanding and capability. Hence, one is struck by the inherent conflict in trying to mount a multiple natural hazards mitigation effort in South Carolina. One problem is a conceptual planning limitation—neither FEMA nor South Carolina has been able to link earthquake and hurricane efforts in their hazard mitigation plans. A second problem is that of government capacity. An effective earthquake mitigation capability would appear to require at least Peak II capacity, yet South Carolina is at a Peak I level of capacity and motivation.

The difficulties of effectively planning and implementing earthquake mitigation and recovery cannot be overstated. For example, California would appear to have Peak III capability, yet municipalities recovering from the Loma Prieta earthquake had serious problems. A recent Earthquake Engineering Research Institute report (1990) noted the deficiency in recovery planning in communities in the San Francisco Bay Area, an area considered

among the most competent and sophisticated in emergency management in the U.S.

General Observations

The research findings led us to be seriously concerned about what would happen in South Carolina if there were another catastrophic event of even greater impact than Hurricane Hugo. The demands on the South Carolina emergency management system would be more far reaching for a catastrophic event, such as a Category V hurricane during high tides that made a direct hit on Charleston or a major devastating earthquake centered in the Charleston area. Given the problems with Hurricane Hugo, a known and familiar disaster agent that has a relatively long warning time, there are reasons for serious concern about future disasters.

Since South Carolina is at risk from earthquakes, there are significant concerns about the potential damage that a moderate to major seismic event could cause in the heavily populated areas around Charleston. One could anticipate that a seismic event would cause more building collapses, structural failures, personal injuries, and deaths than resulted from Hurricane Hugo because of the latter event's lengthy warning period and the major evacuations of coastal areas that followed.

Considering the organizational and functional problems in the aftermath of Hugo that affected the recovery process at the

local and state levels, attention should be paid to the following areas:

a) emergency management capacity and capability at county and state levels;

b) state organizational and staffing problems with respect to all four phases of emergency management;

c) delivery of disaster services and assistance to victims, in an efficient, effective, and equitable manner; there is a need to achieve effective outreach earlier in the recovery period;

d) dealing with societal needs: housing, personal and community welfare;

e) enactment and implementation of state and county building and construction codes and standards, to meet NFIP requirements and to anticipate seismic safety needs; and

f) organizational and personnel recruitment and training systems at the National Red Cross and FEMA.

Changes Made or Pending in South Carolina

In the months since Hurricane Hugo, some changes have occurred and others are pending in South Carolina.

1) In South Carolina, a task force appointed by the governor examined the emergency management capacity and the placement of these functions within state government. Since the task force was operating in an election year, the recommended changes were modest. No major changes appear likely in emergency services

functions at the state level, and the responsibility for emergency preparedness remains with the adjutant general. A high priority was given to increasing education and training efforts in emergency management for state and local officials.

2) The state was not able to prepare its hazard mitigation plan required by Section 409 of FEMA regulations within the 180-day deadline. However, about six months after Hugo hit, the state did hire a state hazard mitigation officer and a 409 plan was in the draft review stage about nine months after Hugo.

3) In early 1990, legislation pending before the South Carolina legislature regarding the enactment of statewide building codes was defeated.

4) Both state and county governments faced major budget reductions in 1990-91 due to lost income and unusual expenses connected with Hurricane Hugo.

5) Charleston has a task force looking into research needs. Local business and civic organizations, as well as the tricounty council of governments, were at work with proposed projects to improve the awareness and capabilities of local government regarding emergency management.

6) The Red Cross is engaged in internal reviews and evaluation efforts in an effort to improve its ability to augment chapter- and state-level capacity in a future catastrophic event. The Red Cross has experienced an increase in interest among its chapter personnel in disaster training and an increase in volunteers in some chapters in South Carolina.

7) FEMA is engaged in an internal review, the Office of Management and Budget has asked for a review, and the U.S. General Accounting Office is reviewing FEMA's performance after Hurricane Hugo. The GAO report had not been completed at the time this report was written.

8) Six research teams have received support from the National Science Foundation to investigate various aspects of the hurricane. The researchers are examining such aspects as changes in law and policies at the state level regarding hazard mitigation, and experience with coastal zone restrictions, building standards, and practices. Only the research team from Clemson University is from South Carolina. There appears to be little ongoing disaster-related research in academic institutions within the state, although the governor's office tried to encourage such activity soon after Hugo.

9) At the state and local level, steps have been taken to beef up and sustain forest fire-fighting capability and to create public awareness that this will be a threat for the next few years. This risk is due to the huge amount of downed timber throughout the state.

IMPLICATIONS OF FINDINGS

The recovery experience in South Carolina raises many areas of concern that go beyond South Carolina. The problems experienced in the aftermath of Hugo have implications for the public and emergency management communities, for national dis-

aster organizations (such as the American Red Cross), and for the hazard/disaster research community.

Public and Emergency Management Communities

Emergency management at the state, county, and local level has had a checkered history in the U.S. Originally, it was a part of civil defense and dealt largely with protecting the general public against an enemy attack. At that time, its federal support and guidance came primarily from the Defense Civil Preparedness Agency in the Department of Defense and the Federal Disaster Assistance Agency. Even today, with those agencies combined as part of the Federal Emergency Management Agency, emphasis is placed on dual use, or integrated emergency management. One hundred percent federal funding of state emergency management programs applies only to activities that can be used under both attack and disaster conditions. Purely disaster-related activities are funded on a 50/50 matching funds basis. The amount of federal funds funneled by the state to the county and local level varies from state to state.

State-Level Issues

In a 1980 report, the U.S. General Accounting Office (GAO) said:

> With the incorporation of FDAA and DCPA into FEMA, we believe that a more coordinated approach to training of emergency preparedness officials may now be possible. That is, training standards and guidance can be provided that would include FDAA-type disaster training, including federal disaster relief programs and assistance available, and civil defense-type training in one uniform program. (General Accounting Office, 1980)

The GAO urged that FEMA develop training programs for state agency staffs and for local government officials and that each governor be asked to require that state emergency preparedness agencies "develop training programs for state agency liaisons and local government officials."

Ten years later, after Hugo and Loma Prieta, in congressional testimony the GAO said:

> There seems to have been coordination difficulties and uncertainty about the roles and responsibilities among the agencies involved in disaster relief. The state plans we reviewed vary widely in specificity, and we are exploring whether FEMA needs to provide more specific guidelines. In addition, state officials have questioned the currency and relevance of some of FEMA's training courses. During the immediate response phase after Hurricane Hugo, local, state and federal agencies were confused about their roles, and communications system inadequacies and breakdowns contributed to delays in relief efforts. (South Carolina, 1990c)

Local-Level Issues

A University of Delaware Disaster Research Center (Quarantelli, 1987) report compares the center's latest findings regarding recovery to those of an earlier study in 1970, noting that while there was some improvement, "most of the issues and problems that were evident in the 1970's continued to surface in the early 1980's . . . they were the traditional concerns of poor task allocation and coordination, confused authority relationships, and inadequate information collection and distribution."

Other problems at the county level are described by Nehnevajsa (1990). His report was based on information provided

by more than 2,300 emergency managers. Only 56% of the respondents were civil defense directors or emergency managers, per se. More than 18% were fire chiefs, almost 6% were police chiefs, and about 3% had various other responsibilities.

In this study, county and local emergency preparedness coordinators saw their major responsibilities as providing information, protective measures, warnings, generally "helping communities," and evaluating local disaster plans. Keeping track of personnel and emergency equipment ranked high; planning for emergency housing, food, and water ranked much lower; and providing construction and clothing supplies ranked even lower. Moreover, despite the obvious problems with funding and contracting in South Carolina, only one-third mentioned such problems as important and less than 17% had adequate emergency fiscal priority.

According to Nehnevajsa's study, in their working and planning relationships, the vast majority of county emergency managers related well to the fire, police, and emergency medical services. However, less than two-thirds of the respondents said they had good relationships with city or county managers. Only 20% reported predisaster contacts with planning, housing, and community development agencies. Our South Carolina interviews found no such relationships.

It is not that nothing has been done to enhance training and information resources for state, county, and local emergency managers and other elected and appointed players. There have been

a number of conferences and publications, all or partially funded by FEMA and, of course, there are FEMA training and education programs. In addition to its own publications, conferences, and training programs, FEMA has supported other education efforts through grants and contracts. Some excellent materials have been produced in the last decade or so, but their availability and impact seem questionable. Many seem to be out of print and have not been reissued.

The National Governors Association published a three-volume series (now out of print) on emergency management in 1978 and has discussed the subject often at its conferences of state executives. The United States Conference of Mayors published Emergency Management: A Mayor's Manual in 1980. The National Association of Counties published Comprehensive Emergency Management: A Guide for County Officials in 1982 and Applying Interlocal Agreements to Emergency Management: A Handbook in 1981. The International City Management Association (ICMA) published a study, Local Government Disaster Protection, in 1984. For the most part, these organizations have not produced any additional major reports in the areas of hazards/disasters since. One exception is ICMA; with FEMA's financial support it has recently completed a textbook, Local Emergency Management, to be published in late 1990.

The National League of Cities published a major special edition of its magazine, Nation's Cities, entitled "Is Your City Prepared for a Major Disaster?" in 1973 and has devoted several special reports to hazards/disaster topics. In addition, numerous

articles on the subject have appeared in the Public Administration Review, Urban Affairs Quarterly, and other professional journals in recent years.

What, if any, effect did these materials have in subsequent disasters? As GAO found, and as our interviews showed, little of the pertinent information about disaster preparedness and response seems to have reached current local elected and administrative officials.

Peer Exchanges

At the county level, several people mentioned that their preferred assistance was help from peers. Several examples were cited in which voluntary and spontaneous peer help was provided during response and early recovery efforts following Hugo. Among the city and county administrators and county emergency managers we interviewed there was great interest in peer exchanges. Use of peers occurred because some just arrived uninvited and offered to help. Others were recruited from nearby nonimpacted counties via personal network or buddy systems. Apparently, mutual aid exchanges were informal, without documented pacts or written agreements and without the involvement of state government. The South Carolina Municipal League said it facilitated this process, but none of the interviewees mentioned that organization as a source of mutual aid personnel.

Apparently, the interest in and need for on-site, hands-on technical assistance was great. Local officials seemed to be more

comfortable with peer assisted than with staff help from another level of government. No one mentioned that they wished they had had help from experts or consultants.

Educational and Training Concerns

In South Carolina, the county emergency managers we interviewed were not well informed about recovery management. Since all four county preparedness offices we visited were seriously understaffed and on a tight budget, any training would probably have been done within the state. Our interviews, therefore, raise these concerns:

- the results of emergency management education and training that has been provided thus far show there is great room for improvement;
- the use of volunteers (unsolicited or otherwise) to assist in the Emergency Operating Centers (EOCs) and elsewhere is not necessarily based on their demonstrated knowledge or expertise;
- public officials who experienced the latest major disaster become, by default, the instructors of others whether or not they did a good job by objective standards.

National Disaster Service Providers

Personnel Problems at FEMA and Red Cross

A number of questions arose after Hurricane Hugo regarding how FEMA and the Red Cross estimate and supply adequate personnel (staff, reservists, contract labor, and other hires) to deal with

a catastrophic event. Both organizations had difficulties in determining the overall needs for services and personnel after Hugo hit South Carolina. Both had major response efforts underway in the U.S. Virgin Islands and Puerto Rico. Nevertheless, both had efforts that were supply driven rather than demand driven in terms of South Carolina's needs. They both experienced serious shortages of trained and experienced personnel, particularly supervisory personnel. As a consequence, there were serious delays in opening FEMA's Disaster Application Centers (DACs) and Red Cross Service Centers. In addition, many interviewees mentioned that FEMA staff, other than those in the Disaster Assistance Program (DAP), were underutilized.

A significant number of people who have general hazards/disaster knowledge are never asked to help. A significant question is why not recruit academics and emergency management staff from other states, all of whom would benefit from a disaster experience? Why not develop on-site technical assistance teams? Both FEMA and the Red Cross could use such persons as reservists in the event of a major disaster. FEMA might:

- use such persons in connection with the extended applicants briefing sessions mentioned above;
- use them in connection with the follow-up recommendations made by the Interagency Hazard Mitigation Teams; or
- assign one team member responsibility for the documents, and have that person locate and distribute past reports, handbooks, and guidelines thought to be of use to those

involved in the present disaster—in short, personally deliver the needed documents to local and state officials, civic groups, and citizens.

Some suggested funding mechanisms that could be used include, having specialists on board as disaster reservists; using existing standby assistance contracts, which are now used by FEMA to hire damage assessors (the money comes from the president's fund); and augmenting administrative capability to improve recovery capability and coordination, an allowable expense in a declared disaster. By preparing a Damage Survey Report (DSR) for the needed staff and support expenses, augmented recovery capability could be paid for by FEMA.

FEMA: Education and Training

South Carolina's results suggest some rethinking regarding FEMA's provision of training as well as how its support of state training efforts in emergency management, in general, and in recovery, in particular. It would appear that the present system of FEMA/EMI and FEMA-funded state training is not effective. New efforts are needed to provide a wider variety of training in more locations and possibly to localize and customize offerings that may be more useful to and convenient for all who want them.

A broader approach to education and training should be taken, going beyond providing courses at fixed times and locations. A more flexible, varied, action-training approach may be a better alternative. In the near term, greater emphasis should be

given to on-site education and training immediately following a major disaster. An often unanticipated outcome of a major disaster, such as Hurricane Hugo, is that the Federal Coordinating Officer (FCO) and other FEMA personnel who staff the Disaster Field Office (DFO) become frontline emergency management educators.

Perhaps it is time to decide that in those cases where state and local capabilities are determined to be relatively weak, the education and training functions should be assessed in the immediate aftermath of the disaster, and customized on-site sessions should be developed and taught to match the local needs. The Red Cross has done this for many years. It is in the interest of federal and other assistance agencies to upgrade local capability.

Some areas where improvement can be achieved are listed below.

1) Applicant's briefing. The applicant's briefing should be examined in terms of content and duration. Perhaps more than this one-shot information effort is needed. For example, a series of sessions may be needed, with a staff person assigned for follow-up work in less capable communities.

(2) Knowledgeable persons. There is a need for knowledgeable persons with up-to-date information to assist with informing local public officials and others about FEMA programs and their administration. Two overlooked sources:

a) researchers (academic and private) and emergency management trainers (federal and state) who could be FEMA or Red Cross reservists and go out occasionally on an operational job as a disaster worker;

b) local emergency management staff; such staff often lack disaster experience, but why not work out a mutual aid exchange between states? Response work elsewhere could be more valuable than a desk-top training exercise and credits could be given for experience.

3) Peer exchange. As mentioned, peer exchanges occur now in an informal, haphazard way. With some organization this could be a valuable form of inexpensive technical assistance. For example, a cadre of experienced competent state and local officials together with specialists, consultants, and educators, could be invited to serve as part of an elite technical assistance team. Perhaps they could be supported and prescreened as FEMA disaster reservists.

FEMA, or another organization, could create and maintain a list of capable officials at county, city, and state levels who have recently experienced a major disaster and dealt with it well. These names could be made available to officials in impacted areas, and the officials could be encouraged to invite them to assist.

4) On-site technical assistance. New ways of providing technical assistance to bolster state and local emergency manage-

ment competence should be explored. Some ways include using existing devices such as the Standby Disaster Assistance Contract (SDAC) and selective use of reservists.

At the present time, the firm of Dewberry and Davis has the FEMA contract for Standby Disaster Assistance. Apparently this contract is used for damage assessment. Perhaps the scope of work of the SDAC could be broadened to provide states and counties with hazard mitigation planning assistance, particularly in complying with Section 409 (the required state hazard mitigation plan), and with help in developing Section 404 projects. In addition, perhaps the SDAC could be used to obtain professional assistance for impacted cities and counties to develop and follow up on the IHMT report recommendations.

In some places, better use could be made of regional planning agencies and government councils to offer assistance to small communities with recovery planning needs.

The Hazard/Disaster Research Community

A great concern after viewing the recovery experiences of the South Carolina communities was the serious lack of research and experience-based knowledge about recovery and mitigation. If there were lessons learned, they were largely from the actual Hugo experience, rather than from preparedness training and available information. There seem to be two interrelated problems:

- persons who receive emergency management educational or training programs or materials no longer are in the jobs they held at the time of training; and
- incumbents in key jobs did not get the education or training needed for that position in time to respond to a major disaster.

These problems raise questions about some of the information produced in the last decade or so. Specifically, one can ask whatever happened to—or what use has been made of—some of the practical, client-specific documents produced, such as:

a) the National Governors Association's seminal research on state organizational arrangements and the need for comprehensive emergency management;

b) prototype recovery programs that included realistic, practical simulations of the disaster recovery process, featuring the conflicts of local interests and complex interorganizational relationships that typically occur in the aftermath.For instance, Rubin and Barbee (1985) wrote two recovery training programs for FEMA (one on recovery from a coastal storm and the other from riverine flooding) and pilot tested them in three vulnerable locations in 1982. These prototype training programs used simulated disaster situations and role playing on the part of participants. The pilot programs received excellent evaluations, but the simulations were changed, and the programs were never offered to a national audience.

c) the applied research products (identified earlier in this section) produced by public interest groups in the last decade or so;

d) the recovery research by Haas, Kates, and Bowden (1977), Reconstruction Following Disaster; Tierney (1985) on the Coalinga, California, earthquake recovery; Rubin, Saperstein, and Barbee (1985), Community Recovery Following a Major Natural Disaster; and Bolin (1982), Family Recovery After a Disaster;

e) sources of information and assistance, such as the Natural Hazards Research and Applications Information Center at the University of Colorado and the Disaster Research Center (DRC) at the University of Delaware;

f) documents or handbooks, such as those produced by FEMA, USGS, and other agencies, on state and local mitigation.

The engineering community seemed to do the best job in learning from Hurricane Hugo. Peter Sparks of Clemson University received a NSF grant to study research Hurricane Hugo's effects and was under contract with South Carolina to provide technical assistance to local governments regarding building codes in coastal areas. He also organized a meeting for engineers on lessons learned about one year after Hugo.

Recovery Research and Training: Why Is It as Poor as It Is?

The level of available research and knowledge about recovery is sufficiently adequate so that new or expanded training

materials could be developed. These materials should be aimed at upgrading training practices and should be made widely available in a variety of forms. Existing training is too limited, and we suspect, not current in terms of the most recent research findings.

The available informational and skill transfer systems and their contents need to be seriously addressed, in terms of:

- who is targeted and who is receiving training;
- what is the quality and quantity of training;
- which federal and state agencies are the major focal points for training and educational efforts in emergency management; and
- what other possibilities for making federal and state programs more readily available and more customized exist?

Part of the problem is that emergency management education and training is a closed circuit. FEMA offers training through its training facility at EMI and occasionally via other means, such as regional special topic workshops. Although FEMA provides some money to state emergency services agencies to provide training to local officials, that training seems to lack imagination, appeal, and aggressive outreach so that local elected officials will participate. There appears to be little or no contact between the recovery and mitigation researchers and those persons designing and executing FEMA's training programs.

RECOMMENDATIONS FOR FUTURE RESEARCH

While many questions and issues that warrant research have been discussed in earlier sections, some issues of special interest are listed here. These topics are categorized as operational or basic. In fact, many of these topics do not fall neatly into the basic or applied research categories.

Operational Topics

1) How can evacuations from coastal areas or other high-risk areas be ordered, and yet permit key persons, such as Red Cross and fire-fighter volunteers, to remain in the evacuated areas? The evacuated areas would (probably) not have shelters, mass feeding facilities, or power.

2) What are the current organizational models of emergency management used at the state level, and which are the most effective? It would be useful for someone to update the research on state-level emergency organizations, using the work done by the National Governors' Association in 1978 as baseline data.

3) How can organizations such as FEMA and the Red Cross improve recruitment, training, and deployment of reservists? How can they improve their ability to quickly provide temporary help that is adequately trained and knowledgeable about the organization and its programs?

4) How can a workable recovery plan, as a component of state and county emergency management functions, be developed? Currently, plans and efforts focus mainly on emergency response

(such as debris removal and power restoration) and do not deal with matters such as acquiring and repairing housing units, changes in building codes and construction standards and inspection, and changes in land use. As currently constituted, many county emergency management agencies lack policy-making powers needed to perform these broader functions.

5) How can FEMA better assess the ability of states and territories to respond to disasters prior to becoming involved in a presidentially declared disaster? Not all states and territories are equal in their ability to prepare for and respond to a catastrophic event. Some states are clearly better organized, better staffed, and more financially secure than others.

6) How can the American National Red Cross better assess and anticipate variations in capabilities and strengths of chapters in states, territories, and possessions? There need to be differentiated responses on the part of national disaster assistance organizations that are based on current, realistic assessments of state-wide capabilities.

7) How can the recommendations in the Interagency Hazard Mitigation Team reports, state hazard mitigation plans, and Section 404 proposals be better monitored?

8) How can thinking about recovery and advanced planning for future catastrophic events be fostered at the county and state levels? What planning and management competence must be acquired to deal with another "big one" in South Carolina? How will the needed personnel be adequately trained and provided?

9) How can housing for large numbers of low and moderate income displaced residents be provided? In 1989, both Hurricane Hugo and the Loma Prieta Earthquake raised this issue.

Research Topics

1) What use, if any, has been made of earlier recovery research products, particularly of applied research produced by public interest groups? Is anyone paying attention to earlier user indications of the types of products they find most useful? Should some formerly useful products be updated and reused?

2) What alternative modes of delivering information (video programs, disaster simulations, computer-based decisions systems, better information and data systems, etc.) can be used to share information more effectively?

3) How can monitoring and evaluation of the major organizational personnel involved after a catastrophic event be improved? We need a better system of on-the-job oversight and evaluation. This duty should not be left to politicians and the news media.

One possibility is a public post-mortem on each major disaster, at least on an annual basis. This would allow frank discussion among researchers and other impartial persons watching the processes and the public officials involved at all levels. In the case of Hurricane Hugo, a post facto assessment should include the key people from the U.S. Virgin Islands, Puerto Rico, South Carolina, and North Carolina.

4) How can both teaching and learning about the recovery process be upgraded? There is very limited application of disaster knowledge stemming from experience or research. We are underestimating significantly the time and effort required for new information to be absorbed and used. We need to improve the transfer of information and its translation into practical knowledge and operational skills.

SUMMARY

South Carolina has been an unusually interesting case for the study of emergency management, generally, and recovery planning and management, in particular. The number and range of issues identified and the list of topics for further study demonstrate the breadth and depth of problem areas that manifested after Hurricane Hugo.

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Personal interviews were conducted with American National Red Cross and FEMA regional staff; Charleston News and Courier articles from September 1989 through October 1990 editions were reviewed; and fourteen on-site interviews were conducted with employees from city, county, and state government, and nonprofit organizations.

APPENDIX 1

South Carolina Field Interview Guide

I. General Description

1) Local emergency management organization
   - Pre-Hugo
   - Post-Hugo

2) Recovery plan
   - Pre-Hugo
   - Post-Hugo

3) Size of county, communities

4) Extent of damage, by sector

5) Domains of recovery
   - Residential
   - Business/commercial/industrial
   - Public services and facilities
   - General population (citizens' needs)

II. Leadership Roles and Functions (public and private sectors)

1) Effective local public/civic decision making

2) Priority attention to intergovernmental relations

3) Broad gauge (e.g., urban renewal) treatment of impacted areas

4) Long-range view of rebuilt community (betterment, vision)

5) Ability to marshall internal and external resources

III. Ability to Act/Recovery Capability

1) Availability of federal and state resources

2) Local capability versus dependence on external resources and other assistance (e.g., mutual aid pacts)

3) Local administrative and technical capacity

4) Horizontal relationships (within local government)

5) Vertical relationships
City/county coordination
County/state/federal relations

6) Issues regarding local authorities, powers, enabling legislation, home rule, etc.

7) Mitigation: interest in, capability for
Federally-mandated mitigation:
a) Section 409, state hazard mitigation plan
b) Section 404, specific mitigation projects

IV. Knowledge of Emergency Management and Disaster Agents

1) Local knowledge of procedures, requirements, and benefits of state and federal disaster assistance

2) Identification of sources of disaster assistance

3) Realistic, workable, and current emergency management plan (including a recovery component)

V. Resources Wanted?

1) What personnel, consultants, and financial resources do you wish you had?

2) What information—publications, technical documents, or computer systems—do you wish you had?

3) What training do you wish you and/or your staff had?

VI. Lessons Learned:

1) If Hurricane Hugo happened this week, would the recovery process be different?

2) What would be different and why?

APPENDIX 2

The Role of the Red Cross Post-Hurricane Hugo in South Carolina

Although frequently lumped casually together with other disaster responders under the rubric of private or voluntary agencies, the American Red Cross is unique in that it was congressionally chartered as a voluntary disaster relief agency more than a hundred years ago. This traditional role is restated in the Robert T. Stafford Disaster Relief Act.

Because of the agency's past performance and ongoing response to crises of all sizes, it is seen by FEMA and some state and local (largely major metropolitan areas) emergency managers as a "first line of defense" in major disasters,because it provides emergency mass care for evacuees and the disaster-caused homeless, and individualized emergency family assistance until the federal/state programs are in place. The Red Cross then supplements those as needed. Red Cross's postdisaster surveys are generally the basis on which both the Red Cross and FEMA determine needs for personnel, supplies, assistance centers, etc.

Red Cross Response to Hurricane Hugo

South Carolina's Department of Social Services (DSS) is legislatively mandated to implement the state's Emergency Welfare Services Plan in time of disaster. The Red Cross is considered a component of that plan—to the extent that Red Cross staff coming to South Carolina to organize a relief operation were described as being surprised that they had to share responsibility for mass

care operations. The Red Cross, the DSS, and the Department of Education jointly decide which schools are to be used as shelters and when they are to be opened. This decision seems to be made on a county-by-county basis. The state DSS also assists Red Cross with the distribution of food for use in mass care.

1) Emergency operations. The Red Cross initiated its hurricane action plan in South Carolina the day before the Hurricane hit, opening a Hurricane District office to coordinate local chapter activities. A Red Cross staff member was assigned to the State Emergency Operating Center (EOC) in Columbia. Some national staff were assigned to the operation before the storm struck, but essentially, the initial response was the responsibility of local chapters, many of which had participated in hurricane preparedness activities with the National Weather Service and county offices of emergency preparedness. According to Red Cross reports and the state's DSS, there were at one time 208 Red Cross sponsored shelters in South Carolina for evacuees and persons whose homes were uninhabitable. There were 60,000 people housed and fed in those facilities for varying periods of time. Most of these shelters were in schools. Because of a shortage of local Red Cross volunteers and staff, more than 1,400 DSS employees and school personnel were used to manage and staff the shelters. To provide food at the shelters and in the disaster cleanup areas, the Red Cross ultimately used 65 of its own vehicles plus the services of Southern Baptist and Salvation Army mobile units.

2) Other mass care operations. The Red Cross participated with local emergency managers and other community groups in the bulk distribution of food, water, ice, and clothing, but not to the degree it did in disasters around the nation, and not, apparently, to the degree expected—or desired—by local officials. This was because the massive inundation of relief supplies (needed or not) prompted by public appeals from Charleston officials, created a plethora of bulk goods that were being distributed by all kinds of official and unofficial groups. In the counties we studied, this distribution ultimately became reasonably organized but not necessarily with Red Cross assistance. In at least three places, officials expressed disappointment in the initial Red Cross response. However, two of them indicated that once the Red Cross opened service centers for individual assistance, their feelings improved even though they did not seem well-informed about the kind of assistance involved. Mass care expenditures exceeded $1 million, not including the value of bulk donations, government surplus food obtained through DSS, and the parallel costs of other voluntary groups supporting the Red Cross effort.

3) Coordination with FEMA. The Red Cross works closely with FEMA and other federal agencies in disaster situations and did have a representative permanently assigned to FEMA's disaster field office in Charleston. However, the Red Cross established its field office in Orangeburg, 60 to 70 miles from Charleston, which made coordination more difficult until communication

services were fully restored. In addition, because of the limited availability of personnel, the Red Cross did not send any staff members to FEMA Disaster Application Centers (DACs) as it usually does following a major disaster. The victims seeking or needing immediate assistance while they waited for federally funded help had to go to another location to get Red Cross aid. This was further exacerbated when, two weeks after the storm, the Red Cross closed its assistance centers on Sundays. This made it impossible for victims to apply for Red Cross help on Sundays.

Nonetheless, the working relationships went reasonably well. The Red Cross helped many victims fill out forms (as did many other groups) and provided additional assistance to victims referred by FEMA after receiving the maximum $10,000 from an Individual and Family Grant. The Red Cross also sent hundreds of families back to FEMA to appeal grants in lesser amounts when those grants did not appear to meet the actual disaster-caused needs. One Red Cross supervisor described a room in the FEMA Disaster Field Office (DFO) as being "absolutely filled" with paperwork from such appeals.

4) Individual family services. Ultimately, the Red Cross assisted over 20,000 South Carolina families with their individual emergency needs for food, clothing, household effects, occupational supplies, minor repairs, and medical and nursing needs (replacing lost prescriptions, eyeglasses, etc.) Although the Red Cross provided close to $7,500,000 in such assistance, some Red Cross staff felt the figure would have been higher had inex-

perienced, undersupervised local hires and volunteers followed the organization's normal assistance practices more closely. The Red Cross's own study shows evidence of inadequate help in some cases, possibly due to racism on the part of Red Cross personnel.

Regarding what the Red Cross calls "additional assistance," approximately 1,200 South Carolina families who received the maximum Individual and Family Grant were referred to a small Red Cross casework staff that remained in the state for more than seven months. Of these, more than 500 were provided additional Red Cross assistance, with a number of cases involving major repairs or rebuilding costing between $12,000 and $20,000. (Comparable figures for Loma Prieta were $30,000-$60,000 because of the considerably higher cost of housing and land preparation.) All told, the Red Cross spent $7.5 million dollars on individual family emergency assistance and somewhat less than a million dollars on additional assistance.

The Red Cross had a number of problems dealing with Hugo and its aftermath. Some of the problems were related to the state of disaster preparedness on the part of its South Carolina chapters. Others appeared because—like FEMA—the organization has experienced a series of budget constraints and infrastructure vicissitudes in the past decade. The problems were particularly acute since the Red Cross's last truly massive disaster response was in 1972 when tropical storm Agnes followed swiftly on the heels of the Buffalo Creek and Rapid City floods. South Carolina was hit following the Hugo's massive destruction in Puerto Rico and the

U.S. Virgin Islands, and, in turn, was followed by California's Loma Prieta earthquake. This coincidence of major disasters put a tremendous strain on the Red Cross response system, which, as mentioned, had already been weakened by a series of internal changes and fiscal constraints.

A) Infrastructure and organizational changes - In 1983, in response to impending national budget shortfalls, the Red Cross implemented what was termed a modified field service plan. This replaced a division structure in which approximately 80 larger chapters (with the help of some national budget support and staff) were responsible for maintaining program levels in assigned chapters within their assigned jurisdictions. This system had worked well in some areas but not in others.

Under the new system, about 200 chapters are designated as Key Resource Chapters (KRCs). Among these are the Charleston Low Country Chapter, which had three of the counties hardest hit—Charleston, Berkeley, and Dorchester—in its jurisdiction, and the Columbia chapter, which is also responsible for state relations. The KRCs are expected to provide some training and other support to smaller chapters around them. Responsibility for recruiting volunteer leaders for smaller, rural chapters rests with a territorial manager, who, in South Carolina, had no day-by-day responsibilities in the Red Cross disaster programs in the larger chapters. Oversight responsibilities rest with management at the Red Cross Eastern Operations Headquarters in Alexandria, Virginia. That office is responsible for not only the quality of

disaster programming in chapters in its jurisdiction but also for mounting and staffing disaster responses when situations are beyond the capability of local chapters. In actual practice, this means the field service manager is responsible for disaster response in smaller communities. This same individual is the organization's Hurricane Preparedness Officer for South Carolina. Chapters in the state share the support services of one disaster field representative who is based in Charlotte, North Carolina.

Under the new system, disaster Services at national headquarters had no designated oversight responsibility for the program at the operations headquarters level and beyond. This was made even more drastic in 1984, when another reorganization cut the national headquarters staff from nine to four professionals (a situation which has been reversed only relatively recently).

Beginning in 1983, field staff specializing in nursing, military hospital social work, first aid, and water safety were eliminated, further reducing the national organization's immediate response capability. The theory was that the gap would be filled by people from other chapters and volunteers willing to serve without salary for extended periods of time.

B) Program changes - As recently as the early 1960s, the Red Cross was virtually the only major resource for disaster victims and their families. Government programs were extremely limited (except for Small Business Administration disaster loans). But as the federally funded assistance programs grew, the Red Cross program became more limited, providing short-term, immediate

assistance, counselling, and referral assistance. Additional help was available for those for whom federal programs were not available or not sufficient. Even these services were retained only after efforts by Red Cross management to eliminate the extended help were defeated at a national convention.

Fiscal concerns created considerable emphasis on keeping administrative costs down. Some operations headquarters' management urged disaster field operations to keep assistance minimal. As the increasingly independent regional operations continued, there was little effort from national headquarters to reverse the trend. The reduced program also shortened the length of time people were expected to stay on field assignments. Chapter personnel were recruited for three weeks, then some for two. The percentage of volunteers on assignments increased, but membership in the skilled, experienced disaster staff reserve fell off sharply because these professionals could not make enough money on short-term operations. Many of them became FEMA reservists. In fact, many Red Cross veterans in South Carolina worked for FEMA during Hurricane Hugo. In California, many worked for FEMA or the state.

C) Weak state of preparedness - The Red Cross state of preparedness in South Carolina was relatively weak, a fact reportedly known to the operations headquarters but about which not a great deal was done. The Charleston chapter focused on its blood program, and there seems to have been little activity in the smaller communities within its jurisdiction, or for that

matter, in Berkeley and Dorchester counties. Further, many of the chairpersons of smaller, rural chapters were also the county emergency managers. In Hugo, some of these chapters responded well, others poorly. Unfortunately, the response in the counties we visited was, as we were told more than once, "disappointing" or did not improve until "the national sent someone in to help us."

D) Survey results - The initial Red Cross survey, completed shortly after Hugo hit, showed that about 39,000 families had suffered losses. This survey was the basis for early staffing patterns and other organizational actions. A month and a half later, Red Cross reports showed 110,875 families had been affected, and ultimately it was discovered there were even more victims in poor, isolated rural areas. By this time, however, the competing, indeed, overwhelming, demands of both Hugo relief operations following Hugo in the Caribbean and California earthquake made it virtually impossible to get enough capable, experienced help for South Carolina's Red Cross operations.

Red Cross survey activity was slow and incomplete because many chapters, overwhelmed by their initial mass care responsibilities, just did not get the surveys done in a timely way. It took days for incoming national staff to get into the field to oversee additional efforts.

E) Accounting - Although the field staff administrators asked that the accounting function be transferred from the national headquarters to South Carolina, this was not done

because of a lack of available staff. As a result, payment of funds owed to merchants and landlords (for temporary quarters) took much longer than usual. The result was that some victims were threatened with eviction, and the Red Cross field headquarters in Orangeburg had to frequently deal with angry merchants.

APPENDIX 3

Outline of Recommendations of the Interagency Hazard Mitigation Team Report

Hurricane Hugo

FEMA 84-DR-SC

October 1989

The hazard mitigation recommendations of the Interagency Hazard Mitigation Team were broken into six categories, which in turn were subdivided into 42 separate work elements. The six categories and the main issues under each are as follows:

Emergency Management

Issues: Inadequate Emergency Operating Centers (EOCs)
Development of Standard Operating Procedures (SOPs)
Training of Key Agency Staff

Communications and Warning

Issue: Emergency Communications and Warning Systems

Infrastructure; Utilities; Transportation

Issues: Identification of Critical Facilities
Emergency Power Sources
Safe Locations for Commercial and Recreational Crafts.
Clearance of Right of Ways
Replacement of Existing Movable Span Bridges

Floodplain and Coastal Management

Issues: Restoration of Damaged Beaches
Stabilization of Dunes
Debris Removal from Inland Waterways
Development and Implementation of Shorefront Management Plans
Elevation and Installation Requirements for Manufactured Homes in Flood Zones
Technical Assistance to NFIP-Affected Communities and Community Compliance with NFIP Requirements
Regulation of State and Federally Funded Municipal Facilities Located in Floodplains

State Adoption of Updated NFIP Standards

State-Owned/Financed Structures in Floodplains

Potential Section 1362 Acquisition Program

Historic Structures Compliance to NFIP Requirements

Completion of Flood Prevention Projects and Implementation and Identification of Future Projects

Codes and Standards

Issues: Mandated State Building Codes

Coastal Construction Compliance to NFIP Design Requirements

Adoption of V-Zone Foundation Criteria

Construction Compliance with Coastal Wind Standards

NFIP Design Certification for Coastal Construction

Improved Design Standards for Manufactured Housing

State 409 Plan Issues

Issues: Involvement of Key State Agencies in the Development and Implementation of Postdisaster Hazard Mitigation Plans

State Recovery Plan

State Funds for Hazard Mitigation Projects

Mandated Storm Water Management

Detection, Prevention, Suppression of Wildfire Hazard

APPENDIX 4

New Explanatory Model of Recovery

(Rocky Mountain Model)

Note: This model was developed by Claire B. Rubin after three post-Hugo, on-site visits. It also draws upon observations made during three previous sets of site visits, which were completed as part of another major research project but have not yet been written up for publication.

The recovery process, particularly the process that includes significant mitigation measures, remains poorly understood and underappreciated in terms of the effort required. A new explanatory model of public-sector recovery is offered here.

This model, constructed during the course of researching community recovery from Hurricane Hugo in early 1990, is provided to show the many levels of effort, commitment, and cost connected with recovering from a major natural disaster and attending the reduction of risk from future disaster. It reflects more than observations and findings after Hurricane Hugo. It reflects observations made during the past five years after visiting several communities recovering from a major natural disaster.

The earlier explanatory model of recovery (Figure 1), which was an important first step, was developed by Haas, Kates, and Bowden (1977). It now appears that this model no longer provides an accurate depiction of the aftermath of major disasters in the United States. First, this author has observed that the recovery process does not follow a predictable timeline. Second, I have not

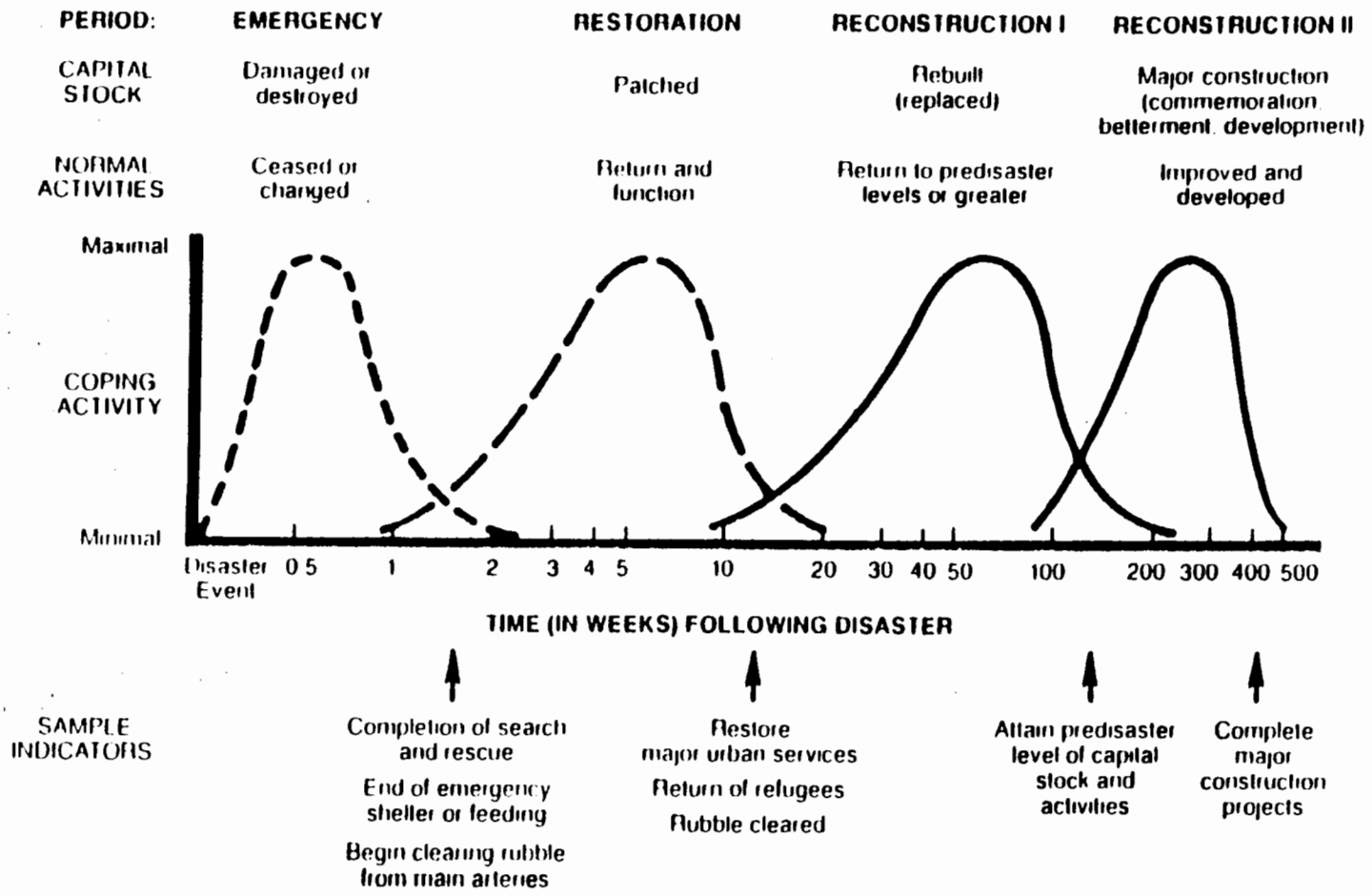

Figure 1. Phases of Disaster Recovery

observed a progressive sequence from response to recovery (near- and long-term) to a community betterment sequence. Last, recovery is not a linear process.

An Alternative Model: The Rocky Mountain Model

In contrast to the figure above, called a wave chart by some, I would like to suggest that the stages of recovery are more like separate peaks of a mountain, each of which is separately discernable, yet connected to the adjacent peak. The outline of the three stages of recovery are depicted in Figure 2, the Rocky Mountain model in honor of the Boulder, Colorado, location of the talk at the Natural Hazards Research and Applications Information Center's annual conference in which this model was first presented.

A brief description of each stage and of the forces that connect the three stages is provided below.

Peak I: Minimalist/Restoration

This is the most common mode of recovery. It emphasizes the physical recovery (public works, repair, restoration, etc.) of the community. For many communities, the amount of attention paid to mitigation of future events is the least they can get away with it.

Key Characteristics:

1) Physical cleanup and repair
   - debris
   - public roadways, structures, utilities, lifelines
2) Restore or replace structures, systems, lifelines

3) Local governments may delegate functions connected with temporary and long-term housing and with citizen well-being and personal needs, to private voluntary or nonprofit organizations. Some of these services may be done by national relief organizations such as the Red Cross or paid for by FEMA.

Drivers (motivators):

1) A common, minimal set of requirements for state/local emergency preparedness and community planning and management capabilities

2) Federal (National Flood Insurance) and private insurance requirements

3) Human need possibly)

Enablers (Information Sources/Modes of Learning):

1) Training courses on emergency management

2) Off-the-shelf documents (emergency preparedness plans, model contracts, inventory lists)

3) Peer exchange (hands-on help from counterparts). This occurs informally in the form of self-invited officials or invited counterparts in nonimpacted areas. The result is help of highly variable quality and quantity.

Peak II: Foresight/Mitigation

Communities at this level of recovery engage in longer-term and more comprehensive thinking and preparation than those at the earlier level. Their actions show concern for more than physical restoration, particularly for societal impacts and human needs after a disaster.

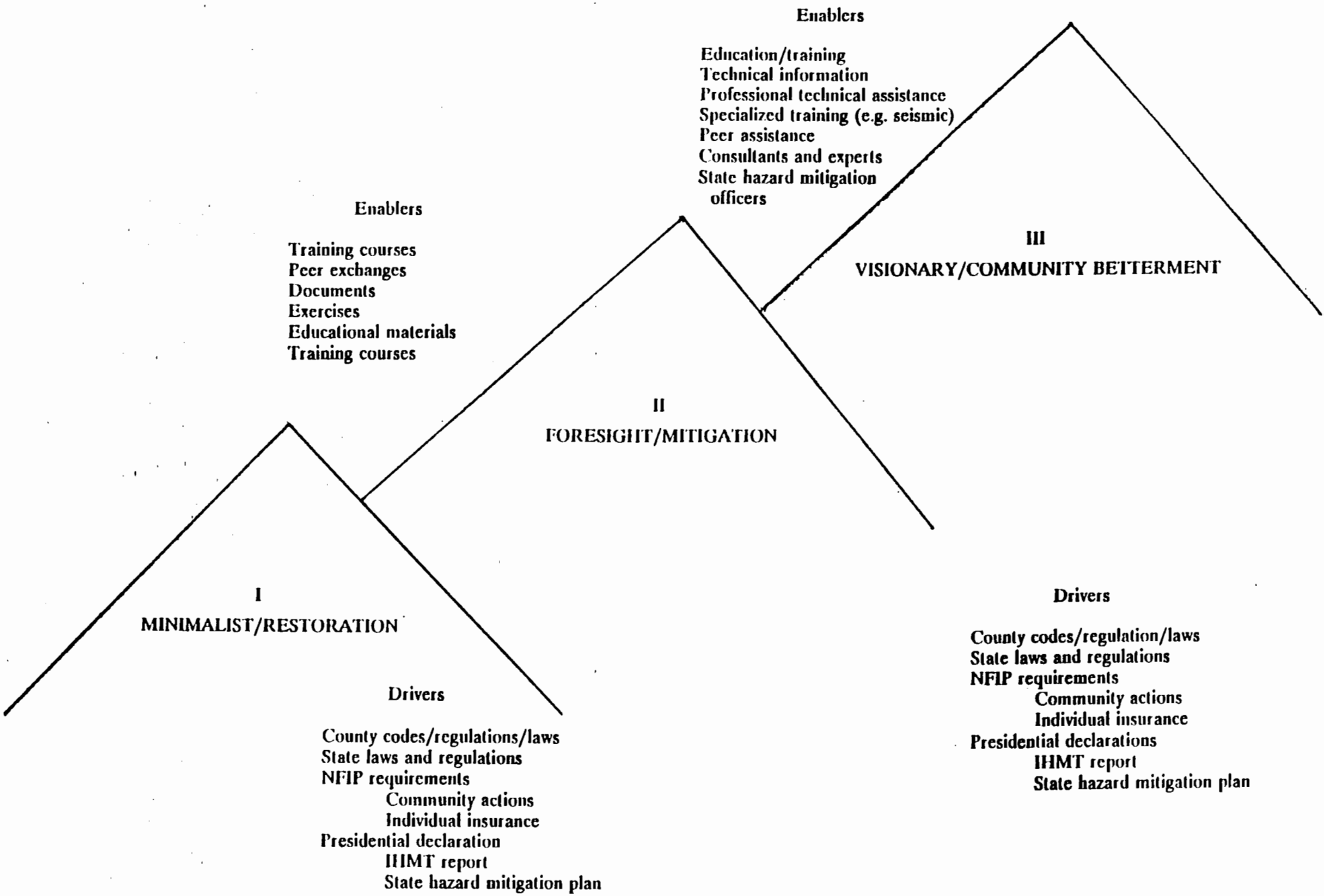

Figure 2. The Rocky Mountain Model of Recovery Following a Disaster

Communities that participate in the National Flood Insurance Program (NFIP) must undertake some mitigation activities as a condition of their participation in that program.

Key Characteristics:

1) Short- to medium-term time span
2) Single-hazard focus and hence mitigation for single hazard
3) One-county approach (for land-use controls and building codes and standards changes); for example, enactment or upgrading of county building codes, construction standards, land-use controls; use of building permits to control rebuilding and to monitor construction contractors
4) Relatively simple, one-tier organizational arrangements to improve interagency arrangements; linkages between local government and Red Cross, United Way, interfaith housing groups, etc.
5) Mostly horizontal intergovernmental relationships
6) Improvement of one- or multi-county emergency management; e.g., formalization of mutual aid exchanges.

Drivers:

1) FEMA/NFIP (community requirements,individual insurance)
2) Federal IHMT Report recommendations
3) FEMA requirement for state hazard mitigation plan
4) Implementation of state hazard mitigation plans
5) State laws (e.g., coastal zone regulations; seismic codes)
6) County laws (land use, building codes)

Enablers (Information Sources/Modes of Learning):

1) Technical information from FEMA regulations, handbooks
2) Professional publications
3) Assistance from professional, trade associations

4) Assistance from consultants and academics
5) Specialized training from state government, FEMA, others
6) State floodplain managers
7) State hazard mitigation officers
8) Assistance from peers

Peak III: Vision/Community Betterment

Communities that display the highest level of competence typically show greater concern not only for public safety but for community betterment. This level requires greater breadth, depth, and farsightedness than earlier levels. Few communities show this level of sophistication in their recovery effort, yet this level is needed for effective seismic safety preparedness and for successful flood and other hazard mitigation.

Key Characteristics:

1) Long-term time span; enactment or upgrading of state-wide building codes
2) Multi-hazard approach covering substantive mitigation vis-a-vis; all major hazards in impacted areas
3) Broad geographic area (more than one county); multi-county planning approaches (mutual aid agreements for response, recovery)
4) Multiorganizational arrangements; for example, state seismic safety commission/interstate river authorities/the Central U.S. Earthquake Consortium.
5) Vertical and horizontal intergovernmental relationships
6) Improvement in emergency management capability at state and substate levels; for example, the incorporation of mitigation and recovery planning as components of emergency management. This is a function of improved education

and training, investment in staff and equipment, and hiring practices.

7) Appropriate funding systems or appropriations

Drivers:

1) FEMA/NFIP (community requirements,individual insurance)
2) IHMT report recommendations
3) FEMA requirement for state hazard mitigation plan
4) Implementation of state hazard mitigation plan
5) State laws and regulations
6) State and regional planning agencies
7) Councils of government
8) County laws and regulations

Enablers (Information Sources/Modes of Learning):

1) Custom-tailored, sophisticated
2) High level of emergency management knowledge
3) High level of technical knowledge, including hazard assessments, zonation studies, specialized building codes, special construction practices, regulations
4) Use of consultants or experts for customized assistance
5) Highly trained staff

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