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Disaster Analysis: Emergency Management
Offices And Arrangements

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SUMMARY

DISASTER ANALYSIS:
EMERGENCY MANAGEMENT OFFICES AND ARRANGEMENTS

FINAL REPORT ON PHASE I

for

Federal Emergency Management Agency
Washington, D.C.   20472

by

Dennis Wenger
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The Disaster Research Center
University of Delaware
Newark, Delaware   19716

under

Contract #EMW-85-C-1981
Work Unit 2651 F

February, 1987

SUMMARY

Part I describes and analyzes the research of the Disaster Research Center (DRC) on the responses of local emergency management systems in six community disasters. Effectiveness of response was assessed in terms of communication which resulted in correct information collection, a fully functioning EOC, appropriate procurement and distribution of human and material resources, proper task delegation and coordination, a legitimated authority structure, integrated and coordinated relationship with outside private, state and federal organizations, cooperative relationships with mass media groups, and response activities based upon real, not mythical needs. We examined how extensiveness of response was influenced by prior disaster experiences, prior planning, and federal aid. We then derived an eight-fold categorization of emergency management systems: traditional offices, by-passed agencies, emergent agencies, established agencies, embedded agencies, by-passed community agencies, emergent community agencies, and established community agencies. After a comparative examination of the likelihood of the existence of different types, we point out the policy implications of the findings for response, planning and structure of local emergency management systems.

Part II describes the processes and problems in the computerization of the DRC library and data base and projects DRC's future work.

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EXECUTIVE SUMMARY

In the fall of 1985, the Disaster Research Center (DRC) at the University of Delaware began work under contract EMW-85-C-1981 on a five-year project focusing upon community response to natural and technological disasters. There are two distinct, but interdependent, areas of activity, i.e., the field work and the library and data base work. These two areas are discussed separately in Parts.I and II of this report.

One ultimate purpose of our overall five-phase effort is to improve understanding of the total community response to a major disaster that overwhelms local capabilities and necessitates substantial assistance from the outside. Our guiding hypothesis is that the form of the organized response, the nature and relationships of the multiple groups involved in the response, the pattern of organizational communications and coordination, and the role of the local emergency management agency in a catastrophic disaster will both differ from and be similar to that which will emerge in a more limited type disaster. However, any realistic move to developing applicable knowledge for a catastrophic event requires an examination of what actually is in place by way of preparedness for moderate and major emergencies, and the obtaining of empirical data on the actual response to current community disasters in American society.

Our first year effort on this contract benefitted from previous work undertaken by the DRC for the Federal Emergency Management Agency (FEMA) in 1984. The major findings of that work were: (1) there continues to be considerable variation in the overall structure and functioning of local emergency management agencies in American communities; however, there are some common elements that are significant for disaster planning; (2) the changes that have occurred over the past decade are most noticeable in the planning and preparedness areas which show general improvement; (3) there has been relatively little change in the response patterns of local emergency management agencies in actual threats or disasters. Most of the same issues and problems that were evident in the 1970's continued to surface in the early 1980's.

The current study replicated and extended this earlier research with the focus of this year's effort being on how disaster emergencies are managed, including both instances of where there were local arrangements with full-time personnel and also with only part-time personnel. The latter situation is in addition to what we had previously studied. Our goal was to identify those dimensions that influence the _effectiveness_ of response activities in the six case studies that formed the core of our analyses, although we used other field data as well in reaching our conclusion.

PART I

Field Research on Local Emergency Management
Agency Response to Disasters

DRC research undertaken in 1977 reported that ambiguity on the part of the general public, community influentials, and organizational officials existed over the structure, function and role of civil defense offices (as

local management agencies were called a decade ago). **Those local units which had the greatest saliency and viability tended to be those with extensive horizontal relationships to other local organizations, and those with a broad task orientation who were concerned with multiple hazards.** Those units that had legitimacy tended to be in localities where: (1) **there were persistent threats,** (2) **civil defense was within the local governmental structure,** (3) **extensive relationships were maintained with other organizations,** and (4) **the output or product of the civil defense unit was seen as useful to other community groups.**

Analysis of the findings of other researchers in combination with the earlier work of the DRC indicates that, prior to the 1985 DRC research, there was general agreement that variability in the overall functioning of local emergency management agencies exists within the United States. However, the 1985 report advanced a very important finding: <u>Since 1977 disaster planning and preparedness activities have improved at the local level.</u> This improvement can be seen in a number of areas, particularly with regard to hardware items, such as resource procurement and the establishment of Emergency Operations Centers (EOC). The communities are doing a better job of not only producing paper plans, but at making planning more of a process, rather than a product. (In other words, they approach disaster preparedness and planning as a never-ending, on-going activity that includes such various elements as hazard analysis, public education activity, exercises and simulations, ongoing networking and interaction between local units, and training; they do not view planning as simply the production of a paper plan.)

However, we had also observed in 1985 that although planning and preparedness have improved, <u>response patterns have not.</u> There were still problems regarding coordination, communication, resource allocation, task assignments and organizational responsibilities. In part, there is an incorrect view of coordination as simply involving contacting or cooptating others instead of a meshing of concurrent actions toward relatively agreed upon goals.

Why has response not improved? The 1985 DRC report offered a number of possible explanations. First, the implementation of planning during normal periods is often difficult and becomes even more problematic under the pressure of emergency-time demands. Second, although increased planning has occurred, it has often been of poor quality. It is weak in three ways: (1) **there is a failure to recognize a need for a system or overall perspective both for planning and response;** (2) **there is a frequent underestimation of the need to plan for flexibility and improvisation in the emergency response;** (3) **there is little recognition of the inherent limits to planning.**

This past year we focused upon the response activities of local emergency management agencies. We developed and applied an inventory of response dimensions particularly in an analysis of the response of six communities to disasters. We examined the quality and effectiveness of response in these communities in light of such variables as their previous disaster experience, the role of federal assistance in the planning effort, and the extensiveness of prior planning.

Dimensions of Local Emergency Management Agency Response

We analyzed the response of the six case study communities on the
following dimensions:

A. The **Extensiveness** of Response Activities

We determined the involvement of local emergency management units in
such tasks as warning, evacuation, search and rescue, damage assessment,
information collection and distribution, sheltering, emergency medical
care, handling of the injured and dead, security and convergence
activities, restoration of essential services, and local decision-making.
We analyzed the extensiveness of response for each communit. and especially
of the local emergency management system, keeping in mind tnat not all
disasters create similar and/or equal demands.

B. The **Effectiveness** of Response Activities

We evaluated the effectiveness of local response activities on the
following dimensions:

1. Communication Which Results in Correct Information Collection
    and Distribution

With regard to communication activities during disaster, researchers
such as ourselves and Drabek have observed three major types of problems:
(1) **agencies have a limited capacity to process the huge volume of
information presented to them,** (2) **there are important disjunctures or
breaks in the response networks, both between local units and with outside
agencies,** (3) **no single unit has the authority to structure, control, or
regulate the flow of messages across the network; this results in cross-
checking and needless message flow with the already overburdened system.**

There are two components to the effectiveness of communication. The
emergency response agency must have the technical ability to effectively
collect and distribute information. However, the problems of communication
during disasters are often not technologically rooted; they have to be
recognized as being socially, intraorganizationally, and interorganiza-
tionally based.

2. A Fully Functioning EOC

Emergency response is clearly aided if all local response organiza-
tions are aware of, and are represented at, a common location. Organiza-
tional liaison personnel operate best if they are knowledgeable and possess
certain authority and decision-making ability within their own organiza-
tion. The physical facilities are relatively unimportant if the EOC
operates as an expanding social system.

3. Appropriate Procurement and Distribution of Human and Material
    Resources

Effective response is facilitated if needed resources can be
efficiently gathered and distributed. What is critical is that the local
emergency management agency knows where important items or individuals are

located, or how to find out quickly, and has made pre-arranged plans for using them at the time of disaster.

4. Proper Task Delegation and Coordination

Response is hindered if there is not a clear delegation of specific tasks to specific organizations. For an effective response, it is necessary to maintain both interorganizational and intraorganizational knowledge of task responsibilities.

5. A Legitimated Authority Structure

In an effective response, the locus of decision-making is clearly specified, understood, and accepted by the responding units. This implies an emergent resources model and not a "command and control" model.

6. Integrated and Coordinated Relationships With Outside Private, State and Federal Organizations

In an effective response there is a minimization of the degree of conflict in external horizontal and vertical relationships. The relationships are mutually beneficial and there is a high degree of agreement about the nature of the relationships.

7. Cooperative Relationships With Mass Media Organizations

An effective response is one in which patterns of relationships develop that are acceptable and beneficial to the local emergency management agency, the mass media organizations, and the public. The quality of the response suffers where conflict and lack of understanding exist between emergency officials and the media.

8. Response Activities Based Upon Real, Not Mythical, Needs

An effective response is based upon accurate knowledge concerning actual disaster behavior. Response is often hindered by inaccurate perceptions of public behavior in such areas as shelter utilization, convergence, and security issues.

In sum, an effective response is highlighted by excellent information collection and distribution, a fully-staffed and functioning EOC, adequate human and material resources, a specialized division of labor among responding units with the coordination of those units by one agency, a legitimated authority structure, integrated and coordinated relationships with outside organizations, mutually beneficial and effective relationships between emergency officials and mass media representatives, and "reality based" activities.

Brief Case Studies of the Six Disasters

We present six case studies derived from our intensive field research. These case studies focus upon the description and analysis of the planning and response activities of the local emergency management agencies. The six cases involve a variety of technological and natural hazards, including

a toxic spill, hurricane, tornado, and floods, We also examined a variety
of different types of local arrangements ranging from the non-existent
local agency, through the small, part-time office, to the large, well-
staffed and managed local unit.

An Analysis of the Response Patterns in the Case Studies

The Patterns of Response

We observed a dramatic variation in the extensiveness of response. It
ranged from a broad level of involvement in most of the pertinent tasks in
three communities to a very limited response effort in two of the research
sites. We judged the effectiveness of the response to range from an out-
standing effort observed in one community to rather ineffective, problem-
plagued response patterns observed in two communities. Between these
extremes, three communities had adequate responses that were not, however,
trouble-free. Our comparisons across the six communities indicated that
the areas of most difficulty included communication, task assignment and
coordination, and authority relationships. We found only one community
consistently handled these problems well. The problems of communication
were not those of technology or equipment. They were a result of autono-
mous units acting independently and not talking with each other.

The communities fared somewhat better in the area of hardware. For
example, there was adequate handling of resource procurement and distribu-
tion in all communities except one. Where we found problems with re-
sources, they were difficulties in distribution and allocation, not in
procurement. Adequate resources were available; the problem was one of
distributing them. We noted that most of the communities had an adequately
functioning EOC. The problems of EOCs were not those of facilities, but
were of a social and political interorganizational nature. For example,
liaison personnel failed to appear or left the EOC, high level managerial
staff did not report, the EOC was by-passed in matters of procurring re-
sources, and a delay occurred in establishing an EOC in some of the com-
munities.

In a majority of the sites, our analysis indicated that the response
appeared to be based upon fairly accurate perceptions of the actual needs
that can arise in a disaster. However, we observed problems of "overkill"
in sheltering and a lack of preparation for the convergence phenomenon in
certain settings.

Finally, we found generally favorable relationships with outside
agencies and organizations. Media relationships were generally adequate in
all but one case, although there were some problems in all cases. Problems
in media relationships included the lack of a trained Public Information
Officer, and the lack of provision of space and facilities for media
representatives. In all cases, relationships with state and federal agencies
were adequate to excellent.

Factors Related to Extensiveness and Nature of Response

We selected three important contextual or pre-impact factors and examined their relationship to disaster response: (1) previous disaster experience, (2) the extensiveness of disaster planning, and (3) the existence of federal assistance. We found a strong positive relationship between previous disaster experience and the extensiveness of response. Similarly, we noted that the effectiveness of response is also positively related to previous disaster experience. While there was no indication that a lack of experience is beneficial to response, there was also no guarantee that moderate or extensive experience automatically resulted in more effective response patterns. We think that the intermediate link may be the extent to which this experience is concretely translated into improved planning and preparedness measures.

By extensiveness of planning, we refer to the range and kinds of disaster agents covered by the planning activity, as well as the nature and variety of the planning activities. We observed that the range of planning activity in these communities varied from practically nonexistent to the comprehensive pattern of total planning activities. Once again, we found there is a strong positive relationship between the level of preparedness activity and the level and effectiveness of response. Response patterns are broad and varied where planning is extensive, multi-hazard in nature and comprehensive. With regard to the effectiveness of the response, our findings can be summarized in two statements. First, more problems and difficulties arose in those communities which had no planning or very limited planning activities. Second, while moderate or extensive planning activities tended to facilitate an effective response, they did not guarantee it.

Therefore, we must qualify our previous findings from 1985 that planning has improved, but response patterns have not. Not all planning has improved. Planning is often still limited in communities without viable, full-time emergency management agencies. There is a less extensive response pattern in these communities. We noted the response pattern can be excellent where planning is of high quality and the attempt is made to interface those preparations with response activity. However, where there are structural discontinuities between the planned emergency response system and the normal organization of government, the efficiency of the response may be hindered--even in the face of excellent planning.

We observed that various forms of federal assistance can have positive, salutary effects upon local community response. Within the limits of our small sample, case-study approach, we noted that the response to disasters tended to be more effective in those communities that had received more extensive federal funding. In addition, the response in one community significantly benefitted from having had its officials attend the one-week course at the National Emergency Training Center at Emmitsburg, Maryland. There had been almost a complete lack of disaster planning within this community, and without the experience and assistance provided at Emmitsburg, the response probably would have been more problematic and less adequate.

An Empirically-Based Categorization of Emergency Management Systems

Our data indicate that the communities vary on three dimensions that have importance for understanding the structure of local emergency management. They are (1) **the degree of autonomy as opposed to integration of the emergency management agency,** (2) **the extensiveness of planning activities,** and (3) **the extensiveness of response activities.** We found it possible to classify emergency management systems on these dimensions. First, any local emergency arrangement can be classified as to whether or not it is an independent or autonomous unit, or an integrated one that is part of a larger, local department, such as police or fire. Second, each unit so classified can also be categorized according to whether its planning activities are narrow or broad in scope. Third, the units can finally be classified according to the narrow or broad scope of their responses to disaster. For example, a unit may be autonomous and engage in narrow planning and response. We identified eight types as follows:

1. Type I - <u>The Traditional Local Emergency Management Office</u>
This type of arrangement is highlighted by an independent, emergency management office that engages in narrow or limited planning and response activities.

2. Type II - <u>The By-passed Local Emergency Management Agency</u>
In this situation a local independent emergency agency exists that may have engaged in extensive planning and preparedness, yet at the time of disaster it is generally ignored by the broader community or only engages in a narrow range of activities.

3. Type III - <u>The Emergent Local Emergency Management Agency</u>
In this instance an autonomous agency has undertaken limited or no planning, however, at the time of disaster it is suddenly involved in extensive, ad hoc response activities.

4. Type IV - <u>The Established Local Emergency Management Agency</u>
This agency represents the ideal pattern of the traditional, viable local emergency management agency. The independent agency engages in extensive planning activities and their response activities are broad in scope.

5. Type V - <u>The Embedded Community Emergency Management Office</u>
In this situation emergency management activities are located within a larger county or city government agency; they are not an independent office. Furthermore, the office engages in limited or no planning activities and at the time of disaster is either inactive or undertakes only a narrow range of tasks.

6. Type VI - <u>The By-passed Community Emergency Management Arrangement</u>
This pattern is similar to Type II except that the agency is not autonomous. Although a part of one local department, such as the fire department, it engages in an extensive planning effort that involves a wide array of governmental and private agencies in a new, emergent emergency management organization. However, that response is by-passed in an actual disaster.

7. Type VII - <u>The Emergent Community Emergency Management</u>
<u>Arrangement</u>

This type represents a situation in which little or no planning has been done by a local, integrated office or department within a larger organization but an extensive response effort occurs during the disaster.

8. Type VIII - <u>The Established Community Emergency Management</u>
<u>Arrangement</u>

The locus of activity is within a larger division or department and the planning activities are broad in scope and involve participation by all response organizations. At the time of disaster, the response is also a system-wide one.

We present examples of these various types. We observed that the weakest patterns are Types I and V, with the latter being the least viable. The two strongest patterns are Types IV and VIII.

<u>Strong leadership appears to facilitate the formation of the Type IV or Established Local Emergency Management Agency.</u> Continuity of leadership also seems to be critical in forming this traditional, independent arrangement. They are also more likely to be established in disaster prone areas. We hypothesize that they are more likely to be established in medium-sized cities, as opposed to either very small or large areas. Where these factors are missing, the context will not facilitate the existence of a strong, independent unit which controls and consumes resources. The strength of this pattern is in the strong authority relations that it engenders. The structure enhances task specification and coordination.

We found that the <u>Type VIII, or Established Community Emergency Management Arrangement, is a product of rational, bureaucratic design and is likely to be facilitated in those communities in which police and fire departments desire to not relinquish authority over their units during disaster.</u> It is compatible with communities that have a moderate disaster history. Furthermore, we noted that the pattern is most compatible with the structure of small or very large cities. Barriers or threats to the development and continuity of an Established CEMA include: a high rate of turnover in personnel, normal competition and domain conflicts among local governmental units, and a lack of strong, committed leadership. The strength of this type of arrangement resides in its ability to piece together collective resources and produce involvement on the part of a wide range of emergency relevant organizations. The major weaknesses are the problems of task assignment, coordination, and authority; they may be somewhat endemic in the model.

Summary and Policy Implications

There are three major themes in our work. <u>First,</u> there is considerable variation in the adequacy of response in dealing with the usual social organizational problems. Our research this time focused upon response patterns in a greater variety of different kinds of emergency management arrangements than had the DRC's previous work. Although responses varied from the outstanding to the barely adequate, the problems that we identified generally were not those of technology or resources. Instead, they were the traditional concerns of poor task allocation and coordination,

confused authority relationships, and inadequate information collection and distribution.

Second, pre-impact factors such as prior disaster experience, adequate planning and relevant federal government input can make a positive difference in emergency response. We suggest a developmental sequence from our data which point to disaster experience resulting in increased planning activities which eventually produce an improved response. We discuss exceptions to this pattern. Both federal funding and the educational and training programs offered at Emmitsburg significantly improved the response in various communities.

However, extensive disaster experience and planning do not guarantee an effective response; in other words, our findings reinforce an earlier stated DRC position that managing a disaster involves more than planning for such a community emergency.

Third, the diversity in organizational structure is not in itself dysfunctional. We developed a typology of eight different types of local emergency management agencies or arrangements, classified our case studies into the scheme, and discussed the strengths and weaknesses of the various types. Our discussion shows that different types of communities are more structurally supportive of different types of systems. This diversity may be beneficial. However, it can create problems for federal agencies in developing training and educational programs to govern all situations.

Implications from the Findings

Response

1. It is possible to evaluate, through systematic social science research, the effectiveness and extensiveness of emergency responses. Perhaps similar, although grosser, measures could be developed for internal (i.e. within LEMAs) and external (i.e. by state agencies and FEMA) evaluation purposes.

2. EOCs, if used correctly, appear to be good investments. There should be emphasis on appropriate uses of EOCs (e.g. as sites for coordination rather than control operations).

3. Difficulties and problems almost always arise between emergency agencies (especially LEMAs) and mass media organizations during emergency time periods. Both groups need to be educated to the nature and disaster related problems of the other group.

4. Much of what actually goes on at LEMAs during disasters involves information processing and coordination. These kinds of probable disaster responses (and possible problem areas) should dictate emphasis in planning.

5. Disaster experience does not automatically translate into better future planning. Encouragement should be given to the development of

systematic ways LEMAs can learn appropriately from the past (beyond routine after action reports).

Planning

1. Planning, if understood as more than just writing disaster plans, almost always makes a positive difference in response. As such, emphasis should be on what is learned by participating in the planning process and not on an end product, such as a plan.

2. Some kinds of planning activities by LEMAs, such as those that create better coping for or adaptability to new emergency situations, are better than others. Planning and training activities ought to develop adaptive, innovative or creative abilities.

3. The variety of FEMA programs can contribute significantly to local planning and response activities. Possibly more attention might be given to ways of systematically identifying and documenting the contributions of educational and training programs.

4. Communication difficulties underlie many, although not all coordination, task assignment, and/or authority problems in disasters. Planning activities should recognize this.

5. There is frequent absence of pre-impact contact between different sectors involved in disaster planning (e.g. between key community organizations such as police and fire departments and LEMAs, and other groups such as in the medical, health and welfare areas). Major efforts ought to be undertaken to bridge such gaps.

Structure

1. There is considerable and continuing variation in the structure of LEMAs. This stems from the nature of community life and, therefore, the range of variation is unlikely to change very much in the future.

2. There is no one structurally optimum type of LEMA for all communities. Efforts to impose a single uniform model are likely to be both ineffective and dysfunctional.

3. The degree of autonomy of LEMAs is less important than the extensiveness of the planning and response they undertake. It appears that less attention can be paid to the positioning of LEMAs in the social structure of communities than is frequently assumed.

4. There is extremely wide diversity in local disaster planning as well as considerable variety in the structure of LEMAs. While minimum standards ought to be set for LEMAs, the advantages of heterogeneity should be recognized and accepted.

5. The case for the integrated emergency management system idea insofar as disasters are concerned seems a valid one. The structure of LEMAs ought to assume a generic or all hazards, instead of an agent specific, approach to disasters.

In conclusion, keeping in mind the limits of our research, we see evidence that **while other factors are also involved**, federal assistance by way of funding, planning assistance, educational and training programs, and

policy guidance are all contributing to improvement in local level disaster planning and response. While existing efforts should generally continue, more could be achieved if some of the specifics of our research findings were taken into account. In particular, it would be wise for FEMA to further encourage the appropriate kind of planning, to emphasize the social organizational nature of the response problems in disasters, and to continue to emphasize the positive features of local variations in emergency management agencies and arrangements.

PART II

Library and Field Data Computerization

The second part of this year's work concerns the upgrading and computerization of the DRC's library and the exploration of the problems inherent in computerizing the vast data collection archives of the Center. Both tasks will be undertaken during the five years of the contract period, and significant progress was made on them during the first year. However, more time will be needed than originally visualized to complete all the work.

The Upgrading and Computerization of the Library Holdings

The library holdings of the DRC are the most extensive collection of material on the social and behavioral aspects of disasters in the world. The holdings number over 18,000 items. The current project allows for the continued upgrading of the collection and for the modernization of the retrieval system. With the computerization of the library classification system, and the distribution of these holdings on diskette to practitioners and other research centers, the utility of the library for those outside the confines of the Center will be greatly enhanced.

We purchased the necessary hardware and software materials. We entered the 442-page <u>Inventory of Disaster Field Studies in the Social and Behavioral Sciences 1919-1979</u> into the computer system. The SCIMATE software program has been utilized for both the computerization of the library and the inventory. This program is also being used by the University of Colorado Natural Hazards Center. A copy of the inventory has been sent to the University of Colorado and is also included with this report.

In order to upgrade the library, we initiated exchange agreements between the DRC and eleven other centers and groups which issue disaster related publications. Other less formal agreements allow DRC to build its collection at little cost and to obtain publications that would otherwise remain unknown or not be easily available to the American disaster research and planning community. New journals, books, research monographs, and articles continue to be added to the library at the rate of about 10 per day, mostly through non-FEMA funding sources.

The DRC continues to provide information through its publication list. Currently available are 20 DRC Books and Monographs, 18 DRC Report Series volumes, 6 Historical and Comparative Series volumes, 183 articles, 44 Preliminary Papers, 11 Miscellaneous Reports and 14 other publications. About a fifth of these resulted from FEMA or predecessor organization

supported research projects. Hundreds of DRC publications were either provided gratis or sold at nominal costs during the year. Apart from libraries and disaster researchers, about 50 domestic organizations ranging from local emergency management offices to chemical companies obtained DRC material during the past year. (A list is provided in the report.)

With regard to the computerization of the library holdings, we have presently catalogued over 2,000 items into the library computer system. The DRC classification system is described in detail in the report. It is a standard system that includes the Library of Congress reference number.

The library at the DRC continues to have heavy use from emergency managers, emergency officials, and others from throughout the United States. About three dozen individuals came to the Center to use its library during the year; they ranged from local emergency management officials to foreign disaster researchers (a list is provided in the report). In addition, there is much information seeking from the Center by way of mail correspondence and phone calls; these average about a dozen a week.

We now anticipate that a proposed meeting with personnel from the DRC, the University of Colorado Natural Hazards Research Center, the University of Pittsburgh Risk and Emergency Management Program, and the technological accident program at Clark University will be held in the middle of 1987. This meeting will allow for discussion of the interface and compatibility of these major library holdings.

The Computerization of the DRC Data Archives

The DRC archives contain the largest collection of data which can be found in the world focusing upon organizational and community response to natural and technological disasters. The data have been gathered from over 470 different studies of crisis events. These events have involved over 1,300 separate field research trips. The DRC has produced 223 different field instruments in gathering this data. The vast majority are detailed, open-ended interview guides. This information is augmented by systematic participation observation and the gathering of documents and statistics. Presently, the archives contain slightly more than 9,000 tape-recorded interviews, notes from hundreds of non-recorded interviews and secondary documents, and thousands of disaster plans, organizational logs, after action reports and related documents.

This past year we have examined the problems of developing a meaningful system for categorizing the information in a form that will allow for ease of retrieval. A coding scheme for social organizational substantive data is currently being developed based upon the 223 different field instruments. We are also discussing the problem with other researchers who have used the DRC data archives for their own purposes as well as other researchers who have constructured and computerized data coding schemes. At the end of the second year we hope to have identified several options regarding how to proceed and the relative advantages and costs of each in further attempting to computerize the substantive contents of the DRC data archives.

Included in the report are appendices on the research methodology used for Phase I, the field guides used in Phase I, and the DRC library classification code.

I. INTRODUCTION

In the fall of 1985, the Disaster Research Center (DRC) at the University of Delaware began work under Contract EMW-85-C-1981 on a five-year project focusing upon community response to natural and technological disasters. There are actually two distinct, but interdependent, areas of activity in this project, i.e., the field work and the library and data base work. In Part I, this report discusses the major findings uncovered during the first year of field research. The major accomplishments made in the library and data base activities is reported in Part II of this report.

The Field Work

The five-year field study of local community response to disasters is divided into five phases. During the first phase, the preparedness and response of local emergency management agencies (LEMA's) is the focus of analysis. The second year attention shifts to local fire and police departments. Hospitals and emergency medical organizations will be examined during the third year of the project. Finally, in the last two years we will look at interorganizational disaster coordination and planning.

One ultimate purpose of the overall five-phase effort is to improve our understanding of a total community response to a major disaster that overwhelms local capabilities and necessitates substantial assistance from the outside. Our general guiding hypothesis is that the form of the organized response, the nature and relationships of the multiple groups involved in the response, the pattern of organizational communications and coordination and the role of the local emergency management agency in a catastrophic disaster will both differ from and be similar to that which will emerge in a more limited type disaster. However, any realistic move

to developing applicable knowledge for a catastrophic event requires an examination of what actually is in place by way of preparedness for moderate and major emergencies, and the obtaining of empirical data on the actual response to current community disasters in American society.

The first year effort was able to benefit from previous work undertaken by the DRC for the Federal Emergency Management Agency (FEMA) during 1984. At that time, DRC gathered data from seven communities across the United States. This information was combined with data gathered from nine other disaster sites to provide a sample of 16 research settings. The purpose of this effort was to compare the status of local planning and response by emergency management organizations in the 1980's with what had been found in similar DRC studies in the late 1960's and 1970's.

The Final Report for that project presented a detailed, considered discussion of three major findings. First, we observed that since the earlier studies the considerable variation in the overall structure and functioning of local emergency management agencies still exists in American communities; however, there are some common elements that are significant for disaster planning. Second, the changes that have occurred over the past decade are most noticeable in the planning and preparedness area. Third, DRC found that there has been relatively little change in the response patterns of local emergency management agencies in actual threats or disasters. Most of the same issues and problems appear at the present time as in the past (Quarantelli, 1985: 9).

Based upon these observations, the current study has replicated and extended the research effort. Simply put, the focus of this year's effort has been on how disaster emergencies are managed, including both instances of where there were LEMA's with full time personnel and also with only part

time personnel. Inclusion of the latter situation is an addition to our previous research effort, but the focus on the disaster response is a continuation of some previous studies done by DRC in the 1970's. Through in-depth field research during actual disaster situations, we have attempted to detail not only various response activities, but also to delineate and clarify the dimensions of an effective response. As such, we have considered why response activities have remained problematic in the face of improved planning and preparedness measures. Our detailed analysis of six case studies has identified some important dimensions that influence the effectiveness of response activities within the integrated emergency management scheme.

Obviously, this analysis does not ignore planning issues. In all instances we have examined and chronicled the state of pre-impact planning within the community. Furthermore, we have attempted to develop a typology of local emergency management arrangements based upon the relationship between planning and response activities. As opposed to the work in 1984, however, we have concentrated most of our analysis upon response dimensions.

The Library and Data Base Work

During the first 21 years of its existence, DRC had assembled the largest library by far anywhere in the world on the human and social aspects of disasters. In addition, the Center had accumulated thousands of interviews and other primary data, including more than 3,500 transcriptions of field data tapes. The move from The Ohio State University to the University of Delaware in 1985 provided an opportunity to better organize the library collection and to make the data base more accessible for research and other purposes.

Thus, Part II of this report focuses on the progress that has been made in the computerization of the DRC library holdings and data base. We had proposed that work during the first year of the contract would involve placing the books and monographs of the library in a standard catalogue format on computer disk. The intent is not only to upgrade the cataloging system of the library, but also to make the holdings available to a much larger audience of potential users. Furthermore, during the year we began work on how to computerize the data base that has been gathered from DRC's approximately 470 previous studies.

The goal here also is greater access for research users. In addition, we proposed to selectively increase the holdings of the DRC library so there would continue to be one central place where the great bulk of the social and behavioral science research literature on disaster topics can be consulted. It would be very costly, if not impossible, to duplicate the Center's library holdings because it includes the inheritance of the library of the Disaster Research Group of the National Academy of Sciences, the gifts of large private collections of pioneer disaster researchers, and what the Center acquired through two decades of studies for the National Science Foundation, the National Institute of Mental Health, the Health Resources Administration and other federal and state agencies, as well as FEMA and its predecessor agencies.

In Part I (Chapters II-VII) we report the major findings of our field work. In Part II (Chapter VIII) we report the accomplishments of our library and data base work. There then follows three appendices: A on the research methodology used in Phase I; B on the field guides used in Phase I; and C on the DRC Library classification code.

PART I

FIELD RESEARCH WORK

II. FIELD RESEARCH ON LEMA RESPONSE TO DISASTERS

The study of preparedness and planning activities by local emergency management agencies has received considerable attention in the literature. Research at DRC in 1977 focused upon the nature of planning and prepared- ness by civil defense offices. That study observed that while overall disaster planning at local agencies tended to be differentiated, segmented, isolated, cyclical, and spasmodic, it had broadened to include a wider range of agents and a greater level of involvement by various local organi- zations in the plans. Little consensus was found with respect to such issues as disaster tasks, organizational responsibility and the role of civil defense in overall community disaster planning (Dynes and Quarantelli, 1977).

Furthermore, DRC reported that ambiguity on the part of the general public, community influentials, and organizational officials existed over the structure, function, and role of civil defense. **Those local units which had the greatest saliency and viability tended to be those with extensive horizontal relationships to other local organizations, and those with a broad task orientation who were concerned with multiple hazards.** As noted by Dynes and Quarantelli (1977) local offices which had legitimacy tended to be in localities where **(1) there were persistent threats, (2) civil defense was within the local governmental structure, (3) extensive relationships were maintained with other organizations, and (4) the output or product of the civil defense unit was seen as useful to other community groups.**

Additional information on the nature of local disaster planning was provided by the International City Management Association. A large-scale survey of local and county governmental units revealed significant varia- tion in the structure of local emergency response agencies (Hoetmer, 1983

and Hoetmer and Herrera, 1983). Both the locus of authority for emergency response and the degree of planning indicated a lack of standardization (Hoetmer, 1983: 1-6).

Drabek (1985b) made similar observations regarding the structure of local emergency management. He noted that emergency preparedness in the United States was highlighted by localism, a lack of standardization, unit diversity, and fragmentation (1985b: 85-86). Furthermore, Drabek has attempted to determine what factors underlie the successful local emergency management agency (1985a). He concluded that the personality and individual actions of the local emergency management director were the primary factors that resulted in a successful local operation.

Caplow, Bahr, and Chadwick (1984) examined the degree of readiness of 15 local communities for integrated emergency management planning. They found significant local and regional diversity in the structure and function of these units. In addition to this variation, they noted that the emergency management system most often was centered in the control sector of the community with the public service, voluntary, and industrial/commercial sectors being secondary. Furthermore, it was ob- served that most of the emergency management networks appeared to be reasonably structured and could be expected to perform well in a major emergency, although they did not study any actual response situations. Finally, this study reported that the integrated emergency management system was well received by the responsible population because it conformed to existing procedures, it simplified preparation of written plans, and it deflected attention from civil defense issues that might be controversial to issues t'   might be better accepted.

In sum, prior to the 1985 DRC research, there was general agreement that variability in the overall functioning of local emergency management agencies exists within the United States. They generally are small organizations or offices. Generalists, rather than specialists, tend to prevail because staff members must be knowledgeable and informed about many things. There is little hierarchial differentiation which results in easier internal communication and clearer notions of responsibility.

The variations are evident along a number of dimensions. There are variations in the domains and responsibilities of the units. There are wide differences in the ways in which they relate to other emergency relevant organizations within the community. There are differences in the way in which they carry out tasks in specific emergencies. Finally, there are differences in what resources they can command and mobilize in various threat situations.

These findings were also part of the conclusions from the previous year's research on local emergency management agencies undertaken by the DRC (Quarantelli, 1985). As has been found by other recent studies, variation and diversity exist and appear to have been continuous since the earlier DRC work in 1977.

However, the 1985 report advanced a very important finding: Since 1977, disaster planning and preparedness activities have improved at the local level.

> The typical LEMA undertakes more planning than the
> local civil defense office of the past, and, at least
> in relative terms, the planning can probably be said to
> be better in the sense of being more systematic and
> realistic. (Quarantelli, 1985: 18).

In particular, local emergency agencies appear to be doing a better job at not only producing planning documents (most communities have some sort of plan), but also at making planning more of a process, rather than a product

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(an important point we will discuss in more detail later). The majority, however, still are content to produce only paper plans. Most communities have some sort of Emergency Operations Center (EOC), though the quality and adequacy of the facilities varies dramatically. Resource inventories and procurement seem to be handled better than in the past. Some communities are doing a better job of integrating their disaster planning with that of other organizations in the community. Furthermore, stimulated somewhat by efforts at the federal level, local communities tend to plan for a wider variety of hazards. In other words, they are increasingly taking an "all hazards approach" or a generic approach to planning which is consistent with an integrated model of emergency management (Quarantelli, 1985: 18- 22; for a statement by a FEMA official in 1985 on the idea, see McLoughlin, 1985).

However, this optimistic finding must be qualified by a related observation: Although planning and preparedness have improved, response patterns have not. As noted in the report:

> Thus, overall we did not find the convergence or linkage between preparedness planning and emergency response which might have been anticipated. As a whole, the current day LEMA's have better quality personnel and have a much better preparedness stance than the civil defense offices we studied some years ago. However, this difference does not seem to have translated gener- ally into a much better response pattern at times of disasters. This evaluative comparison, given the nature of our data, is necessarily based on relatively gross impressions. But when the cases of a decade or so ago and those of the current study are put side by side, the behavioral similarities in response patterns loom far larger than the differences (Quarantelli, 1985: 26).

What are some of the major problems in response, and why has response not improved in relationship to an improvement in planning? Answers to the first question are embedded in research undertaken by the DRC as long ago as 1969. That report noted a number of difficulties in response activities

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by civil defense agencies (Anderson, 1969). For example, it was found that

civil defense offices were hampered by undue uncertainty with regard to

many of their important organizational dimensions, including their

authority relationships, task domains, internal structures, and public

support (Anderson, 1969: 1). Their expanding structure and the inclusion

of new personnel in unfamiliar roles also created problems in coordination.

Furthermore, these agencies had difficulty in mobilizing because they did

not have the resources to monitor the environment around the clock

(Anderson, 1969: 4-5).

Furthermore, these agencies were observed in 1969 to have problems

involving authority and communication. Thus, the disaster authority of

these agencies was often unclear or was not acknowleged as legitimate by

other disaster-activated social units (Anderson, 1969: 52). With regard

to communication, it was noted that the important support function of

obtaining and providing information was one of the primary activities of

local emergency management agencies. (Later researchers have continually

stressed this point, e.g. Mileti and Sorensen, 1986.) These activities,

however, were often hindered by such problems as the inability to obtain

information about what was needed from other organizations, communication

message overload from both the public and other agencies, equipment

failures or shortages, and lack of adequate provisions for disseminating

information to agencies in general and mass media organizations in

particular.

Finally, although civil defense agencies often stated that the desired

goal of their operation was the "coordination of response," in fact most of

their activities did not involve management, decision-making, or even

coordination. Instead, they primarily were concerned with information distribution and with locating and obtaining resources (Anderson, 1969: 46).

Part of the problem here, and it is a continuing one, is a visualization of coordination that is at variance with the use of the term in the social sciences and in disaster research. Too often "coordination" is incorrectly viewed as simply having contact or communication with other organizations or groups, a "touching of bases" to allow others to express their views or interests. Equally incorrect, "coordination" is sometimes seen as a mechanism for cooptation, or at least getting concurrence from others for doing what the agency wants to do in the first place. As Quarantelli (1984:25) has written, coordination involves a meshing of concurrent actions, an integration of simultaneous activities toward relatively agreed upon purposes. Too often in disaster preparedness and disaster response, there is no coordination in that sense despite much interorganizational communication or groups informing others what they are doing or will do in the situation. Thus, DRC found in its early study of civil defense agencies that while "coordination of response" was a desired goal, we seldom saw it in field research but observed many difficulties involving communications generally.

These problems were observed still to be present in the research undertaken by the DRC about 15 years later (Quarantelli, 1985). Although the Center is the only unit to undertake systematic, detailed analysis of response activities, other case studies in various disasters concur. In particular, Drabek (1982 and 1985b) found that communication problems were the essence of the response to six disasters that included search and rescue activity. Perry and Green (1983) observed similar difficulties in evacuation activities. The work of Sorensen (1981), Scholl and Stratta (1984), and Saarinen and Sells (1985) echoes this theme.

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An answer to the second question is not as easily forthcoming. Why has response not improved in the face of improved planning? Quarantelli (1985) offers a number of possible explanations. First, he noted that implementation of planning is very problematic, even during the non-stress periods of disaster (see also; Kasperson and Pijawka 1985). Under the pressure of emergency-time demands, it is even more difficult. Second, although increased planning has occurred, it has often been of poor quality. It is weak in three ways: **(1) There is a failure to recognize that a system or overall perspective is needed both for planning and response. Also, (2) there is a frequent underestimation of the need to plan for flexibility and improvisation in the emergency response. (3) Finally, the inherent limits to planning are not always recognized (Quarantelli, 1985: 46).**

An analysis of response activities will be the central concern of Part I of this report. Based upon these, and additional components, we make an attempt to describe and analyze the various response patterns of a number of local community emergency systems in actual disaster conditions. To carry out this task, we first develop an inventory of response dimensions that can serve as a model or guideline for evaluating the response of local emergency management agencies. Following this discussion, we present brief case studies of some of the response in disaster situations we studied during the year. The criteria developed in the inventory are then utilized to evaluate these responses. Finally, we make an attempt to understand the varying patterns of response in light of a number of different variables, including previous disaster experience, the role of federal assistance in the planning effort, and the extensiveness of prior planning.

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III. DIMENSIONS OF LOCAL EMERGENCY MANAGEMENT AGENCY RESPONSE

LEMA's obviously differ in both the magnitude and quality of their response activities. Some are involved in extensive response activities; others have a more limited response pattern. Some may be centrally involved in the warning process and in dealing with public information. Information collection and transmission, damage assessment, and resource allocation may be major tasks. Some even become intimately involved in decision-making activities.

This extensiveness of the response activities of the local agency is important for at least two reasons. First, it is one indicator of the viability and salience of the agency within the local community. Where local agencies lack visibility, authority, and salience, they are more likely to be bypassed in the response activities as other local organizations assume responsibility for various tasks. Second, extensiveness is a partial indicator of the fragmentation of the local response effort. Where there is extensive involvement by the local agency, the response is likely to be less fragmented than where authority for various tasks is spread thin across numerous local organizations.

In this study, we assessed the extensiveness of response activities for the various local emergency management agencies. Through interview and observational data, we determined the involvement of the local unit in such tasks as warning, evacuation, search and rescue, damage assessment, information collection and distribution, sheltering, emergency medical care, handling of the injured and dead, security and convergence activities, restoration of essential services, and local decision-making. We, of course, know that not all disasters create similar demands. In certain cases, a number of these activities will not be relevant.

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Therefore, we judged the extensiveness of the response in light of the appropriate level of response for that emergency.

In addition, we attempted to assess the quality of the response. Toward that end, we developed a guideline for dimensions involved in the quality or effectiveness of the response. This inventory of items can be used as a set of criteria for evaluating the actual, observed response activities. Based upon both the prevailing research literature and information collected during this research effort, we offer the following dimensions.

1. Communication Which Results in Correct Information Collection and Distribution

Numerous students of disaster have noted the importance of communication for an effective disaster response. Drabek (1985b) has indicated that it is the most critical dimension inherent in the emergency management of search and rescue activities.

> Interviews with top managers from each of the organiza-
> tions that comprised these six disaster response net-
> works revealed their perception of the key operational
> problem encountered--inadequate communications. While
> stated in different words, cross-agency communication
> was perceived by most to be the greatest weakness and,
> hence, the source of most difficulties. No doubt it was
> (Drabek, 1985b: 88).

Drabek goes on to note that there were three major types of communication problems: **(1) agencies had a limited capacity to process the huge volume of information that was presented to them, (2) there were important disjunctures or breaks in the response networks, both between local units and with outside agencies, (3) no single unit had the authority to structure, control, or regulate the flow of messages across the network; this resulted in cross-checking and needless message flow within the already overburdened system (1985b: 88).**

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The previous work of Anderson (1969), Dynes and Quarantelli (1977), and Quarantelli (1985) also points to this key dimension. Furthermore, data gathered during research for Part I of this report also pointed to the importance of effective communication and information distribution.

There are two components to the communication dimension. **First, the emergency response agency must have the technical ability to effectively collect and distribute information.** The technical ability and means for allowing responding agencies to open and sustain communication through a common medium is important. We should note that this is one of the dimensions Quarantelli, in 1985, found had improved. **Second, the problems of communication during disasters, however, are often not technologically rooted; they are socially, intraorganizationally, and interorganizationally based.** Thus, typically a major difficulty is that the information obtained by the variously involved groups responding to the disaster never gets integrated and, thus, contributes to a lack of coordination. The breakdown of information flow from subunits of an organization to its central communication and/or coordination point is also a common difficulty. A lack of knowledge of the activities of various responding units results in simply not knowing with whom to communicate. Although it is not simple to achieve, an effective response overcomes these problems, as we shall attempt to illustrate later in some of our case studies.

2. A Fully Functioning EOC

Closely related to the preceeding dimension is the existence of a fully staffed, adequately equipped EOC. Emergency response is clearly aided if all local response organizations are aware of, and are represented at, a common location where communication and coordinative activity can occur. **What is especially critical is that organizational liaison**

personnel be knowledgeable and possess certain authority and decision-making ability within their own organization. A coordinated response at the EOC is often limited by having low level personnel represent various agencies. These individuals not only lack adequate knowledge of the resources, domain, and capabilities of their own organization, but suffer from a lack of integration into the decision-making structure of their organization as well.

Obviously important are the physical facilities themselves. At a minimum, adequate communication facilities, adequate work space, and certain critical resources, such as maps and resource inventories, are necessities. However, physical facilities cannot supplant the importance of social factors. A high-tech EOC is useless if it is ignored by organizations who choose not to send liaison personnel to it. An EOC is an expanding social system; if relevant coordination and decision-making occur, the physical facilities are relatively unimportant.

3. Appropriate Procurement and Distribution of Human and Material Resource

Effective response is facilitated by the existence of a current and complete inventory of all available material resources and lists of potential reservoirs of individuals who possess specialized skills and/or emergency relevant knowledge. It is not expected that the local emergency management agency will itself possess many of these resources; what is critical is that it knows where important items or individuals are located, or how to find out quickly, and has made prearranged plans for using them at the time of disaster.

4. Proper Task Delegation and Coordination

Response during a disaster is hindered if there is not a clear delegation of specific tasks to specific organizations. It is necessary to

maintain both interorganizational and intraorganizational knowledge of task responsibilities.

Such a division of labor also involves the element of coordination of the specialized tasks. Not only should each organization have some knowledge of what other units are doing, but there should be generation of some overall coordination of the response activity. However, this goal is often difficult to achieve because many officials do not take a "system" approach to the problem. Drabek has noted:

> Few of these managers evidenced an awareness of the whole. Since they did not fully perceive the totality of the response system even after the SAR demands had been met, it is little wonder that they failed to realize the degree to which the overall system lacked coordination. The high degree of fragmentation was not perceived (1958b: 88).

The task is made more complex because of the fragmented nature of most normal community life. No one agency has responsibility for coordinating both public and private sectors within society. No single unit within local government has responsibility for task assignment and seeing that coordination occurs—even within the public sector. Assignment or assumption of this task by units that lack normal visibility and decision-making authority can be problematic. However, task specialization and delegation are clear in an effective response. Coordination of the various activities, which results among other things in a decrease of duplicated tasks and a more efficient response, is prevalent.

5. A Legitimated Authority Structure

Anderson (1969), has obeserved that authority relationships in disaster settings are often confused. Once again, this condition is often a result of the fragmented, pluralistic nature of normal decision-making in communities. Furthermore, it is not enough to simply plan to place

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authority for decision-making within one agency or position. As noted by Drabek,

> Given the diversity in sponsorship and pluralism in missions and structures, there often was intense ambiguity in authority. Official norms specifying who was in charge, and of what, remained problematic across these networks throughout the response period. (1985b: 88)

Authority is granted, not just by laws, norms, or plans, but also by the subordinate.

In an effective response, the locus of decision-making is clearly specified, understood, and accepted by the responding units. This pattern does not infer that a "command and control" model must be adopted. Dynes (1983) has shown the weaknesses in "command and control" systems and has opted for an "emergent human resources model" instead. Such a model emphasizes the coordinative role of emergency management agencies and argues for a "broker" model of authority in which normally autonomous units maintain some of their independence, but overall authority for issues regarding system-wide or interorganizational impact is authoritatively designated.

6. **Integrated and Coordinated Relationships With Outside Private, State, and Federal Organizations**

Besides problematical relationships within the local emergency management system, there can be difficulties in relationships between the local emergency management system and various outside organizations and agencies. Some of these relationships are horizontal, such as those between local governmental agencies and certain local units of the private sector, such as hospitals, religious groups, or private contractors. However, problems in vertical relationships are also common. There can be

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conflictive relationships between LEMA's and state and federal agencies.
Although these agencies are generally there to assist the local officials
in their response effort, the vested interests of the local and outside
agencies may lead to misunderstandings and a lack of consensus.

**In an effective response, there is a minimization of the degree of
conflict in external horizontal and vertical relationships.** The
relationships among the various units are symbiotic and consensual. That
is, the situation is mutually beneficial and there is a high degree of
agreement about the nature of the relationships.

7. Cooperative Relationships With Mass Media Organizations

The relationship with mass media organizations is so critical that it
is deserving of special attention. An effective response is one in which
patterns of relationships develop that are acceptable and beneficial to the
local emergency management agency, the mass media organizations, and the
public. There are various indicators of such a relationship, one being a
cooperative pattern of interaction between response officials and media
representatives. Furthermore, where these relationships are effective, the
mass media representatives are satisifed with the amount and quality of
information that is given to them by the emergency officials. Conversely,
local emergency management officials believe that the media's response to
the situation is at least an appropriate, if not a key element in the
response network.

**Critical for predisaster planning and preparation is the mass
media/emergency system interface.** A well-informed Public Information
Officer, provisions for work space, access to telephone lines, and access
to key decision-makers at convenient times are parts of an effective
response. Furthermore, the active participation of the mass media as part
of the emergency management system is also important. Where conflict and a

lack of understanding exist between these two units, the quality of the response suffers. Needed information may not be distributed to the public, and interorganizational battles lead to confusion and hostility. Part of the problem here is that there is a strong tendency for the mass media to put out to the public such information as it has available on a developing community emergency. This is usually done as quickly as possible without critical comment. In the absence of information, journalists sometimes will fill the void with speculations or critical comments which may lead to an unnecessary adversarial relationship between LEMAs/community emergency organizations and the local mass media.

8. <u>Response Activities Based Upon Real, Not Mythical, Needs</u>

An effective response must be based upon accurate knowledge concerning actual disaster behavior. Unfortunately, numerous disaster myths are prevalent and are espoused by members of the public, the press, and some emergency officials. In effect, there are certain widely held ideas about what occurs during disasters that have been found to be inaccurate and dubbed "disaster myths" by research (Quarantelli and Dynes, 1972). When response is based upon mythical elements, it is likely to be less effective and efficient.

For example, patterns of sheltering are widely misperceived. While most people believe that most evacuees go to public shelters, in fact the percentage who do is very low, often less than 10 percent. Local officials not cognizant of this pattern may overkill the "shelter problem" by opening too many facilities and committing too many personnel to the shelter activity. Similarly, many people are not aware of the convergence problem. When a disaster occurs, there is often a massive convergence of food, clothing, various materials, people, and information upon the disaster site. The amount of material often exceeds local needs and presents

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serious problems for processing. Convergence of individuals upon the
disaster site can present serious problems of congestion and hinder needed
emergency action. Information overload can strangle the local
communication system. The effectiveness of the response may be hindered if
officials are not aware of this problem and do not take steps to limit this
convergence. As a final example, research has shown that serious looting
and criminal behavior in disaster are not major problems. While some
provision must be made for security at the disaster site, the massive use
of security forces is generally not warranted, and they could be utilized
for other purposes (Wenger et al., 1985).

In general, in an effective response one will be able to observe
minimal instances of unused shelters, minimal convergence resulting from
action taken to lower its magnitude, and minimal, but often symbolic,
deployment of security forces. These and other behavior patterns can
indicate that the response is based upon accurate, rather than mythical,
knowledge of disaster. As such, it can be thought of as "reality-based."

In sum, **an effective response is highlighted by excellent information
collection and distribution, a fully-staffed and functioning EOC, adequate
human and material resources,** a specialized division of labor among
**responding units with the coordination of those units by one agency, a
legitimated authority structure,** integrated and **coordinated relationships
with outside organizations,** mutually beneficial and **effective relationships
between emergency officials and mass media representatives, and "reality-
based" activities.** We utilized these eight dimensions, in combination with
the extensiveness of response, to analyze the response patterns of the
LEMAs we studied. As described in more detail in Appendix A (Research
Methodology for Phase I), for the one-year period of the contract, we

obtained data from 178 in-depth interviews, dozens of disaster plans, hundreds of documents such as afteraction organizational reports and logs, systematic DRC team observations which contributed to six DRC field reports, two very detailed case studies, and DRC staff impressions of several dozen community disasters recently studied by the Center. However, the core of our analysis of the effectiveness of the emergency response of LEMAs was drawn primarily from six disasters we studied during the year which we will now discuss.

IV. BRIEF CASE STUDIES OF THE SIX DISASTERS

In order to convey a picture of the events that we studied, the following brief case studies are provided. In each instance, we describe the general nature of the disaster and the magnitude of its impact. The community's emergency response to the event is depicted, with emphasis being placed upon the extensiveness of the response and the nature of that response as indicated by the eight dimensions previously presented. Finally, we also describe the status of pre-impact planning and the structure of emergency management within the particular community involved.

Case Study #1: Chemical Spill in Conway

It was a typical hot, humid August afternoon in this old industrial city of about 80,000 on the east coast. At a local chemical plant about four miles from downtown, an employee backed a forklift into a pipe which contained the chemical, aniline. This chemical can be fatal if inhaled or absorbed through the skin. The pipe was ruptured at about 1:00 p.m. and the chemical was released.

At this time the chemical company contacted the Fire Department; this organization was the only one contacted by the company. The company informed the Fire Department of the nature of the accident and type of chemical. The call was received by the Fire Inspector who, in turn, informed the Fire Marshall. The Fire Marshall placed a battalion chief in charge at the site of the accident.

A police car patrolling the area followed the fire trucks to the site, unaware of what had taken place. The Police Department never received an official call from the Fire Department or the chemical company. The patrol car radioed the department and reported the incident. The Police Department also contacted the local emergency management director approximately two hours after the incident. The local emergency management office had not been notified by any other organization.

At the suggestion of the "health authorities," the Fire Department ordered the evacuation of the 100-200 residents in a nearby apartment complex. The Battalion Chief actually ordered the evacuation, although the Police Department was primarily in charge of the operation. The residents were asked to leave, though they were not told where to go, for how long, or how far.

Although uninvolved in the evacuation, the local emergency management office began preliminary preparations for a possible shelter at a nearby high school. These plans were suspended, however, when the state environmental protection representative informed the emergency management

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office that shelter would not be needed because the level of chemical contamination in the air was minimal. This decision was reached at 6:00 p.m.

This lack of communication and coordination was found also at the site. Each of the organizations claimed to be manning their own command post. According to informants, a communications van was set up to coordinate communication for the Fire Department. In addition, a command post was reportedly set up in a conference room inside the plant. The police offered that they had their own command post on the site, but not in the plant. The local emergency management office and the Mayor's office also claimed to have command posts located somewhere near the site. Each organization appeared to be unaware of most of the activities of the others. The Mayor's office, in fact, only became aware of the accident inadvertently. A relative of one of the staff members called the office to ask why she was being evacuated. To this point, the Mayor's office was not aware of the incident.

A representative from the state Department of Environmental Protection was perhaps the one official perceived as being in charge of managing the emergency—at least after the individual arrived, some hours after the accident. When he arrived, the local police and fire departments turned management over to him willingly because he was perceived as being knowledgeable.

Shortly after their arrival on the site, the Fire Department set up a decontamination process. After being hosed, victims were taken to the hospital by an independent ambulance company, which reportedly had little actual contact with the hospital. The Fire Department told the hospital of the incoming patients and informed them about the nature of the chemical. In total, about thirty-five patients were taken to the hospital.

Some of them, however, went to the wrong hospital. According to informants, some patients were not taken to the hospital that was near the site and prepared for handling chemical emergencies. They were eventually transferred to the correct hospital, but the lack of communication between the ambulance and the hospital is obvious.

That evening, the evacuated residents had returned to their homes and most of the victims had been treated and released. The local officials were involved in the dual processes of clean-up and investigation.

The role played by the local emergency management office in this response incident is somewhat vague. There is little doubt, however, that its role was not central to the organization or coordination of the emergency response. Although the local emergency management office claimed to be directing the emergency according to plan, the other informants in the various organizations agreed that the Fire Department was, in fact, the basic coordinator until the state representative arrived. The other city departments were essentially unaware of the presence and activity of the emergency management office. Rather than managing the response, the office was busy observing, periodically, at the site, notifying city departments of the hazmat incident, making contact with the Red Cross for possible shelter needs, and checking on the personal belongings of those who evacuated.

Information flow was reported by all informants to be perhaps the primary problem throughout the incident. There was no operating EOC; multiple, independent command posts were established. Basically, the various city response units offered that they were ignorant of what others were doing. For example, the Fire Department offered that it knew, from information it received from the chemical company, what chemical it was handling and what should be done to neutralize it and decontaminate any affected victims. Meanwhile, the Mayor's office and the police stated that they did not know what chemical was involved until newspaper reports emerged the next day.

The response, therefore, was plagued by problems of communication, the lack of an EOC, coordination difficulties, and authority relations. Relationships with outside state agencies were, in this instance, apparently beneficial and helpful. The local units gave up their autonomy and conferred authority to the state agency. No one agency assumed the role of Public Information Officer, although media relationships did not appear to be strained.

A more complete understanding of the incident may be gained by also considering the pre-disaster structure of emergency management within the city and the degree of planning and preparedness activity. A "paper" disaster plan does exist for the city. However, it has been two years since it was updated. The local emergency management office had trouble physically locating a copy of the plan during the emergency period. The Mayor's office was ignorant of its existence, and the police knew of its existence, but had not seen a copy of it. Obviously, it was not utilized in this instance.

The director of the emergency management office does meet monthly with fire and police representatives, but the efficiency of these meetings is difficult to determine. Informants were vague about the agenda of these sessions. Furthermore, the various organizations are not completely familiar with the emergency relevant tasks that are spelled out in the plan. For example, notification of other governmental units was perceived by three different agencies to be their own responsibility—and no one directly notified the Mayor's office. It would appear that the local emergency management office lacks authority and resources during normal periods, which works against its assumption of a major coordinative role in the emergency phase. A lack of coordination of information flow and the lck of actual management of the emergency could be expected.

Some of these difficulties may result from the structure of the agency. First, the office is actually embedded within the Department of Human Services. The Director of Emergency Management is only one of a number of hats worn by the Director of Human Services. During normal periods, he functions as essentially the administrative chief of the city welfare office. During emergency time, he directs the expanding organization of the Office of Emergency Management. The office does not have the authority or the resources to develop the infrastructure during normal time to facilitate utilization of the disaster plan during emergency periods.

The city of Conway certainly survived this incident with no loss of life or serious injuries. However, if a more severe disaster had occurred, the system would have been taxed perhaps beyond its capabilities to respond.

Case Study #2: Fall Flooding in Tramble

It had been raining for four days. The mountain streams were swollen and the local river was slowly rising. Then, on Monday, the skies opened over the city of Tramble. From Sunday at midnight, until midnight on Monday, 6.6 inches of rain--an all-time record--fell on the city of 100,000. The onset of the flooding, however, was rapid. The local weather service issued a warning for high water. Within several hours, they updated their forecast for a flood watch, which was changed within the hour to a flood warning. In the late afternoon the river crested 13 feet above flood stage. The flooding cost the lives of 10 individuals within the Tramble area and an additional 11 in the surrounding counties. Hundreds of people were treated for flood-related injuries at local hospitals. Estimates were that hundreds of businesses and perhaps 3,000 homes were damaged within the county. Property damage for the city was estimated at $125,000,000 and over $300,000,000 for the western region of the state. By Tuesday evening, less than 100 people remained in two shelters, and the community began the serious problems of clean-up and damage assessment.

There was an extensive response effort within the community. One estimate is that 250 people were evacuated from the roofs of buildings by helicopter. Massive search and rescue was undertaken by a variety of fire, police, state police, Coast Guard, and volunteer units. Red Cross shelter operations were extensive, though generally of a short-time nature. Private utilities attempted to restore power to over 5,000 homes. Hospitals were actively involved; one major local hospital was inundated by the flood; another area hospital treated 200 victims. The private sector, through the activities of the local Chamber of Commerce, was actively involved in disaster tasks.

In general, however, this massive response effort was not coordinated or managed to any significant degree by the local emergency management agency. Due to the rapid onset of the flood, the local emergency management agency and other relevant disaster response organizations reported having very little time to prepare for the impact. All the organizations indicated that their first notice of the impending flood was from the local radio station. By 2:00 p.m., the local emergency management staff and various organizational liaison representatives gathered at the local emergency management agency to coordinate the local response.

The picture that emerged from various informants in a variety of organizations, however, was that extensive coordination and direction from the local emergency management office was not forthcoming. Although sought by some organizations, coordination and integration of communication flow did not come from the EOC. Instead, the various organizations undertook their own tasks as they defined their missions. This pattern resulted in some instances of duplication of effort and a lack of overall coordination of the response.

For example, after initially experiencing disappointment and some frustration in coordinating their activities with the local emergency management agency, the Police Department returned to their own headquarters and utilized their personnel in the best manner they saw fit. They engaged in barricading flooded streets, deciding upon and carrying out the evacuation of flooded areas, rescuing stranded persons by boat and helicopter, and patrolling areas to protect against looters.

Similarly, the Red Cross was deeply involved in the response effort, but claimed to have no contact with the local emergency management agency before, during, or after the flood. Activities included manning and operating shelters, collecting all relief fund donations, dispersing emergent work crews such as volunteers and church groups, coordinating the use of community supplies, such as donated pumps, and taking complete control of the damage assessment operations for private citizens.

The Chamber of Commerce attempted to help local businesses, which were seriously affected by the flooding. They did so by trying to coordinate resources among the local businesses, locating resources for the clean-up of businesses, and distributing information to affected businesses regarding availability of monies for restoring their businesses. Once again, little contact with the local emergency management office was noted.

A number of informants commented that "everyone pitched in to help themselves." It was observed that no one acted as the central coordinator of the disaster response. It was perceived that the local emergency management agency did perform some function as a coordinator of communication. They were able to gather some information relative to the extent of the impact and relay some requests for help to various emergency organizations; some resources also were allocated during the emergency period. However, even for these activities, the agency did not receive high marks. Representatives of other agencies who were intimately involved in the response effort could not identify specific tasks carried out by the local emergency agency.

What activities did the local emergency management agency undertake? Apparently, their major tasks were in the area of resource allocation. The staff defined their role primarily as a "coordinator of response resources." It was offered that they were not managing the response, but were trying to coordinate requests for resources and information about claims from citizens. It was also observed that the staff was frantically attempting to respond to each request on the phone and to meet all the political figures.

Obviously, the response by the local agency was not extensive. It was limited primarily to the realm of resource allocation; but even here its activities were not highly visible, nor highly praised, by other community informants. Particular problems appeared to be found in the areas of communication and information exchange, the effective operation of the emergency operations center, coordination of organizational tasks, and authority relationships. Resource availability and allocation were handled in a better fashion. Also, there was extensive outside assistance provided to the city from state and federal agencies.

This limited response role may be explained by the structure and degree of pre-impact preparedness and planning activities in the city. The local emergency management agency consists of three full-time individuals: a director, an assistant, and a secretary. A fourth individual is added during emergency time. This individual normally works in another city agency, but at the time of disaster assumes an expanding role in the emergency management office. The assistant director had only been on the job for less than one month. ·

The staff of the local emergency management agency claimed to have a disaster plan, but could not locate a copy of one. Other organizations within the community were not aware of any extensive planning. One organization stated that the degree of planning in the city is poor. They were not aware of any plan, and argued that the emergency management agency does not engage in community awareness or preparedness activities.

Therefore, limited planning and response highlighted the activity of the emergency management response in this disaster. It was the opinion of one organizational informant that if each organization had not "done its own thing, little would have been done."

Case Study #3:   Flash Flooding in Dornton

Many residents of the city of Dornton were looking forward to the weekend. It was Friday afternoon, summer was just around the corner. At 2:00 p.m. the National Weather Service issued a severe thunderstorm warning for the county and surrounding area. At 3:55 p.m. another warning was issued for "very heavy thunderstorms." Fifty minutes later the warning was for flooding in low-lying areas.

The storm hit about 4:00 p.m. Between 4:15 and 5:15 p.m. the city of Dornton received an entire month's worth of rain. Over three inches fell. In the suburbs of Dornton, small streams suddenly overflowed their banks. Normally placid little creeks became raging torrents. Cars and people were swept up in the current. Within the next couple of hours, eight people would die, 24 would be injured, and the property damage in the suburban area would be estimated at $22,800,000.

At about 5:00 p.m., the county government received a request from suburban locales for assistance. A massive emergency response was undertaken that requires explanation at three levels: local, county, and state. To fully grasp the complexity of this case, it is necessary to first consider the planned structure of emergency response within Dornton County.

There are 130 local governmental jurisdictions within Dornton County. These village or burrough governments are generally small institutions. Responsibility for response to disasters, however, initially resides with these local units. They are expected to have emergency management coordinators; however, these are only part-time officials and many local areas have only token or nonexistent emergency response planning. When response occurs at this level, it generally is emergent, or ad-hoc, in nature.

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Local units, however, can request assistance from the County Government. It is at the county level that formal emergency planning and management activities are located. The county emergency management agency is located within the County Police Department. It has a staff of four full-time employees. While the Superintendent of County Police also holds the title of Coordinator of Emergency Management, the actual day-to-day operations of the agency are headed by the Deputy Coordinator.

The county agency exists to supplement and support the activities of the local governmental units. At the request of the local units, or when multiple-governmental units are effected, the county provides coordination, resources, and guidance. To accomplish this task, the county maintains a modern emergency operations center, an active emergency planning stance, and a large supply of material resources through its Maintenance Department. The planning and response activities are government-wide, i.e., while the emergency management agency is responsible for planning and coordination of response, other units are included within the plan. In particular, the Maintenance Department, with its staff of over 500 persons and a budget in excess of $25,000,000, is a key element in response activities. Although the county is making efforts to stimulate local municipal planning, there is a general lack of participation at the local level.

The response to the flooding generally followed the above arrangements. Immediately after the deluge, local governmental units in the effected suburban areas began to respond. Evacuation and search and rescue activities were undertaken by local fire and police units. Security and the cordoning of areas were established by the local municipalities, with major assistance from the County Police. Transportation of the injured was undertaken by local authorities.

To accomplish these tasks, a local command post was established. In the major effected area, the City Manager assumed the major coordinative role even though the municipality did have a part-time Director of Emergency Management. The City Manager attempted to coordinate local activities and to integrate the local response with the assistance that was being provided by police departments and volunteers from uneffected areas. The response was basically emergent. The city claims to have a disaster plan, however, a copy of it could not be located and local officials were not too sure what was included within it.

One of the first activities at the local level was to contact the county for assistance. The county was approached at about 5:00 p.m. and began its response effort. The EOC was activated and eventually directed by the Deputy Coordinator of Emergency Management. An on-site command post was established immediately adjacent to the local command post. It was directed by the Director of the County Department of Maintenance.

Within the EOC the emergency management officials were involved in contacting other agencies, locating resources, working with the County Health Department, and developing interaction with the State Emergency Management Agency for assistance in damage assessment and in handling public information.

Requests for equipment are supposed to go through the EOC, however, as the response developed, most requests went directly to the On-Site Command Post and were handled by the Department of Maintenance. Due to their massive resources and previous disaster experience, this agency was actually the major response arm of the county efforts. By Friday evening and early Saturday morning, the department was engaged in extensive clean-up activity.

For those at the EOC however, the major task switched to damage assessment. By Saturday, a large retinue of officials from the State Emergency Management Agency had arrived at the EOC and, with federal inspectors, began the process of damage assessment. Assessment teams composed of one county, two state, and one or two federal employees were sent into the field. The state took a major role in this activity.

The state agency also provided assistance in the area of information distribution. By Monday, all of the public information activities had been taken over by the state agency. Prior to that time, no one had assumed the role of Public Information Officer for the county. The state provided one of their staff for this purpose.

In addition to this complex, multi-level governmental response, a number of other response activities were being undertaken by the private sector. The Red Cross, for example, opened four shelters, however, three were closed when only eight evacuees arrived. The Red Cross was also engaged in damage assessment. Utilities were involved in the restoration of service to the inundated area and hospitals were providing medical care. These private activities, however, were carried out independently from the county EOC operation.

There were a number of positive aspects to this response effort. The adequacy and distribution of resources appears to have been good, even though the planned system for requesting equipment was bypassed. Both representatives of the mass media organizations and the emergency management personnel claimed that the media relationships were excellent. However, it was noted that satisfying media requests for information did consume a major portion of the time of the Deputy Director at the EOC. It was not until the state official assumed the role of Public Information Officer on the third day that this burden was lifted. While the response at the local community level was ad-hoc in nature, the county operation tended to follow the county's plan. In addition, the vertical relation-ships to the state agency appear to have been cordial, cooperative, and beneficial.

Was this a problem-free response? Not exactly. For example, local officials noted difficulties in task allocation and communication. Even though the local community and county on-site command posts were in close proximity, local officials noted that there was a lack of communication. There was a problem of getting messages to the correct person. Tasks overlapped as activities were performed by both local and county units. Furthermore, there were some problems associated with locating individuals in authority.

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This latter situation may have resulted from the rather unique confusion of response and management functions by top level emergency officials. For example, when the EOC was first operationalized, both the Coordinator and Deputy Coordinator of Emergency Management went directly into the field, not to the Center. While the Deputy Coordinator eventually returned to the EOC and attempted to perform his coordinative role, the Coordinator remained in the field in the role of County Police Superintendent. This pattern was repeated within other organizations. The coordinating officials on both the municipality and county levels were in the field; though they possessed authority, they were difficult to contact. For example, early in the response phase, equipment requests could not be filled and response was slow because the official with authority to distribute equipment was in the field and could not be contacted. After a liaison was placed at the on-site command post, the problem was alleviated. Another solution, of course, is to be certain that during disasters, officials realize that their roles involve coordination and management, not response.

In sum, although there was an extensive county-wide response, the activities of the county emergency management agency were limited to only coordinating those tasks undertaken by the public sector and to providing assistance to local communities. Although some problems of communication, task allocation, and authority were evident, the response was quite positive and indicated the benefits of resource acquisition and the development and utilization of relationships with outside agencies.

Case #4: A Tornado Strikes Bryan

They eventually decided that it was a tornado. At first they were not sure if it was simply high wind, a mini-burst, or a tornado, but the latter definition was soon accepted. At 4:40 p.m. on Monday, it carved a path roughly one-quarter mile wide by one mile long through the heart of the downtown area of this city of 50,000. The tornado never touched ground. Rather, it skipped along the rooftops of many buildings as it moved through the city. Within minutes, 650 commercial and residential buildings were damaged. Later, damage estimates finally agreed on a figure of between $10 and $15 million dollars. Fortunately, there was no loss of life and only a minimal number of injuries.

The tornado skimmed past City Hall and the police and fire departments responded. In keeping with their normal pattern of operations, both maintained separate areas of operation. Although they share a joint communication center, it was inoperable during the first 30 minutes of the response. A command center was established by the police in the street. They then began to evacuate the impacted inner city area. At the same time, fire department personnel were going through various buildings checking for fires, downed power lines, gas leaks, trapped victims and assessing the structural viability of various buildings. Both departments benefitted from the timing of the event, for it occurred around a shift-change; personnel who were still on duty were asked to remain and they were joined by the next shift. There were no pre-assigned tasks for many of the respondents; they improvised and assumed posts that appeared to be in need of personnel. The Mayor and police and fire officials conferred, and a request was made to solicit the aid of the National Guard. Troops arrived

late in the evening and were deployed for purposes of security and to operate a hastily created pass system through the cordoned area.

The following morning, an EOC was established in the conference room next to the Mayor's office. Damage assessment teams consisting of employees from various governmental departments began to determine the amount of damage, though it was to be days before they could agree on a dollar figure. Clean-up efforts were begun using city resources and private contractors.

The initial search and rescue tasks had been done by the police and fire departments, though not jointly. In fact, both departments claimed that they were coordinating the activity—a theme that would reappear in the response. At the request of the Mayor, shelters were opened at various schools. They were managed and staffed by the Red Cross, however, only 28 individuals were sheltered. The Red Cross also engaged in providing meals for victims and workers and handled clothing donations. The Salvation Army also served food on the first two days after impact, but after a dispute with the Red Cross over domain, they ceased food operation and donated stored clothing and furniture to the victims.

Bryan has relatively large police and fire units. Despite these resources, however, some informants indicated that the emergency units were strained until the National Guard arrived. Convergence of people, debris clean-up, and unauthorized access to cordoned areas presented difficulties.

What about the activities and involvement of the local emergency management agency? There was none. Bryan has no emergency management office; no one possesses the title of emergency management coordinator. There had been no disaster planning within the city in years, although the area had experienced a tragic fire and a plane crash in the past ten years. A county emergency services office does exist, however, it is headed by a part-time coordinator who remained removed from the response within Bryan.

Given the lack of planning and preparedness within the local community, what can be said about the nature of the ad-hoc, improvised and emergent response? It was a response that was plagued with a number of problems, but was generally adequate due in part to the small size and tight integration of the local officials, luck, and the afteraffects of having attended a seminar at the FEMA National Emergency Training Center in Emmitsburg, Maryland. Lets look at these issues in more detail.

Given the lack of planning within the community, it is not surprising that problems of communication were evident. The central dispatch system which handles normal police and fire calls was out of service for 30 minutes due to the lack of an auxiliary generator. As a result, a repeater station failed and the range of the system was reduced. No plan existed for distributing fire equipment during a disaster, and the location of pieces of fire equipment was often unknown to the dispatchers. Interorganizational communications were generally weak. During the first twelve hours of the response, no EOC existed and each agency had its own headquarters. After the EOC was established, most organizations still felt handicapped by a lack of communication channels.

As noted, no EOC was established until the next day, and then it was a make-shift arrangement. This situation indicated a lack of overall coordination of the effort. No organization assumed the role of overall appraiser of the disaster situation. Different informants indicated that certain agencies such as the police, fire, and mayor's office appeared to be the central assessment unit, but there was no consensus on this issue. With regard to overall coordination of the response, although those agencies who were most centrally involved in emergency activities felt that the response had gone well, they disagreed over who coordinated it. Law enforcement officials felt that their department had coordinated the response, city employees felt the same about the local government, and so on. Interestingly, organizations that were not a part of the governmental network of police, fire, and mayor's office reported that as far as they had observed there was basically no planning, preparedness, communication or coordination of the response activities.

With regard to resource acquisition and distribution, Bryan faired somewhat better. The city has a large number of personnel and extensive relationships with contractors. Furthermore, there was a fairly efficient use of resources due to the fact that the disaster response was based on predisaster roles. Since most individuals were performing expanded traditional roles, they knew what equipment was available and where it should be sent.

Task specialization and allocation was primarily based upon normal activities, although there was some duplication of effort. Authority relationships, obviously, were somewhat confused in this setting. However, the Mayor's office did perform the required governmental duties. Relationships with external agencies and the mass media were adequate, although some media representatives felt that information could have been provided faster.

Given these difficulties, the response, though not efficient, was adequate given the demands of this disaster. No loss of life occurred; injuries were relatively few. Debris clearance began rapidly. What factors facilitated the response?

First, there is a tight network of interpersonal relationships between many of the officials in Bryan. They know each other and are familiar with the resources, domain and capabilities of the various city government departments and local organizations. This knowledge and pre-existing networks may have served the community well in the absence of emergency planning.

Second, a number of informants noted that their response had benefitted greatly from having attended a seminar at the National Emergency Training Center in Emmitsburg, Maryland. About one year before the tornado, officials from Bryan and surrounding cities spent one week at Emmitsburg. They attended the IEMC response course. As usually happens, community officials furnished any existing plans and community information to the training center prior to the meeting. An analysis is performed of the material and an exercise scenario is developed. (In this case an earthquake was used.) A packet of material was given to all who attended

which was a duplication of material submitted by the cities themselves. No disaster plan was specifically developed for Bryan by FEMA.

Those officials who attended the seminar, however, had uniform praise for its value in directing their response, although they appeared to be vague about its purpose. One law enforcement official noted that his organization was able to respond so rapidly because of Emmitsburg. "That was very helpful...there were striking similarities. It showed how everybody gets involved and how all the emergency people pull together." Other respondents viewed it as a "School for Disaster Planning." Various informants referred to the document furnished by FEMA to all people who attended the conference as very valuable. As one stated, "It's the only disaster plan that we have. This was a document that was not in existence last year—when we went to Emmitsburg, they put it all together for us." This informant said that it was heavily utilized by those officials who had copies of it—unfortunately, only those officials who attended the seminar had it.

The course appears to have been a genuine aid for those who attended. In Bryan, this did represent a large contingent of officials representing a fairly wide cross-section of the community. Also, the heavy emphasis which was placed on Emmitsburg by the informants may be a result of their extreme need for some type of emergency plan in order to formulate action. In this situation, even informal information such as the Emmitsburg material was better than no plan at all. Those who attended Emmitsburg praised its relevance to their response effort. Informants who did not attend the conference made no mention of it or the document which it produced.

Finally, Bryan was lucky. The timing of the event allowed for mobilization of personnel and aided the egress and evacuation from the damaged area as people were homebound from work. Injuries were minimal, casualties nonexistent, which minimized search and rescue problems. Much of the damage was to commercial property, and the businesses handled the clean-up and restoration problems themselves. The luck of the draw was favorable, but a larger disaster would most likely overtax all the existing community response organizations.

Case #5: Winter Floods in Madeira

A steady, heavy rain had pounded Madeira County on the West Coast for four days. The streams and rivers of the rolling farmland began to rise. Flooding was not a new experience for the region. In the past 30-years county residents had experienced six floods on the river. In the small, old resort town of Brookville, flooding was somewhat part of the way of life. Although the rain began on Monday, the situation grew more serious on Friday. As the water approached the flood stage of 36 feet, some residents began to leave their homes. A shelter had been opened by the county chapter of the Red Cross in the Brookville Civic Building, a traditional shelter location during flooding. One hundred people used the shelter. Although flood forecasts varied, the river continued to rise and more sought shelter. By Sunday, five shelters had been opened within the county with an estimated 1,000 people in them. In Brookville, 200 people had entered the Civic Building shelter.

The Madeira County EOC was activated on Monday morning by the Director of Emergency Management. Although a meeting had been held on Friday concerning the situation, due to conflicting forecasts and past experience, it was decided to open the EOC on Monday. Although it was a holiday, by Monday afternoon, most agencies had been contacted. In addition to the county offices, these included the Water Department, Roads Department, Red Cross, State Highway Patrol, Social Services and RACES.

By this time, the river was approaching record levels. While on its way to a record height of 50 feet, it threatened to inundate the Civic Building which was susceptible to flooding at 48.5 feet. County emergency management officials decided to evacuate the shelter. Most of Monday was spent trying to obtain equipment to carry out the evacuation. The county emergency management agency did acquire boats, busses, and military helicopters for the task.

Under the supervision of the Sheriff's Department, it was decided that the victims would be moved by helicopter out of the Brookville area to the Madeira County airport and then bussed to a shelter in Bradon, the county seat. The evacuation was delayed, however, due to poor flying conditions, indecision regarding the best landing area for the helicopters in the flooded city, and equipment acquisition.

In the interim, the victims were moved from the Brookville Civic Building, which was flooding, to a nearby church that sat on a hill. CH-6 (Chanook) helicopters were used to transport 40 people at a time from the church cemetary to the airport. However, there was a problem of organization at the evacuation site as coordinators were not present to assemble the evacuees. Some helicopters returned to the airport without loads.

By Tuesday evening, about 750 evacuees were in a large auditorium in Bradon. The shelter management and staffing was a combined effort of the Red Cross and the county Social Services Department. Considerable effort was generated in getting relief workers to the shelter, transporting food, and in obtaining additional cots and beds. These activities, and a general monitoring of the river and the evacuated area, were the principle tasks on Wednesday.

By Thursday, officials began to enter the impacted area and to undertake damage assessment. They also attempted to determine when it would be safe for victims to return to their homes.

By Friday, controlled access to the area was initiated. Roadblocks were established by the State Highway Patrol and only people with proof of residency were allowed into the area. The County Emergency Management Agency also provided bus transportation for shelter victims back to the area to check and clean their property. Once access was made available, the population in the shelter declined considerably to approximately 70-100 people. Some of these individuals would remain in the shelter for days.

Also on Friday, information centers were established with representatives from various county agencies to provide medical and social service assistance. Thursday and Friday also brought an influx of calls from

residents wanting to volunteer to assist in the clean-up effort. Though it was not planned, an ad hoc volunteer committee was set up by the county.

By Saturday, the emergency period was completed. Federal declarations were given, and the system began to return to normal. Two people had lost their lives; property damage was about $50 million.

What role did the County Emergency Management Agency perform in this response effort? To answer that question, it is necessary to examine the nature and magnitude of emergency planning that existed in Madeira County before the flood.

Madeira County has an emergency management agency that employees three full-time staff members. It is an active, vibrant agency with a generally impressive record of planning and preparedness activities that subscribed strongly to the integrated emergency management system model. For example, it engaged in a rather comprehensive range of planning activities. It offers a number of training programs for those outside the emergency response system. It serves as a consultant to many municipalities and private organizations in formulating disaster plans. It has an active risk and hazard assessment program that exceeds state requirements. The public education program of the agency is extensive, highly visible, and one of the major activities undertaken by the Director. It holds annual drills and simulations, although some of the other agencies within the government were not certain of their value.

The County emergency plan is comprehensive, updated, and as noted, indicates an integrated emergency management system focus. The document closely follows the guidelines developed by FEMA for local planning. With the possible exception of a less than adequate treatment of issues regarding public information and citizen interaction, the plan meets general expectations and is generic, i.e., it takes an "all-hazards approach" within the general plan and provides supplemental annexes for specific hazards.

What is most critical, however, is the structure of emergency response indicated in the plan. Consistent with the philosophy of an integrated emergency management system, in times of disaster the agency expands and encompasses the totality of county government. Individuals with normal responsibilities in diverse county departments are given specific emergency roles in the EOC. In addition to the creation of new roles for most of the people who function within the agency during emergencies, a new authority structure is also created. In effect, a new, artificial structure (i.e., the Emergency Management System) is superimposed upon the normal structure of county government.

Obviously, the planning was extensive, highly visible, and generally of high quality. What about the response? Although the response was generally effective, there were a number of problems. These difficulties may indicate certain inherent weaknesses in the proposed structure of emergency response. Let us consider some of the areas.

There were problems of communication. Part of the problem was technical in that equipment from one agency was not compatible with that

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from others. For example, while the Sheriff's department was directing the evacuation, it could not communicate directly with the military units who were actually evacuating people in the field. Within the EOC, communication among workers in this new, artificial system were also less than ideal. Staff within the EOC tended to interact and communicate on the basis of normal, familiar patterns of interaction, not on the basis of the newly created emergency roles. Thus, these networks did not always include those who knew best what should be done or what had been done during the emergency.

Communication problems also developed with the local Red Cross chapter. The Red Cross maintained their own command post at the Chapter headquarters; they were physically separated from the EOC. Although a Red Cross liaison was at the EOC, the individual was perceived as lacking authority to speak for the agency. Communication tended to occur via telephone between the EOC officials and the Red Cross Director. This resulted in certain problems of coordination and disagreements over shelter management.

The agency did, however, have a viable, functioning EOC. It was staffed on a 24-hour basis throughout the week. The physical facilities were adequate and it performed its intended purpose. Resources, however, were more problematic. Due to the unforeseen need to evacuate the Brookville shelter, almost one full day was spent in acquiring necessary resources for the task. (It is to the credit of the agency that it did possess the necessary flexibility and knowledge to complete the job.) Also, the normal channels for procurring resources were altered. Responding units soon went straight to the source of resources, rather than channel their requests through the EOC as had been planned; it was observed that the EOC slowed the process.

The coordination of tasks and the structure of authority also presented some problems. As noted, the written plan explicitly sets forth the transformation of county positions into emergency positions. However, during the flood, one point of confusion, caused by lack of information, was task assignment in the EOC. For example, the written plan calls for a specific individual to assume the role of Public Information Officer. Actually, three different individuals performed this role during the disaster. Informants noted that responsibility was assigned to individuals and organizations according to normal time contacts and immediate physical proximity; somewhat overriding the emergency management system created in the plan.

Some authority difficulties also were evident. Some officials did not know who was responsible for specific tasks, where ultimate authority resided for some decisions, or which decisions made by individual agencies had to be approved by higher authorities. There was considerable "functional autonomy" among the organizations, and, although there was strong consensus that the emergency management agency was coordinating the response, the locus of authority was less clear.

Relationships with outside agencies were extensive, beneficial and generally cooperative. Relationships with the mass media, however, were more problematic. Media representatives felt that they were isolated from

important sources and information and that the lack of a professional Public Information Officer hindered their coverage of the disaster.

Although the response presented some problems, it must be emphasized that it was generally effective. The quality of the response effort, however, did not match the quality of planning. Why?

One problem may be that it is difficult to obtain cooperation among diverse departments and agencies that normally compete for budget dollars and attention. It was noted by informants that those units within county government that normally had the most political clout, budgetary power, and influence assumed control of the response system. Those smaller units felt somewhat isolated from the process, and communication and coordination may have suffered.

More importantly, a major structural weakness appears to exist in the creation of a new, artificial integrated emergency management system and its imposition upon the traditional structure of government. For individuals within the system, task and role ambiguity are evident. A number of individuals who had key emergency roles found themselves working with people from other agencies whom they had never met. An organizational chart of the emergency management system hung on the wall of the EOC. It included the names of individuals from various departments who were to take on emergency roles. One informant noted that he wished that photographs had also been posted. These pictures would have been valuable, because some of the individuals did not know each other. Under these conditions, individuals often fell back upon the normal, traditional patterns of interaction. The emergency system was circumvented.

Case Study #6: Hurricane in Magnolia

The storm was fickle. It meandered throughout the Gulf of Mexico for days. Forecasters at the National Hurricane Center were frustrated as the hurricane frolicked in the Gulf. It seemed to make a run at the Mississippi and Alabama coast, only to veer at the last moment and head east toward the Florida panhandle. Skirting the western coast of Florida, it seemed to threaten Sarasota. It slowed, built power, and suddenly turned north and west again. Panama City looked like a probable target, but it brushed by the Florida coast, continued west, and smashed into the coast at Magnolia at about 7:00 a.m. on Monday of Labor Day weekend with winds of about 115 miles an hour. Magnolia was fortunate. There were no deaths or major injuries. Magnolia was smart. Most people in threatened areas evacuated to safety. The storm created severe property damage, however, as estimates of loss ranged from $100,000,000 to $500,000,000.

It had been a very difficult storm to forecast. As it skimmed the Gulf Coast, hundreds of thousands of people evacuated the threatened areas. Magnolia had the opportunity to evacuate twice.

Hurricanes are nothing new to this resort and port city of 50,000. Magnolia had experienced the wrath of Camille in 1969, Frederick in the 70's and numerous near misses. There is somewhat of a local hurricane subculture within the area. In order to better understand the response of the emergency management officials to the most recent hurricane, allow us

to describe the nature of emergency planning in Magnolia and the structure
of emergency management.

Magnolia has one of the most visible, legitimate, and competent
emergency management agencies in the United States. The agency is housed
within the County Courthouse and is part of county government, though it
also has authority for emergency response in the city of Magnolia. There
are four full-time employees: the Director, two Assistant Directors, and a
Secretary. In addition, a person with professional media experience joins
the staff as the Public Information Officer during emergencies. The
Director of the agency has a national reputation and has even consulted
with foreign governments on emergency planning.

The agency engages in extensive planning activities. It understands
that planning is a process, not just a product. Public education programs
in the schools are provided; training programs in a variety of emergency
activities are offered. In addition to the hospital exercises, a yearly
disaster drill is held on a community-wide basis. Hazard assessment is
undertaken annually, and all plans are updated annually, as well.

The facilities of the agency are undoubtedly the finest in the United
States for a city of comparable size; in fact, most very large cities would
be envious of the facilities. The EOC is a modern, high-tech structure.
It has extensive communication equipment with linkages to all important
response networks. Positions are available for 53 organizational liaisons.
As a physical structure, it is somewhat idealized; it looks like what every
Hollywood producer thinks a command post should look like.

The quality of the local disaster plan is also impressively strong.
The planning document itself has become a model for use in other agencies
across the nation. The Director was a Task Force member of FEMA's National
Standard Plan Format Task Force, and the plan was commissioned as a model
document. It is a generic, all-hazards document with accompanying annexes.
It clearly delegates tasks, authority relationships, and elements of
coordination. While certainly consistent with the integrated emergency
management system model, the document does not call for the integration of
traditional governmental employees into new, artificial roles in the
emergency management agency. It does not create a new structure
superimposed upon traditional governmental relationships. It does propose
that the local emergency management office serve as the coordinator and
primary manager of the response.

It should be noted that informants from other organizations were very
aware of the emergency management agency's planning and preparedness
activities. There was the understanding and expectation that the agency
and its Director would assume managerial authority during an emergency.
Other emergency relevant organizations perceived the level of community
preparedness and planning as being from good to outstanding; almost all
rated it at the highest level.

It is against this backdrop of extensive planning and preparedness
activities that we turn to a discussion of emergency response.

The Emergency Management Agency in Magnolia first heard of the
hurricane from the weather wire on Wednesday. They monitored the storm

throughout the day via the weather wire, NAWAS, and the National Hurricane Center. In-house preparations were undertaken.

On Thursday morning an "Increased Readiness Planning Session" was held in the EOC. All city and county elected officials and department heads attended. They reviewed plans and shelter lists. Certain "what if" scenarios were discussed. It was also decided to activate the EOC.

The EOC was fully staffed with 54 liaison personnel and local officials and the five permanent staff members. After discussion with the "Hurricane Control Group," which is composed of mayors and supervisors, it was decided to "strongly urge" evacuation of the coast. The probability of landfall was increasing for the Magnolia area, and it was expected that the storm might hit in the early morning hours of Friday.

By evacuation standards, it was somewhat a leisurely enterprise. The recommendation was made over the media. Schools were opened as shelters at 4:00 p.m. after the students had left for the day. Under the direction of the Emergency Management Agency, police, Sheriff and Highway Patrol units worked traffic control, and the local police, sheriff, and fire forces assisted in the evacuation of individuals. Eleven shelters were opened. Faced with the possibility of a Category III hurricane, at the request of emergency officials, the Governor declared a state of emergency. This gives authority to the local emergency management agency to take appropriate action, including the issuance of an evacuation order. Even though evacuation had been urged earlier in the day and shelters were open, an evacuation order was given at 10:00 p.m. on Thursday to take effect at 8:00 a.m. Friday to avoid a night evacuation.

On Friday morning the major activities were monitoring the storm and the evacuation. By noon on Friday, however, it was obvious that the storm had changed direction and was now heading east. In the early afternoon the hurricane warning for Magnolia was lifted. At 4:00 p.m. the shelters were closed.

The evacuation had been successful. Estimates of from 40,000 to 60,000 evacuees in the area were reported. Over 2,300 individuals were registered in the 11 local shelters on Thursday evening, and the number of evacuees in the county was 20,000. Since many of these live far from the coast, this represents a sizeable number of people who were in the danger area.

It was the Labor Day weekend, and with the closing of shelters the local emergency management Director informed people through the media to go home and enjoy their holiday. Saturday the EOC remained closed.

At 2:00 p.m. on Sunday the National Weather Service again placed Magnolia under a Hurricane Warning. The EOC was reactivated. At noon the storm had picked up steam, and discussions were held among officials concerning another evacuation. That evacuation was ordered at 6:00 p.m. on Sunday evening and the shelters were opened at 8:00 p.m. During this second evacuation 100,000 people left a three-county area. Within Magnolia county, 60,000 left and some 24,000 sought refuge in the 22 shelters opened in the area. A considerable number of these individuals were tourists who

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simply cut their vacation short. Representatives of the tourism industry were not exactly pleased with two evacuations in three days.

The storm hit at about 7:00 a.m. on Monday. Its winds were less than feared and its storm surge never developed killer proportions. However, it did spawn seven tornados. Due to the highly successful evacuation, and the magnitude of the storm, no lives were lost.

There were, however, some problems. An apartment building caught fire during the onslaught of the hurricane and presented severe fire fighting difficulties. Also, a tornado hit one of the shelters which caused an additional evacuation.

Damage surveys were begun soon after impact using tax assessors and city employees, with the assistance of the Engineering Department. A "symbolic" detachment of the National Guard was requested and arrived. They were stationed in pairs at various intersections and in visible areas to deter any criminal behavior. Electrical power was out for 60,000 to 70,000 people; restoration took a number of days. Debris clearance in the streets was undertaken by the street and highway department. For private homeowners, a system for certifying private contractors to do debris clearance was established. By Wednesday the area had been declared a disaster area and became eligible for federal relief.

The response by the local emergency management agency had been extensive. It was generally agreed by various informants from a variety of emergency organizations that the agency had been involved in warning activities, notifying other organizations, requesting and distributing resources, deciding to order the evacuation, informing the mass media about pre-impact preparedness measures, undertaking damage assessment, coordinating roadblocks and a security system, recalling the evacuation on Friday, and in activating the EOC. There was unanimous consensus that the key coordinating role or managerial activities were undertaken by the Emergency Management Agency. In most cases this perception was even more specific. It was stated that the Director "ran the show." As one informant noted, "He is a coordinator, not a dictator. We have the best prepared hurricane community in the United States. We rely on (the Director) to handle the show."

This response was not perfect. For example, there were problems concerning the handling of the mass media. During the day of impact the Director found he was paying far too much attention to, and time with, the national media. Network television and national newspapers requested interviews, and he gave them. Not only did this seem to discriminate against local media, but it distracted him from other duties. By the second day the problem was solved by scheduling two daily press conferences. These conferences served not only to inform the media and public about recovery efforts, but also to provide additional information to other responding organizations who attended.

Furthermore, although the EOC was fully staffed prior to impact and during the immediate post-impact period, as early as Monday afternoon some liaison personnel began leaving and returning to their parent agencies. By Tuesday and Wednesday the room was relatively vacant. This situation

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increased the problems of interorganizational communication, but they never reached a serious level as landline and radio channels were still operative.

Certain areas were handled well. Task assignment and coordination went smoothly; all organizations were briefed prior to impact on their roles and responsibilities, and each liaison representative had a copy of the disaster plan to assist them. Authority relationships were clear and were followed. Simply put, it was understood that the Director would assume overall authority, and he did. Resource allocation was handled well. The action of the agency indicated a realistic understanding of actual disaster behavior. For example, shelter utilization was adequate, and did not represent a waste of effort. Since only "symbolic" security measures were used to indicate that the possibility of looting (never a real problem) was recognized by the authorities, law enforcement personnel were freed for other duties. The relationship with outside agencies was excellent, as indicated by the quick assistance from state agencies and the rapid disaster declaration by the federal government.

It is probably true that this disaster did not strain or overwhelm. As the Director stated, "It was not a killer; but it was a messy nuisance storm." It is likely, however, that a more devastating hurricane would still have been responded to in a commendable fashion.

V. AN ANALYSIS OF THE RESPONSE PATTERNS IN THE CASE STUDIES

The Patterns of Response

We observed a striking diversity of response within these six local communities. The extensiveness of the response ranged from the practically nonexistent to the bewilderingly complex. Also, we noted a range of different difficulties and problems.

Table 1 presents a summary of the response patterns. It should not be viewed as a scoreboard pointing to the winners and losers in an analysis. Rather, it is a device to concisely consider the various dimensions of response activities in a comparative fashion.

Table 1: Patterns of Response and Related Variables for the Six Case Studies

Dimensions	Community					
	Conway	Tramble	Dornton	Bryan	Madeira	Magnolia
Extensiveness of Response	Limited	Limited	Mod.	Broad	Broad	Broad
Communication	−	−	o	−	o	+
Effective EOC	−	o	o	−	+	o
Resources	o	o	+	o	−	+
Task Coordin.	−	−	o	−	−	+
Authority	−	−	o	−	o	+
Outside Rel.	o	o	+	o	+	+
Media Rel.	o	o	o	o	−	o
Actual Needs	−	o	+	−	o	+
Disaster Exp.	Limited	Limited	Mod.	Mod.	Exten.	Exten.
Planning	Limited	Limited	Mod.	None	Exten.	Exten.
Federal Asst.	Yes	Yes	No	No*	Yes	Yes

* = Emmitsburg Connection
+ = No Problems; very well handled
o = Though some problems were present, the task was adequately handled
− = Major problems with the response dimension

With respect to the extensiveness of response, it must be recalled that, in terms of our earlier discussion, this measure is not effected by the magnitude of the event. Instead, it refers to the extent of involvement on the part of the local emergency management agency in the array of appropriate tasks that could be undertaken. Therefore, the limited responses in Conway and Tramble should not be interpreted as the result of small scale disasters for which little response was demanded.

While the demands in Conway were few, the flood in Tramble actually created rather extensive destruction and many disaster related tasks. In neither case, however, were the local emergency management agencies involved in a significant proportion of these activities. Conversely, in Bryan, Madeira, and Magnolia the emergency response system was intimately involved in a wide variety of tasks. We viewed the response in Dornton as moderate, because while the county agency was involved in damage assessment and resource allocation, other units were primarily responsible for search and rescue, emergency medical care, and security.

The effectiveness of the response is indicated on the remaining eight response variables. Certainly the response in Magnolia was excellent. The response was hindered only by minor problems concerning media relationships and a lack of liaison personnel in the EOC during the recovery phase. Similarly, there was quite a good response in Dornton. Although it was not an extensive response action, all of the areas were adequately managed, and some, such as resource allocation (aided in part by the massive Maintenance Department within the county) and relationships with outside agencies (the assistance of and interaction with the state agency were excellent) were well done. The major problem may have been top level managers going directly to the site as responders making it difficult to contact them for managerial tasks.

The flooding in Madeira presented a high stress, extended response situation, the flooding problems lasted a week, for the county emergency management agency. The overall response was adequate, and some areas were very well handled, such as the EOC operation and the relationship with outside agencies. Although a few problems existed with regard to communication and authority relationships, in the main these were

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adequately handled. Except for a problem of material convergence, the

response appeared to be based upon accurate knowledge of disaster behavior.

There were problems, however, regarding task assignment and coordination.

As we noted, these appear to have derived from the creation of an

integrated, artificial emergency response system that was superimposed upon

the traditional county governmental structure. Resources were difficult to

obtain for the unforeseen problem of evacuating an existing shelter. Media

relationships were hampered by the lack of a professional, or individually-

responsible, Public Information officer and by the attempt to isolate the

press from the emergency officials.

There was a more problematic response in Tramble, Conway, and Bryan.

In all of these communities there were problems of communication, task

coordination, and authority relationships. Of course, these three

dimensions tend to co-vary. If communication among units is limited, then

confusion concerning task assignment, coordination, and authority is

likely.

Considering the various dimensions across the six research sites,

Table 1 indicates that the areas of most difficulty include communication,

task assignment and coordination, and authority relationships. These

problems were consistently well handled only in Magnolia. It should be

recalled that, generally, the problems of communication were not those of

technology or equipment. They were basically a result of autonomous units

acting independently in their response efforts and not talking with each

other. The related problems of task coordination and authority

relationships perhaps stem directly from the communication issue. (Then

again, individuals and organizations may not communicate because of

confusion over task assignment, coordination, and authority!)

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Researchers have noted these issues for the past two decades. Even in the face of concerted efforts to improve planning, they continue to plague disaster response. (Although, as we will note below, planning does appear to ease these problems.) While some emergency managers may be tired of hearing of these problems and request that researchers "tell them something new," the problems have not disappeared. They are still present, and in many local communities they are the essence of the response problem.

These communities faired somewhat better in the area of hardware. For example, there was adequate handling of resource procurement and distribution in all of the communities except Madeira. In Madeira we observed problems of both procurement and distribution. Interestingly, in the three communities that experienced some problems within a generally adequate response, the problems were of distribution and allocation, not of procurement. Adequate resources generally were available; the problem was one of distributing them. As we previously noted, it is likely that this problem was exacerbated by the lack of communication among responding units.

Most of the communities had an adequately functioning EOC. What problems we observed with EOCs were not generally those of facilities or equipment. Instead, they involved liaison personnel leaving the EOC or failing to appear (Tramble, Magnolia), high level managerial staff not being present in the EOC (Dornton), the by-passing of the EOC in matters of resource acquisition and coordination (Dornton, Tramble), delay in establishing an EOC which severely limited its effectiveness (Bryan), or the failure to ever establish an EOC (Conway). In most communities, the hardware for an EOC was in place. Although most functioned adequately, the

difficulties that did occur were a result of social and political interorganizational forces.

Again, in a majority of the sites, the response appeared to be based upon fairly accurate perceptions of the actual needs that can arise in a disaster. However, we observed certain difficulties. For example, sheltering continues in some settings to be an "overkill" phenomenon. In Bryan and Tramble, shelters were opened and staffed far in excess of needs. (Studies have indicated that often the magnitude of the sheltering problem is not known early in the response period, and that some emergency officials would rather be "safe than sorry" by opening massive shelter arrangements. However, research has also consistently shown that shelters are utilized by a small minority of evacuees, and that a more efficient response can be enacted by utilizing human and material resources in activating moderate shelter space·in salient, accessible locations and then staffing and supplying them in an excellent fashion.) Convergence of materials still is a problem that "catches communities by surprise" and often is not handled in an efficient, or effective manner. Nonetheless, generally the patterns of response in these communities indicate activity based upon the realities, rather than the myths of disasters (Wenger et al., 1985).

Finally, there were generally favorable relationships with outside agencies and organizations. We noted that media relationships were generally adequate in all cases, with the exception of Madeira. However, in no situation was the relationship trouble-free. Difficulties were caused by the lack of a trained professional Public Information Officer who understood the needs of both emergency officials and the media in a number of communities. There was a difficulty in the lack of provision of

adequate space and facilities for media representatives. We even observed "overindulgence" in media activities by emergency management officials.

Relationships with state and federal agencies were adequate to excellent in all cases. In the case of Conway and Bryan, these relationships were probably the most positive factor in the response effort and were extremely beneficial. Although we observed some disagreement between federal officials and some local representatives, these relationships, which are inherently structured for some conflict based upon vested interests, were generally positive. Since a relationship by definition involves at least two parties, both the local and the outside agencies should be commended.

In sum, we have a wide range of response patterns exhibited in only six cases. At this time let us turn to a discussion of factors that might be related to the varying patterns.

Factors Related to Extensiveness and Nature of Response

We selected three important contextual or pre-impact factors for their apparent relationship to disaster response: previous disaster experience, the extensiveness of disaster planning, and the existence of federal assistance. Although other factors could also be included, these elements have traditionally been viewed as important predictors of the level and nature of response activities.

We are aware of course of the difficulty of generalizing from a sample of six cases. Certainly no definitive conclusions can be drawn from such a small, nonrandom sample about the relationship between the selected variables and response. However, we should emphasize that these six cases represent a significant proportion of the major disaster response activity in the United States that occurred within the year of the research effort.

Furthermore, they also represent, in combination with data gathered during the previous year, the most detailed and complete analysis of actual response activities by local emergency management agencies that has been undertaken in the 1980's. Therefore, although our conclusions must be viewed within the context of the study design and overgeneralization of the results must be avoided, our search for factors related to response activities should provide clues for policy and future research.

1. Previous Disaster Experience

The communities vary rather dramatically with respect to their previous disaster experience (see Table 1). Magnolia and Madeira have had very extensive experience with hurricanes and floods. At the other extreme, Conway has had very little disaster experience, and Tramble has experienced few floods or other hazards throughout its history. Within the past decade, Bryan has been the site of an air disaster and a devastating night club fire. Dornton has had moderate flooding in the past, and a few additional natural and technological incidents.

With regard to the extensiveness of response, there appears to be a strong, positive relationship with disaster experience. Where disaster experience was limited, so was the response of the local emergency management agency. Conversely, extensive previous experience seemed to support a broad, multi-faceted response pattern. It is probable that previous disaster experience influences the extensiveness of response through the dimensions of saliency and visibility. Normally in many communities local emergency management agencies are not "high profile" organizations. While the assumption of a "high profile" is often assumed by many people, they are generally not as visible or salient as such other emergency relevant departments as police, fire, or the utilities. In a community with limited experience, it is possible that the emergency management agency may be

"overlooked" or bypassed in response activities. On the other hand, higher visibility and saliency may occur for local emergency agencies in communities with extensive disaster experience. This pattern would support a more extensive and varied response.

In addition to the extensiveness of response, the _effectiveness_ of that response appears also to be related to disaster experience. In general, we observed fewer problems in the response patterns of those communities with more extensive disaster experience. While Conway and Tramble faced a number of difficulties in their response efforts, they were also seeing them for the first time. They could not rely upon past encounters with these issues to guide them in resolving the problems. However, in Magnolia, little occurred that had not happened in the past. Within Magnolia there is a sincere effort to learn from previous experience, as indicated by debriefings, after-action critiques, and yearly updates of the community disaster plan. These efforts appear to have aided Magnolia in their ability to respond well in disaster situations.

In contrast, the earlier moderate disaster experiences in Bryan were not translated into a highly successful response effort. Although it is very likely that certain "lessons" were learned by certain organizations, from the city's previous experience, there was no attempt made to share this information, formalize planning or preparedness measures, or implement the knowledge in future incidents. As a result, the response in Bryan was basically ad hoc in nature.

Both Dornton and Magnolia were able to benefit from previous experience, and their response patterns were generally efficient and effective. Therefore, while there was no indication that a lack of experience is beneficial to response, there was also no guarantee that

moderate or extensive experience automatically resulted in more effective response patterns. It would appear that the intermediate link may be the extent to which this experience is translated into improved planning and preparedness measures.

2. The Extensiveness of Planning and Preparedness Activities

Planning is not unitary; it is composed of a number of activities and products relating to a wide range of possible threats and agents. There are considerable differences among local emergency agencies in the range of disaster agents which they accept as salient and for which they plan. For example, while there may be agreement that the agency is involved with more traditional disaster agents, such as floods and hurricanes, there may be less consensus on their involvement in chemical and toxic agents; in conflict situations, such as riots; in terrorist response; in public health emergencies; in nuclear plant safety; and in conventional and nuclear war response.

In addition to differences in the comprehensiveness of planning for a wide variety of crisis generating agencies, there are also considerable differences in the nature of planning activity. For example, some local emergency management agencies are involved in activities which touch on every phase of emergency activity from mitigation, to preparedness, to emergency response, to recovery, while others are only involved in preparedness planning. There are some which are involved in continuous planning involving updating and rehearsal, while others have produced only paper documents. There are local agencies which have created and used EOCs as well as those that have developed other types of resources within the community. There are agencies which have articulated their own planning activity involving other organizations, while others have planned in isolation. There are some agencies which have developed legitimacy and

saliency within their communities, while others do not have such acceptance.

By extensiveness of planning we refer to the range and kinds of disaster agents covered by the planning activity, as well as the nature and variety of the planning activities. Some local agencies engage in little or no planning of any type. Others not only focus upon a multitude of hazards, but are involved in planning, updating and exercising of plans, procuring and maintaining an inventory of resources, establishing an EOC, making annual hazard assessments, and presenting public education programs.

It may be recalled that our previous year's work had found that, generally, planning had improved, but that response patterns had not. In addressing this issue, we have categorized the level of planning activity at these six sites. The results are presented in Table 1.

While planning has generally improved throughout the United States, it has not improved everywhere. There was no planning or preparedness activity in Bryan. The activities in Conway and Tramble were limited; disaster plans could not even be located by the emergency management agency when copies were requested by our field team researchers. We should note that communities such as Bryan and Conway would not have been studied by the DRC in previous years; they lacked full-time personnel and an independent emergency management agency which were the criteria we partially used to select situations for study. They are, however, examples of the current patterns in many American communities. Therefore, our previous finding of generally improved response should perhaps be qualified and limited to those communities with full-time, autonomous agencies. Enlarging our research scope to look at how disaster emergencies are

managed, rather than just how LEMAs perform, has enabled us to reach this conclusion.

There appears to be a strong, positive relationship between the level of preparedness activity and the level of response. Where planning is extensive, multihazard in nature, and comprehensive, as in Madeira and Magnolia, response patterns are broad and varied. Where planning is limited, as in Conway and Tramble, so is the response activity. As we noted previously, this may be related to the increased visibility, salience, and legitimacy that extensive planning provides for a local agency. These qualities increase its effective response activities at the time of disaster.

The major exception to this pattern is Bryan, where no planning had occurred, but a broad response pattern was observed. We had found no local emergency management agency in the city. At the time of the disaster, major elements of the city government, in effect, had to become one supra, emergent emergency response agency. The tornado created a number of demands that the city had to respond to, whether or not any planning had occurred. The ad-libbed system-wide response was certainly broad, but it was also hampered by a number of problems. In this instance previous planning and the extensiveness of response activities were somewhat independent as operative factors since the disaster itself created a new, ephemeral emergency response system.

What is the relationship between the level of preparedness activity and the effectiveness of the response? Once again, the pattern tends to show a positive relationship with certain qualifications. It can be summarized in two statements. First, **more problems and difficulties arose in those communities which had no planning or very limited planning activities.** Second, **while moderate or extensive planning activities tended**

to facilitate an effective response, they did not guarantee it. Let us discuss these two points in more detail.

We find it interesting that the problems which plagued the three communities with limited planning activities tended to be similar. They all suffered due to difficulties in communication, task coordination, and authority relationships. It is exactly these processes that planning, exercising, and updating are aimed at correcting. The goals of such activities are to predesignated authority roles and relationships, coordinative relationships and adequate equipment, and the channels and modes for communication. Where planning does not occur, problems of communication are likely.

However, extensive planning activity, even if it is of high quality, does not guarantee a problem-free response effort. Certainly the situation in Magnolia indicates in almost ideal-type terms the sort of relationship that planning is supposed to engender for response activities. The generally good response in Dornton was also linked to a strong planning context. However, in Madeira, we see an example of a disjuncture in relationship between extensive planning and effective response.

We earlier remarked that Madeira undertook extensive, high quality preparedness and planning activities. Officials had developed training and public education programs. Plans were updated and consistent with the philosophy of an integrated emergency management system. However, there were a number of problems and difficulties within the generally adequate response of the local emergency management agency. As we noted, these problems involved task assignment and coordination, authority relationships, and communication, among others.

The problem in Madeira may have stemmed from the imposition of an artificial, integrated emergency response system upon the normal structure

of local government. At the individual level, the disaster response system required personnel from other departments and agencies to assume specific roles in the emergency management agency. Working with different people than they normally did, and under some ambiguity with respect to roles and tasks, there was a tendency to engage in make-shift activity and to interact and coordinate action with those with whom they were familiar. At the organizational level, the traditional cleavages and power struggles within normal governmental operations cannot be ignored during disaster. The artificially created emergency response system asked that units that normally compete for resources and influence in the system suddenly cooperate and interact in a different manner. As this response developed, the traditionally dominant units and departments tended also to dominate the response activities. Lesser units were somewhat excluded from certain decision-making. There was a fostering of problems of authority relationships and communication.

Therefore, we must qualify our previous statement that planning has improved, but response patterns have not. Not all planning has improved. Planning is often still limited in communities without viable, full-time emergency management agencies. The response patterns in these communities are less extensive. The response pattern can be excellent where planning of high quality and the attempt is made to interface those preparations with response activity. However, where there are structural discontinuities between the planned emergency response system and the normal organization of government, the efficiency of the response may be hindered—even in the face of excellent planning.

Finally, we observed a possible developmental pattern in our data between the variables of disaster experience, planning, and response. We would hypothesize that extensive disaster experience results in more

extensive planning activities. This relationship holds for all communities

except Bryan. _Subsequently, the heightened levels of planning activity

tend to facilitate, but not guarantee, a more effective response.

Experience alone is not an adequate teacher. The experience must be

analyzed. The lessons learned from previous response must be integrated

and implemented through planning and preparedness measures, including

updating and training. Only under these conditions will response patterns

generally improve.

3. The Effect of Federal Support

Finally, we examined the extent of federal assistance to various

communities and searched for its relationship to disaster planning and

response.

As can be observed in Table 1 (page 22), four of the communities

received some federal assistance for emergency planning. Dornton and Bryan

had not. At first glance one might propose that funding had minimal

effect, since communities with very effective responses as well as those

with more problematic responses received funds. However, that conclusion

would probably be in error for at least two reasons.

First, the range of federal assistance is from about $9,000 to about

$41,000. The communities that received larger federal assistance tended to

be those with more extensive planning activity. For example, the most

extensive planning tended to occur in Madeira and Magnolia, and these

communities received larger sums than the others. The response in Madeira

was adequate to good; that of Magnolia was outstanding. Communities with

less funding, or no funding at all, tended to have less extensive planning

and more problems in their response activities.

The situation, of course, is not that simple. Dornton, for example,

received no funding, but still has moderate planning activities and exhibited

a good, though limited, response. Dornton, however, is located within a large metropolitan area. It is an area more than five times the size of the next largest community in our sample. The population exceeds 2,000,000. It has a large county governmental unit that has chosen to make emergency management part of an extensive Sheriff's Department and made the services of a massive Maintenance Department available to it. The sheer scale and resources of the area appear to be adequate to support their moderate level of planning and its effective, though moderate, response pattern.

Second, there are other sorts of federal assistance to local communities in addition to funding. Consider the case of Bryan. Although the community has no local emergency agency or office and receives no federal funds, it certainly benefitted during the response to the tornado from federal assistance. Even though there were a number of difficulties in the response effort, it is evident that the community benefitted greatly from having had officials attend the one-week course at the National Emergency Training Center at Emmitsburg, Maryland. Numerous informants mentioned the value of this experience in aiding their response. Without this form of federal assistance, the response probably would have been more problematic and less adequate.

In summary, it is not possible to determine the exact effect of federal assistance upon the planning and response activities in these communities. Given the small size of our sample and the lack of critical data on how funding is used within each locale, any overall conclusion would be folly. However, there is evidence from our analysis that federal assistance can have a positive salutary effect upon local areas.

VI. AN EMPIRICALLY-BASED CATEGORIZATION OF EMERGENCY MANAGEMENT SYSTEMS

Evident in our sample is the variability in local emergency management arrangements that has been observed elsewhere by Drabek (1985b) and earlier by Quarantelli (1985). Our data indicate that the communities vary on three dimensions that have importance for understanding the structure of local emergency management. They are (1) the degree of autonomy as opposed to integration of the emergency management agency, (2) the extensiveness of planning activities, and (3) the extensiveness of response activities. We have already discussed the last two dimensions, so let us now look at the first characteristic.

Some local emergency management agencies are inherently independent, semi-autonomous structures. Although usually a part of local government, they have a personal identity and are not subsumed within a larger agency or department. Furthermore, their response patterns are generally based upon maintaining the integrity of the agency while having it play a major role in the coordination or management of the response. These rather traditional structures may range from the small office to the fully staffed, full-time organization.

In other situations the local emergency management system may be tightly integrated into the community governmental structure. They may be part of a larger unit or division. Their response patterns are generally based upon viewing the entire structure of local government as the responding unit during disaster, with the emergency management agency simply being one actor, though an important one, in the system. The size of these units can also range from a part-time coordinator who holds multiple positions during normal times to a fully-staffed organization.

We found it possible to classify emergency management systems on these three dimensions. We identified eight different types as noted in Figure 1.

Figure 1: An Empirically-based Categorization of
Local Emergency Management Systems

		STRUCTURE			
		Autonomous		Integrated	
	EXTENSIVENESS OF PLANNING ACTIVITIES	Narrow	Broad	Narrow	Broad
EXTENSIVENESS OF RESPONSE	Narrow	Type 1	Type 2	Type 5	Type 6
ACTIVITIES	Broad	Type 3	Type 4	Type 7	Type 8

Type 1 = Traditional LEMO, Local Emergency Management Office
Type 2 = Bypassed LEMA, Local Emergency Management Agency
Type 3 = Emergent LEMA, Local Emergency Management Agency
Type 4 = Established LEMA, Local Emergency Management Agency
Type 5 = Embedded CEMO, Community Emergency Management Office
Type 6 = Bypassed CEMA, Community Emergency Management Arrangement
Type 7 = Emergent CEMA, Community Emergency Management Arrangement
Type 8 = Established CEMA, Community Emergency Management Arrangement

Types of Emergency Management Systems

1. Traditional LEMO

Type 1, or the Traditional LEMO, is an arrangement in which an inde-
pendent office exists for emergency management functions. However, that
office does not engage in extensive planning activities. Furthermore, at
the time of disaster response, it engages in a narrow range of activities.
Other community emergency organizations, such police and fire departments
often ad hoc their responses and assume major roles in the response effort.
Often these situations involve offices of small size, limited personnel,
and few resources. What planning occurs is often piecemeal in character
and often is an agent-specific, as opposed to an all-hazards, model.

Example from the current study: Tramble had an independent agency
with limited planning activities. The LEMO played a limited response role,

since during the disaster major activities were performed independently by various local organizations in an ad hoc fashion.

2. Bypassed LEMA

Type 2, or the Bypassed LEMA, represents a situation in which an independent, local emergency agency exists that may have engaged in extensive planning and preparedness, yet at the time of response it is generally ignored by the broader community or only engages in a narrow range of activities. This condition could result from the poor quality of the planning effort, from the extensive development of planning documents with little attention being paid to training, networking, or exercising the plans with other local agencies, a major turnover in elected and appointed officials of local government, or from a variety of idiosyncratic circumstances.

Example from the current study: None, although empirical examples are known from previous DRC work.

3. Emergent LEMA

Type 3, or Emergent LEMA, described a situation in which limited or no planning has taken place by an autonomous agency; however, at the time of disaster, it is suddenly involved in extensive, ad hoc response activities. Although not a viable local unit before the disaster, it emerges as one due to the demands being made upon it by the event. Obviously, while the response of an Emergent LEMA is likely to be problematic due to the lack of planning activities, it does provide a foundation upon which an Established LEMA can be constructed.

Example from the current study: None, although empirical examples are know from previous DRC work.

4. Established LEMA

Type 4, or Established LEMA, is the ideal pattern of the traditional, viable local emergency management agency. These fairly autonomous offices are salient and legitimate units of the local community. Due to their extensive planning activities, they are expected to play major response roles as key coordinative units or agencies. Their response activities are broad in scope.

Example from the current study: Magnolia, where an independent, viable, highly visible, and legitimate local emergency management agency exists. As we noted, both the planning and response functions of the organization were extensive and of high quality. Furthermore, although the planning is oriented toward a generic or "all-hazards" model, and is, therefore, consistent with certain elements of an integrated emergency management system, there are a number of differences. First, the planned emergency response system in Magnolia, while utilizing the resources of various local departments and organizations, maintains the autonomy of those units. There is no creation of an artificial system. The Established LEMA serves as a key coordinative and management body. It is clear that the response was the LEMA's, not the county's, response. Second, this system is also independent and somewhat autonomous because of the visibility and reputation of the Director. In many ways in the eyes of organizations and citizens in the community, the Director is the LEMA. They are one and the same. The Director has taken on almost charismatic qualities, and he is relied upon to provide direction in planning and response activities. In this regard, Magnolia supports Drabek's (1985a) finding that the personality and individual style of the local emergency management coordinator is the most important factor in explaining the viability of units.

5. Embedded LEMA

Type 5, or Embedded CEMO, describes the situation in which emergency management activities are located within a larger county or city government agency. They are not an independent office or organization, but are usually part of another department or agency. Often the position of emergency management coordinator is a part-time one. Furthermore, the CEMO engages in limited or no planning activity, and at the time of disaster is either inactive or undertakes only a narrow range of tasks.

Example from the current study: Conway, where emergency management is located within the City Welfare Department and is headed by a part-time Director. As we noted, its planning activities were very limited, and it was basically ignored during the response as police and fire units independently ad hoced a response.

6. Bypassed CEMA

Type 6, or the Bypassed CEMA, is similar to Type 2, except that the agency is not autonomous. For example, although located within a Fire Department, it engages in an extensive planning effort that involves a wide array of governmental and private agencies. In this instance, the plan for response would be a system-wide one based upon a new, emergent emergency management organization. During the event, however, these previously arranged management patterns are ignored or bypassed. The response becomes ad hoc in nature.

Example from the current study: None, however, empirical examples are known from previous DRC studies.

7. Emergent CEMA

Type 7, or an Emergent CEMA, represents a situation in which little or no planning has been done by a local, integrated office or department

within a larger organization, but an extensive response effort occurs during the disaster. This type of arrangement has great potential. While the engendered response may be problematic due to the lack of preparation, it does offer a basis for future planning efforts. In fact, communities epitomized by this pattern are prime candidates for developing some form of Established LEMA or CEMA.

Example from the current study: Bryan, where no local emergency management agency existed and no planning had been done, but where an extensive response effort was undertaken by police, the fire department and the mayor's office. It would be useful to follow up on the planning efforts in Bryan to determine if this experience did foster the establishment of a viable, local planning office.

8.   Established CEMA

Type 8, or an Established CEMA, in many ways represents the ideal structure as envisioned in the integrated emergency management system idea. Although the locus of the activity is often within a larger division or department, the planning activities are broad in scope and involve participation by all response organizations. Similarly, the disaster response is a system-wide one.

Examples from the current study: Dornton and Madeira. In Dornton, emergency planning is located within the Sheriff's Department. However, its planning and response activities were system-wide and integrated. In Madeira, although the local emergency management agency does have a semi-autonomous, independent status, i.e., it is not a division of some larger agency, its extensive planning and response activities are the essence of the integrated emergency management model.

The two weakest patterns are obviously Type 1 and Type 5. Which of these is the weaker? The pattern that represents the least viable local

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arrangement would appear to be Type 5, or Embedded Community Emergency Management Office. Not only are planning and response activities limited, but responsibility and authority for carrying them out are diffused throughout the system or embedded within a non-viable segment of a more powerful division as in the case of Conway. Here the CEMA was part of the Welfare Department. At least in the Type 1 arrangement, authority and responsibility for planning and response activities can be identified and the locus for producing change can be pinpointed since responsibility is structured into an independent office.

The two strongest patterns are obviously Type 4 and Type 8. We want to discuss these two arrangements in more detail for there are some interesting differences in their structure that have implications for their development.

Comparison of the Types

Type 4

What factors would tend to facilitate the formation of a Type 4 or Established Local Emergency Management Agency? Given the findings of Drabek (1985a) and the case of Magnolia, it would appear that this traditional, independent arrangement can be established under conditions of strong, perhaps charismatic, leadership. The strength of the agency in Magnolia is strongly attributable to the perceived skill and tenacity of the local Director. In addition, continuity of leadership appears to facilitate the emergence of an Established LEMA. Since developing visibility and legitimacy may take time, an extended tenure in office for the director of an Established LEMA may be necessary. Similarly, these types of agencies are more likely to be established in disaster prone areas which provide visibility and extensive "practice" for the local agency.

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Where the threat is less vague, less distant, and more predictable, the climate facilitates the development of a strong, viable local agency.

Based upon the observations of our study, we may hypothesize that it is easier to establish these types of LEMA's in medium-sized cities, as opposed to either very small or large areas. In contrast to small communities, medium-sized cities have a critical mass of adequate resources needed to support an autonomous planning effort. Furthermore, LEMA's can develop as autonomous entities in those settings where they are "allowed" to develop. In other words, their establishment is facilitated in cities where police and fire departments are willing to delegate certain emergency responsibilities, as opposed to trying to maintain full control over all aspects of the problem. This condition is more likely to exist in medium-sized cities than in large cities. Medium-sized cities do not provide the police and fire departments with as extensive a resource base. Police and fire officials are also more likely to develop a pattern of trust through working with known others, the latter being a greater probability in medium size cities than metropolitan areas. Where continuity, strong leadership, visibility, and trust are developed, the agency is able to acquire additional resources, equipment, an EOC and so on.

We see as one barrier or threat to the development of a LEMA, a high turnover of personnel. Thus, this type of structure is not one where positions can be filled for political reasons with non-career oriented individuals. Furthermore, a traditional LEMA structure is also vulnerable to a lack of disaster activity. Where threats cease to become events, and where the level of disaster activity is low, the context will not facilitate the existence of a strong, autonomous unit which controls and consumes resources.

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The strength of this pattern is in the strong authority relations that it engenders, during both planning and response phases. Task specification and coordination are probably enhanced by this structure. An artificial, ephemeral response system is not created.

Type 8

The Type 8, or Established Community Emergency Management Agency, represents a condition of an integrated emergency management system. Its development is one of rational, bureaucratic evolution and it requires the organized cooperation of various local agencies and emergency response organizations.

We think a CEMA is most facilitated in locales where police and fire departments are not willing to delegate authority for emergency response to another agency. Where police and fire units possess extensive resources and normal autonomy, such delegation is not likely. Also, embedding the CEMA as a subdivision within an agency may enhance that agency's resources.

In addition, this type of arrangement appears to be most compatible with communities that have a moderate disaster history. As opposed to the long organizational history that is important in the development of an Established LEMA, an Established CEMA, due to its rationalistic nature, may be facilitated by a single, recent event. For example, we would suspect that Emergent CEMAs, such as Bryan's, are prime targets for development of Established CEMAs. Due to the lack of planning in these communities, response tends to be rather extensive and system-wide; it is not focused upon one agency. We think that these structural patterns might influence the future development of a similar planning arrangement and a response pattern of an integrated form.

We see the development of an Established CEMA as most compatible with the structure of small or very large cities. In the former situation,

individual organizations lack the size and resources necessary to independently handle the demands of disaster planning and response. Furthermore, the community is not likely to possess enough resources to establish an autonomous LEMA; therefore, an integrated, system-wide arrangement is likely to be developed.

Conversely, in very populous cities, large, autonomous, resource-rich organizations such as fire, police, and maintenance departments are not likely to want to delegate control and authority to another agency during emergency response. An integrated arrangement may be more acceptable.

We believe there are a number of barriers or threats to the development and continuity of an Established CEMA. For example, these structures tend to derive from and perpetuate "rational," as opposed to expressive commitment on the part of participants. In the absence of either an extensive and continuing history of disaster experience or an impassioned, charismatic leader, the driving force for continued activity and improvement may weaken. Furthermore, in this type of arrangement, participation on the part of various departments and organizations may be based on protecting the autonomy and resources of the parent organization. This situation is most likely to develop in larger cities. Particularistic, myopic motivation based upon vested interests can lower the commitment to the cooperative endeavor which is required under the integrated emergency management concept. Finally, a high rate of turnover in personnel can be problematic in this type of system. The needed specialized, disaster-relevant information and skills are widely spread throughout the governmental structure. With high turnover, the locus of expertise may be difficult to determine and inventory.

We see some obvious strengths and some weaknesses to this type of arrangement. One important advantage is its ability to piece together collective resources. As we found in our study, resource procurement and distribution is one of the response areas that is generally well handled. This advantage is particularly important in smaller cities that lack a critical mass of centralized resources. Furthermore, it tends to engender involvement on the part of a wide range of emergency relevant organizations in the planning and response effort. As opposed to an Established LEMA which facilitates the notion of "Let the Director do it!", this arrangement requires greater involvement from diverse units.

However, with regard to weaknesses, we think that problems of task assignment, coordination and authority may be somewhat endemic in the model. For example, by diffusing authority away from the LEMA one also creates a more decentralized, blurred authority structure. The structuring of tasks in the emergency response system is often based upon positions of authority in the normal, traditional structure. With commitment often stronger to the parent organization, coordination and cooperation may be lowered.

As we observed in Madeira, the imposition of an integrated emergency response system upon the traditional structure of governmental relations may not be the best arrangement when that traditional structure is based upon a zero-sum power game of competition among functionally autonomous units. Under those conditions the envisioned cooperation and integration among various units may dissolve under the impact of coalition formation and social power. It is interesting that both in Madeira and Dornton, two Established CEMAs, the response became dominated by the most powerful departments and organizations in the pre-crisis structure.

We will conclude this chapter with the following comment. No government function thrives without either an organized constituency or an actively supportive local political culture. Emergency management, by its nature dealing with rare community events (crime is a rare event for the individual, but not for the community), will not normally have an organized constituency on an all-hazards basis, but may for specific hazards such as nuclear power, hazardous chemicals or earthquakes. Without strong reasons, the general public will not exert the pressure on the basis of a generalized risk that does not appear to pose imminent threat.

A community such as Magnolia, where occasional disasters maintain the community memory and good disaster response management creates a supportive community political culture, is an infrequent case but does represent one type in any complete typology. However, local government organizations as a set also comprise a community of shared perceptions, and patterns of interaction may also provide the constituency for or against any particular arrangement or aspect of emergency management and how preparedness planning and response are organized in a community. Vested interests can either strengthen or weaken emergency preparedness, depending on how specific emergency preparedness activities relate to perceived interests.

In this chapter, we set forth an eight-fold typology of local and community emergency agencies and arrangements. Based upon the six case studies and other data gathered this year at the DRC, as well as previously collected information on LEMAs, we then discussed the strengths and weaknesses of each type. Further, we considered some of the conditions that may facilitate or work against the development of the two most viable and effective systems.

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VII. SUMMARY AND POLICY IMPLICATIONS

We will conclude the discussion of our field research by summarizing

three of its major themes. The first is that there is considerable

variation in the adequacy of response in dealing with the usual social

organizational problems. The second is that pre-impact factors such as

prior disaster experience, adequate planning and relevant federal

government input can make a positive difference in emergency response. The

third is that the diversity in organizational structure of LEMAs is not in

itself dysfunctional. We will now elaborate briefly on each of these

themes before pointing out some implications.

(1) The field research this year focused upon response patterns. As

opposed to what we examined in previous work, the six cases used for our

systematic analysis involved a greater variety of emergency management

arrangements. Based upon an inventory of response dimensions, we examined

the extensiveness and effectiveness of response in six communities. We

found that responses varied from outstanding to barely adequate. Problems

that were identified generally were not those of technology or resources.

They were the traditional concerns of poor task allocation and coordin-

ation, confused authority relationships, and inadequate information

collection and distribution.

(2) We also looked at the relationships among the extensiveness and

effectiveness of response and previous disaster experience, disaster

planning activities and federal assistance. We observed that, generally,

the relationship between disaster experience and the extensiveness and

effectiveness of response is positive. Although planning has improved

generally throughout the United States, it has not improved everywhere. In

most cases the level of planning activity was positively related to the

effectiveness of the response. In fact a developmental sequence was

suggested from our data which pointed to disaster experience resulting in increased planning activities which eventually produced an improved response. We discussed exceptions to this pattern. The effect of assistance was viewed as positive. Not only did federal funds give an indication of improved local planning and response activity, but the educational and training programs offered at Emmitsburg significantly improved the response in a community with limited planning.

It would appear that where planning has occurred, response patterns have benefited. This statement is particularly valid with regard to resources utilization, physical facilities, and equipment. These are elements that an integrated emergency management system appears to be particularly adept at handling. Furthermore, in general, the organizational and political problems of communication, task coordination, and authority relationships were also better handled in those communities where there had been some planning activity. Where planning had not occurred, these problems are the most severe. However, extensive disaster experience and planning do not guarantee an effective response. While they facilitate it, local officials must implement developed plans and integrate past lessons into action to achieve maximum improvement.

However, as noted earlier, what is crucial is the planning process and not a planning product, i.e., a written disaster plan. What this statement is partly attempting to emphasize is that there are a variety of different activities crucially involved in creating an effective preparedness stance by the key emergency organizations of a community. They include:

      developing training techniques;
      educating the public;
      scheduling meetings to share information;
      formulating memoranda of understanding;
      obtaining, positioning, and maintaining relevant resources;
      assessing likely risks and hazards in an area;

conducting disaster drills and rehearsals;
establishing informal links among key parties;
monitoring sources, including research ones, of relevant
information;

and so on. The drawing up of plans, therefore, at most is only one, and not

necessarily the most important one, in the overall disaster planning

process. Officials will learn much of what is needed by participating in

the planning process, and will also recognize that the process is a never-

ending one with no end point mistakenly signified by the production of a

written document.

Our research further reinforces an earlier stated DRC position that

managing a disaster involves more than planning for such a community

emergency (Quarantelli, 1985). In some of our cases, the local emergency

agency was able to adjust well to some of the contingencies in the

situation; in others, aspects of the response were less appropriate.

Managing a disaster is not independent of planning, but the relationship is

always complex and not always direct.

(3) Finally, we developed a typology of eight types of local

emergency management systems and arrangements.

Three dimensions were used to build the types: (1) how autonomous or

integrated the emergency management pattern is in the community

governmental structure; (2) the narrowness or broadness of the emergency

planning undertaken; and (3) the narrowness or broadness of the response in

disasters. In terms of labels, the types are:

Type 1   Traditional Local Emergency Management Office
Type 2   Bypassed Local Emergency Management Agency
Type 3   Emergent Local Emergency Management Agency
Type 4   Established Local Emergency Management Agency
Type 5   Embedded Community Emergency Management Office
Type 6   Bypassed Community Emergency Management Arrangement
Type 7   Emergent Community Emergency Management Arrangement
Type 8   Established Community Emergency Management Arrangement

As the labels indicated, there can be differences on whether there is
a traditional, established, emergent or bypassed structure; whether the
basic group is a local or community one; and whether there is an office, an
agency or an arrangement.

The six case studies were classified within the scheme and the
strengths and weaknesses of the various types were presented. What this
discussion supports is the observation by Drabek (1985b) and Quarantelli
(1985) that, although there is significant variation of local arrangements,
this variation is not necessarily bad. Although it creates problems for
federal agencies if they want to develop universal and uniform policies to
govern all situations, the diversity may actually be beneficial since
different types of communities are more structurally supportive of
different types of systems. (We recognize that FEMA, for example, as a
matter of explicit policy regarding a number of matters, currently follows
a system of planning for the use of federal funds that is based explicitly
on the assumption of variations, but this has not always been true at all
times and for all federal agencies, and some training and educational
programs and materials are not as explicit on the point.)

LEMA arrangements seem to be most supported by the structure of
medium-sized cities; CEMA arrangements are perhaps better suited to small
and very large communities. It is not necessarily true that a Type 8, or
Community Emergency Management Arrangement, is the optimal structure for
all communities. As we saw in Madeira, imposition of an integrated
emergency management system upon a traditional structure that does not
support that system may generate problems of communication, coordination
and authority.

We think it is very possible to generalize from our specific cases to
typical LEMAs and CEMAs. However, it should be observed that we did not

study the operation of such agencies in any **massive disaster or catas-**

trophe. As such, we do not have a maximum test of any of the points we

have made.

Implications

There are a number of implications of our general themes as well as

more specific findings and observations. We have already articulated many

of the implications for policy, training, education and planning. However,

we would like to make explicit some of the more important ones with respect

to the responses, planning and structure of LEMAs.

Response

1. It is possible to evaluate through systematic social science

research the effectiveness and extensiveness of emergency responses.

Perhaps similar, although grosser, measures could be developed for internal

(i.e. within LEMAs) and external (i.e. by state agencies and FEMA)

evaluation purposes.

2. EOCs, if used correctly, appear to be good investments. There

should be emphasis on appropriate uses of EOCs (e.g. as sites for coordin-

ation rather than control operations).

3. Difficulties and problems almost always arise between emergency

agencies (especially LEMAs) and mass media organizations during emergency

time periods. Both groups need to be educated to the nature and disaster

related problems of the other group.

4. Much of what actually goes on at LEMAs during disasters involves

information processing and coordination. Probable disaster responses

should dictate emphases in planning.

5. Disaster experience does not automatically translate into better

future planning. Encouragement should be given to the development of

systematic ways that LEMAs can use to learn appropriately from the past (beyond routine after action reports).

Planning

1. Planning; if understood as more than just writing disaster plans, almost always makes a positive difference in response. As such, emphasis should be on what is learned by participating in the planning process and not on an end product, such as a plan.

2. Some kinds of planning activities by LEMAs, such as those that create better coping for or adaptability to new emergency situations, are better than others. Planning and training activities ought to develop adaptive, innovative or creative abilities.

3. The variety of FEMA programs can contribute significantly to local planning and response activities. Possibly more attention might be given to ways of systematically identifying and documenting the contributions of educational and training programs. (We will attempt to obtain such information in future DRC studies for FEMA.)

4. Communication difficulties underlie many, although not all coordination, task assignment, and/or authority problems in disasters. Planning activities should recognize this.

5. There is frequent absence of pre-impact contact between different sectors involved in disaster planning (e.g. between key community organizations such as police and fire departments and LEMAs, and other groups such as in the medical, health and welfare areas). Major efforts ought to be undertaken to bridge such gaps.

Structure

1. There is considerable variation in the structure of LEMAs. This stems from the nature of community life and, therefore, the range of variation is unlikely to change very much in the future.

2. There is no one structurally optimum type of LEMA for all communities. Efforts to impose a single uniform model are likely to be both ineffective and dysfunctional.

3. The degree of autonomy of LEMAs is less important than the extensiveness of the planning and response they undertake. It appears that less attention can be paid to the positioning of LEMAs in the social structure of communities than is frequently assumed.

4. There is extremely wide diversity in local disaster planning as well as considerable variety in the structure of LEMAs. While minimum standards ought to be set for LEMAs, the advantages of heterogeneity should be recognized and used.

5. The case for the integrated emergency management system idea insofar as disasters are concerned seems a valid one. The structure of LEMAs ought to assume a generic or all hazards instead of an agent specific approach to disasters.

In conclusion, keeping in mind the limits of our research, we see evidence that **while other factors are also involved,** federal assistance by way of funding, planning assistance, educational and training programs, and policy guidance are all contributing to improvement in local level disaster planning and response. While existing efforts should generally continue, more could be achieved if some of the specifics of our research findings were taken into account. In particular, it would be wise for FEMA to encourage the appropriate kind of planning, to emphasize the social organizational nature of the response problems in disasters, and to continue to emphasize the positive features of local variations in emergency management agencies and arrangements.

PART II

LIBRARY AND DATA BASE WORK

VIII. LIBRARY AND FIELD DATA COMPUTERIZATION

The second part of this year's work concerns the upgrading and computerization of the DRC's library and the exploration of the problems inherent in computerizing the vast data collection archives of the Center. Both of these tasks, which are time consuming and labor intensive endeavors, will be undertaken throughout the entire five years of the contract period. We made significant progress during the first year. It is now obvious that both tasks can be successfully completed. However, we must note that the originally projected five-year period appears to be somewhat ambitious; more time will be necessary than initially visualized, as we discuss later.

We first discuss the progress and problems with respect to the library and conclude with a focus on the issues involved in data processing.

The Upgrading and Computerization of the Library Holdings

The library holdings of the DRC are the most extensive collection of material on the social and behavioral aspects of disasters in the world numbering over 18,000 items. The current project allows for the continued upgrading of the collection and for the modernization of the retrieval system in place at the library. With the computerization of the library classification system, and the distribution of these holdings on disc to practitioners and other research centers, the utility of the library for those outside the confines of the Center will be greatly enhanced.

1. Computer hardware and software

We chose and purchased computer hardware and software that permited extensive text handling and data analysis. The hardware includes an IBM AT, Comrex printer, and 1200 Baud modem. Software purchases included the acquisition of micro-SPSS for data analysis, Word Soft for word processing,

Zyndex and SCIMATE for computerizing qualitative data, and Crosstalk which
enables communication between micro computers and mainframe computers.

We trained the research assistants at the Center and part-time library
assistants in the use of the computer material.

2. <u>Pilot Work: The Computerization of the Inventory of Disaster Studies</u>

We entered the 442-page <u>Inventory of Disaster Field Studies in the
Social and Behavioral Sciences 1919-1979</u> into the computer system. Part of
the intent was to test the feasibility and utility of handling similar
material in such a way. The pilot work confirmed the ease and value of the
approach.

The SCIMATE software program has been utilized both for the computeri-
zation of this inventory and for the computerization of the library
catalogue system. SCIMATE was selected after discussions with the
University of Colorado Natural Hazards Center. It is compatible with their
computerization efforts. Therefore, two of the major libraries related to
disasters in the nation are utilizing the same system. (The SCIMATE
program will also allow us to link into the University of Pittsburgh Risk
and Emergency Management Program.)

We gave a diskette containing the computerized inventory to the
University of Colorado Natural Hazards Center. A copy of the inventory is
also part of this Final Report to FEMA. The inventory itself is a valuable
resource item. It lists all the studies undertaken and related English
language publications in the social and behavioral sciences on disasters
occurring from 1919 to 1979. With SCIMATE, it is possible to search for
studies and publications by type of agent, e.g., "hurricanes"; locale,
e.g., "California"; or disaster activity or process, e.g., "warning." Of
course, combinations, e.g., "Southern Italian Earthquakes," are also

possible. This retrieval inventory should prove to be valuable to FEMA in its research and training activities, and others interested in quickly ascertaining what research has been done on specific disasters.

3. Upgrading the DRC Library Collection

To upgrade the library, we entered into exchange agreements, increased the flow of free and gift items, and bought material which an inventory indicated ought to be in the Center's research collection.

We developed exchange agreements between the DRC and eleven other centers and groups which issue disaster related publications. Exchanges are being undertaken with:

1. Natural Hazard Research and Application Center, University of Colorado, USA
2. Center for Technology, Environment and Development, Clark University, USA
3. Center for Research on the Epidemiology of Disasters, Louvain University, Belgium
4. Flood Hazard Research Center, Middlesex Polytechnic, Great Britain
5. Mass Emergencies Program, ISIG, Italy
6. Asian Disaster Preparedness Center, Bangkok, Thailand
7. Australian Counter Measures College, Mt. Macedon, Australia
8. Munich Reinsurance Company, West Germany
9. Indonesia Disaster Management Center, Jakarta, Indonesia
10. Center for Disaster Studies, James Cook University, Australia
11. Joint Disaster Assistance Center, new Delhi, India

We also have limited exchange of selected publications with major disaster researchers in Japan, Sweden and Canada. A few disaster research organizations in the United States, although approached, have not been willing to institute an exchange program, and some others simply do not produce enough relevant publications on a yearly basis to warrant an exchange with DRC which averages more than two dozen publications yearly. The agreements not only reduce the costs for keeping the DRC collection current, but also brings to this country much material which otherwise would not be known or easily available to the American disaster research and planning community.

The Center receives on a complimentary basis many publications and also some disaster researchers routinely send their papers to the DRC library. Last year a letter from the DRC appealing for unpublished reports from disaster researchers in the United States evoked a substantial reply. Several hundred papers were obtained which otherwise may never have been deposited in any library. A future request will ask if the paper was produced on electronic media and if it is available in that form. In addition, the DRC has updated its collection of social science dissertations on disaster topics. We now have several hundred, more than available from the University Microfilm International dissertation collection in Michigan. Finally, in the last few months we have made a systematic attempt to increase the number of newsletters, journals and periodicals which the library regularly receives. These now number about 125.

Only a small proportion of FEMA funds are actually being used to purchase new items; most of the funding for library computerization is going for personnel costs. The bulk of new publications for the DRC library are being purchased through University of Delaware sources and non-FEMA governmental agencies.

On the average, over ten new items arrive daily for addition to the research collection (as a result of purchase, gift or exchange). The items include books and monographs, reprints, articles, periodicals and journals, government documents, unpublished papers, dissertations, films, and pamphlets. New items arrive in a variety of media: print, microfilm, microfiche, floppy disk, film reels, video tape, photographs, and slides. Because of the variety of forms and media involved, it is difficult to provide meaningful numbers, but in the course of the year, several thousand

items (exclusive of journals) were added to the DRC library and resource collection, with only 112 of them purchased through FEMA funds.

Besides obtaining the works of others, the DRC library also continues to add items to the DRC Publication List. In the period covered by this report, Center personnel published nine new journal articles, two miscellaneous reports, and twelve preliminary papers. Currently available to any interested party are 20 DRC Books and Monographs, 18 DRC Report Series volumes, 6 Historical and Comparative Series volumes, 183 articles, 44 preliminary papers, 11 miscellaneous reports, and 14 other publications. Approximately a fifth of all DRC publications have been produced from data obtained in studies funded by FEMA or its predecessor organizations (e.g. OCD or DCPA). A number of the items most requested from DRC, such as A Perspective on Disaster Planning, Organized Behavior in Disaster, and Organizational Behavior in Disaster and Implications for Disaster Planning, and Evacuation Behavior and Problems: Findings and Implications from the Research Literature, resulted from such studies.

Hundreds of DRC publications are either provided gratis or sold at nominal costs every year, with last year being the peak in terms of total number of items distributed. Apart from university libraries and academic researchers, the kind of domestic organizations which tend to obtain DRC publications is illustrated from the following sample of last year's recipients:

- Dept. of Emergency Services, Grants Pass, Oregon
- Maricopa Co. AZ Civil Defense & Emergency Services
- City of Louisville, KY Emergency Medical Services
- Bay Area Regional Earthquake Preparedness Project
- City of Jacksonville, FL Training Division
- Civil Defense Emergency Services, Phoenix, AZ
- Colorado Division of Disaster Emergency Services
- Division of Emergency Government, Madison, WI
- Toxic Chemical Coordinator of City of Santa Monica, CA
- Emergency Management Assistance Agency of Greensboro, NC
- American National Red Cross Headquarters

- Bristol Memorial Hospital, TN
- County of Fresno, CA Emergency Services
- Arthur Little, Inc. Library Resource Center
- Eastern EMS Council of Norwich, CT
- International Society of Fire Service Instructors, Ashland MA
- Emergency Response Institute, Olympia, WA
- Public Safety, Richmond, VA
- Rocky Flats plant, Golden, CO
- IRT Corp, Vienna, VA
- California Seismic Safety Commission
- Office of Emergency Preparedness, Dallas, TX
- Safety & Loss Prevention Dept of the Hercules Co.
- The Rand Corp, CA
- The Public Safety Communication Center of Florence, KY
- Emergency Services Division of San Bernadino, CA
- Auburn, WA Fire Dept.
- Office of Emergency Management, Clarksville, TN
- ICI Americas Inc. Library
- State of Connecticut Dept. of Public Health
- OES Hazardous Material Division, Sacramento, CA
- Greater Hartford Connecticut Chapter of the Red Cross
- Boulder, CO Police Department
- Southern California Edison Co.
- Contingency Planning, Seafirst Bank, WA
- Idaho Bureau of Disaster Services
- Loss Prevention Division of SCM Corp.
- Arizona Division of Emergency Services
- Memphis State University Earthquake Center Library
- Detroit MI Waste Water Treatment Plant
- Disaster & Emergency Services of Missoula, Montana

4. The Computerization of the DRC Library Collection

Computerization of the extensive research collection is progressing steadily. At present we have are over 2,000 items catalogued in the library computer system; most of these are books and monographs. The computer files represent both new materials recently processed into the library as well as previously held items (see later for the priority system we will establish in the second year).

We have developed an extensive library classification system to accommodate the wide variety of materials. Phone conversations with Library of Congress officials, other professional librarians, and consultation of LOC documents, have indicated that standards have been only partly developed for cateagorization. We are still looking into such standardization

as exists for articles and government reports since we have received conflicting statements about the whole issue. However, it is clear at this point that there is little consensus on the whole categorization issue with different library systems and different producers of publications using a variety of different classification codes and formats.

The DRC has developed a clear and standardized format, which includes the Library of Congress assigned number. With minor modifications, the same format is utilized for materials in all media. Items in certain media, such as microfilm, are cross-classified both by media type and substance. We developed new classification numbers for materials on video tape and floppy disks.

The DRC call number is composed of a substantive code from 005 to 985 (see Appendix C) and an author-title code. Works are alphabetized by author, then by title. Use is made of the Library of Congress method of indicating alphabetical order as part of the call number.

In using the Library of Congress method, the first letter of the author's last name is followed by a number assigned to the second letter of her/his last name. This code is followed by the first letter of the first significant word of the title and the number assigned to the second letter. For example, the call number for Panic Behavior by Duane Schultz is 150.S3P3, which is comprised of the DRC substantive code and the Library of Congress author-title code. (See Below)

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Library of Congress System

Names that begin with a <u>consonant</u>:

Second letter of name:	A–D	E–H	I–N	O–Q	R–T	U–Z	
Corresponding number:	3	4	5	6	7	8	

Names that begin with a <u>vowel</u>:

Second letter of name:	A–C	D–K	L	M–O	P–Q	R	S–Z
Corresponding number:	2	3	4	5	6	7	8

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When new materials are received for the collection, they are assigned a call number and all important information is recorded both in the computer system and in physical form. Information recorded includes all authors, the full title (including all subtitles), publishing information and three to eight key words from the subject index code. While three to eight key words may not be enough for all purposes, this was the number used in an earlier pre-computer coding system developed by DRC. In time, we may expand the number of key words, but at present we are giving priority to getting items on the computer in some form so users will have at least something to initiate searches.

The DRC classification system is illustrated by the three sample computer cards presented below. For contrast, the Library of Congress card is also included. It can be noted that usually the DRC format carries more of the important information (e.g., listing of <u>all</u> authors) than does the Library of Congress card.

We enter the information into the computer via the SCIMATE software program. Then, by activating a search, one may print out a list of all items of interest. SCIMATE will search all records and find every occurrence of a word, such as "tornado" or "Smith," and retrieve all

entries in which that word occurs. Visitors to the library have found the computerization helpful in searching for material and much quicker to use than the set of cards which contains an older and partial subject word index of perhaps half of the DRC library collection.

All new items are processed and information computerized as they enter the library. At the present, an extensive inventory is also ongoing. Items previously collected are compared with the respective catalog cards in order to check the accuracy of the information, and the material is entered into the computer. Items inventoried and added to the computer file at this time include many of the books and monographs pertaining to comparative and theoretical material on disasters, books and monographs of a descriptive or narrative nature on single disasters and multiple disasters, legal material on disasters, books and monographs of insurance materials on disasters, as well as engineering, structural, and architectural material. Work is proceeding with books and monographs about geophysical, climatological, chemical, and nuclear issues. Books and material on semi-disasters and stress situations, and all DRC books and monographs pertaining to disaster already on the shelves will eventually be entered into the computer catalog file; the processing of new materials is ongoing. The work is progressing well, but we fell short of having on the computer at the end of the contract year all information on the books in the DRC library (contributing to the slowness of processing is the difficulty of distinguishing a book from a report, and the absence of a printed Library of Congress number in many regularly produced publications).

5. Use of the DRC Library

Since the first of the year, the DRC library has been visited by, among others, representatives from the County of San Diego, California Office of Disaster Preparedness; the Chemical Manufacturer's Association, the Oak Ridge National Laboratory; Region III of FEMA; the DuPont Edgemore plant; the Radiation Management Corporation; the Safety Division of IBM; the Eastern Region Headquarters of the National Weather Service; the Department of Emergency Medicine of John Hopkins University; the Department of Geography of Rutgers University; the Harrison County Mississippi Civil Defense Office; Cox Publications; the Department of Health and Safety Studies of the University of Illinois; the City Manager's Office of the City of Newark, Delaware; the Department of Sociology of the University of Maryland; the Rohm & Haas Chemical Company; the Boston Globe; the State of Delaware House of Representatives; the Mobile Crisis Unit of the Division of Mental Health of the State of Delaware; and the Safety Health & Environmental Affairs Division of PuPont. There were also disaster researchers from the University of North Carolina at Charlotte; Stetson University; the College of William and Mary; Ohio State University; and the Virginia Polytechnic Institute and State University. In addition, there were foreign visitors from Australia, Mexico, Great Britain, West Germany, Japan and Canada.

In addition to visitors, the Center receives many inquires and questions in mail correspondence and phone calls. Roughly a third of the requests are from disaster planners and emergency managers or operational personnel. Another third of those inquiring are persons, usually from colleges or universities, doing research in the disaster area. The last third of the questions come from a miscellaneous set of sources such as journalists and mass media personnel, professional associations, certain

kinds of industrial groups such as chemical companies, and various members

of the general public ranging from activist citizen groups to those with a

personal interest in a particular disaster event or phenomena.

These kinds of inquiries average about a dozen a week. Simple

questions sometimes can be directly answered; in other cases, the inquirer

is referred to other organizations such as the Natural Hazards Information

Center at the University of Colorado, the American National Red Cross, or

specific officials or researchers DRC knows has more direct relevant

information about the question being asked. However, in more than half the

cases, those inquiring are sent the most current DRC Publication List since

we usually have something of relevance listed. It is the very rare day

that the Center does not receive at least an order for one of its

publications, the only charge for which is barely enough to cover handling

and mailing costs.

6. Conference Among Library Personnel

We originally proposed that a conference be held with library

personnel from the DRC, the University of Colorado Natural Hazards Research

Center, the University of Pittsburgh Risk and Emergency Management Program,

and the technological accident program at Clark University. Discussions

were initiated by DRC with representatives of these other institutions. In

addition, more detailed discussions were held with University of Colorado

personnel in July. There was consensus that the projected meeting would be

premature. We now anticipate that a meeting will be held sometime in the

middle of 1987.

In conclusion, we can say that insofar as the library work is

concerned, we have put in place the necessary computer hardware and

software. We have done pilot work which confirms we are on the right track

and have developed a classification system which seems useful for most of our purposes. A start has been made on actually computerizing the necessary information on items. We have also institutionalized a number of steps to insure the continuing upgrading of the resource collection. All these activities have contributed to the greater accessibility and use of the library as we have tried to document and illustrate.

The major problem (apart from the one of seeing what library categorization standards can be used) is that the computerization of the library will take longer than originally planned. While undoubtedly we will be able to speed up the process in a second year, it will take time to cut into the backlog of uncataloged items given that we are adding several thousand new items annually. Even if we double to 4,000, the number of items we process on the computer, that will mean we will be able to process only around 2,000 old items. At that rate, it will take us eight years to completely clear up the backlog items.

Given this situation, we have instituted another set of priorities for the second year of our work. Incoming material of a book, report, or article nature, which is directly disaster relevant will be given highest priority for processing (about a fourth of the material DRC receives, especially through gifts is only indirectly disaster related). Insofar as material already in the DRC is concerned, we will give secondary priority for processing to disaster-related reports and disaster plans. These priorities have been set from an analysis of what users of the DRC library primarily request. In the main, such users usually want new or current material (they do not distinguish between books, reports and articles); secondly, they want to look at disaster plans as much as other material.

The Computerization of the DRC Data Archives

The DRC archives contain the largest collection of data which can be found in the world focusing upon organizational and community response to natural and technological disasters. The data have been gathered from over 470 different studies of crisis events. These events have involved over 1,300 separate field research trips. The research has been carried on in 44 states and 11 foreign countries and has studied a variety of disaster agents (floods, hurricanes, tornados, toxic spills, earthquakes, transportation accidents, mine disasters, dam catastrophes, etc.)

The Center's research techniques have ranged from the quantitative to the qualitative, from laboratory experiments to clinical case studies. The DRC has produced 223 different field instruments in gathering data on these and other topice. These instruments range from observational guides for studies of crowd behavior and emergency operating centers, to detailed, fixed-alternative, closed-end questionnaires to be completed by victims.

However, the vast majority of the 223 different field instruments are detailed, open-ended interview guides. Over 7,000 different questions are included in these interview guides. These interview guides average over 30 questions in length, and normal interviews take about two hours to complete. In-depth interviewing of organizational informants has always been the central thrust of the DRC field research. However, this information is augmented by systematic participation observation, as well as the gathering of documents and statistics.

Presently the archives contain slightly more than 9,000 tape-recorded interviews. Transcripts of about half of the tapes processed so far total over 65,000 pages. There also exists notes from hundreds of nonrecorded

interviews. In addition, we have gathered thousands of disaster plans, organizational logs, after action reports, and related documents. Several sets of mail questionnaires numbering in the hundreds have also been accumulated, as well as affected community's newspaper runs for a month or a year following disasters.

The problem we have is one of developing a meaningful system for categorizing the information in a form that will allow for ease of retrieval. The development and implementation of this coding scheme is proving to be very complex and will require years of effort to complete. DRC staff members did attend a meeting at the University of Pittsburgh to learn about the coding and computer work that had been done there primarily with standard survey data on civil defense and disaster related individual behavior. Some of what has been done at Pittsburgh can be adapted to the DRC data, but much can not given the fact that the Center has mostly collected information about groups through open-ended typing of interviewing of organizational personnel. Apart from further considering the coding scheme from Pittsburgh, we have given some attention to the framework used by Drabek since Quarantelli acted as an informal consultant from the initiation of his substantive inventory of sociological studies (Drabek, 1986). .

We realized after several months of work that the existing coding scheme utilized by the DRC for locating interviews could continue to be utilized. In this system, all completed interviews are coded on such dimensions as the event, the date of the interview, the interview schedule utilized, the specific study involved, the position of the informant, the name of the interviewer, the sex of both the interviewer and the informant, the type of disaster or crisis, the city involved, etc. It is possible in principle, therefore, to be able to locate all interviews DRC has ever

conducted with emergency management officials in floods. This scheme has proven to be useful, and the field data obtained during this last year was coded according to it.

However, there are some coding gaps in earlier gathered DRC interviews and there is a backlog of about four recent years of field data which has never been coded in any fashion whatsoever. Nonetheless, we gave priority to processing the field data gathered in current studies.

After some preliminary work, we came to recognize that any scheme that attempted to capture the substantive content of the data, as opposed to simply locating the material, could not be based only upon data gathered for the present project. As we have noted, there is an amazing variety of data gathered on various projects in previous years. Different projects have had different objectives, have sampled different kinds of groups, and have used different interview guides.

To deal with this problem, we made an examination of all relevant DRC field interview guides that exist in the Center's files. One of the Co-Directors examined the 223 different field instruments. We decided that the most fruitful approach to the problem of coding the gathered data was to first examine and compile a list of the variables and dimensions included in the interview guides and other data gathering instruments. In other words, we felt that an inductive approach developed by examining the data would not be as useful as a deductive examination of the interview guides and, if feasible, their later application to the transcribed and tape-recorded interviews.

Staff members of the Center have begun the process of compiling a list of variables appearing in the research instruments since 1963. The variables involve a variety of disaster activities, processes, and patterns

which range from the individual to the group, organizational and community levels.

Just in the first three years of DRC field studies we have identified 291 discrete variables. This total represents an average of 97 discrete variables in each year's research. However, we estimate that the average per year will be significantly reduced through time as variables reappear in interview guides. Nevertheless, we will end up in the aggregate with hundreds of discrete variables DRC has used in over two decades of field research.

We have classified the variables so far identified into the following categories:

1. Event
2. Event Awareness
3. Event Response
4. Personnel Information
5. Group Information (established)
6. Group Information (emergent)
7. Inter-Group Information
8. Intra-Group Information
9. Organizational Information (established)
10. Organizational Information (emergent)
11. Inter-Organizational Information
12. Intra-Organizational Information
13. Community Information
14. Experience and Planning
15. Suggestions, Advice, Recommendations and Problems

Within each category, we include a number of the variables. For example, within the intra-organizational category (established), the following are some of the dimensions identified to this point: name, authority structure, activities during the disaster, linkages to other entities, resource mobilization, required resources, organizational difficulties, organizational successes, decision-making process during normal times, decision-making process during the event, interpersonal structure, boundary mechanisms, linking roles, normal communication patterns, disaster communication patterns.

Our intent now is to proceed along two lines. First, we will continue to examine and extract the variables used in all the DRC field research instruments up to the present time. These variables constitute the focus of the substantive information that was obtained. After all the variables have been identified and classified into the categories indicated above, we will develop a coding scheme which we will then test out on some of the more detailed transcripts of interviews that the Center has in its archives. We will then make a judgment on the value and cost of continuing on to content analyze all of the available data.

Concurrently, we will initiate extended discussions (actually some have already been held) with researchers who have already analyzed, for their own purposes, DRC archival data which was made available to them and from which they have already published. For example, Bosworth and Kreps (1986) has written on his own independent use of DRC archival data. We will also continue our consultations with others (such as Drabek, as mentioned earlier, and the University of Pittsburgh group) who have, for their own purposes, developed computer based classification schemes for data they wished to analyze. We already know some of the limitations of there other procedures given the rather different theoretical goals and substantive texts that we have (e.g. more than half of the earlier DRC field tapes exist only on recorded tapes; any content analysis of those would require listening to tapes, a rather different problem than looking at frequencies of closed-end survey questions, printed pages of articles, or even typed transcripts of interviews). Nonetheless, we shall see what we can learn from the experiences of others.

Our basic objective is to try to arrive at the end of the second year of our work with several options on what might be done, the relative

advantages, and the costs involved in further attempting to computerize the substantive contents of the DRC data archives. In the original proposal of the five-year work for FEMA, we stated that. **"In Phase I we propose developing and pretesting a methodology for the computerization of raw primary data. . . In Phase II, assuming that the pretest effort in Phase I turns out to be satisfactory, ·we will start to code and computerize, in a systematic fashion, our primary disaster data."** Obviously, we are moving into a consideration of whether the effort started is worthwhile and should be continued, and if so, in what form.

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APPENDIX A

RESEARCH METHODOLOGY FOR PHASE I

RESEARCH METHODOLOGY

The Disaster Research Center has engaged in rapid-response field studies of disasters for 23 years. The data gathering techniques are primarily qualitative in nature, and rely heavily upon intensive, open-end interviewing of officials, the collection and analysis of secondary documents and plans, and participant observational data. These techniques served as the core of the methodology utilized in this study.

1. Recruitment and Training of the Field Team

When the DRC moved from The Ohio State University to the University of Delaware in 1985, it was necessary to recruit and train an entirely new team of research assistants. From a pool of potential members we selected five individuals, later augmented to six. The team members were all graduate students in the Department of Sociology. Although only three of the students were supported by this research contract, all were trained for participation in this project.

The students were given extensive training. First, we conducted a total of 20 hour-long training sessions. These sessions covered a wide range of subject matter, from the history of disasters in the United States, to the problems of undertaking field work, to the structure of FEMA. A complete list of the training sessions follows:

Training Session Schedule

Disaster area and the DRC

1. Nature of disasters and disaster preparedness and response
2. History of disaster research in the social and behavioral sciences
3. Overall view of substantive disaster findings
4. History and activities of DRC
5. Past DRC work and resources
6. DRC operations

Field Work

7. General orientation
8. Preparations and entry
9. Interviewing problems and procedures
10. Observing problems and procedures
11. Documenting problems and procedures
12. Processing of field data
13. The field report

The FEMA study

14. FEMA as an organization and its interests
15. Earlier related DRC work
16. Last year's work
17. Projected field work for this coming year
18. The research design: Issues and questions for consideration
19. Specifics of the research design
20. Planning and doing a specific field study

After these sessions, field team members conducted training interviews with emergency officials throughout the surrounding area. These interviews were tape-recorded and subsequently critiqued and evaluated by one of the DRC Co-Directors. Furthermore, a training field trip was undertaken in Baltimore, Maryland. While in Baltimore, the members experienced the rigors of field work as they gained entre and conducted various interviews with local emergency, media, and hospital officials. Once again, these interviews were critiqued. After this training, we determined that the team was ready to engage in actual field operations.

2. Development of the Research Instruments

We constructed detailed, in-depth interview guides. (See Appendix B for copies of these guides.) As noted, the major concern of phase one of the research effort was to examine the extensiveness and the nature of the disaster response activities of local emergency management agencies. We developed Interview Guide I to gather data on the response activities of both the emergency management agency and other local emergency relevant organizations. In general, the guide attempts to obtain an overall picture of the emergency response, including (a) a sequence of disaster tasks and activities undertaken by the various responders, (b) community perceptions of the legitimacy, responsibility and authority of the local emergency management agency, and (c) the degree of perceived conflict and/or cooperation characterizing the overall disaster response.

Specifically, the first two questions on the guide concern initial notification of the disaster. Questions 3 and 4 consider organizational involvement in the response and the degree and nature of interorganizational contact in the response effort. Questions 5 and 6 directly examine the issue of information distribution. They catalogue the information distribution activities of the local organizations during both pre- and post-impact periods. Question 7 elicits data on the central issue of the study, i.e., the involvement of the local emergency management agency and other organizations in 25 different disaster tasks.

Questions 8 and 9 involve qualitative discussions of the nature and sequencing of these tasks. Question 10 includes an evaluation of the local emergency management agency's performance of the various tasks in which they were engaged. This evaluation is obtained both from the emergency agency as well as from the other organizations involved in the response. Question 11 considers overall community coordination of the response. The remainder of the questions include an evaluation of perceived performance by each organization and an inventory of resources.

Finally, Interview Guide III includes response activities for organizations other than those previously studied. These organizations include the Mayor's office, religious groups, outside organizations, relevant state and federal agencies, and emergent groups. The material duplicates the information involved in the previously discussed interview guides.

The data gathered through these interview guides allow us to evaluate the extensiveness and nature of the local response activities. In particular, questions 7, 8, 9 and 10 detail the variety of activities

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undertaken. Furthermore, questions 5 and 6 provide information on the
communication activities of the local emergency management agency. An
analysis of the specific tasks undertaken in question 7 and 10 allows for a
determinati·n of the degree to which the local agency engaged in management
activities.

Data were also gathered on the extensiveness and nature of planning
activities. Generally, Guide IIA aims at obtaining information on (1) the
internal structure and functions of the local emergency management agency,
(2) social linkages established between it and other emergency-relevant
organizations for purposes of disaster preparedness, (3) emergency-
relevant resources available to the local agency, (4) preparedness
activities undertaken by the agency, and (5) the history of the
organization.

Specifically, questions 3A, 3B, 3C and 3D attempt to determine the
level of interorganizational involvement in planning activities undertaken
by the local emergency management agency. As such, they determine the
degree of "networking" and overall community planning involvement
engendered by the agency. Question 4 examines the local agency's
perception of the division of labor among local community organizations
with regard to 25 important disaster tasks. Question 5A determines if a
disaster plan exists, when it was last revised, the degree to which it is
exercised or rehearsed, and the role of the local agency in these
activities. Question 5B determines if the planning is comprehensive and
coordinates the activities of various community organizations. Question 6
catalogues the existing equipment and facilities possessed by the agency.
Question 7 determines the variety of planning activities that are engaged
in by the agency, including such tasks as hazard assessment, public
education, training programs, mutual aid agreements, etc. Finally, in
order to examine the impact of previous disaster experience upon response,
questions 8A - 8E gather data on past experience and its relationship to
planning and response.

In addition, we undertook a content analysis of the existing disaster
plans within each community to determine the orientation of the planning
effort and the degree to which they were comprehensive in nature.

Finally, Interview Guide IIB was used with local emergency response
organizations other than the local emergency management agency. It
attempts to determine the overall extent of community disaster planning and
to consider the expectations, perceptions, and evaluation of other local
organizations of the local emergency management agency's planning
activities. This guide, which is used with police, fire, hospitals, media
and other key emergency organizations, generally seeks to ascertain (1)
the general social climate providing the context for disaster planning and
preparedness, (2) the role of the local emergency management agency in
community disaster planning and preparedness--as viewed by other
organizations, (3) the extent of social knowledge about the state of the
local emergency management agency's disaster preparedness, and (4) the
degree to which all emergency organizations within the community are
involved in disaster planning and response.

After these interview guides were developed, they were pretested in
New Castle County, Delaware and in Baltimore, Maryland. Revisions were

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made, and the instruments were ready for field operations.

3. Selection of Research Sites

The attempt was made to cover a wider range of disaster agents than was possible in the previous work by the DRC (Quarantelli, 1985). That sample of agents was heavily weighted in the direction of floods. In the year of the contract, an attempt was made to include both natural and technological disasters within the sample. Furthermore, the goal was to purposely select events that allowed for warning and evacuation and to compare them with events that occurred without warning.

Most importantly, however, the attempt was made to study a wider array of local emergency management agencies. In the past, the Center had only studied formal, self-contained organizations with full-time staff members. In other words, only formal organizations were studied. However, it is realized that only a minority of local emergency management systems have independent, full-time personnel in a self-contained unit.

Therefore, during the year of field research, the decision was made to study situations that would have been bypassed in the past, i.e., to study some disasters in which emergency management responsibilities are held by part-time personnel or are embedded within other units (such as local fire departments), or are disbursed throughout a variety of local agencies. This greater variation in the structure and locus of the local emergency management system brought greater breadth to the research effort.

In addition, after discussions with FEMA, we also decided to study some disasters in locales that received FEMA funding and some in areas without FEMA money.

The only problem that arose in the selection of research sites was the relative scarcity of disasters during the period of the work. There were no domestic earthquakes of any consequence during the period of this contract. Although late 1985 was a busy hurricane season, most of those storms occurred before the project became operational. This past spring was one of the lightest tornado seasons in years. The number of tornadoes and the amount of destruction and loss of life were significantly below yearly averages. Finally, while flooding was prevalent in the Appalachian mountains in the fall, Northern California in February, and the Pittsburgh region in the Spring, neither the number nor the magnitude of flooding were of major proportions. Therefore, we were left with some important sampling goals, e.g., technological and natural agents, warning and no-warning situations, a variety of types of local emergency management arrangements, and diversity in federal funding, but few events from which to select.

After gathering information on a number of events, we undertook specific studies at nine disaster sites. Three, however, were excluded from systematic analysis for this report, although relevant observation became part of our background set. A chemical plant explosion in a mid-Atlantic state and the threat of Hurricane Charlie to an Atlantic coast city did not generate enough local LEMA activities to warrant an in-depth analysis. A major plane crash incident in California, because it occurred very late in the first year of the contract period, was primarily used to do some pilot work on police and fire department responses, the focus of

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our second year's work. Thus, for extensive analytical purposes, we were left with the events listed in Table IA.

Table IA: Research Sites by Type of Disaster

Name*	Population Size**	Regional Location	Type of Disaster
Conway	80,000	East Coast	Chemical Spill
Magnolia	50,000	Gulf Coast	Hurricane
Tramble	100,000	Appalachians	Flood
Madeira County	330,000	West Coast	Flood
Bryan	50,000	Mideast	Tornado
Dornton	2,200,000	East	Flood

*Names of the Cities are Pseudonyms
**Population Size has been rounded to nearest ten-thousand

In addition to the data from these six sites, further observations were made at sites being studied on a different, though related, project. These were observations in a town in Texas, in the aftermath of a tornado; in Ohio, after a train derailment and toxic spill; and in a major southern metropolis in preparation for Hurricane Bonnie. Although primary data gathering at these sites focused upon the mass media, it was possible to make observations about the response of the local emergency management agency. Data from these research sites, however, are not independently analyzed in this report. Similarly, preliminary observations made in cities in Alabama and Florida in preparation for the impact of Hurricane Elena will not be specifically discussed. While we undertook systematic analysis of the data from our six case studies, we had relevant field impressions from about nine other disasters.

To what degree are our research goals actualized in these six case studies? Although floods still dominate, at least one technological disaster was studied. Furthermore, three of the events involved warning and three did not. In addition, there are varying amounts of federal funding for emergency management in the six locales. Finally, as will be evident later, we were able to study a wide range of different structural arrangements among the local emergency operations and a correspondingly wide diversity of response patterns.

4.   Selection of Organizations

Within each research site, the field team would arrive on the scene generally within hours of the impact. Normally, a three-person field team was sent to the scene, however, four individuals were sent to Madeira. After arriving in the community, the team would first go to the EOC, or,

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lacking such an arrangement, they would descend upon government offices, police or fire departments, etc. Once at the EOC or similar facility, an overall picture of organizational involvement in the response effort would be developed. Through in-depth interviewing with organizational representatives, the accumulation of secondary documents, and observational data, the attempt was made to reconstruct the response system. Within all the communities, the field team interviewed personnel from the following agencies if they were involved in any way: local emergency management agency, police, fire, sheriff, hospitals, utilities, Red Cross, and Mayor's office or the City Administrator. In addition, depending upon their degree of involvement, other organizations contacted included the Salvation Army, local mass media organizations, private organizations involved in the response, emergent groups, and relevant state and federal agencies.

The range of organizations interviewed was from five in Conway and seven in Tramble to 11 in Magnolia, 13 in Bryan, and 15 in Madeira. The total number of interviews, of course, exceeded these figures since more than one individual was interviewed in many organizations. The result was a profile of all relevant organizations within a community, including their perception of and involvement with the local emergency management agency in planning and response activities. Although the central thrust of the research was on the emergency management units of the community we chronicled, the response activities of all organizations.

5. Selection of Informants Within the Organizations

Within the local emergency management agency, we made an attempt to interview all organizational personnel. Within the other community organizations, personnel were selected based upon their being in key operational and decision-making roles with regard to disaster planning and response. For example, within police departments we gave high priority to interviewing the EOC and on-site command post representatives, the liaison to the local emergency management agency and a high level operational officer. Within hospitals, the field team was instructed to gather interviews with the following individuals in order of priority: Hospital Administrator, Disaster Coordinator, head nurse in the Emergency Room, and ambulance drivers.

A total of 178 interviews were conducted at disaster sites during the course of our work. However, the core of our analysis comes from the 103 interviews obtained specifically for this project, as well as a variety of secondary documents and disaster plans collected in the course of the field work. Since the DRC treats those we interview as informants, not respondents, we have an average of 16 independent observations from critically placed informants about the nature of organized disaster response in each community.

Over 90 percent of the interviews were tape-recorded. Of those that were not, hand written notes were used to reconstruct the interview, and these were dictated onto tapes.

6. Data Processing

Upon returning from the field the team members offered a debriefing to the staff. Following the debriefing, a field report was written within the

first three days. It detailed the field work, event and preliminary obser-
vations. Meanwhile, the field team members audited the recorded interviews
they had completed and transcribed the information onto paper copy. With
the completion of the "write-ups" of the interviews, additional data
analysis occurred, including the content analysis of the procured disaster
plans. A revised, and more detailed field report was then produced. In
the cases of Madeira and Bryan, it was decided that a full-scale case study
should be undertaken. In each instance, a team of three researchers was
given responsibility for the production of the case study. These detailed
case study documents, although used in our analysis, are not part of this
report, but will be published separately.

Certain information was available in machine-ready form. Various
rating scales, for example, were included and entered into the computer for
later analysis.

APPENDIX B

FIELD GUIDES USED IN PHASE I

NOTE: It should be kept in mind that the following field research
         instruments are interview guides, not interview schedules. As
         such, interviewers are expected to obtain information about the
         questions posed, but, in most cases, not necessarily to ask the
         question exactly as phrased in the guide. This will result in
         obtaining high quality data only if the interviewers have been
         involved in the development of the overall research design, if
         they have been given extensive in-depth training on how to con-
         duct open-ended interviewing, and if there is close supervision
         and continuing monitoring of all phases of the field work--
         standard procedures DRC has followed for over 20 years.

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FIELD INSTRUMENT I

Interview Guide for Emergency Organizations--Disaster Response

General Considerations

1. This guide is for purposes of ascertaining (a) a general picture of the emergency response--including a time-ordered sequence of disaster tasks and activities undertaken by the various responders; (b) community perceptions of the legitimacy, responsibility, and authority of the local emergency management agency; and (c) the degree of perceived conflict and/or cooperation characterizing the overall disaster response.

2. This interview guide is to be used with the following organizations unless the field situation dictates that one or more other organizations should be substituted for or added to this list.

    A. Local Emergency Management Agency
    B. Local Police Department
    C. Local Fire Department
    D. Local Red Cross Chapter
    E. Local County Sheriff's Office
    F. (if casualties) Major Hospital Involved

3. Specific personnel to be contacted will be dictated by the field situation, however, in general, effort should be made to contact the appropriate organizational representatives as listed on the Field Document entitled "Chart of Possible Organizational Contacts."

4. It will also be necessary in these organizations to interview for organizational involvement in disaster planning and preparedness. However, Field Instruments 2a or 2b should be used to obtain this information, and a different organizational representative may have to be used as the informant.

5. This interview guide should be accompanied by a 4 x 6 index card which lists 22 different disaster tasks. This card should be given to informant when asking Question #3.

6. Keep in mind that our primary focus is on the local emergency management agency (LEMA). We are interested in obtaining information on exactly what this group did during the response and how it fit in with what other organizations were doing. Furthermore, we are interested in ascertaining organizational perceptions of the role of LEMA in disaster response. In other words, we want to know **everything** we possibly can about LEMA **BUT**, we want a significant proportion of this information to be derived from the prospective of LEMA's organizational set.

Introductory and Concluding Remarks

The following introductory remarks should be modified on the basis of what has been said prior to the formal starting of the interview.

General Introduction

This part of the interview focuses on the actual response to the disaster. I'm particularly interested in getting some idea of the different tasks and activities undertaken by the various groups and organizations involved in the disaster response. Let's start with your organization's involvement in the response.

General conclusion

If informant mentions planning and preparedness in response to the probe for the last question, you're already set up for your lead into Field Instrument 2a or 2b.

If informant fails to mention planning and preparedness, you could lead into Field Instrument 2a or 2b with the following.

> Now that you've given me a good picture of what went on during the emergency time period. I'd like to ask you a few questions about the state of disaster preparedness for both your organization and the overall community.

Response to the Disaster

(This guide is set up as if the disaster emergency was over, but since we may be in the field in the middle of the emergency time period, phrasing of questions and probes may have to be adjusted accordingly.)

1. I would like to ask you some questions about the response of your organization in this particular disaster. Maybe we can go back to when your organization first heard about the _____ (agent/event), and take it step-by-step up to the present time.

    As far as your group is concerned, when did all this start?

    PROBE: 1. (Awareness) When and how did the organization first hear of agent/event?

    2. (Involvement) At what time/phase did the organization become involved and in what way?

    3. (Tasks) What tasks did the organization undertake (time-ordered)?

    4. (Problems) What problems or difficulties did the organization have, and were they major or minor?

    5. (Relationships) Which other organizations (groups) did the organization work closely with?

    6. (Responsibilities) What was the basis of the responsibilities the organization assumed?

(Allow informant--and treat as informant rather than respondent--to reconstruct the situation in his/her words, but keep in mind that for our purposes we want to obtain a clear picture of the social chronology of the situation including: sequences of actions and happenings; what specific things were done by which groups and when; chains of communications and command; interactions among various groups, etc. Organizations rather than individuals are our focus.)

2. Now I would like to get a little more specific about the major tasks your organization undertook during the emergency period of the disaster. You mentioned a number of things your organization did (if that was the case). What would you say are the three most important things or tasks your organization did in the emergency period of the disaster?

    PROBE: (for all three tasks)

    1. Time sequence and duration of each task.

    2. Difficulties and problems in carrying out each task.

    3. Which other organization(s) if any, also undertook same task?

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3. Let's turn to a related matter. You may not know or be able to give me an answer on the things we'll ask about now, but that's OK. Just tell me about those things which you know about.

We want to get an idea of who did what in this disaster. Would you look at this card (HAND CARD TO INFORMANTS) and tell me if you know which organization did this task during the emergency period of the disaster? There can be more than one organization involved. For example, which organizations were involved in providing warning to the public about the danger? (OR IF A NONWARNING TYPE EVENT) Which organizations were involved in search and rescue?

(Go through list one by one. Be sure you keep in mind answers obtained in reply to Questions #1 & #2 where presumably informant talked about own organization tasks.)

WHICH ORGANIZATIONS WERE INVOLVED IN:

Pre-impact time in:

1. Warning public about possible danger?
2. Notifying other emergency relevant organizations about possible danger?
3. Requesting emergency relevant resources from other organizations?
4. (IF IT HAPPENED) Deciding on ordering or requesting evacuation?
5. (IF IT HAPPENED) Actually ordering or requesting evacuation?
6. Informing mass media on pre-impact preparedness measures?

Post-impact time in:

7. Search and rescue activities?
8. Transporting the injured?
9. Handling the dead?
10. Compiling lists of missing persons?
11. Making overall damage assessment?
12. Establishing on-site command post? (IF THERE WAS ONE)
13. Setting up roadblocks or a security system?
14. Establishing a pass system?
15. Providing food for victims?
16. Opening up mass shelters for victims?
17. (IF IT HAPPENED) Evacuation:
    a. Decision or ordering or requesting evacuation?
    b. Actually ordering or requesting evacuation?
    c. Providing transportation for evacuation?
    d. Recalling evacuation request or order?
18. Activating the EOC?
19. Notifying other emergency relevant organizations about impact?

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20. Requesting any specialized equipment or resources needed?

21. Releasing information for mass media and public?

22. Declaring or announcing the emergency was over?

WAS THERE ANY OTHER IMPORTANT EMERGENCY TIME TASK CARRIED OUT WHICH WAS NOT LISTED ABOVE?

IF SO, WHAT? WHICH ORGANIZATION(S) WERE INVOLVED?

> NOTE: On all answers in which the local emergency management agency is mentioned as one of the organizations undertaking the task:

> PROBE: 1. (Difficulties and problems) As far as informant knows, were there any difficulties or problems in carrying out the task?

> 2. (Evaluation) In general, how well or how poorly was the task carried out? Put on a 1 to 5 scale, with 1 being the lowest grade and 5 being the highest. On that scale, how does informant rate the performance of all the organizations mentioned as doing that particular task.

> 1   2   3   4   5

(Remember this probe only for answers in which local emergency management agency is mentioned or listed as involved.)

(Get card back from informant.)

4. We are particularly interested in coordination, especially of the overall response. Was any group or organization in charge of the overall response?

    If yes, who?

    How did that organization coordinate the overall response?

    PROBE: Was there any change through time in overall coordination, and if so, which organization(s) were involved?

    If no coordination, what might account for that situation?

5. So far we have talked primarily about local emergency groups. What about outside groups? Which were the most important ones here?

    PROBE: Private as well as governmental, state level, and federal level.

    A. Whad did these outside organizations do?

    PROBE: Tasks they undertook.

    B. How did they get along with the local organizations?

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PROBE: Positive, negative, or neutral relations.

PROBE: Any conflicts, and if so, source of conflicts?

6. Most organizations have some difficulties or problems of one kind or another in responding to emergencies and disasters. That's to be expected. What types of problems or difficulties did your organization encounter?

   (Note that informant may have already mentioned problems of own organization--lead into question by noting whatever said.

   Also keep in mind we are primarily interested if the local emergency management agency is perceived as the source of the difficulties and/or the solver of the problems.)

   A. Technological problems or difficulties: be alert to matters relating to resources, information, and expertise.

   PROBE: Types of equipment needed and from where obtained?

   Specialized knowledge or information needed and where obtained?

   Specialists or skilled persons needed and where obtained?

   B. Intraorganizational/Interorganizational problems or difficulties: be altert to matters relating to coordination, communication, authority, legitimacy, domain, and boundaries.

   PROBE: (Conflicts) Was there any disagreement over who should be doing what? If so, how was issue resolved?

   (Assessments) Obtain examples of some matter that was particularly well handled? Something particularly poorly handled?

7. In concluding this part, how would you evaluate your own organization's performance in this situation. Let's use the same scale as before with 1 being the lowest grade and 5 being the highest. On that scale of 1 to 5 where would you place your organization?

   1   2   3   4   5

   PROBE: Why is that evaluation given?

   (Presumably in answer to question, something will be said about community disaster preparedness, organization disaster preparedness and/or situational contingencies--factors we are positing as affecting response. Use what is said to make a transition to Part 2a of Interview Guide (for local emergency management agency, or Part 2b for other local emergency organizations being studied.)

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FIELD INSTRUMENT IIa

Interview Guide for Local Emergency Management ·gency--Disaster Planning·
and Preparedness

General Considerations

1. This interview guide is for purposes of obtaining information on (a)
    the internal structure and functions of LEMA, (b) social linkages
    established between LEMA and other emergency-relevant organizations
    for purposes of disaster preparedness, (c) emergency-relevant resources
    available to LEMA, (d) preparedness activities undertaken by LEMA, and
    (e) the disaster history of LEMA.

2. This interview guide is to follow Field Instrument I and is to be used
    with representatives from LEMA only. Specific LEMA personnel to be
    contacted will be dictated by the field situation. However, an attempt
    should be made to contact the LEMA representatives cited in "Chart of
    Possible Organizational Contact."

3. This interview guide should be accompanied by a 3 x 5 index card which
    lists eight (8) different emergency-relevant organizations. This card
    should be given to informant when asking Question #5.

INTERVIEW GUIDE IIa

Local Emergency Management Agency Disaster Planning and Preparedness

Internal Structure and Functions

1. What is the legal jurisdiction of this agency?

2. What is the table of organization of this agency?

    (Get organizational chart if possible)
    (Establish total number of personnel--full, part-time, volunteers, etc.)

    PROBE: Division of labor

3. To whom is this agency responsible?

    PROBE: Lines of authority
            Nature of authority (what it can and cannot do)?
            Financial base (where does budget come from)?

4. What are the major goals and objectives of this agency?

    PROBE: Priorities?

Interorganizational Aspects

5. We want to turn now to your organization's contact with other groups
    during normal times. Would you please look at this list? Let's start
    with the first organization on the list. THE POLICE.

    a. During normal times how much contact does your agency have with
        the local police?

        PROBE: Nature of contact?
                Formal or informal?
                Initiator of contact normally?
                Is organization supportive or non-supportive of local emergency
                management agency?

    b. How much disaster planning has your agency undertaken with the police?

    c. As your organization sees it, what are the major tasks the police
        should have during a disaster in this community?

    (ASK a, b, c for rest on list)

    THE FIRE DEPARTMENT   LOCAL UTILITIES
    THE MAYOR'S OFFICE (OR CITY MANAGER'S OFFICE)   LOCAL RED CROSS CHAPTER
    LOCAL HOSPITAL(S)   SHERIFF'S DEPARTMENT
              STATE EMERGENCY MAN, _MENT OFFICE

Resources

6. Let us turn to the resources your organization has. What about written disaster plans? What kind of disaster plan do you have (OBTAIN COPY OF PLAN AND INDICATE WILL ONLY ASK QUESTION PROBABLY NOT IN THE PLAN)?

    PROBE: Last revision of the plan?

    Rehearsals and exercises of the plan, including last time exercised?

    Any group which has helped in developing the plan?

    Especially find out changes in written plans in last five years.

7. What kind of facilities does your agency have?

    PROBE: Details about EOC.

    Especially find out changes in facilities in last five years.

8. What kind of equipment does your agency have?

    PROBE: Stockpiling of any resources?

    Especially find out changes in equipment in last five years.

9. What kind of budget does your agency have? (OBTAIN COPY OF LAST BUDGET)

    PROBE: Especially find out changes in budgets in last five years.

Planning Activities

Apart from these more material matters or things, let us look at some other aspects of the disaster planning you might be undertaking. For example,

10. How much does your agency do by way of assessing risks and hazards in this community?

11. ...educating the general public about disasters and planning for them?

12. ...conducting training programs relevant to disasters?

13. ...establishing informal links with other key emergency personnel?

14. ...holding formal meetings with other groups to exchange disaster planning information?

15. ...signing memoranda of understanding and developing mutual aid agreements?

16. ...helping other organizations draw up their disaster plans?

History

Finally, to conclude, let us look at a little bit at the experiences of your agency.

17. What kind of disaster experience has this organization recently had? Say in the last five years?

    PROBE: Kind of disaster and involvement of agency in disaster.

18. Was the disaster plan used in any of these recent disasters? Take the last disaster. Was the plan used?

    PROBE: If used, how well did it work, and were any changes made as a result of experience?

    If not used, why not?

19. The last question I want to ask is what lessons have you and your organization learned as a result of this last emergency or disaster experience?

    PROBE: What would they do different in the future?

    What advice would they give to colleagues elsewhere in similar situations?

(Thank for assistance, indicate might recontact in future to fill in gaps, and ask if there is anyone else in particular, DRC should talk to in order to get good picture of the situation.)

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FIELD INSTRUMENT IIb

Interview guide for Emergency Organizations (excluding LEMA)--Disaster Planning and Preparedness

General Considerations

1. This interview guide seeks to ascertain (A) the general social climate providing the context for disaster planning and preparedness, (b) the role of LEMA in community disaster planning and preparedness--as viewed by other organizations, (C) the extent of social knowledge about the state of LEMA's disaster preparedness, and (d) the degree to which all emergency organization's within the community are involved in disaster planning and preparedness.

2. This interview guide is to follow Field Instrument I and is to be used with the following organizations unless the field situation dictates otherwise.

    A. Local Police Department
    B. Local Fire Department
    C. County Sheriff's Department
    D. Local Red Cross Chapter
    E. Major Hospital in Community

3. Specific personnel to be contacted will be dictated by the field situation, however, an effort should be made to tap organizational representatives as cited in "Chart of Possible Organizational Contacts."

4. This interview guide should be accompanied by a 4 x 6 index card which lists 23 different disaster-related tasks. This card should be given to informant when asking Question #7.

Disaster Planning and Preparedness of Other Emergency Organizations

1. Setting aside for the moment what actually happened in this disaster,
    what in your estimate was the state of the overall disaster planning
    in this community?

    How prepared was the community as a whole?

    PROBE: Get an assessment on a 1 (low) to 5 (high) scale of disaster
            preparedness in the community.

                                          1   2   3   4   5

2. Generally speaking, was there any overall disaster planning among the
    emergency organizations in the community

    PROBE: What did such planning involve?

            Which organizations participated?

            Which organizations took lead or initiative?

3. Which local organizations, if any, would you say has been most important
    in the overall disaster planning in this community?

    PROBE: In what way?

4. We are particularly interested in one local organization. What part
    did the local emergency management agency play in the overall disaster
    planning in this community?

    How important or unimportant has it been?

    PROBE: If important, in what way?

            If unimportant, why not?

5. More specifically, do you know if the local emergency management agency
    has: (and I will go through a list here)

    a. A written disaster plan?
    b. Conducted rehearsals and exercises of the plan?

        PROBE: When last done?

    c. Made assessments of the risks and hazards in this community?

        PROBE: What was found?

    d. An emergency operating center (EOC)?

        PROBE: If location known?

    e. Made attempts to educate the general public about disasters and planning
        for them?
    f. Conducted training programs relevant to disasters?
    g. Established links with other key emergency personnel?
    h. Held informal meetings with other groups to exchange disaster planning
        information?

i. Signed memoranda of understanding and develoing mutual aid agreements?

j. Helped other organizations draw up their disaster plans?

6. In terms of your own organization, what has been its contact (before this disaster) with the local emergency management agency with respect to disaster planning?

   PROBE: Nature of contact, including if formal or informal?

   Frequency of contact(s)?

   If assistance sought, assessment of help received on 1 to 5 scale?

   _ 1 2 3 4 5

   General evaluation of the local agency on a 1 to 5 scale?

   1 2 3 4 5

7. Talking more generally with respect to disaster planning in this community, which organization(s) as far as you know had responsibilities prior to this disaster to: (give card)

   (Tell informant to include own organization in the discussion)

   (Go through list one by one. Be sure you keep in mind answers obtained in reply to earlier questions where presumably informant talked about own organization.)

WHICH ORGANIZATION(S) HAD RESPONSIBILITIES TO:

In Pre-Impact Time To:

   1. Coordinate overall community disaster planning?

   2. Warn public about possible dangers?

   3. Notify other emergency relevant organizations about possible dangers?

   4. Stockpile disaster supplies and equipment?

   5. Decide on order or request evacuation?

   6. Actually order or request evacuation?

   7. Inform mass media on pre-impact preparedness measures?

In Post-Imact Time To:

   8. Engage in search and rescue activites?

   9. Transport the injured?

   10. Compile lists of missing persons?

   11. Make overall damage assessment?

   12. Establish on-site command post?

   13. Set up roadblocks or a security system?

   14. Establish a pass system?

15. Provide food for victims?

16. Open up mass shelters for victims?

17. If evacuation:
    a. Decision on order or request for evacuation?
    b. Actually order or request evacuation?
    c. Provide transportation for evacuation?
    d. Recall evacuation request or order?

18. Activate the EOC?

19. Notify other emergency relevant organizations about impact?

20. Request any specialized equipment or resources needed?

21. Release information for mass media and public?

22. Coordinate overall disaster response?

23. Declare or announce an emergency is over?

8. Now let's narrow this down to the disaster planning and preparedness of your own organization as it existed before this disaster. Does your organization:

   a. Have a written disaster plan? (If yes, obtain a copy)

      (If no, ask if anything similar to a plan such as a SOP exists?)

      PROBE: When last updated?

   b. Carry out any rehearsals and exercises of the plan?

      PROBE: If only within organization or with other organizations?

   c. Have any kind of special facilities for disaster operations?

      PROBE: Any command post or van?

   d. Have any personnel assigned to specifically planning for disasters?

      PROBE: Who and what they do?

9. Let me mention a few activities which sometimes are carried out in connection with disaster planning.

   a. How much does your organization do by way of assessing risks and hazards in this community?

   b. ...educating the general public about disasters and planning for them?

   c. ...conducting training programs relevant to disasters?

   d. ...establishing informal links with other key emergency personnel?

   e. ...holding formal meetings with other groups to exchange disaster planning information?

   f. ...signing memoranda of understanding and developing mutual aid agreement?

   g. ...helping other organizations draw up their disaster plans?

History

Finally, to conclude, let us look at a little bit at the experiences of your agency.

10. What kind of disaster experience has this organization recently had? Say in the last five years?

    PROBE: Kind of disaster and involvement of agency in disaster.

11. Was the disaster plan used in any of these recent disasters? Take the last disaster. Was the plan used?

    PROBE: If used, how well did it work, and were any changes made as a result of experience?

    If not used, why not?

12. The last question I want to ask is what lessons have you and your organization learned as a result of this last emergency or disaster experience?

    PROBE: What would they do different in the future?

    What advice would they give to colleagues elsewhere in similar situations?

(Thank for assistance, indicate might recontact in future to fill in gaps, and ask if there is anyone else in particular, DRC should talk to in order to get good picture of the situation.)

Interview Guide for Other Relevant Groups

General Considerations

1. This interview guide is for purposes of obtaining information from groups and organizations which were more peripheral to the operations of the LEMA during the disaster response. As such, it seeks to ascertain (a) the degree and nature of involvement of these groups and organizations in the overall disaster response, (b) interorganizational contact and interaction between these groups and LEMA, (c) how these groups perceive LEMA's performance and involvement in the disaster response as well as in disaster planning ane preparedness, and (d) an overall assessment of community disaster preparedness.

2. This guide is to be used with any or all of the following organizations (as dictated by the field situation).

    A. Mayor's office/City Manager's office
    B. Hospitals
    C. Religious groups and churches
    D. Local utilities
    E. Local mass communications organizations
    F. Other private organizations
    G. Extra-community emergency organizations
    H. Relevant state agencies
    I. Related federal agencies
    J. Emergent groups (e.g. search and rescue teams)

3. Specific personnel to be contacted will be dictated by the field situation, however, an effort should be made to contact appropriate organizational representatives as cited in "Chart of Possible Organizational Contacts."

4. Note that because these groups range from formal bureaucracies to ephemeral groupings, you may have to modify considerably the actual questions you will ask. Keep in mind our general research objectives when you make such modifications.

INTERVIEW GUIDE III

All Relevant Groups and Organizations for Which Field Instruments I. IIa. and IIb Cannot be Used in Their Entirety

1. I would like to ask you some questions about the response of your organization in this particular disaster. Maybe we can go back to when your organization first heard about the _____ (agent/event), and take it step-by-step up to the present time.

   As far as your group is concerned, when did all this start?

   PROBE: 1. (Awareness)   When AND how did the organization first hear of agent/event?

   2. (Involvement)   At what time/phase did the organization become involved and in what way?

   3. (Tasks)   What tasks did the organization undertake? (time-ordered)

   4. (Problems)   What problems or difficulties did the organization have, and were they major or minor?

   5. (Relationships)   Which other organizations (or groups)did your organization work closely with?

   6. (Responsibilities)   What was the basis of the responsibilities the organization assumed?

   OR,

   Why did your organization think it had to undertake the tasks mention in #3?

(Allow informant to reconstruct the situation in his/her words, but keep in mind that, for our purposes, we want to obtain a clear picture of the social chronology of the situation including: sequences of actions and happenings; what specific things were done by which groups and when; chains of communication and command; interactions among various groups; etc. Organizations rather than individuals are our focus.)

2. We are particularly interested in the coordination of the overall emergency response. Was there any group or organization coordinating the overall response?

   PROBE: If YES:

   Which group coordinated the response?

   In what manner was the response coordinated?

   Was there any change in coordination through time?.

   If NO:

   What might account for that situation?

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3. We also are particularly interested in any contact or interaction your organization had with the local emergency management agency in this disaster. (MAKE TRANSITION TO THIS QUESTION DEPENDING ON ANSWER TO PREVIOUS QUESTIONS AND PROBES.) Was there any contact or interaction in this disaster.

    PROBE: Nature of contact/interaction.

    Perception of what tasks they saw LEMA undertaking.

    Evaluation on a 1 to 5 scale of agency performance.

    1   2   3   4   5

.4. Had your organization had any pre-disaster contact or interaction with the local emergency management agency?

    PROBE: Degree and nature of pre-disaster contact/interaction.

    Planning and/or preparedness activities with the agency prior to the onset of current disaster.

5. (FOR LOCAL COMMUNITY-BASED ORGANIZATIONS ONLY. DO NOT ASK OF EXTRA-COMMUNITY GROUPS.)

    Setting aside for the moment what actually happened in this disaster, what was the state of overall disaster preparedness in this community? In other words, how prepared was the community as a whole?

    PROBE: Ask informant to assess preparedness on a 1 to 5 scale.

    1   2   3   4   5

6. In conclusion, what has your group or organization learned from this experience?

    What advice would you give to a colleague in a similar situation?

    (Thank informant for his/her assistance. Indicate that we might make future contact to fill in gaps. Ask if there is someone else in particular that DRC should talk to to get a good picture of the situation.)

APPENDIX C

DRC LIBRARY CLASSIFICATION CODE
(1986 version)

DRC_LIBRARY_CLASSIFICATION_SYSTEM
(July, 1986 edition)

I. DRC MATERIALS (1-99.9)

(DRC Theses and Dissertations are listed under 940; DRC
Confidential Research Notes, Research Reports, Working
Papers, Research Memos, Field Reports, Tapes of DRC
Training Meetings as well as Internal Documents are in
DRC Archives).

II. MATERIALS ON DISASTERS (100-729.9)

III. MATERIALS ON MASS EMERGENCIES AND COLLECTIVE BEHAVIOR
     (730-799.9)
     (Primarily on conflict situations--riots, civil
disturbances, terrorist activities, social movements, etc.)
     (Wartime material is classified under 160-169.9)

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Non-public material
   DRC Archives
   Non-DRC Research Proposals
   Other

VIII. PRIMARY DATA

Non-public material
   DRC
   Non-DRC