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SHELTERING AND HOUSING AFTER MAJOR COMMUNITY DISASTERS: CASE ST--ETC(U)

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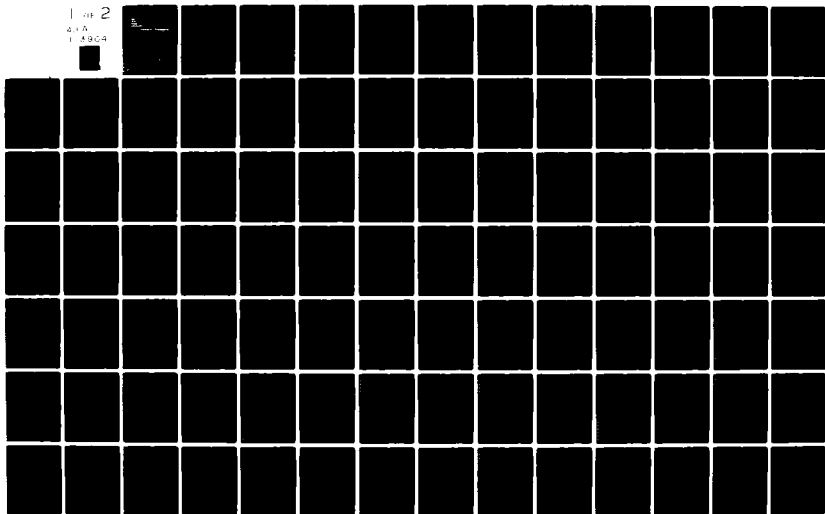
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Final Report

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SHELTERING AND HOUSING AFTER MAJOR COMMUNITY DISASTERS:
CASE STUDIES AND GENERAL OBSERVATIONS

Enrico Quarantelli
Department of Sociology

For the Period
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FEDERAL EMERGENCY MANAGEMENT AGENCY
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confusion may be eliminated by distinguishing among emergency sheltering, temporary sheltering, temporary housing, and permanent housing. Drawing on DRC data, we also compiled three studies focusing on sheltering and housing in three major American disasters, namely the Wilkes-Barre flood, the Xenia tornado, and the Grand Island tornado. From the case studies, a series of observations and conclusions were drawn about emergency sheltering, temporary sheltering, temporary housing, and permanent housing. We note that there are different behavioral manifestations and problems (both organizationally and individually), depending on which activity is being discussed. In addition, we suggest some high priority studies on sheltering and housing which ought to be conducted in the future. The report concludes with an appendix providing an annotated bibliography of three dozen publications which constitute the bulk of the empirical social science literature on disaster sheltering and housing.

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Final Report

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CASE STUDIES AND GENERAL OBSERVATIONS

for

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January 1982

by



E. L. Quarantelli
Disaster Research Center
The Ohio State University
Columbus, Ohio 43210

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This report has been reviewed in the Federal Emergency Management Agency and approved for publication. Approval does not signify that the contents necessarily reflect the views and policies of the Federal Emergency Management Agency.

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As is true of almost all reports from the Disaster Research Center (DRC), this publication also is a collective product. The overall data analysis and field work for the initial stages of the study was supervised by Barbara Baisden who, however, left after about six months to go back to school to resume her work for her doctoral degree. She also wrote the initial draft of the case study on Grand Island, Nebraska and prepared part of the annotated bibliography. William Marsiglio, a graduate research associate on the study, wrote the initial drafts of the other two case studies, those on Xenia, Ohio and on Wilkes-Barre, Pennsylvania. I thank Baisden and Marsiglio for their work on the study.

All initial chapter drafts, as well as the overall draft of the report was edited by Jennifer Welch, the DRC Administrative Director. She is to be thanked for her careful editing of drafts which were sometimes very rough and incomplete. Any readability of the report is due to her usual conscientious work and editing skills. Connie Smith, is thanked for typing the final version and supervision of this publication.

Much of the data used for description and analysis in the report were obtained in earlier DRC studies for a variety of different federal agencies including the Office of Civil Defense, the Defense Civil Preparedness Agency, the National Institute of Mental Health, and the Health Resources Administration. However, the actual work done on the study was done under Federal Emergency Management Agency (FEMA) contract number EMW-K-0385. The usual helpful assistance of James Kerr, the FEMA project monitor is acknowledged.

The final report represents the views and opinions of the author who served as Principal Investigator on the study. It does not necessarily reflect the ideas or positions of any of the above named individuals or agencies, including FEMA. The responsibility for this final report is mine, and mine alone.

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Director, Disaster Research
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CHAPTER I

INTRODUCTION: THE PHENOMENA OF SHELTERING AND HOUSING

In this chapter, we first present the background of our study, noting that the whole subject of sheltering and housing is conceptually vague and little empirically explored. We then make some simple conceptual distinctions between emergency and temporary sheltering, and temporary and permanent housing, and also note there are organizational as well as individual aspects of these phenomena. We conclude the chapter with a description of the nature and format of the remainder of the report, especially the case studies presented in the three following chapters.

Background

Prior to the initiation of the study summarized in this report, the Disaster Research Center (DRC) completed an extensive review of the literature on evacuation behavior in disasters (Quarantelli, 1980). One of the conclusions drawn was that the subject of sheltering and housing after major community disasters, although usually treated as a part of evacuation behavior, deserves study in greater depth than had been possible in the earlier review. The pages that follow discuss the research and analysis of literature undertaken by DRC on disaster sheltering and housing, and the findings and implications derived from these efforts.

We found two immediate difficulties in examining sheltering and housing in disasters. First, there is very little systematic literature on the subject, especially if we exclude (as we did) descriptions and analyses of refugee behavior associated with wars and civil disturbances, and of diffuse and slow moving crises such as famines and droughts. The few studies available, several dozen in all, are described in the Appendix. The quality and quantity of the research permits the drawing of very few general observations, certainly nothing in the way of systematic and empirically-sound generalizations. A second problem is the lack of a specific scientific vocabulary and set of concepts with which to describe and explain sheltering and housing phenomena. This absence is partly related to the minimal literature available. As a consequence, students of the problem face a lack of consensus regarding, and in many cases ambiguous meaning of, such key terms as disaster "shelter" and "housing."

This shortage of empirical data and paucity of analytical tools forced us to proceed differently than we might have preferred. We have had to struggle with definitional problems. We have had to undertake some relatively simple examinations of previously unanalyzed data in the DRC files and to gather more recent but limited new data. Nevertheless, while the conclusions and implications which can be drawn from such research are hardly definitive, our attempts represent an initial step in codifying what is known about sheltering and housing in major

disasters. Previous reviews of the literature all but ignore the topic (e.g., Barton, 1970; Mileti, Drabek, and Haas, 1975; Dynes, 1975).

Conceptualizing Sheltering and Housing

As with the term evacuation (Quarantelli, 1980), the terms sheltering and housing are used in the disaster area with little attention to clarifying and specifying their referents. There is an implicit assumption that the terms are self-explanatory. It is very rare to find any writer who attempts to define the terms or otherwise attempts to give them explicit referents, whether the author is a disaster researcher or a disaster planner, or someone from the operational area or some emergency organization.

One consequence is that the terms commonly have multiple and ambiguous meanings. The term shelter is used to refer to everything from an evacuee leaving his home to stay in his neighbor's house for a few hours while awaiting the passing of a dangerous threat, to an evacuee staying with relatives for several years in a different part of the country while awaiting the rebuilding of her home in her local community. The term shelter also refers on the one hand, to solo behavior by an individual, and on the other hand multi person and group activities involved in mass sheltering of many evacuees in public facilities. The term housing as used in the literature suffers from similar problems. It sometimes refers to an evacuee's returning to the original home; or to the obtaining of new quarters by a displaced disaster victim. In fact, the terms sheltering and housing, are often used interchangeably without being specifically defined as to point of time reference in a disaster life cycle from the appearance of a threat to the return back to normal routine activity in the community. It is not unusual for a writer to use both the terms, shelter and housing, in several and not always consistent senses.

As we shall discuss in the last chapter, we think it is both necessary and useful to distinguish between relatively distinctive phenomena often tagged interchangeably with the common labels of sheltering and housing. The major distinction which appears worth making is between emergency sheltering, temporary sheltering, temporary housing, and permanent housing.

Emergency sheltering refers to actual or potential disaster victims seeking quarters outside of their own permanent homes for short periods: hours in many cases, overnight at most. For example, residents had to leave their undamaged homes in Xenia, Ohio, after a tornado because all utilities were not functioning, but were able to return after an overnight stay elsewhere. Temporary sheltering, on the other hand, involves more than taking shelter elsewhere during the emergency; it refers to peoples' displacement into other quarters, with an expected short or temporary stay. For instance, some residents of Wilkes-Barre, were forced by floods from their home for several days. They stayed elsewhere but made no attempt to reestablish household routines until they returned to their original homes. Their temporary stay whether in a second home, friend's house, motel, or public facility--was for more

than just the height of the emergency period. Obviously, emergency and temporary sheltering shade into one another but there are differences in the behavioral aspects which are worth distinguishing for practical as well as theoretical purposes. For example, emergency sheltering does not usually raise the question of where and how the displaced disaster victims will be fed, but temporary sheltering does.

It also seems valid and useful to distinguish between sheltering and housing; the latter involves resumption of household responsibilities and activities, in the new quarters. The evacuees know that the living arrangement exceeds a mere emergency or temporary basis, and may extend for months, if not years. The evacuees may occupy mobile homes, rented apartments, tents, or whatever, but the important point is that unlike temporary sheltering, household routines must be established. Finally, the difference between temporary and permanent housing; the latter involves disaster victims returning either to their rebuilt homes or moving into new quarters--but in both cases, the moves involve occupying permanent, residential facilities. Unlike the shading between emergency and temporary sheltering, there is usually a sharp distinction between temporary and permanent housing. The exception occurs when what is initially defined as temporary housing actually becomes the permanent homes of the disaster victims, as occurred in the case of some Sicilian earthquake survivors in 1968. Years after the disaster, some evacuees were still living in what had originally been defined as simply temporary housing provided while new homes were to be built for the victims.

These distinctions are relatively simple and lack the sophistication probably necessary for a totally meaningful analyses of the phenomena. But even these simple distinctions are virtually absent in disaster literature and disaster planning documents. As we shall note in the last chapter of this report, however, an initial use of such distinctions is necessary to address the theoretical and practical questions involved in sheltering and housing after major community disasters. There are different behavioral phenomena and problems associated with these four different kinds of situations as we try to illustrate in our case studies.

Another distinction missing from the literature is between individual and organizational aspects of the phenomena. In fact, the minimal discussion of sheltering and housing deals almost exclusively with the behavior and activities of individuals, families, and households. Apart from some unanalyzed DRC data on the topic, there is almost nothing in the literature concerning the organizations and agencies involved in large-scale sheltering and housing operations. Except for one unpublished DRC study on mass shelter operations during Hurricane Betsy, there is not a single mass shelter study reported in the disaster literature in situations involving urbanized and industrialized societies. Particularly in our Wilkes-Barre case study, we try to give considerable information about the organizations' efforts to obtain temporary and permanent housing for the victims. However, as we will note again in the last chapter of this report, the organized aspects of sheltering and housing are at present almost totally unexplored territories, and about which our systematic knowledge is all but nil.

The Nature and Format of this Report

The crux of this report, comprising the next three chapters, is a set of three case studies on sheltering and housing after major disasters. We first describe the situation in Wilkes-Barre, Pennsylvania, following major flooding of the community and surrounding areas. The vast bulk of the population at least temporarily left their homes, and thousands of households could not return to their usual quarters for a long period, in some cases several years. The temporary housing provided in Wilkes-Barre constituted one of the largest such efforts in the United States since World War II. We note both the organizational and individual aspects of sheltering and housing, drawing our data primarily from field work DRC undertook in the community up to two years after the flood. DRC focused on the government agency most involved in providing housing in this situation, since we had some previously unpublished but relevant data available for analysis. In addition, DRC had survey data of a random sample of the population obtained six months after the flood.

Our second case study involves Xenia, Ohio, after a massive tornado struck the town. Thousands of residents were temporarily displaced, and hundreds of households were disrupted for months after impact. In relative terms, this was one of the largest sudden (American) disasters, in terms of property damage in recent decades. In this case, we discuss primarily the individual aspects of sheltering and housing, reflecting the study DRC undertook for several years after the tornado. In particular, we used data from two DRC population surveys, one several months after the disaster, the other 18 months afterwards. In addition, a followup visit was made to Xenia for purposes of this report, some six years later, which attempted to obtain a long range perspective of the rebuilding of Xenia's housing.

Our third case study centers around Grand Island, Nebraska, and its June 3, 1980, tornado. A DRC team visited the community, the third largest in the state, immediately after the disaster. We specifically focused on sheltering and housing activities. An effort was made to ascertain the emergency sheltering pattern which emerged, especially the night of the tornado. We also examined some of the temporary housing aspects of the disaster, using a six month period; research resource limitations prevented the longitudinal analyses we had originally intended. We include this case study as one of the few pieces of research which explicitly focus on emergency sheltering.

All three case studies use a conceptual format originally prepared for the earlier DRC evacuation study (see Quarantelli, 1980). Thus, with minor modification, each case describes the community context, threat conditions, warning, behavioral patterns of response, withdrawal evacuation, shelter, temporary housing, and return to the evacuated community. All three cases deal with individual aspects of sheltering and housing, but organizational aspects are dealt with at length only in the Wilkes-Barre study. This limitation was dictated by the availability of relevant data in the DRC files.

It might be argued that some of the specific governmental actions and policies on sheltering and housing described in the three case studies are historically dated and no longer valid. With regard to the specifics, this is probably true. However, general problems inherent to large-scale sheltering and general issues pertinent to massive rehousing, are the same in any large-scale sheltering and housing effort. There are certain generic matters in any housing and sheltering operation--past, present, or future. Thus, any case study, even of a past event, can improve our understanding of the phenomena.

This report concludes with a chapter on general observations and conclusions about sheltering and housing after major community disasters. We point out the little that is known, and we note what yet has to be learned and how that knowledge might be obtained. In the Appendix, we present a selected annotated bibliography of the literature on disaster sheltering and housing; the several dozen major references are briefly described.

CHAPTER II

THE WILKES-BARRE FLOOD CASE STUDY: INDIVIDUAL AND ORGANIZATIONAL ASPECTS

In this chapter, we present a case study of sheltering and housing in the Wilkes-Barre flood. Both individual and organizational aspects of the behavior are discussed; more specifically, this chapter has nine sections which discuss community context, threat conditions, warning, impact, behavior patterns, withdrawal evacuation, shelter, return, and temporary housing.

Community Context

During the summer of 1972, life for thousands of people in flood-stricken Wilkes-Barre in the eastern part of Pennsylvania was far from normal. The heavy rains which accompanied Hurricane Agnes produced disastrous flooding which left this community in a state of social disarray and physical ruin. The entire business district was inundated and approximately 30,000 local residents had to be evacuated and temporarily sheltered. In fact, many of those who were dislocated has to spend months and in some cases, even years, in temporary housing units. However, flood-related injuries were fortunately minimal and only four people died as a result of the flood.

The Agnes flood was one of the nation's largest disasters in terms of property damage. Roughly 14,000 housing units in the Wilkes-Barre community alone were damaged. Three colleges, two hospitals, and various churches, social agencies, nursing homes, recreational facilities, and corporate plants and offices were likewise damaged by the flood waters. The massive physical damage in the city and surrounding areas provided an impetus for a large-scale disaster relief effort by the federal government.

The federal government's response in providing temporary housing facilities for displaced families was a very important feature of this particular disaster. Since numerous families were unable to return immediately to their former residences, the Department of Housing and Urban Development (HUD) was delegated the responsibility of supplying temporary quarters for them. The task quickly became complex. This disaster was unlike most disasters in American society in which individuals are provided with emergency shelter only during the impact stage and (possibly) the immediate post-impact period. In this case, thousands of individuals were housed in temporary living units for prolonged periods. This frequently occurs in catastrophes outside the United States, but rarely in America, especially during the last four decades.

Wilkes-Barre, Pennsylvania, is best characterized as a working-class, industrial city with a population of roughly 60,000 exhibiting strong ethnic roots. Data from a DRC survey in 1972 showed that approximately 59% of the families had incomes under \$10,000, while 87% of the families had incomes under \$15,000.

Much of the population consisted of second- and third-generation descendants of German, Irish, Italian, Lithuanian, Polish, Slovak, and Welsh immigrants. Significant to the post-flood housing situation was the fact that the population was considerably older than the national average. Not only was there a heavy concentration of older persons in Wilkes-Barre, but the housing stock was dated as well.

The 1972 flood was one of several Wilkes-Barre experienced during the last century. Prior to 1972, the most recent occurred in 1936 and did considerable physical damage; it was the most devastating of these previous floods, with property damage exceeding \$9 million dollars (measured in 1936 dollars). Although no one was killed, approximately 15,000 people had to be evacuated.

The thirty-six years separating the '36 and '72 floods were relatively free from major flood threats. The levee system was improved and the dikes were raised several feet during this period. During this period, the dikes held effectively each of the three times that the river crested above thirty feet. While the levee system responded adequately, warnings were issued by construction specialists (although they went unheeded) that the burgeoning development of the flood plain would inevitably result in higher and higher river crests and eventually, a major flood. Business, industry, and residential development tended to gravitate toward the flood plain, not only in Wilkes-Barre but also in communities to the north. Fields which used to absorb much of the rainfall were developed and/or paved, consequently increasing the amount of runoff which drained into the river.

There were some resources in the area for dealing with disasters, although certain pre-impact weaknesses in organizational disaster preparedness were also apparent. On the positive side, the County Civil Defense (C.D.) office did have a significant communication system. This consisted of 12 standby telephones, 10 private lines, and 4 lines connected to the county courthouse switchboard, which were, however, located in the subbasement of the courthouse (in the flood plain), which also housed the local Emergency Operating Center (EOC). A police and fire communications center was conveniently located in a separate room adjacent to the EOC.

In addition to its communications system, the C.D. had access to an abandoned industrial complex which it used as a fire and rescue training center. Disaster training was also provided through a local college, which had a contract with C.D. to offer six to eight courses per semester in emergency operations.

The C.D. was a predominantly volunteer organization with the exception of one executive director and two secretaries. It was manned by 75 volunteers, and directed by a volunteer as well. Several of the key officials had considerable emergency and crisis experience and came from military backgrounds. One of the top officials also served as the river observer for the local community and had direct contact with the Flood Forecasting Service.

Some pre-disaster planning had also been undertaken, especially for floods. The C.D. had conducted a training exercise in 1971 to simulate response to a 37-foot flood threat. It also kept an updated listing of phone numbers and locations of emergency-relevant organizations and personnel. During the winter preceding the flood, an eight-week course for radio operators (e.g., citizens band personnel) was conducted, giving individuals an opportunity to exercise their skills in simulated emergency situations.

On the other hand, a comprehensive plan designed to deal with natural disasters did not exist. Prior to the flood, the most recent planning document for a large-scale emergency was a 1959 county disaster plan geared towards a nuclear threat, which was useless for a natural disaster situation.

Even though the C.D. exercises were beneficial, they were inadequate in two important respects. First, the exercises were primarily confined to the County Civil Defense personnel, excluding the various local and private organizations from having the opportunity to define and clarify their own roles in a full scale emergency. Second, concrete plans were not formulated for particular organizations, individuals, and locations. For example, while it was recognized that the evacuation of large numbers of people during a major disaster was an important consideration in disaster planning, no specific plans for the location or manning of mass care shelters were delineated.

Although the police and fire departments had communications facilities in the same building as the C.D., there was little, if any, serious discussion between these organizations concerning evacuation procedures. In fact, the fire departments and C.D. shared minimal communication, primarily because of technical problems. The fire departments radio systems were fragmented, some having low frequency and others high frequency equipment. The meetings which were held to discuss emergency operations did not seem to be very fruitful in integrating the various emergency organizations.

The overall coordination of the various responders was also affected significantly by a multiplicity of various political subdivisions. Hence, the integration of the resources within the county was minimized by inadequate communication and coordination between the small municipalities. Municipal planning was typically done in a piecemeal fashion with little effort to integrate the activities of the various municipalities.

Threat Conditions

It appears that people were unconcerned with hurricane Agnes until the night of June 21, when heavy rains began to fall. Many people supposedly were uncertain about the potential effects of the rain; they perceived the threat to be the water accumulating in their own community from the heavy rains falling in the immediate vicinity. The real threat, however, was 90 miles away. The water tables of the northern communities were unable to handle the excessive volume of water spawned by the heavy rains, subsequently record crests and catastrophic flooding.

In 1936 the community experienced a relatively severe flood, which served as a benchmark for judging the impending emergency. Heads of various organizations, as well as everyday citizens, judged the threatening conditions according to experiences associated with the 1936 flood. Not surprisingly, then, many decisions were based on the scope of the prior flood. A hospital administrator, for example, firmly believed that the flood would not inundate the first floor of the hospital because it had not done so before. Thus, some equipment was moved from the basement to the first floor, only to be damaged later by the flood waters, though most was wheeled up to the second floor where it escaped damage.

Many people had difficulty envisioning the river exceeding the record heights of the 1936 flood. In addition, the upgraded levee system had not only prevented flooding in the past, but had instilled a sense of security in the population as well. In many cases, citizens' perception of the possibility of a flood was therefore distorted by the mere presence and past success of the levee system; many households were held captive by their knowledge of the past, unable to appreciate fully the urgency of the situation.

Warning

The warning period for the flood was approximately 6 to 12 hours, which afforded the emergency organizations substantial time to prepare for the initial impact. Although heavy rains actually began Wednesday evening, the levee did not overflow until Friday morning. The seemingly relentless rains prompted the Flood Forecasting Service to update its crest predictions as more and more water entered the river system.

The relatively lengthy pre-impact period allowed the C.D. ample time to organize its strategy and implement its warning system. The predictability of the river's crest allowed the C.D. to issue timely evacuation warnings, and it was even able to request that people continue sandbagging until they heard a whistle signaling that it was time to evacuate. C.D. officials were able to discuss various problems and procedural alternatives; for instance, officials were able to assess the utility of asking people to help sandbag the levee by gathering input from various sources. The decision to evacuate hospitals and low-lying areas was made in a similar fashion. In short, while an emergency situation was evident, it evolved in such a way that decision making

could proceed through much consultation.

A flood watch was first issued Wednesday evening. C.D. officials met to discuss and monitor the crisis situation Thursday evening. Also on Thursday, 30-40 National Guard personnel were called in to patrol the dikes and look for leaks. Radio and television were used to alert the National Guard of this operation and request assistance.

On Friday morning, an emergency flood information network was established, comprising 13 local radio stations, with input at C.D. headquarters, thereby centralizing information dissemination. C.D. would give priority messages to the information network (at 15 minutes past the hour) for immediate broadcast (e.g., what areas were in danger and should be avoided, and what was happening in general). Credibility was maximized by having the same message presented over 13 different stations. Until Thursday at 6:00 p.m., the radio warned "beware of flash floodings; especially in the low-lying or flood prone areas." A warning was also issued Thursday night stating that there would be high water and that people might have to evacuate. People were advised to stay tuned to the station for further developments. Specific evacuation warnings were issued to persons in the flood plain by police and fire officials on Friday morning, using bullhorns and patrolling vehicles.

Behavior Patterns

Despite the dissemination of warning messages, however, the public did not always obtain relevant information concerning the weather and flood probabilities. Part of the problem was that radio broadcasts of the Civil Defense director's messages were given very late at night on June 22 and during the early morning hours of June 23. Many people apparently went to bed the night of June 22 believing that only the very low-lying areas were in danger. In addition to the C.D. warnings, the mayor had also asked for the voluntary evacuation of low-lying areas and for some stores to move their merchandise on Thursday afternoon. A few supermarkets were convinced to move their food to refrigerated trucks, which were later used to supply an evacuation center. As has been stated before, some people heard the various warnings but ignored them. On the other hand, as early as Thursday afternoon (the day before the flood), the local telephone switchboard was bombarded with calls requesting information from the C.D. on the status of the river and the likelihood of an evacuation.

Because the flood developed relatively slowly, people were initially able to evacuate their homes rather smoothly with minimal confusion. Interestingly enough, however, some people chose to remain in their homes because they felt secure and certain that the river would not top the dikes. In other cases in which people did not take the flood threat seriously, personal belongings were not moved to higher floors. As a result, many people lost possessions which they could have salvaged.

The population of any community can be considered a resource, though the nature of the disaster will determine to a large extent how relevant it may be in a given situation. The situation in Wilkes-Barre allowed the C.D. to mobilize a large group of people to tackle the dike project. As a whole, those who went to the dikes represented a massive, powerful resource. This segment of the population was probably not viewed as an emergency relevant resource prior to the disaster, at least not in the manner that they were during and after the event. Containers suitable for holding sand represented another somewhat latent resource which emerged with the onset of the disaster threat. Because of the shortage of sandbags, certain materials took on added importance as a result of their utility. Pillow cases were donated by hotels and individuals, merchants provided plastic bags, and the Postal Service gave empty mailbags for volunteers to fill with sand. These two examples of different types of community resources should help illustrate an important fact: some resources may be undefined prior to a disaster, or may not be perceived in quite the same manner as afterwards. Situational variables of a disaster can therefore not only determine what constitutes a resource, but also how critical it is.

Withdrawal Evacuation

The general evacuation order for Wilkes-Barre was given at 9:30 Friday morning, although some low-lying areas were given notice Thursday evening. The evacuation message was given after the C.D. received a 40-foot crest prediction from the Flood Forecasting System of the National Weather Service.

The evacuation apparently proceeded rather smoothly. Radio announcements, bullhorns, and sirens were used to alert the population that it was time to evacuate. Police and firemen were primarily responsible for cruising through the streets issuing the message to evacuate. No concrete plan for mass care shelters was proposed or promulgated to the public; people were simply advised that local schools and churches would serve as shelters and that food would be available. They were instructed to proceed out of the area and look for open shelters. An EOC official had contacted local school district officials early Friday morning to request that schools on high ground be opened and prepared for the influx of evacuees. The rescue coordinator from the EOC had also alerted local rescue units to prepare for evacuation operations prior to the mass evacuation. Moreover, the EOC had arranged for the National Guard to have standby trucks ready to evacuate levee workers, in the event that they might have to abandon their sandbagging efforts, as proved to be the case.

The National Guard played an important role during the disaster, especially in evacuation activities. At least 2,000 National Guard personnel took part in disaster-related operations and the availability of their heavy equipment (e.g., bulldozers, payloaders, trucks, boats) proved helpful in dealing with the massive physical damage to the community and in rescue operations. Boats were also acquired from the police (2) and private sources (50-60). Operating boats in rescue

maneuvers was a part of the SOP of the National Guard. Navy personnel and helicopters were also vital resources during the rescue operations.

Civil Defense personnel felt that probably no more than 5% of the population heard the early morning bulletins concerning the flood threat. However, it was contended that those who needed to know about the evacuation order were informed one way or another. It was commonplace for people to knock on their neighbors' doors, to telephone their friends and relatives to inform them of the evacuation message. Cruising police and fire squads also contributed substantially to the dissemination of the message. Evacuation to churches, schools, other shelter centers, and homes outside the flood-threatened area presented no major problems. Roughly 80% of those who left their homes found refuge with either relatives or friends, while others stayed in shelters or motels.

It is interesting to note that the percentage of working-class households who left their homes was significantly less than the percentage of upper-middle class households who did so. There was a positive correlation between one's social class and the tendency to leave one's home. Whether this was because housing patterns were such that middle and upper-middle class households were more likely to be located in flood-prone areas than were households belonging to the working class is unclear.

One factor which facilitated a smooth evacuation was its occurrence on an early summer morning. Families tended to be home together, since the children were not in school and the parents, in many cases, had not yet gone to work. This minimized the anxiety frequently associated with not knowing the whereabouts of one's loved ones. In general, plans for evacuation could therefore be made with the entire household present.

While most people listened and responded to the evacuation message, some refused to leave their homes and had to be subsequently rescued. The National Guard, assisted by local fishermen, commandeered boats in many of these rescue efforts. In addition, military personnel operated Navy helicopters during the rescue phase and were accompanied by state policemen who were familiar with the area. In the opinion of the organizations involved, rescue operations were successful, an assessment substantiated in part by the low number of injuries and fatalities sustained.

The decision to evacuate the two hospitals in the flood plain was made Thursday evening by a Civil Defense official. It was not implemented, however, until the early morning hours on Friday. C.D. officials experienced some difficulty when they tried to convince the chief administrator of one of the hospitals that evacuation was necessary. The problem was eventually resolved and evacuation proceeded relatively smoothly. Administrators from the various hospitals involved in evacuating (and receiving) patients generally agreed that their coordinated operations were effective. It should be noted that while only two hospitals were evacuated, several others discharged patients to make room for evacuees. The administrators kept in close contact with one another during the evacuation phase. Besides evaluating their own patients and deciding who was well enough to be picked up by family or

friends, the administrators had to inform each other on the type of medical care and number of beds needed. Sufficient time was available for hospital administrators and personnel to make the appropriate arrangements for the safe and orderly evacuation of patients, and in some cases, for the salvaging of equipment and drugs. Furthermore, the timing of the evacuation was convenient since it occurred near the change of shifts, doubling the emergency personnel available. Finally, since the evacuation occurred prior to the impact, there was an adequate supply of emergency vehicles and transportation routes.

Shelter

Because of the devastation, accommodations for flood victims in many cases were required beyond the immediate period of actual flooding. Thousands of homes were affected, and families were displaced for varying amounts of time. Some evacuees were simply out of their homes overnight; at the other extreme, many persons were still occupying temporary housing several years after the flood. In this section of the report we shall primarily discuss the emergency sheltering which occurred.

A DRC questionnaire completed by a random sample of families living in the flood-stricken community indicated that 54.9% of the area's families were forced to leave their homes because of the flood. While the data showing where people stayed is somewhat redundant because some people spent time in more than one shelter, it is clear that the vast majority of people sought refuge with friends and/or relatives. It is difficult to substantiate an exact percentage or aggregate number of evacuees who used mass shelters in the Wilkes-Barre area, although DRC data suggests that between 6-10% of the families dislocated by the flood spent some time in a mass care shelter. A majority of the mass shelters were located in local public schools and churches and manned by citizen groups. A private college provided refuge for an estimated 1,500 evacuees as well as serving as a temporary hospital for numerous patients displaced from the evacuated hospitals. A nearby airport also played a major role in accommodating individuals forced from their homes, and a local race track served as a receiving area for clothes and other supplies.

The Red Cross apparently did not play a very significant role in the early stages of the shelter operation. According to a Defense Civil Preparedness Agency report, the local Red Cross did not have a large enough staff nor the technical means of establishing a large-scale shelter operation. The local chapter's communications network consisted primarily of commercial telephone lines which were out of order immediately following the flood. Its original headquarters also was inundated and it had to relocate to a motel. The staffing of the Red Cross shelters was accomplished in large part by nursing personnel from the Wilkes-Barre area. Despite the local chapter's resource handicaps, it set up several shelters the first few days. The Red Cross apparently was able to make a larger contribution to shelter operations once national staff and supplies arrived some days later, during the recovery stage. It was able to take charge of all of the evacuation centers in

the area before the end of July.

There seems to have been some confusion between the county EOC and Red Cross regarding the latter's role in sheltering activities. The EOC anticipated that the local chapter would assume the traditional responsibility of overseeing shelter operations. The local Red Cross's capabilities were not realistically estimated, however, consequently leading to unfulfilled expectations and unmet demands. Hence, the lack of pre-disaster coordination between the EOC and Red Cross was reflected in the EOC's misconceptions about the local chapter's response capabilities. Had the Red Cross participated in the 1971 Civil Defense exercise, a more accurate assessment of its resources and capabilities might have emerged.

In an emergency situation, as in any situation in which various organizations participate, disparities in the perceptions of how well a particular organization performed are common. The Agnes flood was no exception. While other organizations may have been dissatisfied with Red Cross's response, internal Red Cross documents paint a rather positive picture of their organization's activities.

Staff and volunteer nursing personnel completed the initial medical and nursing survey a few days after the flood. There apparently was confusion in the early stages concerning the designation and establishment of shelters. Because the evacuation message simply instructed people to leave the area and look for open churches and schools, some facilities became overcrowded while others were underutilized. In response to this situation, the Health Services of the Red Cross, sent local volunteers to the various shelters to assess the problems which had emerged. This Division was involved in every aspect of mass care; its effectiveness was unfortunately minimized, however, due to its inexperienced personnel and lack of support from other disaster service personnel.

Health care is an important function of a mass shelter operation. In the Agnes disaster, Health Services was responsible for daily reporting of the number of various health-related conditions such as upper respiratory infections, animal bites, viral hepatitis, and childhood diseases in Red Cross facilities.

The Red Cross provided supplies and staff to temporary emergency health facilities which were established by medical units. Not only did the Red Cross provide resources to health facilities, but it also supplied clothing, food, and purchase orders to individuals and other shelters. The purchase orders permitted the recipient to obtain various products from local stores in exchange for the order.

In order to illustrate the types of problems that arose during the mass shelter operations, it seems useful to detail a few of the organizational misunderstandings which occurred. In one instance, two Army tankers hauling full loads of water pulled up to an evacuation center only to discover that it was impossible to leave the entire load because there was not enough storage space. Since the drivers had orders to

return the tankers promptly, they were forced to drop off what they could and then leave. In another instance, a helicopter unloaded water at the same evacuation center and a local radio announcer misinformed the public that the water was for anyone in the community. This led to conflict and tension when it was discovered by disgruntled local residents that the water was exclusively for people in the shelter. Confusion was also evidenced when Mass Care personnel did not inform Health Service personnel shelterees were being moved to a particular location. There were no accommodations available for ill or aged people at this particular site. Therefore, three busloads of these types of people had to be moved a second time.

Not surprisingly, shelter management seems to have been the most significant problem which emerged in the Red Cross shelters. Those who were in charge of operations were usually local volunteers with little knowledge of Red Cross policies, procedures, or administrative responsibilities. There were a number of volunteers who lacked an accurate conception of the shelterees' needs and were consequently insensitive to them.

With the loss of telephone communications and the lack of formal shelter plans, it was difficult to determine the supply needs of the various shelters. Food and medicine apparently were the biggest supply-related problems of the shelters. Overall, Wilkes-Barre had the necessary resources to maintain the shelters, but the inability to distribute these resources efficiently created supply problems for individual shelters. The community was deluged with food, clothing, and other relevant items from other cities. These resources could not be distributed effectively, however, since no organizations had been designated the responsibility of overseeing the logistics of supplies. This forced ad hoc arrangements to be made. Delays and confusion accompanied these improvised operations.

An ad hoc arrangement for coordinating incoming medical supplies was initiated by the EOC and located at a local airport. Two similar, though independent, operations were established at a nearby racetrack and a naval facility. Shelterees had a need for not only medical supplies but medical attention as well, especially during the first few days. While there was an ample supply of doctors and nurses in the area, the lack of a pre-disaster plan which assigned medical personnel to particular shelters created a resource problem. Doctors and nurses were frequently not at shelters where they were needed most. Problems with supply logistics also resulted from inefficient registration of shelterees during the first few days. Locator services and the coordination of organizations to meet the wide range of needs (e.g., food, clothing, medicine, access to doctors and nurses, transportation, and security measures) among shelters were adversely effected since evacuees were not properly registered.

Security at shelter centers was one requirement which was, in general, underestimated. In contrast, the coordination and deployment of security personnel from various relevant organizations was satisfactory for the overall community. While data is not available for most of the

shelters, it appears that security personnel were not assigned to these areas until specific requests were made for them. A few of the security problems which arose in a particular shelter and which may be characteristic of problems that occurred elsewhere are discussed later.

Two other organizational tasks relevant to shelter operations should be noted. First, there were inconsistencies at the local, county, and state levels in the administration of tetanus and typhoid shots to shelterees and emergency personnel. In some cases, no shots were given; in others, both tetanus and typhoid shots were administered. Second, the flood water contaminated the community's water supply. In order to test efficiently the water supplies of the various shelters, a coordinated effort among local and state officials was required, and for this particular task, it was achieved.

From an overall perspective, several basically non-intersecting groups assumed responsibility for mass sheltering during the early phases of the operation. Each seemed to attribute more importance to its activities than was warranted relative to the entire shelter operation. The Civil Defense was one such group. Until about a month after the flood, when the Red Cross took control, no single group had complete control of the overall shelter operation with various groups focusing on their own efforts.

During the early phases of mass sheltering, communication between the various organizations was poor. The situation might have been improved had a 1968 Civil Defense emergency communications report been adopted and implemented. It called for nine more communication base stations, well-removed from the damaged areas, but near shelter centers. These were to be tied into the county emergency radio communications network and would have enhanced the coordination among shelters.

We have limited data on the activities and behavioral patterns of individuals while in mass care shelters. In-depth observations are available for only one shelter. Therefore, it is impossible to describe or analyze individual behavior in the variety of shelters.

The shelter which was observed was a school which housed up to 600 people, making it the largest shelter in the immediate community. Local school officials did the bulk of the administration during the first few weeks at this shelter. A few weeks later, Red Cross officials assumed responsibility for this shelter, and the majority of others in the community.

During the first two weeks, sleeping conditions at this shelter were inconvenient for many evacuees. Bedding materials were not secured for everyone until two weeks after the shelter opened. People had to sleep on athletic mats until cots were acquired for them. Some racial tensions developed, and a few persons were so nervous that they could not sleep until they were permitted to occupy an isolated room on the second floor.

A night watch committee comprised of male evacuees was organized to relieve some of the anxiety. These men, equipped with flashlights, patrolled the halls during the night. Two police officers were assigned to the center sometime afterwards and this eliminated most of the fears. The racial and sex related tensions were the result of socially and economically diverse persons forced to share living space with minimal privacy, for an extended period. Some individuals were suspicious of other categories of people; with the passing days and presence of police officers, much of the initial tension and anxiety subsided. However, people grew more irritable as time went on, and conflicts, some resulting in fist fights, were not uncommon.

Providing meals for shelterees was one of the shelters' major responsibilities. Later, shelters served many individuals who needed a place to eat and sleep while they repaired their homes. At the particular shelter observed, the school district's food service manager and a Red Cross volunteer assigned to the shelter helped with the planning and preparation of meals. It was also necessary to supervise shelter volunteers unloading supplies from trucks. There was always an ample number of persons willing to help with both the preparation of meals and the storage of supplies at this shelter. In fact, the problem of efficient distribution and utilization of resources in shelters resulted more from inefficient coordination than from a lack of personnel.

In addition to food and shelter, many of the people at the shelter needed medicine and medical attention. A local doctor stayed at the shelter for a week, during which time he established an emergency clinic. He was assisted by a substantial number of volunteer nurses. Assistance was also rendered by sheltered adult and teenage females who helped care for thirty elderly women who had been evacuated from a nursing home. They helped dress, feed, wash, and read to these women.

Since there was a large supply of canned and other stored food at the high school shelter, shelterees were able to maintain an adequate diet. However, because the community's water supply was contaminated, it was much more difficult to furnish drinking water. It was impractical to boil water for such a large number of people, so officials continuously requested water to be brought in; despite persistent efforts water was always in short supply at this shelter.

Return

Four days after the flood waters had topped the dikes, the Civil Defense issued a message indicating that pedestrians could enter the dry areas. At this time, telephone communications were essentially non-existent and drinking water was contaminated. However, the Army Corps of Engineers played a significant role in getting the area open for reentry by constructing temporary bridges, repairing public utilities, demolishing unfit structures, and removing debris.

With the retreat of the flood waters and the granting of permission to reenter the area, people began to try to get back to their homes. For many, however, it was a long time before they repopulated their original homes or replacement housing. A DRC survey found that only 34% of those who evacuated were able to return to permanent residences within the first month. While 74.4% were able to return by the sixth month, 9.5% had not done so within the first year.

Those that could went back to live in their homes. The Red Cross prepared a list of precautions, which was carried in the local paper on June 3. The list consisted of numerous practical suggestions for ensuring one's safety and preserving the home's mechanical devices after returning.

Temporary Housing

As noted, many evacuees could not immediately return to their homes. Also, many had lost resources which might enable them to secure new housing quickly. For example, 51.6% of the DRC sample lost work due to the flood. Of these individuals, while 22% were out of work for a week or less, 36% lost two weeks of work, and 42% were out of work for over a month. Another indication of loss was that 57.4% of the DRC sample incurred some degree of monetary loss because of the flood. These economic losses, plus the extensive and severe damage, meant that the demand for temporary housing was enormous. However, this demand (as shown in Figure 1, derived from DRC data) led to a complex response pattern.

Forty-six percent of the DRC sample indicated that they had a need for housing as a result of the flood. Seventy-eight percent of these individuals applied to HUD while approximately 20% did not apply at all. The vast majority of applications for agency housing were completed by the end of July (86%), with the bulk of the final decisions on temporary housing being made between July-October. According to the sample, 96% of the final decisions were made by the end of October, and about 90% of those who applied to HUD received some type of housing. Sixty-seven percent of the sample which received HUD aid were furnished with mobile homes; trailers represented the principal form of temporary housing which displaced persons received.

Housing Needs

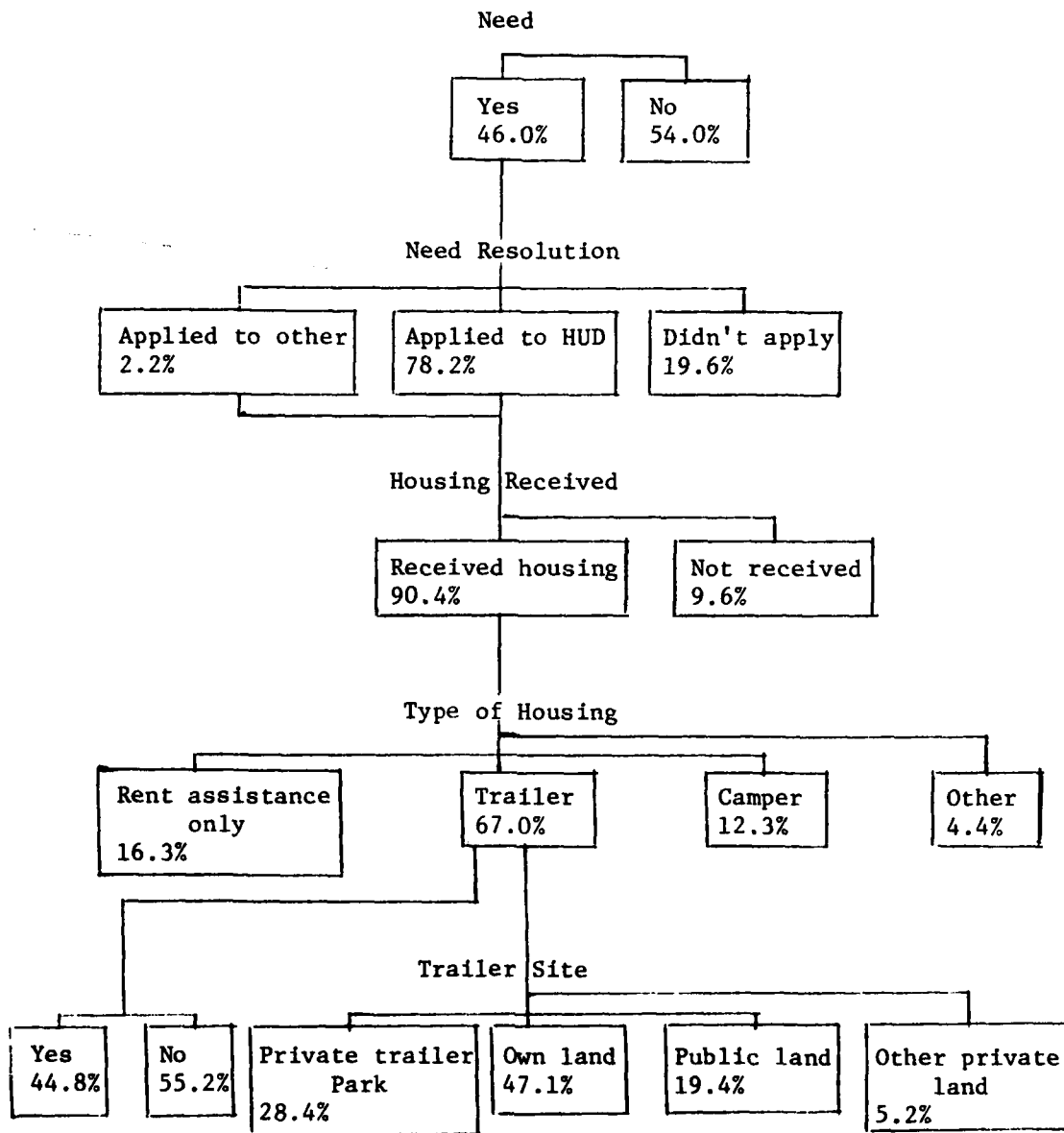


Figure 1

Working class respondents were most likely to receive mobile home assistance; 69% of the respondents who considered themselves members of the working class received a mobile home compared to 58.3% of middle and 48.3% of upper-middle class respondents. On the other hand, 34.5% of upper class respondents received rent assistance while only 12.4% of working class respondents received this type aid. Overall, 45.5% of upper-middle class respondents indicated a need for housing, compared to 34.4% of working class respondents. As noted previously in connection with individual withdrawal during the disaster, upper-middle class respondents were relatively more likely to leave their homes than persons belonging to other classes. Thus 71.3% of upper-middle class respondents left their homes while only 56.2% and 47.2% of middle and working class respondents did so. It is therefore interesting to speculate why proportionately fewer upper-middle class flood victims received trailers than the flood-affected families with working and middle class backgrounds. A possible explanation might be that upper-middle class individuals felt that it was degrading to accept a trailer, and instead, thought it more appropriate to receive rent assistance and hope for an early return to their homes.

There was no statistically significant relationship between one's social status and the length of time one was away from home. This was confirmed by using both a family's self-perceived social class and its income level. At first glance, it would seem as though middle and upper-middle class flood victims would have a better opportunity to return to their homes sooner than working class families. It would seem that families with more financial resources, better cash flow, and higher credit rating would have been able to refurbish their homes more quickly. In actuality this was not the case. The loan provisions designed to help the financially disadvantaged probably helped equalize the return rate of individuals of various incomes.

Whether one was a renter or an owner was related to whether evacuees were able to live in their own homes after the flood, thus, at the time the DRC questionnaire was distributed, 23.3% of those who had left their homes due to the flood and had also been renters before the flood, were living at the same residence. On the other hand, 76.7% of those who had left their homes and had owned them before the flood, were residing there when they answered the questionnaire. This relationship was also supported when the group of respondents who had left their homes and not yet returned was examined.

The distribution of mobile homes created a public controversy in the community. About a month after the flood, citizens began to voice collectively their dissatisfaction with the way HUD preferred handling requests for mobile homes. Public meetings, with HUD and government officials present, were held to air complaints regarding HUD's activities. These meetings were influential in drawing attention to communication problems between HUD personnel and housing applicants. During these meetings, citizens made accusations of favoritism by local HUD employees toward their friends and relatives, as well as complaints about the inept handling of applications in general. Recognition of the situation also surfaced in news reports which helped to intensify the debate.

In the end, the forceful public outcry pressured HUD into changing its priority system on August 5.

Generally speaking, those approved for housing assistance preferred not to live in temporary housing units far from their homes. Some were fortunate in that they were able to have a temporary unit placed on their own property, affording them great convenience as they worked on refurbishing their homes. For other, living in mobile homes on public sites some distance from their homes was the only alternative to living in mass shelters.

The elderly population one which represented a disproportionately large portion of the flood affected population, probably faced the most problems in securing permanent housing. Because displaced elderly individuals had, in general, limited financial resources and lower credit ratings, special provisions were enacted to assist them. Eight weeks after the flood, the President signed a bill extending SBA loans to persons whose homes had experienced 30% or more damage; recipients were excused from paying the principal installments for a five year period provided the borrower could pay the interest installments. In addition, the commonwealth of Pennsylvania entered into an agreement with the federal government which permitted it to co-sign for those elderly persons, and others, who were considered bad credit risks.

After the initial phase of sheltering people during the high water period, the lengthy and complex phase of providing temporary housing for dislocated individuals and families began. A coordinated local, state, and federal effort was necessitated by the severe and extensive housing damage. Thus, any type of long range solution demanded that resources come from outside the immediate community. In short, the network of relatives and friends plus the resources of the local commercial sector were insufficient to mount an effective recovery program without extra-community assistance.

Therefore, the governor of Pennsylvania sought federal assistance by filing a request with the Office of Emergency Preparedness (OEP) on June 23, the day of the flood. The request was evaluated and the OEP's recommendation was sent to the President who in turn declared the state a major disaster area. Funds from the President's Disaster Fund were quickly allocated to the Department of Housing and Urban Development to provide temporary housing and rent and mortgage payments. The "Disaster Relief Act of 1970" to a large extent mandated the type of housing arrangements which followed. In Section (a) of the Act it stated that:

The Director (of OEP) is authorized to provide temporary housing or other emergency shelter, including, but not limited to, mobile homes or other readily fabricated dwellings for those who, as a result of such major disaster, require temporary housing or other emergency shelter, except that for the first twelve months of occupancy no rentals shall be established for any such accommodations, thereafter rentals shall be established,

based upon fair market value...Any mobile home or readily fabricated dwelling shall be placed on a site complete with utilities provided by state or local government, or by the owner or occupant of the site who was displaced by the major disaster, without charge to the United States.

OEP had the responsibility of being the overall coordinator of the relief and recovery programs; although there appears to have been some confusion among various organizations as to the OEP's administrative responsibilities during the disaster recovery phase.

In order to structure our discussion of temporary housing, it seems advisable to follow some sort of functional framework. Three broad functional phases were evident during this undertaking, and are used here to organize the activities of the various organizations involved in temporary housing. The first phase, *incipient*, included such activities as assessing the overall housing situation, locating temporary housing units and space on which to place them, and the actual acquisitions thereof. The second phase, *operational*, encompassed such tasks as the physical preparation of the trailer sites, the selection of occupants, and the general maintenance of the housing units and sites. The third phase, *deactivation*, consisted basically of the restoration of the sites to their pre-development state, the reacquisition and reallocation of the housing units, as well as the disposition of the families who had occupied these temporary units.

When the entire community is used as the unit of analysis, the functional phases tend to overlap, since the housing effort was an ongoing process with various activities occurring simultaneously. For example, it was not uncommon for site preparations to be taking place in one part of the community while mobile homes were being allocated to private locations elsewhere. The obvious reason that the phases overlapped was because people were relocated into temporary and permanent housing at different intervals. Temporary housing could not be made available at the same time for everyone. People were also able to move back into their refurbished homes at different times, depending upon their financial resources and the extent of damage to their homes. The overlap between the phases should not, however, obscure the fact that there was a logical sequence to the temporary housing operation. Even those units which were placed on private lots had to be located, installed, and dismantled, in that order. So, while there was not a clear cut time sequence to the functional phases for the community as a whole, the incipient, operational, and deactivation phases occurred in a sequential pattern for individual housing units and group sites.

Before describing the phases in detail, it seems helpful to outline some of the activities which the more important organizations were responsible for.

Department of Housing and Urban Development: accept temporary housing applications; assess applications as to the extent of damage to applicant's home and certify a person's eligibility; secure temporary housing units (apartments and mobile homes); establish program to inspect and winterize mobile homes; help provide social counseling service for those living in temporary housing; subcontract mini-repair program to Corps of Engineers; provide rent-free accommodations up to one year.

Corps of Engineers: prepare group sites: 1) clear site 2) grade the area and 3) construct sewage disposal piping, manage mini-repair program through contract services; demolish condemned properties.

Department of Community Affairs: site identification and selection of mobile homes; maintain recreational facilities at group sites.

Office of Emergency Preparedness: direct and coordinate disaster assistance activities of federal agencies; execute federal-state disaster assistance agreements with the states; assure that federal relief was supplementary to relief afforded by state, local, or private agencies and not in substitution; delegate responsibility of housing to HUD.

Small Business Administration: provide loans for homeowners (terms of which were liberalized due to the magnitude of the problems and Public Law 92-385 was signed August 16, 1972); worked with General Adjustment Bureau, a professional appraisal organization.

Part of HUD's delegated responsibility was to estimate (and contract for) the number of temporary housing units needed in the area. Its early participation in taking applications for temporary housing represents the beginnings of the incipient phase. HUD set up its first application center within four days after the flooding began; 20 to 30 centers were subsequently established. Over 90% of the HUD personnel involved in this program were local residents hired on a temporary basis. HUD's strategy was to obtain the help of those local organizations and individuals whom they dealt with in their normal activities (e.g., local housing and redevelopment authorities) and to use these various organizations and staff personnel to reach all of the affected areas. Wilkes-Barre, while it suffered the most physical damage, was only one of many communities which received assistance from HUD during this period. Contracts were negotiated between local officials and HUD personnel allowing local officials to play a significant role in the administering of the housing assistance program.

The temporary housing program consisted of pre-existing houses and apartments which could be made habitable in a short period of time and mobile homes which could be transported to the area. Pre-existing housing included vacant government-owned and -assisted housing units. A family was eligible for the temporary program if its home had been

destroyed or if its residence had experienced major damage which could not be fixed within 30 days. It was also permissible for an eligible family to find an apartment or house on its own and HUD would pay the rent for up to a year.

HUD assessment personnel began surveying the flood damage the day after the flood, although subsequent reevaluations of the housing shortage proved necessary. The number of displaced families and the number of housing units spaces necessary were relevant factors which HUD considered over the ensuing months after its initial assessment. This reexamination was necessitated by families signing up late for assistance, families withdrawing their names before receiving housing, and families finding alternative housing after receiving temporary housing. HUD was criticized for overestimating the number of housing units and land space needed, thus generating an excessive purchase of mobile homes and an unnecessary development of park areas; in fact, three large parks were built which were never used. Two explanations for the overestimates were the lack of an accurate recordkeeping system, and the placement of trailers on private sites which were not enumerated into the overall demand estimates.

Mobile homes placed on private property were convenient for families occupying them, since they had facilities for cooking and sanitation, as well as affording them an opportunity to help with the clean-up and repair work on their property. It was thought that such occupants would be displaced for only a short period of time, during the warm summer months. The usage of such units was intended to lessen the burden on other types of temporary housing units. In actuality, however, more families chose this option than anticipated, and they also tended to remain in them longer than expected. Mobile homes were perceived by many families as a quick cure for their situation. The fact that HUD advised families that these units were not winterized and were only to be used until November did not discourage many families from pursuing this option.

When acquiring land for developmental purposes, state and local officials would first suggest particular areas for use as mobile home group sites. Then the Department of Community Affairs, Army Corps of Engineers, and HUD would decide whether the site was developable. The sites were primarily privately owned, although some state and local parklands were used.

Most of the orders for mobile homes were filled outside the state and they did not begin arriving in any significant number until six weeks after the flood. Initially, HUD ordered 12,500 trailers from dealers, most 12 x 60 units; it later reduced its order to approximately 7,500. These units were obtained from eleven different states. In addition to these units, DCA secured auxiliary buildings and facilities for the group sites. These included modular homes used for office and structures which could be quickly erected for laundry facilities and meeting space. A local organization, the City Redevelopment Authority, assumed responsibility for managing the temporary housing operation during the first three weeks. However, it relinquished its responsibility to HUD when

the magnitude of the problem became apparent and it realized it could not deal adequately with the situation.

Acquiring and transporting the temporary housing units was only a part of the overall operation. Suitable land space also had to be developed and prepared for proper utility hook-ups. Site preparation was one of the important tasks which occurred during the operational phase. This phase was probably the most elaborate of the three phases, since it required extensive coordination and cooperation among various organizations.

The responsibility of supervising site preparations was delegated to the Army Corps of Engineers (COE) by HUD. After a site was chosen, the COE went into the area with an architect and drew up plans. All of the contracts were given to private contractors and no COE equipment was used for the development of these sites. Preparations included such things as grading, building streets, and installing sewage disposal plants and utilities (if they were available at the perimeter of the site).

While the preparation of trailer group sites in a disaster has the potential to become a heated political issue, this was not the case in Wilkes-Barre. Another task, selecting families for temporary housing, can also develop into a controversial issue. Unlike the preparation of sites, the selection of occupants for temporary housing did create some controversy. Since numerous families were displaced and the damage to the housing stock was so extensive, providing temporary housing units for everyone simultaneously was impossible. Therefore, a priority system had to be established. It was essentially based on a first-come, first-served basis, with medical exceptions and some consideration for the elderly. There were complaints that the local HUD employees showed preferential treatment to friends and that blacks were discriminated against. These complaints were most pronounced in the early stages of the selection process. The priority system which HUD adopted in early August in response to the public outcry of unjust favoritism worked well. The new system was more standardized and confidential, as names and addresses were removed from applications before they were ranked.

Matching an application to available housing was accomplished by using OEP's Disaster Management Information System File in conjunction with the HUD application. For those who experienced difficulties with mobile homes, the Department of Public Inquiries and Special Priorities served as a problem-solving organization. Eighteen technicians worked in this department, which had interorganizational connections with other agencies (e.g., governor's hotline, President's action line, Interfaith, Bureau of the Aged, and various local agencies). This department most frequently handled cases with medical implications, poverty, and/or delay.

While many families were displaced from their former homes, some families were fortunate to be able to live in their own homes while they refurbished them. In many cases, this was made possible by the unique HUD/Army Corps of Engineers mini-repair program. The program, implemented in early August, consisted of government contracted repair teams securing

homes well enough so that families could live in them while their own contractors did the remaining work. The primary criterion for eligibility was that a family's house could be made habitable with a maximum of \$3,000 work. While there was some initial skepticism of this program, in the long run, it was used extensively and proved to be effective.

The Interim Assistance Program (IAP) and the Small Business Administration (SBA) loans were two other instrumental means for getting people back into their homes. The IAP was similar to the mini-repair program, but with no ceiling on expenditures; it was restricted to private property and thus could not deal with urban renewal. The work was done by private contractors approved by HUD and OEP, with federal and state money used to start the program. When services were contracted outside the community, the State Home Builders Association and the National Home Builders Association were consulted.

The SBA loans were long-term, low-interest loans whose statutory basis was liberalized on August 16, 1972. The new ceiling was \$55,000; households received an initial \$5,000 grant, and paid back the difference at 1% interest over 30 years. The prior law provided for the same maximum, a \$2,500 forgiveness, and an interest rate of 5½% over 30 years. Because of the many requests for damage estimates, the SBA relied on a professional appraisal organization, the General Adjustment Bureau, instead of contractors, to provide damage appraisals for loan applications. About 30,000 SBA loans were approved in this community.

There was a degree of criticism about the SBA's policy for relocating certain displaced families. Its basic position was that a loan applicant whose home had been severely damaged could not acquire a home in the same neighborhood. The SBA eventually relented after the Flood Victims Action Council complained vehemently that this practice was unfair; the SBA then dealt with situations on a case by case basis. The SBA also renegotiated roughly 8,000 loan applications because of increased repair costs.

For those families unable to move quickly back into their homes, the group sites served as the primary refuge. According to one senior HUD official, the maintenance of these sites and the trailers themselves, proved the biggest problem. Underlying HUD's maintenance problems were frequent malfunctions due to poor construction. Many of the trailers were designed for the south, and not the harsh northern winters.

The maintenance of the group sites was not purely physical, as the morale of the people living in these temporary units also had to be contended with. The HUD-initiated Resident Housing Advisory Service, established three months after the flood, provided field workers to help administer social services, referrals, and rehousing. Executives and volunteers of national prominence converged to assist with the training. This service was important because of the dramatic adjustments that displaced families had to make. Learning to accept their hardships and new living conditions was difficult for most households.

Thus, the information provided by advisors acting as liaisons between families and organizations, and the counseling that social workers offered, were important elements in the management of group sites and displaced families in general. In addition to the HUD service, each site had its own manager, secretary, and social worker who contributed to everyday efficiency.

As noted previously, HUD not only provided mobile homes but secured leased housing as well. Families were permitted to occupy these units up to one year without charge. Their subsequent choices were unfortunately limited due to the scarcity of reasonably-priced, adequate housing. In response to this problem, the governor asked for legislation which would assist private industry in alleviating the housing shortage. A state Finance Agency was consequently established, which provided new sources of financing, as well as programs, to reduce costs for low and moderate income families, including the elderly.

Various action programs were suggested to encourage extensive housing construction. These programs were designed to demonstrate the feasibility of innovative cooperation between the private and public sectors at all levels of government. Several of these proposals were:

- 1) To create a county housing council to centralize all housing regulatory functions and coordinate housing construction;
- 2) To sponsor a meeting of private organizations and develop a consortium of interests (e.g., bankers, utilities, labor unions) to pool private sector resources to obtain low interest rates for housing construction;
- 3) To encourage regional homebuilders to combine forces to construct mass-produced housing for individual occupancy.

Securing a commitment from the Finance Agency for constructing a specific number of housing units, and holding region-wide conferences on housing problems are examples of other suggestions which addressed the housing shortage.

DCA, which was initially involved in the sheltering phase, represents an organization which later took specific steps to deal with the community housing problem. It extended one million dollars to purchase and improve a particular site for single-family homes. Furthermore, it conducted a survey to determine housing needs of temporary residents.

As new units were completed and damaged homes were made habitable, the process of deactivation began. It is important to realize that this process required a large bureaucracy to phase itself out. Competent individuals were advised that their services were no longer needed, and the activities of various organizations were eliminated.

HUD assumed primary responsibility for this phase since it was in charge of the temporary housing units. Residents were assigned to a housing advisor who searched for permanent housing for them. When a permanent place was located, or their damaged home was repaired, the evacuees had fifteen days notice to move. After the family moved out, a deactivation team disconnected the utilities and secured the mobile home for transport. Another crew then moved the unit to a storage site. When the units were taken back, some needed only minor maintenance and cleaning, while others required major repairs. The units were prepared and stored so that they could be used in future disasters. Finally, a site restoration crew restored the area to its original condition. In carrying out the deactivation phase, first priority was given to the commercial parks charging rentals to HUD. Attention was then given to the private sites. In some cases, families wanted to restore their yards after their homes had been refurbished, but were unable to do so because their mobile home was in the way.

The completion of the three functional phases--incipient, operational, and deactivation--took several years. It has been noted previously that HUD played a major role during these years in providing long-term temporary housing resources for dislocated families. HUD was only one of many organizations, however, that aided in the housing operation. With the OEP guiding the overall activities of the response organizations, federal, state, and local organizations were able to achieve a degree of coordination and cooperation.

The preceding description of the massive organizational response effort has demonstrated that the concept of shelter can extend beyond caring for a mass of individuals in evacuation centers. The acquisition, maintenance, and deactivation of the thousands of temporary housing units required a tremendous marshalling of physical, monetary, and human resources.

In concluding this section on shelter, it seems important to note briefly the perceived effectiveness of the more important participating organizations. It is difficult to establish objective measures to evaluate the organizations' activities. However, one can obtain a general impression of the public's opinion by noting the positive ratings obtained by organizations in a DRC study. The following results from DRC's randomly administered questionnaire indicate at least two important factors: First, the Red Cross was considered extremely effective during the aftermath of the flood. Second, all of the organizations having a governmental affiliation were rated rather equally favorably, except for local government which received a lower approval rate.

Question: How would you judge the job done after the flood by the following organizations? IF YOU CANNOT MAKE A JUDGMENT, LEAVE BLANK.

	<u>Very Good & Good</u>	<u>Response Rate</u>
Local Government	70.5	69.8
HUD	82.6	78.3
OEP	82.6	50.7
DCA	83.2	51.6
Federal Government in general	83.4	76.0
COE	85.6	69.8
SBA	88.8	77.0
Red Cross	97.4	89.1

The American Friends Service Committee's observations were somewhat less favorable than those of the general population. The committee undertook its study six weeks after the flood and spent four weeks in the community interviewing citizens and officials. Its overall assessment of OEP's performance after the flood was essentially negative. Much of the criticism stemmed from OEP's supposed inability to coordinate effectively the federal agencies it was responsible for. The committee suspected that OEP did not understand its obligations in long-term relief and rehabilitation programs. Another criticism was that OEP expended too much time and effort on physical rehabilitation rather than developing and administering programs aimed at helping people.

HUD received its share of criticism from the committee as well. While the committee pointed out that HUD was doing a reasonable job considering the scope of the temporary housing operation, it did note several problems, including the excessively lengthy inspections for mobile homes which were to go on an individual's own property, the insensitivity of some local HUD employees, the unsatisfactory priority system, and the poor administrative approach of superimposing its personnel on local administrations.

The Wilkes-Barre case study partly illustrates some of the complex relationships between both individual and organizational aspects of sheltering and housing. Sheltering evacuees in mass shelters requires highly integrated organizational responses. Organizational efforts to provide temporary and permanent housing can not ignore the characteristics of the individual households involved. Planning and managing large scale sheltering and housing requires an understanding of the complex relationship between the individual and organizational aspects. Of course, the situation after the flood in Wilkes-Barre was very unusual for a disaster in America, but to the extent future catastrophes will be of a similar magnitude, similar sheltering and housing problems and difficulties can be anticipated.

CHAPTER III

THE XENIA CASE STUDY: INDIVIDUAL ASPECTS

In this chapter we present a case study of sheltering and housing following the Xenia, Ohio, tornado, with emphasis on individual rather than organizational aspects of the behavior. More specifically, this chapter contains nine sections: namely a discussion of community context; threat conditions; warning and impact; behavior patterns; withdrawal evacuation--initial reactions; shelter--phase I; temporary housing--phase II; return--phase III; and post-disaster recovery.

Community Context

As DRC and others have found, exact statistics on specific losses are impossible to establish for any large-scale disaster. However, the gross figures associated with the Xenia tornado are impressive, even though that specific tornado was, in turn, only a part of an incredibly catastrophic day in American history. On April 3-4, 1974, at least 148 tornadoes gouged paths through more than 200 counties in 13 states, from the Gulf of Mexico to the Canadian border. Within those 16 hours an estimated 315 people were killed; 5,100 others were seriously injured; over 21,000 buildings, dwellings, and mobile homes were destroyed or heavily damaged; and perhaps half a billion dollars worth of property was lost. (For overall statistical summaries, see National Oceanic and Atmospheric Administration, 1974, and Weigel, 1975.) This was the most massive outbreak of tornadoes in the history of the United States, slashing a total path length of more than 2,500 miles, with six communities struck twice in a day, and at one time 15 twisters touching down simultaneously. Among the states, Ohio was the hardest hit, suffering about one quarter of the damage, followed by Kentucky, Indiana, and Alabama. But in Ohio, as well as in the nation at large, the city of Xenia suffered the greatest destruction. In fact, as measured by casualties and property losses, the April 3 tornado in the Xenia area was one of the single worst community disasters in the history of the United States.

Because the tornado hit not only Xenia but nearby localities, because the response in Xenia was partly colored by the relationship of the city to its adjacent areas, it is necessary to indicate a few features of the surrounding area. Where possible, 1974 estimates from planning and other reports are used, but in some cases, we have had to rely on earlier 1970 statistics drawn primarily from the U.S. Census figures (U.S. Bureau of the Census, 1972).

Greene County

Xenia is the county seat of Greene County, which lies in the southwestern part of the state of Ohio. In 1974, it was estimated that 130,000 persons lived in 37,300 households in the 430 square miles of the county. The population was almost evenly divided between males and females. Probably because of the presence of five colleges and universities in the area and the Wright-Patterson Air Force Base at the northern edge of the county, a majority of the people were 24 years of age or below, while only 5% were 65 or older. Non-whites made up only 6½% of the county population.

The 1970 census figures show that, excluding persons under 14 years of age, 30% were single and 67% were married. Sixty-three percent of all families had children under 18 years of age. Foreign-born or natives of foreign or mixed parentage made up less than 6% of the total population. Of persons 25 years or over 62% were high school graduates, with 12.3 being the median number of school years completed.

The county is primarily an outlying suburban area of Dayton, a city in adjacent Montgomery County, which is about 15 miles west of Xenia. The area has neither a major central city nor facilities for heavy industry, and has relatively little non-residential-related work activity unless the educational institutions are so viewed. In 1970, 47% of the population was in the work force, and a little over half of these people actually worked outside of the county, mostly in Dayton. Nearly 30% of the labor force was employed in manufacturing, about 15% each in public administration and retail trades, and another 12% in educational services. Almost 30% of those employed worked for some level of government. Median family income was \$11,694, and mean income was \$12,530. A little over 5% of all families were below the poverty level.

There were a total of 36,226 housing units in the county in 1970, with only about a 3% vacancy rate. Seventy percent of the units were owner-occupied. Median value of these owner-occupied units was \$19,900, and median monthly costs for rental units was \$102.

In many respects, Greene County is quite typical of many other suburban areas that are parts of eastern and midwestern metropolitan complexes. In this case, we have a physically-detached, moderately-populated, lower middle class, primarily residential suburb in the metropolitan zone of the city of Dayton, which has nearly a quarter of a million population. In only a few respects is the county possibly atypical. For example, because of the cluster of educational institutions and the military base, almost 40% of the land was tax exempt, an unusually high figure. But as a whole, Greene County is quite similar to many other areas in the shadow of metropolitan complexes in Ohio and around the nation at large.

Xenia

Xenia, whose name is derived from the Greek word meaning hospitality, occupies six and one-half square miles in the center of Greene County. The 1970 census figures gave the city a population of 25,373; the 1974 estimate was 27,642 people in 8,953 households (Xenia Rebuilds, 1974: 122). In sex, age, and racial composition, Xenia varied somewhat from the county ratios and percentages. There were about 4% more females than males in the city, and about 8% of the residents were over 65 years of age. Racially, blacks numbered over 3,000 (12% of the total population), about double the county proportion.

Viewed qualitatively, the town has more diversity than might be supposed, given its small size and the fact that almost all Xenians are native-born, with less than 5% of the population of either first- or second-generation foreign stock. There are old time residents, white and black, whose ancestral roots in the town go back to its founding in 1803, when the state of Ohio was admitted to the Union. Blacks in particular have been present in the area, since it was a major station of the pre-Civil War "underground railroad," and in the 1880's, more than a quarter of Xenians were black. Another segment of Xenia's population is the commuters working in Dayton and elsewhere, and 1,297 civilian and military personnel from Wright Patterson Air Force Base nine miles northwest. There are students, faculty, and staff members from nearby Wilberforce College (with 3,000 students), the oldest black college in America, and Central State University, another predominantly black, state-assisted institution. Despite this relative diversity in social composition for such a small town, the community does not have a history of any great group conflict or hostility.

The 1970 census indicated that less than one-half of one percent of the adult workers in the town were farmers; thus, Xenia cannot be characterized as a small farm community. The work force composition, in fact, roughly paralleled that of the county. For example, over a third of the male workers living in the city actually were employed outside of Greene County.

Although part of the Dayton suburban area, Xenia is not a wealthy suburb. Nearly 53% of the city households had total incomes of less than \$10,000 a year; about 26% had less than \$6,000 annually. Only 15.6% of the households had a yearly income (in 1974) of \$15,000 or over (Xenia Rebuilds, 1974: 111). About 6.9% of all families were below the poverty level in 1970, compared with a 9.3% national average.

Xenia is primarily a city of single-family residential structures. In 1974, of 8,775 residential units, 8,320 (or 87.8%) were single family dwellings and 75.5% were owner-occupied (Xenia Rebuilds, 1974: 107).

There were no large industries in Xenia, although there were some small plants or subsidiaries of national firms in and around the community. Before the tornado, the largest local employer was the

Kroehler Manufacturing Company, which had about 250 workers. Pre-tornado local trade was also on the decline, and one survey found that only drug, hardware, and grocery stores were receiving most of the local trade (Real Estate Research Corporation, 1974).

Politically, the area almost always votes Republican in federal, state, and local elections. Xenia has the standard council-manager form of government. The seven-person council is elected and the mayor is part of this group. Unusual for a city of its size, Xenia has its own daily newspaper, The Xenia Daily Gazette, although two Dayton dailies are also widely circulated in the area. Operating in this local area are one AM and two FM radio stations, although all television services come from the Dayton area.

The Xenia area, while not highly subject to disasters in the past, has not been totally immune. A cholera epidemic occurred in 1848. A tornado hit Greene County in 1884 and killed about 20 persons. Two years later, three persons were killed when an operating powder mill exploded, and a flash flood swept through the heart of the village of Xenia and leaving 30 dead. Other tornadoes in 1916 and 1933 caused heavy damage, the last killing one person, injuring 30, and leaving over 150 people homeless. On May 8, 1969, a tornado cut through nearby Montgomery County, causing about five million dollars in damage but resulting in no serious injuries or deaths. About 40 homes in the Greene County area were also damaged at that time. Despite these disasters, particularly the recurrence of torandoes (at least eight in the county in the last 25 years), the area did not have a disaster subculture, a perceptual and organizational expectation of being disaster-prone (for a discussion of this concept, see Wenger and Weller, 1973). As in almost all of Ohio, neither the population at large nor public officials thought of themselves as located in a particularly disaster-prone locality, and there was no community disaster plan. The school system had a disaster plan but had never conducted a tornado drill.

Threat Conditions

Most of the townspeople of Xenia paid little heed to the weather reports of April 3, 1974. A late afternoon newspaper, The Xenia Daily Gazette, cautioned that stormy weather was moving into the area from the west at noon, but the paper had a late afternoon distribution schedule, and was read by most people at night. Given the negligible news about the weather, it is doubtful that an earlier distribution of the newspaper would have alerted the town to the seriousness of impending danger. The National Weather Service at Vandalia had issued a severe storm watch, effective until 3:00 p.m., forecasting severe thunderstorms with large hailstones and damaging winds.

Earlier that day, an Air Force reconnaissance satellite became alerted by a photo of the eastern United States, plainly showing a shadowy mass of clear, cold air, moving diagonally across the south-central portion of Illinois. A lighter mass of warm, moist air, already moving over Kentucky and Ohio, was seen to be heading toward

the cold front, already moving at a rate of 55 m.p.h. By 2:30 p.m., a tornado was sighted ten miles southwest of Bradford, Indiana.

At 2:35 p.m., the National Severe Storms Forecast Center in Kansas City, mission control for the nation's major storms, had revised its 3:00 p.m. deadline. As reports of worsening weather conditions poured in, the center spotted areas of particular unrest. The 3:00 p.m. broadcast issued a tornado watch (No. 98), prevailing for a distance of seventy miles on either side of a line of demarcation, extending from Jackson, Tennessee, to Covington, Kentucky, and from a point fifty miles south of Jackson to fifty miles north of Covington. (Xenia is situated at the extreme northwestern corner of this area.)

Late afternoon on April 3 was a typical day for Xenia residents. By 4:30, school children had been dismissed; those that remained were a group of high school students practicing for an upcoming performance. In keeping with small town tradition, most local shops had been closed since noon on Wednesday. Office workers and bank personnel were preparing to leave for the day. The largest employer in town, Kroehler, had shut down forty-five minutes earlier. Commuters from Dayton area plants and offices were enroute to their homes in Xenia, while those at home were preparing dinner.

Dayton broadcasters were forecasting to 4:00 p.m. commuters mild, yet unpleasant conditions to come. One radio station, WGIC, did report a known storm, brewing in Indiana and heading northeast. The station's disc jockey charted its progress, but there seemed to be no cause for alarm because his reported reassurances appeared to diminish the perception of threat posed by the storm. By 3:50 p.m., a single hook echo (a tornado's reflection on a radar screen) was spotted on the screen at the Greater Cincinnati Airport.

Warning and Impact

At around 4:20 p.m., this tornado touched down in the Bellbrook area. Channel 7, the only television station in Dayton with its own radar system, immediately flashed a picture of the radar screen on its broadcasting screen to warn people a funnel was heading for the Greater Dayton area. At about 4:35 p.m., as the storm could be seen on the radar scope inching in a northeast direction, the newscaster commenting on the picture said: "It certainly doesn't take much imagination to see that Xenia is going to get clobbered." (Heiland, 1974: 2). Other stations in the area, both radio and television, also gave warnings to take cover up to 20 minutes before the tornado cloud actually hit Xenia. Concurrent with the above warnings, starting at about 4:00 p.m., various police department cruisers moved up and down some streets using loudspeakers to broadcast warnings. The local radio station started issuing a tornado warning at about 4:10 p.m. (Laffoon, 1975: 15). Still other Xenians spotted the tornado funnel coming from afar. Thus, Xenia had information from different sources indicating that there would be danger; many people received the information, but many others did not. It is possible that most people in Xenia had heard something about the

possibility of very bad weather in Xenia that day, but relatively few appeared to have thought seriously about the actuality of a tornado. It is perhaps significant that only two school principals had kept a radio tuned to monitor the development of weather conditions during the school day (Taylor, 1975: 65).

When the tornado touched down in Greene County, it cut a path on the ground for about 16 miles, averaging between 2,000 to 3,000 feet wide, with winds estimated at times to be near 250 miles per hour. The first section of Xenia to be hit, at 4:40 p.m., was the southwestern sector. This was the Arrowhead housing subdivision, where several hundred single story brick veneer homes without basements were leveled. Both the Arrowhead Elementary School and Warner Junior High were in the direct path of the funnel. The tornado, going over the Cherry Grove Cemetery and continuing in a northeast direction, then hit the downtown business district and, in the process, destroyed the Simon Kenton Elementary School. Advancing on into the center of downtown Xenia, the funnel devastated the McKinley Elementary School and the Central Junior High, as well as part of the high school complex. At that point, the tornado headed directly northward towards Greene County Memorial Hospital, but the funnel suddenly realigned its path and avoided striking that facility. Further northeast another residential area was devastated. As the funnel passed out of the city still touching the ground, it reached the Wilberforce area where it went through the heart of Central State University, destroying or damaging 85% of the buildings on the 2,300 student campus. After touching Cedarville, and perhaps five minutes after it had initially hit the southwestern part of Xenia, the tornado dissipated into the open country at the end of its 32-mile path.

The tornado left in its wake many casualties and much devastation. Entire blocks were reduced to rubble. Much of the downtown area was destroyed, as were two major residential neighborhoods.

Twenty-eight persons apparently died instantly and five others died relatively soon afterwards. Of this total of 33 dead nearly half, were 21 years or younger. The total number injured, as DRC has typically found to be the case in most disasters, is very difficult to establish. Greene County Memorial Hospital reported it treated and released at least 468 victims (and admitted 34 others) in the first 12 hours, and treated more than 250 and admitted nine more during the next 18 hour period. Some of these were, of course, from outside the Xenia area, and at least some were people injured in debris clearance activities rather than by the tornado itself. On the other hand, at least 19 hospitals in a five-county area around Xenia received tornado victims. It seems certain that several hundred Xenians received first aid treatment from search and rescue teams, fire and police department units, Red Cross shelter personnel, and other individuals. A minimum figure for any kind of direct tornado-related injury would appear to be at least 1,000-1,200 persons, perhaps 4 or 5% of the total population. (In fact, when absolute numbers are projected from the sample base, the DRC resurvey indicates that possibly a total of around 1,330 persons may have been injured in some way.)

Estimates of property losses varied somewhat, but were substantial in all cases. Officials tended to use figures stating that about a fifth of the buildings in the city were destroyed, and a somewhat higher percentage suffered substantial damage. One incomplete survey indicated that 1,139 homes were destroyed, 511 suffered major damage, and about 1,500 minor damage (Xenia Rebuilds, 1974: 8). (On the other hand, the DRC resurvey found somewhat higher reports of loss: 45% of the sample said they had no dwelling loss whatsoever, but 27% reported minor, 11% major, and 17% total loss to their homes.) About 155 commercial and four industrial businesses in 121 structures were destroyed, including eight supermarkets, and major and minor damage was incurred by another 100 businesses. In addition, public facilities such as schools and the equipment of city departments suffered substantial damage (e.g., the police department lost 11 of its 16 vehicles), as did churches (12 out of 46 churches in the area lost their buildings). Apart from municipal and county services, dollar losses in the city were eventually estimated to be around 90 million dollars, although, as late as November 1974, some city agencies were estimating 177 million dollars worth of destruction in the private sector in addition to all the public damage. Two insurance companies alone paid claims for total automobile loss on over 800 cars. Additionally, in the Wilberforce-Cedarville area just north and outside of Xenia, another 44 homes were totally destroyed, 31 had major damages and 23 minor damages (plus the losses on the campuses of Wilberforce College, Central State University, and Payne Theological Seminary). Further out in the county, 55 farms were damaged and about 100 head of cattle and 1,000 hogs were killed.

Statistical comparisons between disasters are notoriously difficult to make. But it is clear that in relative terms, Xenia as a single community suffered proportionately more casualties and losses in the tornado than is typical of other American communities of some size which have undergone disasters in recent times. Not many other communities have had 5% of their population injured, around a quarter of their residential housing destroyed, 25% of the churches leveled, and more than half of their schools and businesses made inoperative. And excluding transportation catastrophes which are seldom locality-based, even the absolute figure of 33 deaths has not been exceeded very often in any given disaster in a single community in the last decades of disasters in American society.

Behavior Patterns

It is not a purpose of this chapter to describe or analyze the immediate reactions of Xenians to the casualties and destruction. However, the immediate reactions in the hours during the evening and night of April 3 might be of some relevance to the possible development of later problems starting with the dawn of the following morning. If chaos, hysteria, and total breakdown were widespread features of the first few hours, a commonly held image of trans- and immediate post-impact behavior (Fritz, 1961; Quarantelli, 1973), then they might be a contributory factor to later reactions. Such an image has been found to be rather consistently incorrect for other catastrophes in western

societies (Dynes, Quarantelli, and Kreps, 1972: 15-35); the same was true in the Xenia disaster. That is, there was no overwhelming chaos, massive hysteria, or major collapse of local groups or community institutions.

Emergency organizations in the area started to respond as best they could while the winds of the tornado had not yet died down. Members of the fire department, for example, were digging into the debris directly across from one of their stations while the tornado had not yet cleared the city limits in the other direction. The local hospital started to treat incoming casualties within minutes and moved quickly into a modified version of its disaster plan. City officials gathered and initiated an attempt to assess what had happened and what needed to be done and held a series of meetings during the night. The AM radio station in the community shifted completely to disaster-related programming.

Unlike in some other disasters studied by DRC, however, search and rescue efforts were relatively quick and effective. Local groups were aided within a two-hour period by some 30 fire departments and other units performing this task. The Xenia fire department, aided by units from nearby fire and rescue organizations, spearheaded the search for victims in the northern and eastern sections of the city. Dayton police and fire units, and Box 21, a private rescue service, searched through the western side of Xenia. Despite the dark and debris, most areas, such as Arrowhead, had been combed within four hours after impact, and no victims were found much after midnight (Troeger, 1974: 31). In fact, search and rescue was called off at 12:40 a.m. No tornado victim, therefore, underwent the trauma of being buried for hours and not knowing whether one would be found.

There were problems, of course: delays in certain actions that in retrospect were longer than necessary, and a fair amount of inefficiency and ineffectiveness in responses. Overall, the emergency and related groups in the Xenia area did not collapse; they reacted relatively quickly with what capabilities they had, as typically do the vast majority of emergency organizations in any impacted locality (Barton, 1970; Quarantelli and Dynes, 1970). There was no total social disorganizations; the local groups that should have reacted in the emergency did attempt to respond according to their responsibilities. A massive convergence of help from outside Xenia, especially from the Dayton area, occurred rather quickly and helped tremendously; the local emergency and related groups functioned in a reasonable fashion.

Evacuation: Initial Reactions

Withdrawal activities during and after the tornado's touchdown reflect the speed of the onset of the tornado and little advanced warning. Some people remained in the streets and watched for the approach of the cloud. Most, however, gathered inside buildings. In homes, an undetermined number of families took protective actions, moving to the safer sections of their dwellings (i.e., near inside walls, under table, etc.).

Most workers in the downtown area stayed in the shops where they were employed; some bank employees huddled together in a vault. Such motorists as were on the roads tended to keep on driving.

Right after impact, after initial search and rescue and assessment of the situation, most impacted persons sought some kind of shelter. This action was reinforced by the eventual discovery that most utilities were not functioning in most of the town. DRC data indicates that nearly two-thirds (65.5%) of the households sampled left their homes that night, considerably more than the homes which were destroyed or heavily damaged (27.6%). A great majority of those who remained in their homes sheltered others that night.

The typical pattern found in disasters of going to relatives and friends was also manifested in Xenia. DRC data indicate that of those who left their homes, their first stay was with relatives in 75.4% of the cases, and with friends in 18.6% of the cases. About 6.1% of the evacuees went to motels, with only 2.3% going to Red Cross or some other kind of mass or public shelter.

The nearly one-third (32.7%) of Xenian households which sheltered people the night of the tornado, also showed a similar pattern. Relatives were housed in 56.2% of these cases; friends were quartered in 46.3% of the cases. Obviously in some instances, both kin and friends were sheltered at the same time, although the DRC data does not allow a finer breakdown.

Of those who left their homes overnight, 16.1% were black and 83.9% were white. In terms of census racial data, this indicates a higher evacuation of blacks than whites, but probably this reflects the relatively higher destruction in black residential neighborhoods. About 72% of all respondents who left their homes overnight were married, a figure only very slightly over the number of married persons in the area. On the other hand, single person respondents who left their residences overnight comprised 49% of the DRC sample. This is substantially over the approximately 30% single person households in the Xenia area. In addition, it is also clear that couples as well as single parents with children were much more likely to leave their homes overnight than were childless households. DRC data did not permit an analysis if this was related to house damage, but it seems unlikely to account for the seemingly greater tendency for households with children to leave their homes the night of the tornado.

After the first night, the evacuation pattern in Xenia was both typical and atypical. It was typical in that evacuees left public shelters as quickly as possible. One DRC field observer noted that less than half of the 150 cots set up in the town's major shelter were occupied Thursday night, two days after the disaster. Journalistic and popular account statements that thousands were in mass shelters (e.g., Laffoon, 1975: 161) are not warranted by the systematic data available, although it is true that hundreds at a time were fed in shelters, and certainly thousands of people were out of their homes. Nonetheless, only 33.7% of the population received any kind of Red Cross help at

any time during the post-impact period, and this includes shelter.

On the other hand, a larger proportion of the population were out of their own homes for a longer period of time than is typical of the average American disaster. Of those who evacuated, about a third were out only overnight (14.2%) or two-three days (21.7%). But 48.5% of the evacuees were out two weeks or more, and 36.3% reported in the DRC study they were out of their original homes for more than a month. In fact, as we shall note again later, 18% of the respondents (in the DRC survey 18 months after the disaster) said they were still not living in what they considered their permanent homes.

What is socially important about a disaster is not the sheer physical damage and destruction, impressive as that may be in some cases. Rather what is crucial is the disruption of community life, the marked alterations of routine patterns of social expectations and personal habits. The physical impact, as in the instance of a tornado, is usually over in a few minutes, but the other consequences usually extend for weeks, months, or even years.

In the Xenia tornado, as in any major disaster, the damage to buildings and lifelines and the effort required to respond to casualties and destruction significantly disrupted traditional and group activities in all spheres of life, from work to recreation, from religious worship to banking services. A tornado does more than wreck buildings and sever lifelines; if it does not actually interrupt the rhythm and cycles of community life, it at least puts a considerable strain on them. With stores and places of employment closed in Xenia and elsewhere, not only were some people temporarily unemployed, but necessary goods and services could not be obtained in the usual ways at the times and locations wanted, and various governmental agencies did not receive their normal tax revenues. Educational schedules were sharply altered, as were recreational habits for children and for adults. For varying degrees of time, breadwinners were not able to enact their usual provider roles, and different organizations had to augment and extend their routine services and develop new programs for the newly unemployed and otherwise disadvantaged. Government and public units had to drop, curtail, or delay some of their traditional services, such as street maintenance, refuse collection, and mail delivery, and had to develop new ways of dealing with the convergence of people, materials, and information on the impacted area; the problems of possible profiteering; and the coordination of efforts with previously unencountered bureaucracies at state, regional, and federal levels. In short, the tornado very sharply disrupted community life, the social fabric of life, in Xenia.

Shelter: Phase I

Given the amount of damage and destruction, Xenia and the surrounding areas were faced with a rather massive short-run and long-run sheltering and housing crisis. For purposes of discussion, and to illustrate the problems involved, we will separately discuss three phases of the situation. First, we will look at the immediate emergency massive sheltering of individuals. Then, we will examine the relocation of evacuees to temporary housing facilities. We will conclude with the final phase when displaced community members returned to their original community, if not to their pre-tornado dwelling sites.

Mass Sheltering

As already indicated, and as is typical in most American disasters, few Xenians used public facilities or mass shelters, particularly for housing purposes. Mass shelters were established, however. An examination of how they were set up and the problems in their use might be instructive for other situations where such shelters might prove necessary on a large scale.

Reports varied as to the exact number of shelters which emerged following the tornado. Some were activated for brief periods, ranging from hours to only for a night or so. The Red Cross, however, reported having officially established five shelters the first night. By the second night, three official Red Cross shelters were still operating. By the fourth night, only one shelter remained in operation. No organization other than the Red Cross reported the official opening of any shelter, but as the following example indicates, there were emergency shelters other than Red Cross ones.

For instance, at the time of the tornado's touchdown, 145 children were attending a day care facility located in a church basement. Although the upper story of the church sustained considerable damage, none of the children or day care personnel were injured. As the facility was already equipped with cots and food, parents who came for their sons and daughters decided to spend the evening there rather than to take their children elsewhere. In addition, some persons whose homes in the neighborhood were badly damaged came to the church basement for refuge.

Essential resources were immediately funneled into Xenia from extra-community organizations and individuals in numerous cities across the country. Six mobile food service units arrived from various Ohio cities shortly after the tornado struck. The rapid response of nearby agents was evidenced in one instance by the arrival of a Dayton disaster canteen, equipped with a refrigerator, stove, sink, and enough food for a thousand people, within hours after impact. Also, cafeterias in the Cox and Shawnee schools and the YMCA were expeditiously activated.

The operations at the YMCA illustrate some of the complexities involved in understanding emergency shelter operations. The YMCA, centrally located in the downtown area, was designated as the

headquarters for Red Cross communications and coordinating activities. It was also a designated emergency shelter and also served as a major feeding point (the importance of this is indicated by the fact that the Red Cross was serving at one point 14,000 meals per day, 3,000 of which were provided in a given facility). The YMCA additionally served as a place where disaster information could be obtained. Thus, while the YMCA was a public shelter operation, many other activities and problems manifested themselves at that location.

One of the principal functions served was the provision of health care services. Three area nurses reported to the shelter and activated a supportive care unit in the basement. Upstairs, a retired physician and several other nurses administered first aid to evacuees who had sustained minor injuries. Nurses in the basement cared for coronary patients and washed and treated others injured. The most common types of injuries were lacerations and puncture wounds. Initially, drugs were in short supply, and prescription drugs could not be obtained until dawn, when several other doctors came to the shelter with supplies.

One of the nurses noted another problem indirectly related to health care. She maintained that volunteers, mostly men and children lingering in the first aid area, constantly interfered with the work being done. Further, that when asked to sweep the floor, they refused. She suspected that this was because menial tasks did not seem to be as important as the "excitement" they expected to arise. The resulting confusion noted by Red Cross and medical personnel was seen to be a consequence of unarticulated distinctions between areas designated for emergency first aid and those confined to shelter.

Although the YMCA shelter and the Red Cross workers were welcome hosts for displaced evacuees, the physical conditions of the building lacked the adequacy of a comfortable place to rest. One participant described the Y's basement as "raunchy at best with low ceilings and no ventilation, no electricity, and no water." Others present noted that there were no windows, so candles were used. Toilets were unuseable, but people used them anyway.

Right after the tornado's sweep, the Y's basement was used as an emergency refuge for many young children and teenagers, most of whom had been swimming or working out in a gym class. These children were retained about one hour until the Y's director allowed them to leave at their own risk.

Understandably, many who found their way to the Y were frightened and shocked by their experiences. Especially concerned were those who were separated from their families. By 8:00 p.m. the first night, sandwiches were served in the cafeteria. An emergency generator was later activated, restoring light to the first aid room. Some time later, a second generator was installed, lighting the entire basement. Meanwhile, a local radio station broadcasted a list of persons who were safe at the shelter. The Y's office manager was stationed at the front door to answer inquiries concerning the identities of those who were safe inside.

Several days after the tornado, the Red Cross relocated its service headquarters to Shawnee Elementary School. On April 7, three days after the tornado, the Federal Disaster Assistance Administration (FDAA) chose Shawnee Elementary as a one-stop center for victims. A number of booths were created for delivering services and information such as food stamps, Social Security, Internal Revenue, HUD and Veterans Administration assistance, Small Business Administration and personal loans, job placement, legal aid, and voluntary service information. Individuals who had either lost or damaged such things as dentures or eye glasses, or who needed medical referrals, received assistance of this kind from the Red Cross. At its peak, the one-stop center processed about 500 people per day. As of April 26, its closing date, it had processed 6,500 registrants.

The YMCA's overall operations were well received and favorably viewed by the evacuation population. One Red Cross official stated that although some problems emerged, (i.e., unsatisfactory distribution of volunteers and suppliers in the initial period following impact) these difficulties were remedied within a relatively short period of time. Specifically, an overabundance of volunteers at the YMCA were later redistributed to other shelters. Common complaints from evacuees were leveled at the lack of variety in their diets; they were tired of bologna sandwiches. Nonetheless, the very high evaluation the Red Cross received in a DRC survey of organizational performance in the Xenia tornado, indicates that specific complaints were minor compared to the overall satisfaction with the organization's activities.

Temporary Housing: Phase II

The second phase in the process of sheltering activity involves the tasks entailed in locating and managing temporary housing units for displaced families. Traditionally, the Red Cross had for years assumed the primary role in completing these tasks. However, shortly before the Xenia tornado, the U.S. Department of Housing and Urban Development had been designated as primary responders responsible for this critical task. The guidelines HUD officials attempted to follow in administering the temporary program were given to all applicants in an information statement which outlined their function as follows:

HUD has two major responsibilities to disaster victims who have been displaced from their homes. The first is to provide immediate temporary housing for victims to occupy until they can carry out permanent housing plans. The second is to assist disaster victims in making and carrying out plans to relocate into permanent housing at the earliest possible date.

According to HUD officials, approximately 4,000 families experienced some type of housing problem due to the tornado's devastation. These figures include destruction in the adjacent Wilberforce area. DRC-Interfaith survey findings revealed that roughly 44% of the town's households incurred no dwelling loss, 28.4% suffered minor damage,

11% major damage, and 16.6% lost their entire residence. HUD officials indicated that 1,800 families applied for governmental assistance in order to meet their temporary housing needs, and that 1,542 persons were actually assisted. HUD's extensive involvement in the reconstruction project may be illustrated in terms of financial assistance provided. As of January 1980, HUD grants totaled 6.3 million dollars to the town of Xenia. The sum of 2.7 million dollars was specifically allocated for housing disaster victims in nearby complexes (rent free) for a maximum of one year.

HUD planners usually informed displaced families in a major disaster that it will take eight weeks to locate temporary housing. In Xenia, however, everyone who applied was accommodated within six weeks. As early as April 8, four days after the tornado struck, the first family was housed. By April 30, 928 families had been relocated in temporary housing. Of those temporarily housed, 80% were relocated within Greene County, and 30% of these families were temporarily housed in Xenia.

However, these figures are instructive in one sense. Even in this major disaster which forced considerable evacuation, and where thousands had some type of housing problem, only a minority of households still found it necessary to turn to the federal government for shelter assistance. Only about 40% of the families who had housing problems requested such aid--this in a community where DRC figures indicate 17% of all households suffered total destruction of their living quarters.

One salient feature of the HUD operation which deviated from usual procedures was the conscious attempt to limit the use of mobile homes as temporary housing units. Late in April, city commissioners authorized emergency ordinances permitting the use of mobile and modular homes in previously unauthorized areas of the city as temporary housing and business offices. HUD officials advised against the use of mobile homes because past experience suggested that difficulties arise in encouraging families to seek alternative housing at the end of the first year's grace period. In that regard, HUD suggested mobile homes be used only as a last resort. Consequently, few mobile homes were used. Those who occupied mobile or modular units were required to locate them on private property for a limited period of eighteen months. Allowances for mobile units were given only to those who first petitioned the city manager for approval.

Initial grievances voiced by a segment of displaced victims wishing to secure temporary mobile homes may have been partially dispelled by pragmatic considerations. For instance, as one local pastor astutely observed, many of the food stores and various commercial businesses in the downtown area were destroyed. It would have been difficult to support large numbers of people on such limited resources and services had most of the displaced temporarily relocated in town.

Communications problems arose as townspeople took temporary residences in nearby apartments and private homes. Since there was no centrally located area (such as mobile home installation) where

Xenians could be found, a need arose for devising a way to locate displaced families so that others would know their whereabouts. Too, city officials needed to know where people relocated so as to better assess the displacement situation. In order to meet this need, an emergent group called the Spirit of '74 Committee, in cooperation with the local newspaper, undertook the task of accounting for displaced persons. The newspaper ran a column entitled, "Here We Are" for several months after the tornado, requesting displaced persons to report their new addresses to the newspaper for publication.

The general consensus regarding HUD's performance of necessary operations was perceived in favorable terms. Several complaints were leveled at HUD officials during and after completion of the housing operations. Some Xenians claimed that a HUD official fallaciously advised them that they would have to spend a year in the temporary housing provided for them. Seemingly, this claim was contradicted by HUD's information statement which asserted that the lease explanation was misunderstood or misinterpreted by those who thought that the temporary housing for any period of time was compulsory.

Complaints leveled at temporary housing conditions were voiced by some who said that HUD failed to inform temporarily housed families that they were required to reimburse the government from living expense payments given to them by their insurance companies. Regarding this complaint, HUD produced an explicit statement pertaining to lease policies, explaining the responsibilities of families concerning their insurance expense reimbursements. Some displaced persons also contended that they were persuaded by their landlord to sign long-term releases. HUD countered that they insisted landlords tear up any long-term lease agreements which were brought to their attention, and since HUD paid the rental charges directly to landlords, such agreements were illegal.

DRC data did indicate that like all other organizations which operated in the post-impact period in Xenia, HUD received more positive than negative evaluations. However, HUD received the second most negative evaluations about its performance. Only SBA received more unfavorable assessment of performance.

Return: Phase III

Rebuilding or locating another permanent residence constituted the third phase of the shelter process. Apparent options of refurbishing existing homes, rebuilding on the same plot, or seeking rental or private property elsewhere were at times precluded for certain households due to practical and/or financial considerations. A few chose not to rebuild on the same lot for psychological reasons; remembering the trauma of the disaster was, for some, too painful to permit their return to original homesites. The vast majority relocated in the same general neighborhood.

As of March 18, 1975, HUD noted that 848 of the 1,542 assisted families either rebuilt original structures or settled into new residences in the community. Two hundred ninety-one families relocated outside the community, while 45 settled in other states. However, as already noted, DRC findings from a survey taken 18 months after the tornado indicated that 16% of the evacuees reported they were not yet living in what they considered to be their own homes. Thus, it is probable that the final portion of the evacuees who eventually returned to Xenia was higher than these figures indicate.

Overall, 62% of the labor force had their jobs interrupted (180 businesses and industries were destroyed): 34% suffered this problem for more than a month. Twenty-three percent of those whose jobs were interrupted either lost their incomes entirely or experienced cutbacks in salaries. These economic problems are probably not unrelated to the problems of evacuees getting temporary housing and eventually settling into permanent quarters in Xenia.

The disaster prompted a greater demand for multi-family housing, especially low-moderate income units, than existed prior to the tornado, since 47.9% of households earned less than \$10,000 per year, and 41.6% of these were already in the rental market. Redevelopment plans for multi-family housing were opposed, however, by homeowners, who feared neighborhood decline with such additions in primarily single-family residential areas.

Inflated construction costs, problems with incompetent laborers, and unreliable sources for consultation prompted a state of confusion for some. The city manager stated that one of the major problems in recovery operations stemmed from peoples' lack of information about the options for help available to them.

Several of the neighborhoods hardest hit housed many retired people. Characteristic of this segment's plight was their contradictory status in recovery operations. Many who still had mortgages to pay were woefully underinsured. Because of their ages and fixed incomes, these people were reluctant to assume (or were simply ineligible for) loans to rebuild. Some of the displaced elderly rented rooms during sheltering operations. Regrettably, they found that after HUD reimbursements (the first year and a half) were terminated, they could not afford to stay in temporary housing. Others expressed regret from having "signed too soon" for compensation, of being unclear or ill-informed about insurance benefits which were available.

Moreover, some individuals from disadvantaged groups (i.e., the elderly and poor) were successful in securing other financial assistance to pay rents in temporary units, but soon faced other grim realities. As increased incomes rendered them ineligible for food stamps and welfare benefits, they found themselves in higher income brackets, necessitating payment of higher income taxes.

Some of those disenfranchised prior to the tornado remained particularly vulnerable afterward. Others, former residents of the downtown area, moved to senior citizens complexes. One of the complexes had existed prior to the tornado; due to emergent needs, three more were built.

Permanent Housing

Although there was notable overlap of all three phases in the sheltering process, large-scale rebuilding began within six to eight weeks after the tornado. Housing construction took place concurrently with an extensive redevelopment project initiated by the city itself, which concentrated on restoring the central business district. Of note, is the fusion of redevelopment activities which characterized the latter two phases of the process. Efforts to permanently house families were not restricted entirely to the 6-8 week period noted above; more affluent individuals (who were well-insured) began to rebuild almost immediately after the tornado.

In addition assisted by private firms who came to the area, Arrowhead-Windsor Park and Pinecrest-Stadium Heights residents (middle and upper income level families) initiated reconstruction sooner than some others who lacked the resources to rebuild. In contrast to less affluent neighborhoods, by January 8, 1975, 79% of the 350 homes destroyed in the Arrowhead subdivision were being rebuilt. In the entire community, by March 30, 1975, 1,200 homes had been rebuilt; 1,008 of the 1,168 displaced had returned; and 1,700 building permits had been issued for construction of homes, garages, business, and industrial facilities, including repairs and remodeling.

The rebuilding of homes and businesses was aided in no small measure by the Small Business Administration (SBA). Approximately, 6,000 persons sought information from the SBA during the first month after the tornado, concerning their options for federal disaster agency loans. Seven hundred home loans totalling 8.7 million dollars were approved. One blunder which marred the overall SBA performance occurred during the initial ten days following the tornado: inexperienced SBA personnel incorrectly advised a number of disaster victims to pay off old mortgages with their insurance benefits and then request an SBA loan for rebuilding purposes. According to an act of Congress which established the SBA, this procedure was illegal; shortly thereafter, the mistake was identified. Those who acted on the inaccurate advice were extremely upset, fearing that they might incur serious financial losses. The SBA redeemed itself by apologizing for the error, and in most cases, arranged for people to regain their original financial status.

Post Disaster Recovery: How Xenia Rebuilt

This portion of the discussion of shelter operations will focus on housing reconstruction in comparison with past development patterns in Xenia. As one of the DRC respondents noted, the role of previous perceptions operative in "Old Xenia" emerged as a pattern for reshaping the new. Another important component of the analysis examines operations of existing power structures in planning and redevelopment during sheltering and subsequent construction.

Previous sections have noted the impact of individual social-psychological and economic characteristics influencing patterns of housing redevelopment. In order to better understand sheltering operations as a process, one may consider individual activities within a broader conception of the community as a whole. Specifically, although individuals made decisions to rebuilt on original sites or other locations, or chose various other options they deemed feasible, the net effect of these activities may be viewed within a framework of the community itself. Rather than perceiving redevelopment as isolated tasks of certain individuals, the "community" concept requires an understanding of the political, social, and economic forces which shape the framework within which individuals perceived options and later acted upon them.

The Role of Citizen Participation in Planning

The establishment of the Spirit of '74 Committee brought together previously active citizens at the request of Xenia city commissioners. The committee, along with its dozen or so subcommittees, held a series of neighborhood meetings designed to facilitate reciprocal information flow between individuals and government. The committee's proposed objectives were: to help displaced individuals to relocate within the town; to return students to school in the fall; to work with displaced business people; and to coordinate plans for rebuilding the downtown in cooperation with the Miami Valley Regional Planning Commission (MVRPC), aiming for a "cross section reflection of the general public."

The city commission appointed three individuals who were prominent figures in community affairs to select a committee of not more than twenty members. Thus, The Spirit of '74 Committee, instead of being a response to improve the planning process, was an effort by city officials to assure that they would control municipal affairs. Consequently, the selection of committee members was never open for public discussion.

The three initially selected to choose the committee were a prominent businessman (a former city commissioner and mayor); the editor of the daily newspaper, and the city manager. The latter declined, however, perceiving such an appointment as a conflict of interests with public office. Among those selected for the committee were two businessmen; one federal civil servant; the newspaper editor; two housewives; two corporate executives; one attorney; two architects; one insurance agent; one banker; one professor; and a minister. Although the committee was said to have represented a cross section of interests, when one reviews

the demographic characteristics of Xenia (i.e., 52.8% of all households earning less than \$10,000 per year; 29.9% earning less than \$6,000 per year; and 62% of persons 25 years or over were high school graduates), the issue of representation of interests becomes subject to scrutiny. One may conclude that the committee members represented the interests of the business and professional community rather than those of a predominantly working class community. The committee selection was justified by its members who said that other citizens would be asked to serve on subcommittees as advisors.

Issues discussed in neighborhood meetings (Spirit subcommittee meetings) of the North, South, East, and West quadrants revealed differences in organization, in the extent of residential damage, and in citizen opinions for setting priorities for the redevelopment project. More affluent-old north end residents were well-organized prior to the disaster; this quadrant was most vocal in pressuring city officials to meet its demands. Less effective in inducing changes on their behalf were citizens from the South, East, and West quadrants. Although the tornado's path affected some neighborhoods more than others, citizen participation at neighborhood meetings was not greatly altered by the extent of destruction experienced. Consequently, residents already organized in neighborhoods prior to the disaster emerged as prominent forces in redevelopment operations. Also, issues regarding property rights were of greater interest to residents than urban renewal.

This aspect of redevelopment planning was addressed by one city official in a recent DRC interview. He stated that the juncture of conflict illuminated the difficulty of planning, that problems arose in moving from the general idea of what planning entails to the specific sacrifices individuals were asked to make. In this sense, people wanted the benefits of a well-planned redevelopment project only so long as planning and reconstruction did not directly impinge upon individual property rights. Thus, individuals' primary concerns centered around fulfilling self-interests. Though planning was considered necessary, individual interests surfaced rapidly as the primary opposition to comprehensive redevelopment planning efforts.

Citizens were overwhelmingly concerned with rebuilding Xenia as soon as possible. For this reason, certain business leaders and residents pressured the city commission not to pass a building moratorium. The city commission wanted urban renewal and federal funding to accomplish the revitalization, but also recognized the import of citizen support. Hence, the Spirit of '74 Commission was seen as a means of achieving citizen participation from "people whom the city commission could trust," as one informant said in a DRC interview.

Citizens directly affected by the tornado voiced concerns relevant to rebuilding homes and businesses. Conversely, residents indirectly or marginally affected emphasized community development issues, such as the city's westward growth and the need for a direct route to the hospital. Citizen opposition to the MVRPC proposals may be partially explained in terms of a misunderstanding concerning the nature of citizen participation in planning. A review of the May and June

proceedings of neighborhood meetings indicates that residents were misinformed about what federal funds were available to the city for residential and urban renewal revitalization. Residents also apparently remained ill-informed of the city commission's priorities involving urban renewal for the downtown area.

Approximately forty persons who owned business sites in the downtown area opposed the plan proposal for rezoning adjacent sites for medium-density housing. These shopowners insisted that medium-density housing would cause devaluation of their property sites, thereby forcing them to buy prime real estate or to relocate elsewhere. The city manager urged them to agree to the plan. There was the view that if the plan was adopted without change, those business persons who would have to relocate might receive substantial payments from urban renewal funds budgeted for purchase of land to complete the project.

Further opposition to the MVRPC plan was indicated in a published statement by a public official. He said: "People like Xenia the way it was. Businessmen, like many others, disliked the poor plans that had existed before the tornado, but do not want the downtown radically different from what they had."

By June 19, fewer than 1,000 persons had attended the Spirit of '74 neighborhood meetings, and many of these were repeaters. A June 19 editorial tried to rationalize the low attendance by claiming that thousands had attended the May meetings. For those who did attend, citizen frustration grew as neighborhood meetings proceeded. Many citizen proposals focused on non-urban renewal issues related to housing, but most were not addressed specifically in the plan's outline. Residents' proposals were supported if compatible with community interests as perceived by the Spirit of '74 Committee. Furthermore, the city's primary concern for urban renewal was not clearly understood by citizens as a whole or at least, the flow of information from city government vis a vis the Spirit of '74 Committee and the media reporting did not communicate fully the city's aims in the planning and redevelopment process.

At this time also, the Spirit of '74 Committee appeared to doubt the efficacy of citizen participation, since the passage of the MVRPC plan was in jeopardy. Neither the committee nor the city commission addressed the issue that certain neighborhoods were neglected by the plan.

Of note is the perception of Xenia residents regarding those who served on the committee. Although substantial numbers came to distrust the Spirit's committee members' representation of their demands, they seemed to believe that business, professional, and semi-professional representation was quite "natural," rationalizing the absence of working class citizenry by saying that such activity was time-consuming, that since the meetings were held during the daytime when only professional and business people could attend, it seemed only natural that they should be chosen for the responsibility.

Moreover, the Xenia citizens' perceptions of committee members' status within the power structure seemed to reflect their position within the political and economic structures, rather than a perception which included positions which dominate social and ideological formations of individuals (i.e., minister, editor of the newspaper, attorney, professor, etc.). The fact that, traditionally, certain individuals had been active in community affairs seemed to override accusations that the committee was not doing what it was supposed to do. Given the resources available, it was felt, one could expect no more. The absence of city officials on the committee seemed to dispel the possibility that committee members may have been inclined to advance the interests of a select group. Those who had been influential in community affairs prior to the disaster were deemed "naturals" to carry on with redevelopment operations. The fact that admittedly poor planning had occurred in the past, and that many citizens' proposals were omitted from the plan (especially those from lower-income, politically less-powerful residential sections of the South and East quadrants) did not appear to influence or jeopardize the "natural" scheme of things in post-disaster recovery.

The outcome, a distinct absence of citizen participation in redevelopment planning and decision-making, was rationalized as a factor of time constraints. No federal urban renewal money would be available if a redevelopment plan was not produced within sixty days. Since the disadvantaged and "average" citizens were unorganized, and generally invisible in community affairs prior to the disaster, their interests remained unaddressed thereafter. The "naturalness" of those influential prior to the tornado assuming the prominent decision-making positions (which resulted in advancement of their interests) precluded the possibility of substantial redevelopment for the underprivileged groups whose interests remained secondary.

Furthermore, budgetary constraints, land acquisition costs, and federal renewal regulations were reasons given why the city commission did not meet all citizen demands. However, such constraints apparently were reserved for an ostensibly unheard from majority whose proposals were neglected in the final plan and who were inadequately apprised of the possibilities which would benefit them in a comprehensive plan. The few proposals which were considered were those in compliance with the city commission's priorities for redevelopment which were said to benefit most Xenia residents.

Since most citizens did not have a clear understanding of the purpose of redevelopment and the role of citizen participation, comprehensive planning was misinterpreted by many who thought that prior problems beyond the officially-designated planning area would also be resolved in the final plan. Citizens who normally had little contact, political, social, or economic input into decision-making processes remained as such. Ironically, the nature of the tornado path and the scope of federal regulations were said to prevent modifications which could benefit residents in pre-existing problem neighborhoods. A few participants--those representing business, professional, and city government interests--were seen to dominate redevelopment efforts.

Pre-Tornado Trends Reflected in Redevelopment

Prior to the tornado, Xenia had been researched by city planning specialists who described the town as having:

1. a substantial but deteriorating, physical core of residential and commercial structures (many of them dating from 1880-1910);
2. a substantial, but declining, residual retail trade downtown, adversely impacted by the commercial strip development on one of the main thoroughfares and the growth of shopping centers in nearby Dayton and Springfield;
3. a dangerously built-up flood plain to the West along Shawnee Creek;
4. a large, primarily black population living in the lower income East end;
5. rapidly growing suburban neighborhoods located to the West in incorporated tracts (Windsor Park and Arrowhead).

After surveying the tornado damage, Xenia city commissioners foresaw the occasion as a fortuitous moment in Xenia's history. Recognizing this crucial period as an opportunity to circumvent continued mistakes in zoning and land use patterns, the commission ordered an immediate moratorium on all reconstruction in the heavily-impacted downtown area, including both residential dwellings and commercial structures. The MVRPC, of which Xenia was a member, simultaneously prepared a plan of suggested strategy for redevelopment activities.

During the next two months, local, state, and national officials convened with local citizens on numerous occasions to devise a strategy which would most successfully and expeditiously complete the project. The subsequent exchanges of ideas and information produced two opposing factions. One group favored local, free-enterprise redevelopment oriented towards individual decision-making power and capability to rebuild. The other group favored outside, extra-community expertise and federal funding to spearhead the project. Observers noted that loyalty to one faction over the other depended upon the individual's confidence in strategies proposed. The entire business community was, in fact, divided on the issue.

Following heated discussion, the MVRPC's proposed plan, Xenia Rebuilds, was approved in June, 1974, along with decisions to seek federal funding and urban renewal guidelines for reconstruction. The MVRPC plan was thought to be comprehensive and resourceful in light of its potential for correcting past mistakes. With respect to the rebuilding of destroyed homes in the downtown area, the plan suggested a wide variety of housing alternatives for the ethnic and socio-economically depressed individuals from this area, a strategy consistent with the development of a river park which would prevent

rebuilding of homes in the Shawnee Creek flood plain area.

The efficacy of the new plan was severely hampered, however, when city commissioners passed a law approving overlay zoning. This departure from the accepted plan insured possibilities for piecemeal modification of the MVRPC proposal from the onset. Those opposing the proposed plan defended the provision of overlay zoning as a protective mechanism which would override "rigid or restrictive" redevelopment, as some described it. In effect, the political forces at work insured the capability of local landowners and business persons to bring pressure upon the city's planning commission and an objective hearing examiner to augment the original MVRPC redevelopment plan. The pre-existing network of forces reasserted itself in the stages of planning and operations which followed.

Even during the building moratorium, two fast food chains threatened to leave Xenia if they were not allowed to rebuild downtown; the city promptly bowed to corporate demands. Subsequently, over the next three years, dozens of zoning appeals were approved, predetermining patterns for years to follow. During the interim, another developer was hired by the city to salvage the modifications which were progressing. The new developer proposed a project similar to the original, but the second plan called for redevelopment in two phases. Business interests were vested in the first phase, which emphasized redevelopment of the shopping area. The second phase, also encompassing motel and restaurant facilities, remains uncompleted.

As previously mentioned, badly damaged suburban areas in the western and northeastern sections of town (Arrowhead-Windsor Park and Pinecrest) were rapidly rebuilt. On the other hand, older and less affluent neighborhoods immediately west and southwest of the central business district (CBD), those on the decline prior to the tornado, suffered continuing neglect after redevelopment was essentially completed.

The old north end, populated by some of the wealthiest people in Xenia's community power structure, was also rebuilt rapidly. Even homes condemned as total losses were salvaged due to the owners' substantial insurance settlements and owners' extensive financial resources which enabled them to hire crews to repair massive damage. Consequently, the north end is still considered one of the more desirable sections of town, especially because of residents' concern for maintaining its traditional historical image.

For the socially and economically depressed residents, the tornado represented a termination of years of neighborhood decline, particularly for those individuals living in the areas immediately west of the CBD, whose residents experienced spreading commercial encroachment in the years prior to the storm. These lower-income families included the disenfranchised groups, the elderly, and younger Appalachian families, most of whom occupied rental properties. Throughout this depressed area, the devastation was massive. As one might expect, the rebuilding which followed was marginal.

Escalating building costs and lack of sufficient insurance coverage prevented many previous homeowners from rebuilding. At least 33% of the displaced reported being underinsured. Some residents of this area did form a coalition in an attempt to increase the value of their vacant property by requesting commercial rezoning. Several real estate companies represented these people at planning commission meetings, and some lots were rezoned for highway commercial purposes. However, the overall effect was generally isolated commercial developments circumscribed by vacant lots of diminished value, rather than a coherent residential community.

Moreover, commercial interests infiltrated the Shawnee Creek flood plain. The MVRPC plan had designated this area as a recreational space, limiting future building in the area. Here, too, pre-tornado forces emerged; within four months after the tornado, a fast food restaurant was erected. Two months later, rezoning had effectively reinforced the highway commercial strip across Shawnee Creek and toward the central business district.

The homes along the southern extension of Shawnee Creek were refurbished. Despite MVRPC warnings about the area's potential for periodic flooding (as had happened in the past), residents moved back to the area as soon as repairs were completed. Within one year, the shortcomings of haphazard relocation in this area were clearly recognized, the federal flood plain insurance program announced that these residents would encounter problems in obtaining flood insurance.

Failure to correct past mistakes in planning and rebuilding has been attributed to inertia by powerful social, political, and economic forces operating within the community following the disaster, a reflection of the predisaster context. These social, economic, and political forces may be understood in terms of their interrelated operations which, taken together, underlie the structure of the community of Xenia as an entity.

The economic or commercial forces in Xenia appeared to be unorganized in effecting the continuing decentralization of the central business district, as evidenced by the random highway commercial overlay zoning, perpetuation of residential neglect (of portions of the decaying downtown residential section), and the demise of the Shawnee Park recreational area. Yet despite the apparent disorganization, we discern a pattern of redevelopment accomplished by those individuals enjoying the financial and political power to restore the community according to their own interests. The activities of private and/or residential forces, although they varied among particular neighborhood groups (in terms of organization or structure), influenced and prescribed rebuilding patterns according to their social and economic status within the community.

Traditional ideas of what existed prior to the tornado pervaded every sector of redevelopment operations, yet those who enjoyed greater power in the social, economic, and political sectors affected redevelopment to a great extent. A strong tradition of fundamental beliefs, as

well as individualistic attitudes toward community life, may also have limited the range of possibilities for substantial changes in a restored Xenia. Traditional perceptions varied among diverse groups and individuals (i.e., the city manager, city planner, numerous business people, school board members, etc.), yet they suggest a philosophy "what existed prior to the tornado was good for the town," narrowing the options for post-disaster recovery and reconstruction.

Opinions and constraints derived by the community power structure were supported by others less visible in the decision-making process. For instance, one woman wrote to the local newspaper urging that the low-income area along Trumbull Street (immediately west of the CBD) not be redeveloped because "it would revert to what it was--'Tobacco Road'."

Pre-tornado territorial boundaries persisted throughout the redevelopment project, resulting in identification of certain districts as vital neighborhoods, increased traffic patterns over previously established major roads, and redefinition of Shawnee Creek as the demarcation of the southwestern segment of the CBD. Revitalization of Xenia's housing stock and patterns of rebuilding operation, were seen to be clear indications of regressive notions of redevelopment in terms of the past, Xenians' interest in redoing what had existed. The pre-tornado perception of the town was upheld by a resurgence of interests in nostalgic portrayals of certain landmarks depicting the town as it was.

Various modes of communication induced this kind of thinking among the citizenry. Specifically, the Xenia Daily Gazette featured stories about homes and businesses which the tornado had destroyed and some of which relocated. Calendars depicting familiar landmarks were produced and sold. "Old Fashioned Days," promoted by local businesses increased in popularity shortly after the disaster. These promotions can be seen to be compensatory reactions to the material losses of familiar settings as well as an interest in reminding Xenia of its pre-tornado situation.

Overall, rebuilding a community after a major disaster is not simply a question of the restoration of the physical structure. That structure is an integral part of the social fabric of the community. As such what will be rebuilt will reflect past conditions as much as current circumstances.

CHAPTER IV

THE GRAND ISLAND, NEBRASKA TORNADO CASE STUDY:

EMERGENCY SHELTERING ASPECTS

In this chapter, we present a case study of the sheltering and housing activities and problems after the Grand Island, Nebraska, tornado. We emphasize the emergency sheltering aspects the night of the disaster. An intended analysis of temporary sheltering and housing could not be completed as originally planned, so we present only a short discussion regarding this. More specifically, in this chapter we discuss community context, threat conditions, warning and impact, behavioral patterns, withdrawal evacuation--including institutional evacuation, shelter (the emergency phase), and temporary and permanent housing.

Community Context

Nebraska has three major metropolitan centers. Late on the night of June 3, 1980, a swarm of tornadoes descended upon one of them, immediately bringing Grand Island to national attention as "the third largest city in the State" and the site of one of the nation's most destructive disasters in recent history.

Located in Hall County, in southeastern Nebraska, with a population of roughly 40,000, Grand Island lies within 150 miles of Omaha and Lincoln--the state's only other large cities. It was settled in the middle 1800's by Germans, mostly farmers, who brought their language, and forms of local government, and education with them. Until an outbreak of anti-German sentiment during World War I, Nebraska was officially bilingual; as many publications were printed in German as in English. The waves of mass immigration during the late 19th and early 20th centuries brought more settlers from northern and eastern Europe, in search of land to cultivate. Today, after many years of acculturation, the population is fairly homogenous. There are a few blacks, some native Americans, and a small Mexican-American community descended from the migrant laborers who used to come annually to harvest sugar beets--the primary crop in the days before widespread irrigation.

Agriculture remains the economic mainstay. Corn, soybeans, wheat, and livestock are the principal products. Grand Island has always been a marketplace for the area; in recent years, however, it has evolved into a center of agriculturally-related industry as well. Three major companies employ about half the population in the manufacture of farm equipment and in beef processing. Although the economic health of the city, as of the region, is susceptible to fluctuations in the agricultural sector of the national economy, Grand Island's particular mix of both basic production and support services has given it a degree of flexibility that has kept it vital. In fact, the city has experienced a boom in recent years, as evidenced by a very low unemployment rate

(1.5%), the opening of two impressive shopping malls, a considerable development of middle and upper level real estate, and a housing occupancy rate of 96%.

It appears that the whole of Nebraska has enjoyed some good years of late. At the time of the tornadoes, there was a surplus in the state treasury, a fact that became a political football in the early reconstruction period. Several issues were raised regarding the appropriate respective fiscal responsibilities of federal, state, and local governments in time of disaster, with implications for public policy going far beyond Grand Island itself.

The prevailing ethos in Grand Island includes conservative populism, fundamentalist Christianity, and, in spite of the growing numbers of two-income and single-parent households, overtly traditional attitudes toward family life. The work ethic is strong here. A stigma attaches to public welfare (at least of the obvious kind), although there is also a countervailing force for the good in the enduring tradition of voluntarism, neighborliness, and mutual aid.

Grand Island enjoys the intricate network of family ties, personal contacts, and inter-organizational and even inter-city cooperative patterns that characterizes rural, sparsely populated parts of the country. This pattern of social linkages, both internal and external to Grand Island, is diverse. At the individual level, for example, an official at the State Mental Health Office in Lincoln was asked what options families might have for temporary housing in both the near and long run after the storm. He stated that most residents of the town have kin in the many small farm communities that dot the state. To what extent this resource was used is difficult to ascertain, but we do know that far fewer than 10% of the victims sought public shelter in the immediate aftermath. Although substantial numbers made use of the Federal emergency housing program, the majority did not. Since rental housing was tight in the community prior to the tornadoes and tighter afterwards, it seems likely that most victims did rely to a large extent on personal and family resources.

At the organizational level, within Grand Island, many emergency response tasks were done with the help of mutual cooperation among agencies that seemingly arose more out of goodwill and friendship than from formal, pre-planned agreements. A county supervisor, for instance, who assumed responsibility for emergency sheltering, relied heavily on her personal links with members of the general community. She called "people she knew": the owner of a baking company, for trucks and food; pastors of churches, for space; friends, to "organize things" at some of the shelters; owners of bulk storage warehouses, for supplies and food; even funeral directors.

Numerous external links existed which proved invaluable. There is an unusually strong connection between the Grand Island and the state Civil Defense, and between these and the State Highway Patrol and the National Weather Service. Threat or impact alerts are rapidly conveyed along these lines, beginning at any point and soon reaching the other

agencies. Local fire departments from within a 40-mile radius were said to have voluntarily and spontaneously responded to the situation in the community on the night of June 3. The Veterans Administration (VA) Hospital in Grand Island and the Federal VA in Omaha jointly planned and implemented an efficient evacuation of that institution.

One further set of links needs to be described, for it says something significant about the tenor of life in Grand Island and also related importantly to the issue of housing. A member of the financial community indicated that the lending institutions in town have a very good working relationship with each other. As a group, following the disaster, they agreed to blend future mortgages, a process which reduces interest rates on new mortgages by granting additional funds, up to the amount of the previous balance, at the previous rate. Any additional money borrowed is at the current rate. The rationale offered was that the size of the community precludes the pursuit of windfall profits, if one wishes to retain business over the long term, at least. Apparently the financial community also communicated well with the Small Business Administration staff in Omaha both before and after the storm--a relationship which no doubt facilitated matters in the aftermath.

Thus it seems that things tend to "work" in a town like Grand Island in a manner different from larger cities. People still "know" one another and can deal with each other in informal, personal ways as well as through the formal structures. This quality was manifest in a flexibility of both individual and organizational interaction that benefitted disaster response.

Threat Conditions

Nebraskans tend to grow up with a healthy respect for tornadoes, although Grand Island itself has been extraordinarily free of them. The city has experienced several floods, including a rather serious one in 1967, but it had not suffered from a tornado since 1857. To the extent a disaster consciousness existed, it was based on memories of the Omaha experiences of 1913 and especially 1975, and a pervasive realization of living in the heart of tornado country. Year after year, however, Grand Island witnessed numerous storms forming in the area but always veering north around the city.

Sirens are heard frequently from April through late summer, but their warning value may have been somewhat tempered by a sense of relative invulnerability, and by familiarity, since the Civil Defense runs siren tests twice per month, and there are occasional soundings when a funnel is sighted nearby. The town's people seem to rely primarily on their own weather sense and ability to read environmental cues. The sound of sirens is interpreted not so much as a warning of clear and present danger as it is a signal to watch the skies. Thus, unless conditions look particularly threatening, the sirens do not generate much alarm.

It is interesting to note that on the evening of June 3, they were not heard with the usual complacency. The skies did, on this occasion, look uniquely ominous. Many people turned on the radio, began making personal weather observation, and in general became sensitized to signs of potential danger even before the sirens began to sound. When they did go off, they were heeded. The result: in spite of bearing the full and extended force of six twisters that flattened one-fifth of the town, there were only five deaths and a relatively small number of injuries. The experience of most persons interviewed after the storm can be summed up in the words "we hear the sirens all the time, but for some reason [this time] we paid attention."

Only the week before the tornado, some major changes occurred in the structure of emergency services in Grand Island and Hall County. The County Board of Supervisors voted six to one to combine the Civil Defense (CD) Office with the 911 Emergency Communications Center. The (former) CD Director, with 15 years experience and an office holder on the National CD Council, was notified the last week in May that her job had been abolished. The head of the 911 Center, who had assumed that post a few weeks earlier, was made acting CD director effective June 1.

The change was ostensibly an economy measure, and because, according to the Board of Supervisors, they did not believe the emergency needs of the county were such that two separate agencies were needed. Of the two, they decided that the 911 center was the more salient to probable needs. In the words of one supervisor, interviewed at the time the decision became public, "I don't think CD is in a class nowadays as when everybody was running...bombshelters." A further rationale offered was that the CD director lived on a farm just outside the county line and was therefore ineligible for the position she had been holding all those years.

The Board was at pains to explain that they had no intention of doing away with CD. Apparently they originally intended to reduce its status to that of a subsidiary operation, with a part-time position under the authority of the 911 Center. Only after this decision was made did they discover that, in order to draw Federal and State CD funds, a full-time supervisory position was required. Subsequently, the secretary to the former director was promoted to Deputy Director under the new acting director.

Thus, on the night of the tornado a situation existed in which both the structure and key personnel of the emergency service network were new, relatively untested, and (given the manner in which the changes came about) probably experienced certain additional pressures to perform.

Warning and Impact

Several DRC informants, both officials and ordinary citizens, remarked that atmospheric conditions during the afternoon and early evening alerted them to the possibility of heavy weather. On June 3, the increasingly darkening skies and churning quality of the clouds seemed unusual and threatening enough to capture attention. People began to turn on radios and TV to weather stations for further information. Early evening tornado watches were not sufficiently alarming, however, to influence people who had plans for being away from home that evening to change their minds. Indoor and outdoor activities such as bowling, dining out, and Little League meets went on as scheduled. Nor were most people particularly alarmed by the first actual sightings, between 8 and 9 p.m., of a twister just outside of town. Although a few of the many who lived in vulnerable housing (trailers and homes without basements) made some effort to seek safer accommodations, the majority merely continued to monitor their radios. As previously mentioned, the history of Grand Island over several generations had built up an expectation that tornadoes would veer away to the north of the city.

On the whole, the combination of individual perceptions of weather conditions, official watch and then warning, elicited a condition of alertness in most households and simulated some precautionary measures in several, but did not send the majority to seek cover.

The storm that struck Grand Island that night spawned more tornadoes than had ever been known in such a small area. Not one but six major funnels formed, accompanied by a dozen of smaller vortices. The system was exceptionally erratic and slow moving. Whereas most tornadoes move generally from SW to NE, some of these funnels moved northerly, straight south, and even due west for periods of their courses. Two even rotated clockwise, a phenomenon that occurs less than .5% of the time. Whereas tornadoes are usually rather narrow, measuring less than one-half mile across, some of these twisters attained widths of three to five miles.

Thus, it appears that, in addition to the general and critically important state of general alert, it may have been the abnormalities of the storm itself which ironically prevented more than five deaths and a dozen hospitalized. Reports of multiple funnels, the news that there were actual touchdowns within city limits, extremely strong accompanying winds and eerie silences and drops in air pressure all helped to send people all over town into their own or neighbors' basements.

First sightings set off the official warning sirens just before 9:00 p.m. Three twisters struck the northern areas of the city around 9:00--one in a heavily residential area and another in an area surrounding the Veterans Administration Hospital which included numerous homes. At least one tornado lingered in the vicinity for a full hour, periodically ascending and descending. Around 10:00 p.m., three more tornadoes formed along the eastern edges of the city and moved west and south into several heavily populated residential sections and along South Locust Street--a major commercial artery. The slow-moving and multiple funnels caused some people to seek shelter more than once during the night.

Even so, not all believed they were in danger. Some simply did not believe the warnings; some residents were fatalistic--a bar manager reported that when he tried to herd his patrons into shelter, he met with an "if it's coming, let it come" attitude. Some chose to wait outside to see what they could see. Possible only because of the slow-moving nature of the storm and the fact that touchdowns of the first funnels lent urgent credibility to warnings, did nonbelievers and slow responders have time and luck to find safety before they were hit.

The system also brought with it extremely heavy winds and rain, leading to a number of persons to be uncertain as to just when the danger was over, and motivating others whose houses had been torn apart to remain there in an effort to protect whatever was left from further damage. Several sections that escaped direct hits sustained extensive wind damage.

As is common, especially in nighttime disasters, there was only a limited perception of the severity of events. Although everyone could bear witness to what had happened in his immediate vicinity, the darkness and the radio station's deliberate policy of downplaying destruction and urging everyone to stay off the roads kept the general public unaware of the total impact until daylight. Public officials expected a bad situation from the first, and in making some rounds during the night realized that they had indeed been visited by disaster and began making decisions based on that awareness. It was not until dawn, however, that they verified their suspicions that it was truly a major disaster.

With daylight came the awareness that one-third of the town lay in ruins; 150 square blocks, mostly residential, were ravaged, leaving over 2,000 people homeless. Approximately 60 small businesses, mostly along South Locust, were hit, but fortunately all major firms were spared, thus only a small percentage of residents found themselves without employment as well as without houses. Large areas were without power for three days, creating problems for householders whose residences were left intact, and for the emergency organizations responsible for mass care.

Behavioral Patterns

The disaster plan which existed in Grand Island prior to June 3 was apparently based on the assumption that key officials--the mayor, the head of CD, etc.--would be informed immediately, and would then contact through an established chain of command to all appropriate personnel. All would assemble and the disaster plan would be formally activated. Meanwhile, the sirens, which apparently constituted the plan's chief vehicle for warning the citizenry, would be sounded, and all would take shelter until the danger was over (the plan does not specify how people are to know for sure that this point in time has arrived).

Events on the night of June 3/4 indicate that only the rough outlines of the plan were followed; most of the decisions were ad hoc. These decisions were, for the most part, effective ones. A number of

persons not included in the official plan became actively involved, and the general success of the emergency response effort that night depended in significant measure on the decisions and activities of organizations that had not been planned for.

In the official plan, much dependence was placed on the city's network of warning sirens. The sirens were activated as planned, and continued to sound throughout the emergency and beyond, since the persistent high winds and the darkness made it difficult to tell when the storm and danger had definitely passed. However, it was noted afterwards by city officials that the sirens were not as effective as expected. The wind itself was a major limiting factor. At least two of the twenty sirens within the city were destroyed or failed to operate. The noise of the wind tended to drown out the sound, while the force of the wind prevented some of the cones from rotating, thus carrying the sound in only one direction and making it impossible for those living at right angles or behind them to hear. Anyone listening from indoors also found it difficult to hear sirens clearly.

On the other hand, a survey taken by the Civil Defense in the weeks following the disaster confirmed that these warning devices worked; those who heard them were moved to take cover. About 1,500 readers of the Grand Island Independent responded to a questionnaire that appeared twice, a few weeks apart. Results indicate that of those responding, most stated they were warned by sirens or the radio.

It seems that the major function served by the sirens was in motivating people to tune into radio and TV. They alerted, but did not particularly alarm people, and by themselves they did not convince large numbers of people to take cover. In a sense, it would have been too much to expect of them. As other studies have found, a siren is an ambiguous sound; the information it provides is quite unspecific, and in this instance may have even proved dangerous. Since people do not expect tornadoes to stay in one area for anywhere near the length of time these tornadoes did, the sound of later sirens may have been interpreted by some as an all clear signal, when in fact they were intended to warn of new sightings and touchdown activity--some parts of town were even struck more than once by the same twister.

Data from the survey, from newspaper accounts, and from DRC interviews strongly suggest that people got the information that most directly precipitated their taking cover from a variety of sources, and that the kind of warning information apparently required to produce this effect is verbal and specific. Non-verbal ambiguous signals were effective only after a sufficient level of threat had been raised. As an example, consider the sequence of events occurring at a bowling alley, where a large number of people could be found at 8:30, just prior to the onset of the disaster. Sirens were heard but prompted no significant leavetaking. Then someone came in repeating a news report of a sighting 14 miles away, which did result in a few people leaving the bowling alley. Shortly afterwards, a second report was heard of another funnel only five miles away. At this point the majority left and the manager shut down the lane, but about 30 people elected to stay, even though a bowling alley,

with a large, high, relatively unsupported roof, offers little protection. Some of the people milled around near the bathroom--the structurally strongest part of the building, while others went outside to watch. Safety personnel tend to frown upon standing in the open looking for twisters, but in this case, those inside had reason to thank those who did, because it was their running in with news that a funnel was bearing down upon them that sent everyone into protective positions. Although the roof was torn off most of the building, no one was hurt. As the rain began to fall, all figured it was over and began to move about again, until a fire engine drove past with siren and bull-horn warning of a second funnel in the neighborhood. Again people sought cover, as this tornado hovered overhead for several minutes without touching down.

From this, it can be seen that the warning process involved at least four distinct elements: the formal and pre-planned, (e.g., the sirens and weather radio); the formal but ad hoc, (e.g., the use of public equipment and facilities, such as the fire engine); the informal word of mouth from citizen-to-citizen; and very importantly, commercial radio. The siren system, the only one of these elements planned for in advance, (which before the incident had been considered adequate) played a useful (perhaps even necessary) but certainly not a sufficient role. Ad hoc efforts such as the use of fire engines and patrol cars were helpful but secondary. The value of individual word-of-mouth, while probably quite high is, by its nature, difficult to determine quantitatively. It was commercial radio, at least in this instance, that probably provided the most useful warning information. The mass media, however, was apparently never considered by those responsible for emergency planning as an important resource to be incorporated into the overall warning system. Media personnel were not on the list of those to be contacted in the event of an emergency, and since there appeared to be no contact between the EOC and media stations during the night of June 3/4, the media was apparently not included in ad hoc decision making either.

Nevertheless, the media, especially radio, played a major role in warning people both before and during the storm, and continued throughout the night to exert influence on the behavior of the general public. As background, it is important to know that radio and TV stations cover wide listening areas in the plains states. People tend to be interested in what is going on in other communities, as well as their own. It seems that a good deal of information about events in Grand Island was first heard in other towns and then relayed back to the community via telephone, or was heard in Grand Island by residents who had their radios and TV's tuned into out-of-town stations. Nor were the benefits limited only to information. Personnel and emergency equipment began to arrive in Grand Island at an early stage of the disaster, sent there by surrounding communities, who knew they would be needed.

In Grand Island itself, one local radio station broadcast almost continuously during the night, either from the studio or from the transmitting tower. When power was lost at the studio the manager kept the tower informed by telephone. Broadcasting was halted only for one

half-hour period when the tower had to be evacuated in the face of an oncoming funnel cloud. It is clear that this station played a critically important role in getting people to take emergency shelter. Through personal surveillance, and from monitoring the broadcasts of other stations, the manager was one of the few who actually had a fairly good idea of the magnitude of the disaster. He made a deliberate decision to withhold this information from the public until daylight. His reasoning was that the full story would be too sensational and might encourage sightseeing, which was dangerous, since no one was certain if the danger was indeed over, and would interfere with official activities. Thus, news was aimed at keeping people indoors and close to cover. However, this decision, was made and effected independently of what was being done at the EOC by the mayor and others responsible for emergency response.

A good deal of information critical to both private and public decision making processes was relayed around Grand Island via telephone. Although the emergency radio system was used extensively for inter- and intra-agency communications by EOC staff, the state police and state Civil Defense and the Red Cross, the heavy traffic over that network and the fact that not everyone was hooked into the system necessitated heavy reliance on telephones. It was phones that were used first to alert emergency staff that they were needed at the EOC, then to obtain and set in place various kinds of personnel and equipment needed for shelter, public safety, and other operations, and throughout the night to exchange information with the multitude of emergency workers who had no radio access. The telephone, for example, was the means by which the Red Cross division chief in Lincoln finally contacted the local chapter, whose headquarters was destroyed. The EOC was a somewhat unfamiliar concept to many, but everyone knew about dialing 911 for emergency assistance; thus, the "911 Center" became a central point for communications. Its operations merged into those of the EOC, with which it shared a building and a director (recall that the new acting director was also the incumbent 911 director). In light of this, it was extremely fortunate that telephone service was never totally disrupted. Lines rapidly became jammed and 20 second delays before getting a dial tone were common, but calls continued to get through.

Overall, the formal emergency response seemed to be characterized by a relatively high degree of emergent organization and ad hoc decision making, as opposed to being dictated by a pre-existing paper plan. Certain things are not known about the community's disaster plan. One is the matter of leadership. Was there supposed to be a single person in charge of all the organizations involved in the EOC; was there supposed to be a key person for each of the three major constituencies--the city, county, and CD; what actually was the role of CD supposed to be relative to the city?

This is not to imply that the chain of command and other organizational procedures called for in the preexisting plan would have been superior to what actually emerged. Discrepancies are mentioned because the work of other disaster researchers in comparing existing disaster plans with what actually happens in disaster situations, found that there

are often differences, and that an examination of them can suggest ways of operationalizing goals, refining plans, and generally improving the planning process and capabilities of response networks. According to the standard operation procedures established by the former CD director, all members of both the city council and the county board of supervisors were to be called in to the EOC in times of emergency. None were called on the night of the tornadoes; one member of each of these two bodies individually and independently decided that the situation warranted their presence, and reported to the EOC around 11:00, when the winds let up sufficiently to allow them to make the trip. As it happened, these two played a major role in EOC functions.

The EOC was located at city hall. By 11:00, the staff there consisted of the mayor, the CD/911 director, the city administrator, the council and board members just mentioned, and several mid-level officers from the police, sheriff's, and fire departments. There were also representatives from the State Police and the National Guard. The mayor and CD director were the first to arrive, shortly after the initial warning sirens were sounded between 8:00 and 9:00. They came because they decided the situation warranted; others responded following phone calls from the mayor, because they too decided they should. This occurred roughly between 10:00 and 11:00 p.m. Around 10:00 the mayor declared an emergency/disaster and requested National Guard troops. About the same time or shortly thereafter, a field command post was established in a large parking area at a shopping center near the site of some of the worst damage. It is not clear who was involved in the decision to set up this field command, and how personnel were assigned to it. Authority at this post seemed to be held by the chiefs and superior officers of the police, fire, and sheriff's departments, and appeared to be exercised relatively independently of the EOC. The mayor quickly emerged as the dominant figure at the EOC, by consensus. As has been stated, decision making was ad hoc for the most part, shaped by needs as they arose and/or were perceived. "Power plays," overlapping domains, or other forms of conflict were not experienced or reported. Macro-level decisions--those relating to the community as a whole--were made by the mayor, assisted by his administrator and the two city and county officials who voluntarily reported for duty. The acting DC director offered input and saw to the activities of the 911 Center. A number of tactical decisions were made by the brass at the field command, with input from their underlings who were stationed at the EOC.

Withdrawal Evacuation

In Grand Island the tornado created a need for all the kinds of emergency and temporary sheltering and housing we mentioned in the first chapter.

The duration of temporary arrangements, as well as the distance moved and the location chosen for shelter, are determined quite often by variables of the disaster agent, i.e., its scope, severity, and nature. In disasters that affect wide areas, such as floods or hurricanes, the distances traveled in search of safety can be considerable--measured in

miles. In the case of nuclear threats, movement can be even further, to other communities entirely. In tornadoes, however, the movement required for physical protection can be rather slight, the distance traveled no further than the basement or a spot within running distance. In the case of trailer parks and the like, where there may not be adequate shelter close by, the distance may be longer, provided inhabitants have the time and motivation to make the necessary effort.

In Grand Island, the first sirens and radio messages elicited some precautionary activity: calling in children; assembling the family or ascertaining members whereabouts; thinking about where to go if; and monitoring weather cues, radio reports, and sirens. Subsequent detailed warnings (reports of multiple, closer funnel clouds, instructions regarding shelter-taking, etc.) increased precautions and by this time, some were making definite moves: congregating in basements, driving out of trailer parks and the like. Finally, the roaring noise associated with tornadoes, and alternately, eerie silences and sudden drops in pressure, sent people seeking whatever cover was available.

Radio messages specifically urged those living in mobile homes to find a safer place. Since no trailer parks had congregated shelters, a number of mobile home dwellers took to their automobiles in search of a better location. Upon encountering streets of downed trees and power lines, some pushed on to motels or the homes of relatives; some went to public buildings; and some returned home to their trailers. As mentioned before, one of the unique features of this particular disaster was the unusual length of time of exposure to dangerous funnel clouds. Because of the duration of the storm and the number of different tornadoes, some people assessed the danger as being over before it in fact, was. Several people left shelter, for various reasons: their houses had been damaged, they wanted to reunite with family members, they wanted to sightsee destruction. Some of them ran right into another tornado. In the words of one victim, "We thought it was all over and it was just beginning."

A certain amount of spontaneous public sheltering emerged in Grand Island, which has not been found in all tornado disasters. Groups, usually numbering a couple of dozens, would congregate in public or quasi-public buildings in the neighborhood. Churches and schools are typical of the buildings selected.

There is only sketchy information about this phenomenon. These shelters were recognized by and received the cooperation of city officials, but they were not, for the most part, established by or under the jurisdiction of any formal organization. As an example, one such shelter was created when a member of the city recreation commission became worried about the players and fans of the city softball league who had continued with their games despite the weather. He personally directed the 150 or so who were still at the park to the nearby armory. They spent most of the night there and the facility became a "shelter" in the eyes of EOC staff, who sent it volunteer staff and supplies.

Several other such shelters existed, although the exact number is not certain. Nor is it known when people first sought them out--before or after contact with a tornado. We do not know why this particular form of shelter was chosen, or if indeed it was voluntarily chosen at all. Did people go there because friends and relatives were not available, because hotels and motels were full, or had not even been considered, because they were on their way to another place and ran out of time, or were they possibly taken there by public safety officers after being rescued from some dangerous situation, as were the softball players mentioned above? How was a particular building chosen? Is it part of Grand Island's particular sub-culture to gravitate to such buildings in times of danger? The answers to these and other questions might provide valuable information since the presence or absence of a tendency for private citizens to spontaneously engage in collective sheltering activity has implications for shelter planning. There may be, to suggest one example, less need to provide physical facilities than had been expected, but more need for establishing communications, record keeping, and various support services for shelters set up by private action.

Institutional Evacuation

The two major institutions in Grand Island concerned for the safety of residents were the general hospital and the V.A. Hospital. According to a visitor in the hospital, emergency procedures were instituted as soon as the sirens were sounded. Bed patients were wheeled to inner corridors and all room doors were closed. Patients who could sit up were placed in chairs with their backs to the walls. Visitors were encouraged not to leave and were also given chairs so that they could sit near the patients they knew. Juice and coffee were provided to all, and coloring books to the children. Radios were placed at various points so that all could keep abreast of events outside. The source of this report stated that there was concern, even fear on the part of some, but no panic. Behavior generally was marked by cooperation with instructions and concern for others. This facility was fortunately not in the path of any of the twisters.

The V.A. Hospital is located in the heavily damaged northern end of town. It had been in the process of having its electrical system rewired, thus its own generator had been disconnected and a temporary one installed in a tractor-trailer parked just outside. Although the building was not directly hit, the wind overturned the trailer, damaging the generator and causing a power outage for the remainder of the emergency.

At 1:00 a.m. the Director of the hospital called his counterpart at the V. A. Hospital in Lincoln and the Regional Director in Omaha, alerting them that he might be requesting assistance later that morning. Between 8:00 and 9:00 a.m. he recontacted them and an evacuation plan was formulated by phone between the three of them. The Regional Director coordinated transportation and arranged for reception at hospitals in Lincoln and Omaha.

At the time of impact there were 143 patients in the Grand Island V.A.--41 in the nursing care facility and 102 regular medical patients. During the morning of June 4, about 20 patients who could be, were released. About 85 of the less seriously ill were transported by bus to the two other cities. Thirty-five to forty of the sicker patients, including two who were in intensive care, were moved by ambulance. By 2:00 p.m. the last V.A. patient was on the road and by 6:00 that evening all had arrived at their destinations, accompanied by medical records and case summaries. As soon as the V.A. was emptied, the Director lent any equipment that could be used by other medical facilities in Grand Island to them for the duration.

Shelter--The Emergency Phase

In American disasters, the provision of emergency shelter and feeding is almost synonymous with the Red Cross (RC), which is by tradition and law the organization responsible for mass care. This is practically a given in the disaster planning of most communities, even where planning is limited or unsophisticated. Some provision is made for a division of labor so that tasks and responsibilities having to do with personal needs of individual victims are assigned primarily to the RC although coordinated somewhat by civil authorities. Where the RC is not an integral part of response planning, it will nevertheless attempt to carry out its responsibilities as defined by congressional charter. This is not a voluntary choice, it is a mandate, and the organization is held accountable. This is not always recognized by civil authorities who, while usually happy for the resources provided by the RC, sometimes see the organization, at least tacitly, as an entity under their domain to be controlled, and in some cases to be ignored or circumvented.

Local RC personnel had developed a shelter plan calling for the use of the Senior and Junior high schools as primary facilities, and school personnel as support staff. The previous winter had provided a test of its workability when a blizzard closed the roads and forced busloads of students en route to a ski meet to take refuge in the Grand Island Senior High. The principal was contacted to learn something of the attitudes of school personnel toward their involvement in the shelter plan. He indicated that the operation during the blizzard went smoothly, and expressed some pride in the ability and willingness of the school system to offer a necessary and, in his view, appropriate service.

As it happened, this plan was not, and could not be, used. For one thing, both buildings were damaged by the tornadoes and were no longer suitable. For another, the RC chapter house was one of the first buildings to be struck and was unusable as a base of operations for the duration of the emergency and indeed for the next six months. Before any decision could be made or much response generated, RC staff had to locate each other and establish a new base of operations. RC staff in the town consisted of one full time executive--the chapter secretary. Although this title suggests a clerical or subordinate position, it is actually the common designation of the chief executive of chapters the

size of the one in Grand Island. In addition to the secretary, there was a part time office worker, and several volunteer chairmen. The key posts in this sort of situation being the chapter chairman and the more specialized disaster chairman.

Upon discovering that the chapter house was hit, the secretary contacted and met the chapter chairman. She also tried throughout the night to reach the disaster chairman and division headquarters in Lincoln, 90 miles away. The disaster chairman's house, it was learned the following morning when he reported in, had been badly hit and was out of phone contact. The division director had heard of the tornadoes by radio and at his end tried to make contact with Grand Island by phone. He finally caught up with the secretary via the help of one of her relatives sometime after midnight. At the same time he directed other RC personnel from around Central Nebraska to report to Grand Island and named a rallying point. He himself, with additional staff, arrived in the town at dawn. Sometime in the early morning hours the secretary, her chapter chairman, and the regional field person who had been the first to reach town on the orders of division headquarters, met and began to operate as a unit. During the time spent in finding each other it had become clear that a major disaster had occurred. All three were aware that, although the majority of tornado victims would elect to stay with friends and relatives, and that the most pressing need would soon be for mass feeding, a certain amount of public shelter facilities had to be arranged immediately.

At the K-Mart field command they learned from others that the High School was damaged but that between 100 and 200 evacuees were located at Barr Junior High. They went there, only to find that building also quite damaged and decided to relocate the group to Stolley Park Elementary, a few blocks west and out of the damaged zone. The EOC, which by this time was actively involved in shelter activity, had become aware that Barr Junior was being used and had requested a bread company to send a truck with food and supplies. The truck arrived just as the RC had decided to move the operation, and was used to transport victims from one school to the other. Stolley Park, around 2:00 or 3:00 a.m., became the first official RC shelter of the disaster, and the first real base of operations for them as well.

At the same time the RC was in the process of locating its members and making contacts necessary to initiate response, considerable shelter-organizing activity was being conducted out of the EOC. As indicated earlier, much of the EOC's organizational structure was emergent. Some of the people involved could have been expected to be there according to the disaster plan; others could not have been so expected. Some areas of decision making, specific tasks, and division of labor were similarly predictable on the basis of the plan. Much, however, was done on an ad hoc basis, in response to needs as they were identified or perceived at the time. Shelter was one such area.

The strongest involvement with sheltering may have come about because it was known that 1) the RC chapter house was destroyed, and/or 2) that people were beginning to congregate in certain places, apparently without any leadership or organization. It is also possible that little thought was even given to what the RC might be expected to do and how to coordinate EOC/RC activities. It is clear only that EOC personnel perceived a need for these activities and decided to do something about it, in the same fashion that they were identifying other needs, making other decisions, and setting other plans in motion.

The expression "setting up a shelter" can mean various things. In one sense it can mean contacting someone with a building available, obtaining the use of the space, and subsequently channelling staff, supplies, and victims to it. It can also mean that certain sites were already being used as shelters by victims, and then acknowledging these sites as official shelters by communicating with them along official lines, sending support services, taking messages, etc. The sheltering activities emanating from the EOC included both.

The EOC person most involved was a county supervisor, with the help of the assistant CD director, who had until the previous week been the secretary to the former director. This supervisor, in what may have seemed to her a logical extension of the manner of operation normal for her everyday business of serving the county, relied heavily on her extensive knowledge of local resources and her extensive personal acquaintance with the people who controlled these resources. As indicated earlier, she met the need as she perceived it by calling on people she knew--pastors in churches, owners of warehouses, friends she could ask to work in the shelters. The assistant CD director seems to have followed her lead, making secondary calls to some of the same people to coordinate what was being done, and to some other resources to which she had personal access.

Two of the facilities that actually functioned as recognized shelters that first night, in that they were generally known to city personnel as places where victims could be taken or directed, were opened apparently as a result of field decisions--at the K-Mart--as opposed to the EOC. The identity of the person(s) who chose these sites is undetermined, but most likely it was someone from the public safety departments.

The first of these was at the Armory. It should be remembered that between 8 and 9:00 p.m., when the weather became alarming and the first sirens were beginning to sound, there was concern for citizens who were participating in the city softball league. The Armory was nearby and was a logical choice, especially if the decision was made to be a representative of city government or one of its agencies, because it was a public building and therefore legally accessible. The second of these was at Barr Junior High. It is also unclear just when this facility was opened for sheltering, by whom and why. Most likely it was shortly after the tornadoes moved through the southeast quadrant of town. Most, if not all, the victims there were taken then directly, or after being taken first to the K-Mart after being rescued from damaged

homes, which suggests that police and fire squads were involved. This school is located toward the edge of one of the damage zones. In fact, as earlier indicated, the building itself suffered considerable damage. It was probably chosen because of its proximity and because the schools were known to be designated RC shelters.

According to EOC records and DRC interviews, there were 11 different locations that were: 1) used as officially (i.e., EOC) recognized shelters; 2) had been contacted by the EOC and were available to be used (permission had been granted by whomever had the authority to do so) or 3) had been considered by the EOC but contact was not completed.

The first group includes the Armory, Barr Junior High, and the First Presbyterian Church. The Armory and Barr Junior have already been discussed. A DRC respondent provided the additional information that she thinks someone from city government law enforcement made the contact that opened the facility. She received a call around 3:45 that the school was open but there was no leadership there. At 3:50 she called friends and asked them to go over and "see what they could do." She also called the pastor of the First Presbyterian Church who agreed that it could be used. It was one of the two that were taken over by the RC early the morning of June 4.

The second group consisted of Central Catholic High; First Baptist Church; Erin Rancho, whose owners volunteered the facility; Walnut School which was also volunteered by the principal; and the Jail at the Public Safety Center. Most of these were not used, or not to any extent that required further involvement of the EOC or the RC. Walnut School, however, became the second of the two shelters taken over by the RC, although this was on the second day after the tornadoes. As it happened, Stolley Park School, to which victims were reevacuated by the RC after first being taken by public safety personnel to Barr Junior High School, was having trouble with electricity. On June 5, the RC closed this facility in favor of Walnut Junior High School, which by this time had full power.

From all reports, mainly those of the RC and the EOC, it is estimated that roughly 200 to 250 people used those shelters during the night of June 3-4, about 70 the following night, and by June 6-7 the number was down to 5 or 6 people.

Temporary and Permanent Housing

A temporary housing effort was initiated by FEMA-HUD on July 27. Because little rental property was available in the community, a decision was made to use mobile homes which arrived within a few days. Although FEMA encouraged everyone eligible to apply for housing assistance, not everyone did. FEMA received a total of 905 applications. About two-thirds of these were from homeowners; the rest were from renters. Approximately 40% of those who applied had incomes of less

than \$12,000. As might be expected, renting households of low- and moderate income were the hardest hit. Of those households which applied for assistance, about 52% of renting households and 31% of owner households were from low or moderate income levels.

Six months after the tornado, FEMA had placed in temporary housing a total of 515 households. Of these 361 had been put in mobile homes, 124 in private rental quarters, 27 in transient accommodations (usually hotels or motels for short periods), and 3 in government owned or subsidized low income housing. The total housed represented nearly 100% of those FEMA found eligible. Of the 905 applications, HUD had found 517 eligible and 30 ineligible. Another 331 applicants had withdrawn their applications before they had been completely processed, and another 18 had been cancelled.

These figures indicate a number of important facts about the temporary housing situation in Grand Island after the tornado. Even considering FEMA could only help those who had suffered total or major damage to their houses, it is clear that a substantial number of households eligible never made even initial application for assistance. Approximately 36% of those who applied, withdrew application presumably as soon as they found something else through their own resources. The application for governmental aid seemed to be a standby measure in case other possibilities did not emerge. Mobile homes, although overtly the most visible manifestation of temporary housing, actually constituted a relatively small proportion of all those in Grand Island who had to use temporary housing.

There were two problems of note in connection with FEMA assisted temporary housing. One had to do with the placement and location of the mobile homes. The other was the question of permanent housing for displaced households who had been renting.

Mobile homes were placed in six different locations. If those who took a mobile home had a place to put it, including the possibility of their own property, a variance was granted for this by the city. Otherwise there were five collective or common sites. Two were pre-tornado trailer parks. A problem arose concerning one of these commercial parks when it was discovered it was located in a 100 year flood plain. FEMA had originally agreed to sell the mobile homes being used to any user wanting to buy them. But FEMA had a rule against such sales. Six months after the tornado the question had not been settled with FEMA arguing there was adequate housing elsewhere in the community. City officials actually tried unsuccessfully to get FEMA to waive the flood plain prohibition, which city council waived for some displaced residents who were rebuilding on existing foundations.

Another controversy arose over a mobile home park that was created at the boundary of a housing development. A private citizen association of homeowners in that development strongly objected to having the 50 unit park in their neighborhood, fearing it would adversely effect property values. The Grand Island city council eventually dealt with

this controversy by promising that the park would be closed at the end of a year and that the land would be restored to its original condition including the removal of the concrete pads.

The mobile home occupants showed little collective unity. Almost all the disaster victims saw the parks as a temporary arrangement. There was little interaction among the occupants; in only one had a common party for the occupants been held in the first six months. The public officials in charge of the mobile home arrangements and the park were subject to many complaints especially after the first few months. There was also a steady turn over of occupants since HUD tried to get occupants into more permanent quarters as quickly as possible, and also tried to get those in private rental arrangements (28 households were still renting six months after the tornado) into one of the mobile homes.

The other major permanent housing problem stemmed from the fact that low or moderate cost rental housing was scarce in Grand Island even before the tornado. Several post disaster matters further aggravated this situation. Of the households which applied to FEMA for housing assistance, 51.9% were renters with low moderate income. FEMA data six months after the tornado also indicated that 131 of the low and moderate income households which applied for assistance were in temporary housing, for which the maximum period of occupancy was one year. Finally, outside of the governmental program, rental units which otherwise might have been available to low moderate income households were being occupied by higher income households able to pay higher rentals. There was also an unconfirmed report that rentals in Grand Island went up an average of 50% after the tornado.

Finally, it should be noted that the overall data about sheltering and housing in general obscures some aspects finer analysis reveals. For example, there is not always a simple movement of evacuees from emergency sheltering to temporary housing to permanent housing. Our DRC sample data indicate that over 36% of those who were in temporary housing had moved at least two or more times. Likewise, our data showed that in the course of moving, sometimes households members had to separate while living in temporary quarters. This occurred in nearly 10% of the DRC cases.

The case study from Grand Island as a whole simply confirms that sheltering and housing is a more complex phenomena and more heterogeneous than perhaps believed. Just as evacuation is not just simply leaving a place, obtaining shelter and housing is not just getting a place to stay, either on a short term or long term basis. The path can vary considerably for different households who have been forced to evacuate in a disaster. The variation can be further compounded, as it was in Grand Island, by the pre-impact state of housing in a community as well as what damage to housing stock is done in the disaster.

CHAPTER V

GENERAL OBSERVATIONS AND CONCLUSIONS

In this last brief chapter, we draw together our general observations and conclusions from our examination of the limited literature and the three case studies dealing with disaster sheltering and housing. We point out the little that is known about the phenomena and note what has yet to be learned. The chapter concludes with an indication of future priorities.

Such observations presently rest upon a weak theoretical and empirical base. The literature, most of which is cited in the attached annotated bibliography, is quite limited. There are few descriptive accounts of many aspects of disaster sheltering and housing, much less systematic studies and sophisticated research analyses.

The case studies, while giving more detail than most other sources, discuss only three disasters. Two of the cases, Wilkes-Barre and Xenia, are also rather atypical in that they involved situations where the need for sheltering and housing was more extensive than in the typical disaster in American society (see Wright and Rossi, 1981, for a discussion of some the consequences of researchers focusing on atypical disaster phenomena).

Nonetheless, we can make some general observations and draw some conclusions from our work (in addition to the literature review and case studies, we also examined available information on the provision of sheltering and housing in American disasters). For purposes of exposition, we will separately discuss emergency sheltering, temporary sheltering, temporary housing, and permanent housing. This distinction among these four modes actually represents one of our primary conclusions: that it is not very useful to consider disaster sheltering and housing as if it were a single homogeneous phenomenon. As previously indicated, there are variable and heterogeneous phenomena encompassed by the "labels" of emergency sheltering, temporary sheltering, temporary housing, and permanent housing, a realization which needs recognition not only by disaster researchers, but also by disaster planners and operational personnel with responsibility for displaced persons and evacuees in community emergencies. The point here is the same general one made by DRC (Quarantelli, 1980) and also by Perry, Lindell, and Greene (1981) with respect to evacuation: certain terms in the disaster vernacular are being used too broadly, implying a similarity of behavior in what are actually quite dissimilar phenomena.

Another general observation is that differential attention is paid in American communities to preparing for the different kinds of sheltering and housing problems. Overall, there is little planning of any kind, but to the extent there is any local community-level planning, it appears aimed at temporary sheltering. The problem of housing

disaster victims, whether on a temporary but particularly on a permanent basis, is all but ignored in planning or operational activities. Local officials sometimes address wartime housing matters, especially under the rubric of crisis relocation, but the results from that preparedness planning are seldom extrapolated to the needs of a natural disaster or technological accident situation.

To the extent that temporary sheltering planning is undertaken, it is often fragmented among various emergency organizations, and generally incomplete. There seems to be little consensus on which community organizations should be involved and which should be the lead agency in preparing for temporary sheltering. Congressional mandate and tradition may give the local Red Cross chapter a major responsibility for the problem, but this is not always known or accepted, especially outside of the larger metropolitan areas. Local civil defense offices or disaster service agencies exhibit the range of "no interest or involvement with the problem" to "accepting as a major responsibility the coordination of all disaster sheltering and housing activities in the local community." But even where some thought has been given to preparing for disaster sheltering and housing needs, it is not a high priority issue, so that pre-disaster planning is often incomplete.

It is difficult to evaluate the sheltering and housing which are provided in contemporary post-disaster situations in American society. There appears to be little overt public reaction to sheltering activities. More objectively, victims do receive shelter, but the temporary sheltering activities exhibit considerable inefficiencies of effort. Housing, whether temporary or permanent, is the source of widespread and often intense complaints. In fact, some public discontent over housing appears to be a nearly universal feature of major disasters. In actuality, however, there often seems to be lengthy delays (especially in providing permanent housing), unexpected changes of policies, inconsistencies in application of standards and requirements, and in some cases, poor administration of the programs. However, to what extent such matters are necessary consequences of the situations, and to what extent they represent a significant lack of efficiency and effectiveness, can only be established by the development of evaluative criteria and empirical data, both of which are presently lacking. In short, it is currently impossible to judge how well or how poorly sheltering and housing are provided to disaster victims. There is considerable public complaining, but while the views of those directly involved should be part of any evaluative criteria, they should not be the only criteria.

Finally, many of the problems that surface stem less from the individuals involved than from the organizations trying to help them. There is, in fact, a tendency for agency personnel to perceive the evacuees as "the problem" and the source of difficulties in the situation. However, we contend that such matters as erratic organizational mobilization; poor use of community resources; lack of interorganizational coordination; failure to recognize pre-impact conflicts and differences in community power; absence of intergroup communication;

and other organizational and community-level factors also contribute to the problems in preparing for and providing sheltering and housing. When the true sources of difficulty are recognized, it will then be possible to make necessary corrections and changes, and to stop blaming disaster victims for that for which they are not responsible. Such a change in perspective from individual actions to organizational functioning has proved necessary (and useful) in other areas of disaster problems, preparedness, and response (Dynes, Quarantelli, and Kreps, 1981), and should be equally worthwhile with respect to disaster sheltering and housing.

If we accept the four types of sheltering and housing activity, what particular observations and conclusions can be drawn? Briefly, we suggest the following, beginning with emergency sheltering, which is closely linked to the evacuation process (Quarantelli, 1980).

Emergency sheltering probably permits the least planning, but it is possibly the sheltering problem which least requires preparedness planning. Situational factors greatly influence disaster victims' need for emergency sheltering. Thus, some locations become identified as shelters simply because threatened or impacted individuals congregate at a particular place. Because such shelter seeking is usually sporadic, disaster victims will often accept conditions otherwise unacceptable under other less temporary circumstances. For example, victims will inhabit public or quasi-public quarters for a few hours, even though they might not want to sleep overnight. Thus, schools, churches, armories or buildings which can temporarily house large numbers of people can be used for emergency sheltering. Again, because of the brief stay, there is no great need for supervisory personnel or operating staff, although emergency medical care may be a problem. Also, because of lack of official involvement, there is often the possibility evacuees may assume the immediate danger is over, when it is not.

Temporary sheltering involves moving into quarters other than one's own for periods far beyond the peak of the emergency. It almost invariably involves more than obtaining shelter; it also involves feeding. It thus requires some community planning, and this in fact is the most locally pre-impact prepared of all aspects of sheltering and housing. Although most preparations are usually for public or mass shelter arrangements; unfortunately, as disaster researchers have consistently found, this is the least preferred of all sheltering arrangements. Overwhelmingly, disaster victims will stay with friends and relatives, although they will, if absolutely necessary, use mass shelters to obtain food. Even those who go to mass shelters stay as briefly as possible. But mass shelters do provide a center for distributing information, and they are often useful in providing quarters for relief workers coming into a stricken community. We frequently observe a problem in the providing of emergency medical services at mass shelters. When multiple mass shelters are in operation, there are often difficulties from uneven distribution of supplies and/or volunteers. Too often the location of mass shelters is dictated by the availability of physical resources rather than where they are most needed and wanted. Often, volunteers in mass shelters are not only

inexperienced, but are generally unaware of established policies or appropriate procedures. Shelter management is a definite problem in almost all cases, with security a perceived although not necessarily a real problem. Sheltering evacuees in mass shelters requires far more of an integrated organizational response than is typically recognized in most communities.

Although our knowledge of mass sheltering is limited, it is even more so for other kinds of temporary sheltering. While it is well established that evacuees seek relatives and friends, we know little else, even of a descriptive nature. There is some evidence that unaffected households in an impacted locality will make aid available to evacuees in the community, but we have little idea of the nature, magnitude, or duration of such help. There are some hints in the literature and empirical data that for such help to be offered, a certain proportion of community housing has to avoid damage. Almost nothing is known about how the pre-impact composition of the population affects post-disaster temporary housing, but it might be suspected such factors as age and sex distribution of the evacuees and potential shelter givers would make a difference. There are some indications that households with children are more likely to seek temporary shelter than those without children, but this possibility is supported more by anecdotal accounts than anything else. Similar accounts suggest that the welcome extended to evacuees may not last too long, but there is no hard evidence on the point. It is clear that emergency and relief organizations usually have little knowledge of non-mass shelter temporary sheltering arrangements, and have no ready mechanisms for obtaining information about the phenomenon. Such organizations spend their time, efforts, and resources on mass sheltering even though the great bulk of temporary housing takes other forms. Without knowledge of temporary sheltering, relief agencies are handicapped in quickly estimating what temporary housing they might need, which may account for the typical overestimation.

Temporary housing involves the reestablishment of household routines but with the understanding that more permanent quarters will be eventually obtained. Far more is unknown about temporary housing than is known. It appears that there is usually an organizational overestimation of the need for such housing, although there are some indications that not everyone who qualifies applied for temporary housing. Renters seem to apply more than homeowners, although it is unclear whether this depends on income levels; the amount of house damage done by a disaster; social class differences in the acceptability of applying for help; or other factors. Likewise, it is generally unknown what happens to those who apply but then withdraw their applications for temporary housing. The time it takes to find temporary housing for victims seems partly related to the capacity of organizations seeking housing for victims to maintain flexibility and not become imprisoned by bureaucratic procedures.

There is some evidence that there are social class differences in the acceptability of using mobile homes for temporary housing; middle

class families do not seem to like them. Rental assistance seems more desired by households from higher socioeconomic levels. In almost all cases, despite great efforts to secure them, mobile homes are seldom the primary form of temporary housing. It does seem clear that displaced persons much prefer to locate a mobile home on their own property rather than in a trailer camp. Such camps are often objected to by the residents of the neighborhoods in which they are located. (The basis of the objection is frequently not clear, and may actually not reflect the real concerns.) On the whole, trailer camps show little collective unity or morale, and not infrequently become the source of certain kinds of social pathologies, especially when children and adolescents are part of the camp population. There seems to be little information and understanding of what might make for a well-run trailer park. Organizations responsible for supervising such parks often compound problems with inconsistent policies and rules. There seems to be little prior knowledge about how trailers may malfunction or be inappropriate for certain localities. If officials neglect the deactivation of mobile homes and restoration of their sites, this can become a source of community complaint.

Very little is known or understood about the phenomena associated with rental assistance for displaced disaster victims. There is some evidence that higher-income evacuees take over such surplus housing as may be available in a community, but the relationship of that to the pre-impact housing stock is unclear. It does appear that there is almost always a problem in finding rental housing for lower-income groups. Placing the elderly also frequently seems to be a problem, which may or may not be related to the matter of income. There is almost no evidence about the problem of temporary housing for minority groups, although it hardly seems likely the situation would improve for them in terms of their pre-disaster status.

Just as there is little understanding of the relationship of temporary sheltering to temporary housing, there is a similar lack of knowledge about the connection of temporary to permanent housing. In fact, about many matters, especially those unrelated to mobile homes, we do not have even simple descriptions of the activities and problems, organizational and individual, associated with temporary housing.

Permanent housing is a matter almost totally ignored at local community-level disaster planning, and perhaps understandably so. One inevitable consequence of this, however, is that when permanent housing has to be provided in a disaster, local officials find themselves quite unprepared for the problem and have to ad hoc most of their activities. The problem is additionally complicated by the fact that the local officials may be dealing with federal agencies and/or some private welfare groups who may have given considerable thought and/or had considerable prior experience in obtaining permanent housing for disaster victims. This situation may additionally stress the usually uneasy local "amateurs" and "professional" outsider relationships which are typical of the recovery period in most major disasters (Quarantelli, 1977). As recently pointed out in the literature (Quarantelli, 1980), evacuation almost inevitably involves a round trip--a "coming back to"

as well as a "going away from" a threatened or impacted locale.

It does appear that the vast majority relocate back to their old location, often rebuilding on the same spot they occupied in preimpact times. However, this seems more true of homeowners than renters. Renters not only take longer to obtain permanent housing, but sometimes they never return to the same location. In addition, in the communities studied, there was actual resistance to the development of multi-family housing designed as rental property. This appears to create a particular problem for the elderly, who are usually renters. However, we have negligible data about as a whole, the rate of obtaining permanent housing, which segments of the population have the most problem in obtaining such housing, and what happens to those who are long-delayed in getting permanent quarters.

In general, we found that the permanent housing which will be developed after a major disaster depends upon the predisaster housing situation and the influence of various local interest and power groups. The latter groups, apparently, strive to insure that the new housing configuration of the community (as a result of the permanent housing) will not differ significantly from the predisaster situation. However, the importance of business and financial interests in the rebuilding process, how various power groups interact, and how extra-community agencies affect the end result, are barely hinted at in what has been studied so far. But at the very least, we suggest that the whole process of permanent housing in the aftermath cannot be understood independently of the larger community context. Whatever the governmental policies and programs for rebuilding, they only develop, in ways not yet understood, in the context of the past history and social factors operative in any given community. They are not dependent only on what happened to the housing stock in the disaster.

Apart from the general matters discussed so far, there are some special problems in disaster sheltering and housing which should be noted. As examples, we might consider institutional evacuation, and the overlap between sheltering and housing phases. The evacuation of institutionalized populations, or their physical displacement, generates distinctive sheltering and housing problems. The movement of such populations frequently necessitates simultaneous movement of an infrastructure, as well as the provision of specialized facilities at the new location. The processes and problems in institutional sheltering and housing have barely been examined; little is known about the details.

Sheltering and housing phases do not usually progress in a neat linear fashion. In a given situation, some disaster victims may be entering the permanent housing phase while others are still in the emergency sheltering phase. Furthermore, there may be several moves as a family goes from one temporary housing situation to another. As a consequence, governmental organizations and relief groups may concurrently be dealing with segments of the population at different stages in the sheltering and housing activities after a major disaster. Sheltering activities may overlap with housing activities and some

permanent housing may occur before some emergency sheltering is finished. Site preparation for mobile homes may have to be undertaken at the same time other trailers are being prepared for storage. Normally, sheltering generally precedes housing, and emergency sheltering precedes temporary housing which precedes permanent housing; however organizations assisting victims may find themselves involved with different phases of sheltering and housing.

It should be clear by now that, both relatively and absolutely, we know little about disaster sheltering and housing. Much needs to be further examined; in some cases, even a first systematic look is needed. The following topics particularly require research; all could be fruitfully explored, but those with a "*" merit the highest priority:

*Studies of disaster sheltering and housing of evacuated institutionalized populations.

Research into interorganizational preparedness planning and coordination of community-wide disaster housing operations.

Studies into the nature, frequency, intensity, and validity of housing complaints by disaster victims.

*Research into local officials, knowledge of federal laws, regulations, and programs concerning disaster housing.

Studies of the advantages and disadvantages of placing evacuees into mobile home camps.

Research into the social and psychological significance of letting displaced disaster victims remain at their preimpact home sites.

*Studies of sheltering housing operations in industrial and urbanized societies similar to the United States.

Research to see if there are lessons for American society to be derived from examination of refugee camps in Third World and developing countries.

Studies into the limits of what friends and relatives will provide by way of temporary sheltering.

*Research into mass shelter operations, particularly organizational problems in staffing such shelters.

*Studies of an intensive and extensive nature of the full cycle from evacuation to permanent housing in disasters of varying severity.

Research into what affects the relationship between local officials and outside agencies with respect to the providing of permanent housing.

Research on those who provide temporary sheltering.

Studies on those who provide temporary housing in their own homes for victims.

Research on those evacuees who have several temporary housing situations.

Studies on which displaced persons do not apply for temporary housing.

Research on the use of volunteers in mass shelters.

Studies of actual security problems in mass shelters.

*Research into the kinds, frequencies, and problems of non-mobile home temporary housing.

Studies of the problems of mobile home camps for disaster victims.

*Research into how predisaster conditions affect the postdisaster recovery operation in housing.

Studies into the operation of business and financial groups in the providing of permanent housing.

Finally, the disaster research community ought to be encouraged not only to perform empirical studies on high priority topics but also to develop distinctive concepts for the area. Until it is clear what is being talked about, and unless it is understood that there may be radically different phenomena involved (often indiscriminately lumped together), it will be difficult to launch all the important studies which should be undertaken. Once the distinctions are made it will be possible to do the empirical studies necessary.

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Human Systems in Extreme Environments: A Sociological
Perspective. Boulder, Colorado: Institute of Behavioral
Science, University of Colorado.
- Perry, 1981 Ronald, Michael Lindell, and Marjorie Greene
Evacuation Planning in Emergency Management. Lexington,
Massachusetts: Heath.
- Quarantelli, 1977 E. L.
"Social aspects of disasters and their relevance to
pre-disaster planning." Disasters 1:98-107.
- 1980 Evacuation Behavior and Problems: Findings and Impli-
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- Wright, 1981 James and Peter Rossi (eds.)
Social Science and Natural Hazards. Cambridge, Massachu-
setts: Abt Books.

APPENDIX

A SELECTED ANNOTATED BIBLIOGRAPHY ON DISASTER SHELTERING AND HOUSING

Explanatory Note

The following is a selected list of the most useful references on sheltering and housing in disaster situations. Actually, the nearly four dozen annotated publications constitute the bulk of the literature on the topic. There is not much published on the subject, especially if accounts of refugee behavior associated with wars and civil disturbances, and diffuse and slow moving emergencies such as famines and drought are excluded. Those interested in the latter should examine the journal Disasters which regularly publishes articles on refugees and diffuse kinds of mass emergencies.

Because the research on warning and on withdrawal aspects of evacuation is covered extensively elsewhere, references primarily dealing with warning and withdrawal are only included if they have explicit and important discussions of sheltering and housing. For summaries of research on warning see especially Ben McLuckie, The Warning System in Disaster Situations: A Selective Analysis (Columbus, Ohio: The Disaster Research Center, 1970), and Dennis Mileti, Natural Hazard Warning Systems in the United States: A Research Assessment (Boulder, Colorado: Institute of Behavioral Science, University of Colorado, 1975). For an extensive discussion of the literature on evacuation aspects of withdrawal behavior in disasters see E. L. Quarantelli, Evacuation Behavior and Problems: Findings and Implications from the Research Literature (Columbus, Ohio: The Disaster Research Center, 1980). In particular, the listing which follows is seen as a complementary publication to the latter volume, which is 214 pages in length with 90 annotated references.

Also, only English language sources are included in the following. Author's own abstracts of their writings, when used, have usually been partly rewritten. The abstracts provided emphasize those aspects most relevant to sheltering and housing, and are not necessarily a comprehensive abstract of the total substantive content of the publication. Whether mentioned in the abstract or not, all references in some way deal with or have direct implications for emergency and temporary sheltering and temporary and permanent housing.

Bates, F. L., C. W. Fogelman, V. J. Parenton, R. H. Pittman, and G. S. Tracy. *The Social and Psychological Consequences of a Natural Disaster: A Longitudinal Study of Hurricane Audrey*. Disaster Study No. 18. Washington, D. C.: National Academy of Sciences, 1963. Report on a four year field study of Cameron Parish, Louisiana, following the 1957 hurricane. A number of interviews, surveys, and documents are used in determining lasting changes in community and individual functioning. Two chapters are devoted to the general and specific stresses of the rehabilitation period in which approximately 75% of the housing stock was replaced or restored.

Carroll, John J. and Salvador A. Parco. *Social Organization in a Crisis Situation: The Taal Disaster*. Manila: Philippine Sociological Society, 1966. An empirical case study of the Taal Volcano eruption of September 28, 1965. Discusses the effects of patterns of social interaction on the response of individuals to an unexpected crisis situation. Among the findings are: that widespread panic does not occur; that families tend to evacuate as a unit; and, that in general, former patterns of behavior are rapidly adapted to the needs by a changed environment. Of interest are the similarities on rates and characteristics of persons seeking public vs. private shelters between U.S. And Philippine cultures.

Clifford, Roy A. *The Rio Grande Flood: A Comparative Study of Border Communities on Disaster*. Washington, D. C.: National Academy of Sciences, 1955. A comparative field study of the warning, response, and some of the recovery of two adjacent communities, one Mexican and one American on the Rio Grande flood of 1954. Differences in the efficiency of formal and informal organizations. The political structure of warning, evacuation and relief efforts, residents response to and evaluation of relief efforts, patterns of helping behavior and response to "outside" organizations are examined in terms of the political and social structures and cultural values of each community. Findings generally support the notion that clearly defined roles and communication channels established prior to emergencies increase the effectiveness of response.

Cohen, Elias S. and S. Walter Poulshock. "Societal Response to Mass Dislocation of the Elderly." *The Gerontologist* 17: 262-268, 1977. A three year study of the impact of the 1972 Wilkes-Barre flood on the elderly. Survey data from a sample of 250 elderly victims revealed that anticipated adverse long-term effects, even on those who underwent considerable displacement, were not realized. The community steady state was restored within 100 days; while one year later some elderly had actually accrued benefits in terms of improved housing and greater family support.

Collins, Robert A. The Investigation of Shelter Management and Control in Natural Disaster. Coral Gables, Florida: American Institutes for Research Performance Environment Studies, 1972. This study was performed to determine 1) management problems of natural disaster shelters and 2) the relevance of this information to fallout shelter management. Interviews were conducted with shelterees from the Hurricane Agnes flood. Some of the management problems noted were management fatigue, information conflict, and identification and control of volunteers.

Davis, Ian. "Emergency shelter." Disasters 1: 23-40, 1977. A state of the art description touching briefly on various technological solutions to the problems of emergency housing in Third World countries, research activities in the area, and the influence of individual self help and governmental response. Priorities and recommended policy guidelines called from experience are outlined.

Davis, Ian. Shelter after Disaster. Oxford: Oxford Polytechnic Press, 1978. In some respects an elaboration of the author's 1977 paper, this first book devoted to the subject of emergency shelter looks both at the physical aspects of disasters as well as at the larger dimensions which impact on emergency needs. Essentially an integration of sociological, urban planning and architectural perspectives. Emphasis is on disasters in Third World countries.

Davis, Ian, (ed.). Research Index: The Provision of Shelter following Natural Disasters. Oxford: Research and Development Group, Department of Architecture, Oxford Polytechnic, 1975. An annotated index of recent international research and development into shelter provision. Research is seen in a wide context, relating to academic, industrial and governmental areas. Third World country emphasis.

Davis, Ian, Everett M. Ressler, and Ken Westgate. Human Settlements and Disasters: A series of five slide lectures. London: Commonwealth Association of Architects Projects Unit, 326 Grand Building, Trafalgar Square, WC 2N 5HB., 1980. This series of slide lectures and accompanying manual applies findings of disaster research to construction and siting requirements for low income housing. Although intended primarily for architects and physical planners, it has relevance to emergency response personnel. The 68 page manual includes an extensive bibliography and resource index especially relevant to Third World countries.

Drabek, Thomas E. and Keith Boggs. "Families in disaster: Reactions and relatives." Journal of Marriage and the Family 30: 443-451, 1968. In studying the response of families to disaster warnings, the authors interviewed a random sample of 278 families of the thousands who were hurriedly evacuated when a flood struck Denver in 1965. They found initial disbelief, regardless of warning source, extensive confirming behavior, and a strong tendency to take refuge with relatives. Choice of shelter was significantly affected by social class variables and the degree of interaction between relatives during the warning period.

Drabek, Thomas E. and John S. Stephenson III. "When disaster strikes." Journal of Applied Social Psychology 1: 187-203, 1971. Following the Denver flood of 1965, interviews with 278 randomly selected families were analyzed to discover response patterns. Evacuation was found to be strongly related to having a known and acceptable source of shelter. Four general patterns emerged: evacuation by 1) default, 2) invitation, 3) compromise, and 4) decision. The article also discusses other aspects of shelter taking related to warning confirmation and family separation at the time of warning.

Drabek, Thomas E., William Kay, Patricia Erickson, and Juanita Crowe. "The impact of disaster on kin relationships." Journal of Marriage and the Family 37: 481-494, 1975. The existence of baseline data, permitted a quasi-experimental design and longitudinal comparisons of kin relationship patterns between victim and non-victim families of the 1966 Topeka, Kansas tornado. Data on interaction patterns prior to and immediately following the event was obtained from 138 victim families and a matched control group. Three years later it was found that the greater the intensity of kin relationships prior to the tornado, the greater the propensity to receive aid from relatives. Victim families also reported increased interaction with immediate kin, and a greater tendency to see relatives as future help sources.

Ellemers, J. E. Studies in Holland Flood Disaster 1953. Volume IV. The Hague: Institute for Social Research in the Netherlands, 1955. The fourth and summary volume of a series on the sociological and psychological effects of the Netherlands flood disaster of 1953. Subjects studied were a) the communications systems before and during the flood; b) evacuation problems and disaster experiences; and c) three communities struck by the flood. Much of the second topic is presented in statistical form; the communities are analyzed via a case study formate (see Lammers). Extensive theoretical interpretation is given to the findings.

Erikson, Kai T. Everything in its Path. New York: Simon and Shuster, 1976. A very detailed case study of the dam flood disaster in the Buffalo Creek mining area of West Virginia. Most of the data used came from indepth interviews with victims. Emphasis is on the short and long run psychological effects on victims, explained primarily in terms of massive dislocation and the destruction of the social fabric of the community that resulted both from the flood and from the rehousing program.

Fogelman, Charles W. and Vernon J. Parenton. "Disaster and aftermath: Selected aspects of individual and group behavior in critical situations." Social Forces 38: 129-135, 1959-60. Seventy-five victim families of Hurricane Audrey were observed and interviewed over a seven month period. Behavior at the time of the disaster was universally family oriented and largely in terms of prior experience. Most sheltering was done with relatives, yet wherever evacuees found themselves, organization quickly emerged according to pre-disaster socio-cultural values and systems.

Forrest, Thomas R. Hurricane Betsy, 1965; a selective analysis of organizational response in the New Orleans area. Historical and comparative disaster series, report #5. Columbus, Ohio: The Disaster Research Center, The Ohio State University, 1979. Case study focusing on responses and problems of sheltering organizations (i.e., Red Cross and Salvation Army), Civil Defense, and the utility companies. An unexpectedly great need for shelter characterized this event, and two the major points made are 1) the greater level of preparation the more likelihood of an effective response; and that 2) communications are crucial at all phases of response.

Forrest, Thomas R. Structure Differentiation in Emergent Groups. Report Series #15. Columbus, Ohio: The Disaster Research Center, The Ohio State University, 1974. Examines in theoretical terms the characteristic and conditions associated with post-impact emergent groups in natural disasters. Chapter V applies empirical evidence from a 1971 flood in Southeastern Pennsylvania to the framework presented, paying particular attention to the operating structures developed by a victim group that emerged. Touches on but not primarily focused on housing aspects.

Haas, J. Eugene. "The Philippine earthquake and tsunami disaster: a reexamination of behavioral propositions." Disasters 2: 3-11, 1978. Events following the Philippine disaster of August 1976 serve as the basis of comparison with selected propositions of the disaster literature, i.e., role conflict, land use reform, and the pace of reconstruction. The findings challenge established views of convergence and the temporary change in status distinctions following disaster. As a cross cultural study it offers clarification on evacuation aspects which may be influenced by specific societal factors.

Haas, J. Eugene and Robert Ayre. The Western Sicily Earthquake of 1968. Washington, D. C.: National Academy of Engineering. Passing references to the sheltering and housing operations in the month after the disaster in which 60,000 to 80,000 victims were homeless. Thousands of the evacuees were housed in tents, in tent camps of 1,000 to 4,000 persons. Water supplies were a problem in the tent camps.

Haas, J. Eugene, Harold C. Cochrane, and Donald G. Eddy. "The consequences of large-scale evacuation following disaster: the Darwin, Australia cyclone disaster of December 25, 1974." Working Paper #27. Boulder, Colorado: Natural Hazard Research, The University of Colorado, 1976. A case study of the post-impact evacuation and sheltering of 36,000 residents of Darwin, following the Christmas disaster. The focus is on individual and organizational activities as well as the economic impact of the disaster and subsequent evacuation of the community.

Haas, J. Eugene, Robert Kates, and Martyn Bowden. *Reconstruction Following Disaster*. Cambridge, Massachusetts: MIT Press, 1977. A systematic analysis which presents a model of disaster recovery activities, and applies it to findings from the 1906 San Francisco, Anchorage and Managua earthquakes, and the Rapid City flood. The central issues around the reestablishment of homes and jobs are discussed from the standpoint of both the community as a whole and the individual household. Evacuation relevant issues are implicit since the four disasters studied resulted in massive post-impact relocation involving complex patterns of withdrawal, shelter, and return.

Hans, Joseph M., Jr. and Thomas C. Sell. "Evacuation risks--an evaluation." Las Vegas, Nevada: U.S. Environmental Protection Agency. Office of Radiation Programs, 1974. Secondary analysis of 64 selected cases of evacuation, occurring between 1960 and 1973, which closely approximate the situation presented by a nuclear plant accident. Seeks to determine the risk of death and injury, costs of evacuation, and the parameters affecting risk and their potential use for predicting risk. Concludes that large or small populations can be effectively evacuated with minimal death and injury risks, and that, in most cases, such populations can take care of themselves provided adequate plans are developed to minimize potential problems that may occur peculiar to the impact area. Deals more with withdrawal than sheltering aspects.

Harshbarger, Dwight. *An Ecological Perspective on Disastrous and Facilitative Disaster Intervention Based on the Buffalo Creek Disaster*. Paper presented at the NIMH Continuing Education Seminar on Emergency Mental Health Services, Washington, D. C., June 1973. Explains how intervention efforts can aggravate as well as aid the recovery process. In Buffalo Creek the efforts to speedily remove debris and find shelter for victims produced a situation that heightened stress and created a potential for emotional disturbance.

Hogg, Sarah Jane. "Reconstruction following seismic disaster in Venzone, Friuli." *Disasters* 4: 173-185, 1980. Examines the reconstruction and rehabilitation process in the Friulian earthquake in Italy. There is a discussion of how the introduction of prefabricated buildings for evacuees radically altered the character of the communities as a whole and individual family lifestyles. Also discussed are factors affecting the slowness of the reconstruction process.

Hultaker, Orjan E. and Jan E. Trost. "The Family and the Shelters." Disaster Studies Report #1. Uppsala, Sweden: Department of Sociology, Uppsala University, 1976. A brief review of empirical literature focusing on two major problems connected with long-term evacuation in particular. One is the difficulties for authorities to convince inhabitants to evacuate or take other protective measures. The other is the fact that although there are positive effects of keeping families together, this is difficult to do and still maintain high employment rates for both men and women. The authors stress the need for active interchange between planners and researchers on the subject of what kinds of family reunification behavior will prevail under different situations. While wartime implications are sought most of data cited are drawn from studies of peacetime disasters.

Ikle', Fred C. The Social Impact of Bomb Destruction. Norman, Oklahoma: University of Oklahoma Press, 1958. An in-depth explanation of the relationship between physical destruction of communities and social consequences. A number of topics are presented which have relevance to general pre- and post-impact evacuation and shelter. Noteworthy chapters discuss destruction of housing; evacuation as prevention; transportation, communications, and housekeeping utilities, and food supply. Emphasis mostly on wartime situations, but some disaster literature is noted and there are implications for natural and technological disaster situations.

Kimber, R. A. Darwin Resettlement Unit Melbourne (D.R.U.M.). Melbourne, Victoria: Department of Social Security, GPO Box 17970, 1975. Briefly summarizes the major events and organizational progress of a program operated by a consortium of social welfare offices to resettle victims of cyclone Tracy in Darwin, Australia. Provides an overview of the planning rationale as well as operational features.

Klausner, Samuel Z. and Harry V. Kincaid. Social Problems of Sheltering Flood Evacuees: Final report. New York: Bureau of Applied Social Research, Columbia University, 1956. A major study of warning, withdrawal and especially shelter patterns of Farmington, Connecticut residents during and after flooding associated with Hurricanes Connie and Diane in 1955. Two hundred and thirty-one evacuees and one hundred and eighty-three host households were interviewed. Chapters include: Crisis Behavior, Finding Shelter, Tension, Time Remained with Host and Host Attitudes. Analysis is mostly of a statistical nature. Instruments used are reproduced.

- Kreimer, Alcira. "Post-disaster reconstruction planning: the case of Nicaragua and Guatemala." Mass Emergencies 3: 23-40, 1978. Natural disasters often draw attention to societal problems that tend to surface during post-disaster reconstruction. The aftermaths of both the 1972 Nicaragua and the 1976 Guatemala earthquakes are analyzed for societal effects which were compounded by many years of underdevelopment. In both instances the poor were most affected by the disasters. Conditions such as malnutrition, housing shortages, illiteracy, urban congestion, and massive poverty are accentuated and become public knowledge. In Nicaragua, basically an urban disaster, reconstruction was shaped by a vertical decision-making structure which led to a highly centralized operation. Influential people made the important decisions while the government failed to set the necessary regulations to control development. In Guatemala, impacted mostly in rural areas, decision-making was decentralized almost to the point where the government avoided taking responsibility in the reconstruction process.
- Kunreuther, Howard and Elissandra S. Fiore. The Alaskan Earthquake: A Case Study in the Economics of Disaster. Washington, D.C.: Institute for Defense Analyses, Economic and Political Studies Division, 1966. An analysis based on mostly secondary sources and data on the immediate post disaster recuperation and long-term recovery from the 1964 Alaskan Earthquake. Topics such as post-disaster organization, supply and demand problems, public and private reconstruction, and others are extensively discussed from an economic perspective. Mostly passing treatment of evacuation supports finding in withdrawal, shelter and return patterns seen in other studies.
- Lammers, C. J. Studies in Holland Flood Disaster 1953. Volume II. The Hague: Institute for Social Research in the Netherlands, 1955. The second volume on the social-psychological effects of the Holland flood disaster primarily deals with the results of a time study conducted to determine what factors influenced the amount of tension that occurred between evacuee and hosts during the extended shelter period following the disaster. Tentative suggestions offered are that few single factors, in and of themselves, were major contributors to tension, but rather various combinations of variables. (See Ellemers).
- Leiversley, Sally. "The social consequences of Australian disasters." Disasters 4: 30-37, 1980. Examines the Tasmanian bushfire, the Brisbane floods, and Cyclone Tracy in Darwin to see what the Australian government policy was with regard to providing housing and other welfare needs of victims. It is shown that welfare agencies arrange services for people with special needs, while the majority of victims are given the resources to help themselves.
- Lewis, James. "Volcano in Tonga." Journal of Administration Overseas 43: 116-121, 1979. Historical account of evacuation and relocation of inhabitants of Niua Fo'ou following the volcanic eruption of 1946. Report is based on a diary kept by an islander, and chronicles the relocation and subsequent return of the island inhabitants.

Lifton, Robert Jay and Eric Olson. "The Human Meaning of Total Disaster. The Buffalo Creek Experience." Psychiatry 39: 1-17, 1976. An analysis of the psychological effects of the 1972 Buffalo Creek, West Virginia dam disaster, which resulted in 125 deaths and nearly 5,000 left homeless. The study was done at the request of lawyers representing townspeople in a case claiming "psychic impairment." Findings revealed that all exposed to the disaster experienced some or all of the following: death imprint and death anxiety, death guilt, psychic numbing, counterfeit nurturing and unfocused rage, and struggle for significance. Five special characteristics of Buffalo Creek flood are given: suddenness, relationship of disaster to callousness and irresponsibility to others, continuing relationship of survivors to the disaster, isolation of area and community, and totality of communal destruction. It is noted that occurrence of all five characteristics in one disaster is highly unusual.

Mitchell, William A. "Partial recovery and reconstruction after disaster: the Lice case." Mass Emergencies 2, No. 4: 233-247, 1977. The series of responses to disasters are only minimally documented for developing societies. When earthquakes occur in areas where ethnic antagonisms and political instability exist, the immediate difficulties of relief and reconstruction are compounded by these problems. Despite the potential for political conflict, some 15,000 Turkish soldiers performed their duties and eventually departed without causing additional problems in the predominantly Kurdish area. Five days after the earthquake, Lice was declared geologically unsafe and was rebuilt on a new site. Turkish-built prefabricated housing was supplemented by housing from six other nations affording observers a number of structural comparisons. A basic question raised during reconstruction concerns the introduction of modern conveniences into a traditional society.

Moore, Harry Estill. Tornadoes over Texas: A Study of Waco and San Angelo in Disaster. Austin, Texas: University of Texas Press, 1958. An analytical description of the organizational response to the 1953 disasters, focusing primarily on reconstruction and mental health issues. General findings regarding the evacuated population include: 1) those forced to relocate incurred greater case and work loss; 2) most people were forced to move several times before "finally" settling; and 3) there seemed to be a tendency for people to resettle as close to their original dwelling as possible.

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Moore, Harry Estill, Fredrick L. Bates, Marvin V. Layman, and Vernon J. Parenton. *Before the Wind - A Study of the Response to Hurricane Carla*. Disaster Study Number 19. Washington, D. C.: National Academy of Sciences, 1963. The first systematic work on a major evacuation, this case study, done nine months after the event, analyzes field data from 1,500 household interviews in five areas hit by Carla in 1961, comparing urban-rural and high-low evacuation levels. Focus is on warning system effectiveness, evacuation decision making, establishment of and assignment to shelters of various types, organizational functioning trans-disaster and during return, and a comparison of voluntary and involuntary evacuation.

Moore, Harry E., et al. *...and the Winds Blew*. Austin, Texas: The Hogg Foundation for Mental Health, The University of Texas, 1964. A companion volume to "Before the Wind." Presents a chronology of events occurring along the Texas and Louisiana coasts from the first reports of Hurricane Carla, through the evacuation, to the rehabilitation process. Descriptions of the extreme orderliness of the withdrawal movement, the interrelation between media coverage and individuals behavior and the decision-making by individuals and organizational representatives regarding warning, withdrawal movement, sheltering and return phase of the disaster.

Oliver-Smith, Anthony. "Traditional Agriculture, Central Places and Post-Disaster Urban Relocation in Peru." *American Ethnologist* 4: 102-116, 1977. Treats the well-documented, cross cultural tendency for people to remain in or return to areas that continue to be dangerous. Following a catastrophic earthquake-avalanche in Peru in 1970, survivors quickly resettled themselves in a nearby location and resisted government efforts to relocate them a second time to a safer place. Utilizes the central place theory from geography to show the importance of socioeconomic and geographic factors in understanding post-disaster reluctance to relocate. The research suggests that, a national assessment of community needs, as well as strong affective ties, enter into the decision. While focus of study is Third World country, description and analysis is partly of an urban setting.

Parker, Gordon. "Cyclone Tracy and Darwin Evacuees: On the Restoration of the Species." *British Journal of Psychiatry* 130: 548-555, 1977. A validated objective measure of psychological functioning was used to determine the incidence and course of dysfunction in veterans of the massive evacuation from Darwin following Cyclone Tracy. Dysfunction increased initially, apparently related to fears of imminent death or injury, and at 10 weeks, apparently related to the stress of relocation. At 14 months the dysfunction levels had returned to normal and possible reasons for this decrease are discussed.

Perry, Ronald W., Michael K. Lindell, and Marjorie Greene. *Evacuation Planning in Emergency Management*. Lexington, Massachusetts: Lexington, 1981. A major study of the processes by which households arrive at a decision to evacuate. Data was gathered from four communities on such variables as warning belief, perceived risk, possession of an adaptive plan, family context, the structure (content) and delivery of warning messages, and the role of social networks. A model based upon these variables is proposed and in the final chapters sheltering issues are discussed as a means by which officials can provide householders with incentives to evacuate.

Scanlon, Joseph, Jim Jefferson, and Debbie Sproat. *The Port Alice Slide*. Ottawa, Canada: Emergency Planning Canada, 1976. A descriptive and analytic case study of the evacuation resulting from a 1975 mud slide which threatened the town of Port Alice, British Columbia. The authors combined official interviews, documentary records and extensive follow-up or trace interviews to reconstruct the event following the slide. All major aspects of evacuation are covered including warning, individual and official response, transportation, sheltering, and return. Recommendations are based on the finding that initial response to disaster is both high speed and generally outside any plan that may exist.

Seaman, John (ed.). *Conference Reports. Disasters 3: 135-168, 1979*. Four reports presented at the 1978 Oxford Conference on Disasters and the Small Dwelling. Three are specific to the Andhra Pradesh (India) cyclone of 1977. The first in the series, by Howard and Mister, reports on the sheltering activities of Oxfam over the past decade. Much of what has been learned derives from Third World experiences, however, the information provided has implications for all kinds of sheltering and housing situations.

Snarr, D. Neil and E. Leonard Brown. "User satisfaction with permanent post-disaster housing: Two years after Hurricane Fifi in Honduras." *Disasters 4: 83-91, 1980*. An examination of the satisfaction with the new housing provided evacuees after Hurricane Fifi in Honduras. In general, there was a very high level of satisfaction with the new permanent quarters which in some cases helped those moving into them to surpass their pre-disaster standard of living.

Stiles, William W. "How a Community Met a Disaster: Yuba City Flood, December 1955." *The Annals of Political and Social Science 309: 160-169, 1957*. Descriptive account by a public health official, of the massive flooding of the Yuba City-Marysville, California area in December 1955. Discusses mobilization of resources, warning and communications, evacuation, rescue and return, response to a renewed threat two weeks later, public and personal losses, and government relief.

Treadwell, Mattie E. Hurricane Carla-September 3-14, 1961. Office of Civil Defense, Region 5, Denton, Texas: U.S. Government Printing Office, 1962. In-agency case study describing the preparedness, warning, and mobilization efforts, but focusing especially on evacuation, reception and return phases. It details the successful sheltering and return of 80,000 Louisiana and 500,000 Texas residents. The success of the operation is largely attributed to previous experience with hurricanes. Principles for shelter management are listed.

Western, John and Gordon Milne. "Some Social Effects of a Natural Hazard: Darwin Residents and Cyclone Tracy." Paper presented on a Symposium on Natural Hazards, Canberra, 1976. From a questionnaire administered to 501 victims a Disaster Impact Scale was devised to assess the social and psychological consequences of Cyclone Tracy in Darwin, Australia. Findings show that the sheltering period had a strong effect on victims, with evacuees who had not returned some 7-10 months later being worse off in several respects than those who stayed in Darwin and never left.

Young, Michael. "The Role of the Extended Family in Disaster." Human Relations 7: 383-391, 1954. The results of a survey that examines the role of kinship ties in providing refuge and support to victims of the February 1953 flooding of the English coast. One confirmed hypothesis is that evacuees prefer staying with relatives rather than in official shelters, but that kinship ties apparently weaken with distance. Three recommendations or conclusion are drawn: there should be 1) evacuation of entire family units rather than "women and children" first; 2) distribution of relief supplies throughout the shelter areas rather than a concentration in the impact area; and 3) rapid provision of free transportation for evacuees to their relative's homes.

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