

CIRCULATING COPY
Sea Grant Depository

**THE SOCIAL IMPACT OF HURRICANE ELOISE
ON PANAMA CITY, FLORIDA**

**Earl J. Baker, John C. Brigham, J. Anthony Paredes
Donald D. Smith**

**A LONGITUDINAL STUDY OF PUBLIC ATTITUDES TOWARD
HAZARD ZONE LAND USE CONTROLS**

Earl J. Baker

**The Florida State University
Tallahassee, Florida**

The information contained in this paper was developed under the auspices of the Florida Sea Grant College Program, with support from the NOAA Office of Sea Grant, U.S. Department of Commerce, grant number 04-6-158-44. This document is a Technical Paper of the State University System of Florida Sea Grant College Program, 2001 McCarty Hall, University of Florida, Gainesville, FL 32611. Technical Papers are duplicated in limited quantities for specialized audiences requiring rapid access to information, which may be unedited.

December 1976

RECEIVED

DEC 6 1983

**NATIONAL SEA GRANT DEPOSITORY
PELL LIBRARY BUILDING
URI, NARRAGANSETT BAY CAMPUS
NARRAGANSETT, RI 02882**

**SW. FLORIDA REGIONAL
PLANNING COUNCIL**

THE SOCIAL IMPACT OF HURRICANE ELOISE
ON PANAMA CITY, FLORIDA

Earl J. Baker
John C. Brigham
J. Anthony Paredes
Donald D. Smith

The Florida State University
Tallahassee, Florida

Immediate Response Project
State University System of Florida
Sea Grant Program

August, 1976

TABLE OF CONTENTS

	Page
List of Tables.....	iii
Preface.....	iv
Introduction.....	1-5
Methodology.....	6-13
Results.....	14-33
Conclusions.....	34-38
Appendix A: Questionnaire.....	39-48
Appendix B: News Coverage Summary.....	49-57
Appendix C: Warning Response Literature.....	58-63

LIST OF TABLES

	Page
Table 1: Socio-demographic Characteristics of Sample.....	16
Table 2: Destination of Those Evacuating.....	23
Table 3: Evacuation by Age	26

PREFACE

In designing this research, the authors were aware of a corollary study that was done by the National Weather Service and Mississippi State University, immediately following Hurricane Eloise. The decision was made not to constrain this study on that basis, except to restrict the sampling area to Panama City and the Panama City beaches. (The other research had concentrated on the Fort Walton Beach vicinity.)

The authors would like to express their gratitude to the following individuals for their cooperation and assistance: Jeff Fisher of the Florida Marine Advisory Program; Jay Mills, Director of Bay County Civil Defense; Messrs. Parish and Cain of the Internal Revenue Service; Leslie Cobb of the U. S. Department of Agriculture; Donald Hall, Panama City Salvation Army; several officers of the Panama City and Panama City Beach Police Departments; Patrolmen Gillman and Pennington of the Florida Highway Patrol; Paul Doughty and Anthony Oliver-Smith of the University of Florida Department of Anthropology; and last but not least, the interviewers--Martha Bagley, Paul Barkowitz, Patsy Eccles, Dave Kamenz, Bonnie Nelson, Don Neubacher, Nancy Rosen, and Alec Steele.

INTRODUCTION

Around noon on September 21, 1975 Hurricane Eloise was just north of the Yucatan Peninsula, 550 miles due south of Mobile, Alabama. The storm proceeded north-northwestward until about midnight at which time it began moving more northerly toward New Orleans. Shortly after noon on the 22nd, about 250 miles south-southeast of New Orleans, Eloise began turning north-northeasterly toward the Florida panhandle, 300 miles away. She maintained roughly that course (with a slight turn northward) at an average forward speed of just over 15 m.p.h. until landfall occurred about half-way between Ft. Walton Beach and Panama City Beach at 6:00 a.m. CDT on the 23rd.

The highest storm surge was 18 feet at Dune Allen Beach, a point west of the Panama City beaches. Farther east, surges ranged from 16 feet at Sunnyside to 13 feet at Panama City. The maximum sustained windspeed in the Panama City area was about 125 m.p.h. at ground level, although a 155 m.p.h. gust was recorded 98 feet above ground. Winds diminished quickly as the storm moved inland toward Dothan, Alabama, spawning a number of tornadoes.

In addition to 33 advisories issued by the National Hurricane Center, bulletins were sent at two-hour intervals beginning at 9:00 a.m. on the 22nd. At 7:00 a.m. on the 22nd a hurricane warning was posted for the area from Grande Isle, Louisiana to Apalachicola, Florida (the center of the forecast "lane" was about 60 miles west

of where landfall eventually occurred). Advisories emphasized that a smaller section of the warning area would actually be hit by the center of the storm. Locational information in the advisories made the northeasterly turn of the hurricane on the 22nd appear much more easterly and then much more northerly than was actually the case.

Local Action Statements advised relocation from coastal areas of Okaloosa, Walton, and Bay Counties at 9:45PM on the 22nd. Monday evening, television stations interrupted programming several times each hour with updates and repeats of forecast information.

Despite the magnitude of Hurricane Eloise there were no reported deaths in the vicinity which were directly attributed to the hurricane. According to one highway patrolman, a Panama City evacuee died of a heart attack en route to his destination, and a man from a neighboring town died in an auto accident the day following the hurricane as he rushed to Panama City to check on possible damage to his boat. The principal immediate problems caused by the hurricane were the need for evacuation from low-lying areas, guarding against looting in the heavily damaged areas along the beaches immediately following the disaster, and providing disaster relief and financial counseling to those who had suffered losses of home or other property.

To a large extent, problems associated with the hurricane were minimized by two major factors: Precautions taken by the many local people who had had previous experience with hurricanes and rapid cooperative response by many local, state, and county agencies. Apart from major damage to some of the motels and hotels along the

strip, the greatest single commercial loss was a reported two million dollar loss by an experimental shrimp farming enterprise. Local commercial fishermen took care to anchor their boats in open water the day before the hurricane, and it was affluent recreational craft owners who suffered the most damage as their crafts remained moored at docks and marinas.

Although there appears to have been some understandable confusion in evacuation procedures during the early morning hours of September 23, 1975, evacuation was accomplished rather smoothly without any major traffic accidents, perhaps as a consequence of the extremely slow speed with which motorists had to leave the area because of sheer traffic congestion. This congestion was in part the result of a disproportionately large number of people deciding to go north, probably in many cases following the lead of military personnel who had been ordered to evacuate to Fort Rucker, Alabama. Although some people did go to the east toward Blountstown and Tallahassee, in retrospect it appears that this route was under-utilized, particularly in view of the fact that those fleeing northward were remaining in the continuing path of the hurricane. During the actual evacuation the local highway patrol unit, local police and the marine patrol worked together to direct traffic, urge people to leave, and otherwise assist in the evacuation effort. The following morning highway patrolmen from other units were brought in along with representatives of the State Game Commission, Beverage Commission, and Marine Patrol to guard against looting; National Guardsmen were brought in later in the day.

Among volunteer agencies, the Salvation Army was especially quick and efficient in providing emergency food and medical care. During the hurricane and the hours immediately following, public and private agencies and the news media performed admirably even though there does not appear to have been any overall plan of operation. Most agency representatives interviewed seemed to have been in agreement that although there was confusion and some breakdown of communication there were no serious problems in those frightening early morning hours of September 23. Local newspapers commended the performance of the agencies, and the majority of respondents to the survey reported here were likewise quite complimentary about official and media response to the disaster.

In the days and weeks following Hurricane Eloise a number of centers were set up in the region by the Federal Disaster Assistance Administration, where various agencies were represented to provide assistance and counseling on such matters as emergency relief, insurance claims, and declarations of losses for income tax purposes. From interviews it appears that in some ways there were more social problems associated with the aftermath of the hurricane than during the actual disaster itself, including coordination of the efforts of various agencies, determination of need, public awareness of types of services available -- particularly among poorer and smaller property owners, and insurance disputes over whether damage was caused by water or by wind. Interviews with various public and volunteer agents suggest that it was commonly assumed that the local

Civil Defense office has more responsibility for the coordination of evacuation and relief efforts than that agency sees itself as having. It should be noted that the directorship of the Panama City Civil Defense office is only a part-time position.

Reactions of those who had suffered losses were highly variable; as representatives of one agency said, "Some came in crying, others came in laughing, but most just took it." Indeed, on the part of both agency representatives and private citizens there appears to have been a kind of "grateful relief syndrome" characterized by thankfulness that losses were few and minimization of criticism of public agencies and media representatives, which was reinforced by media and official praise of agencies. (See Appendix B) In large part these attitudes stem, no doubt, from the recognition that had the hurricane struck just three weeks earlier, during the Labor Day tourist peak, the story would have been very different.

METHODOLOGY

Development of Research Questions

This study was suggested by personnel of the office of the State University System of Florida Sea Grant Program. J. Anthony Paredes was contacted first to pursue the feasibility of a small-scale study to assess the social and psychological reactions of citizens of the Panama City area to Hurricane Eloise and its aftermath. Also of concern was the assessment of what might be learned from the experiences of evacuees from the hurricane which might be useful in planning for evacuation procedures for other coastal communities which might be hit by future hurricanes, particularly in the case of communities with limited exit routes.

Paredes consulted with the Florida Marine Advisory Program Area Coordinator in Panama City, Mr. Jeff Fisher, to obtain specific recommendations for topics of research which would produce potentially useful information. Although by this time, late October, the community had already received considerable attention from various news media, government agencies and researchers, Mr. Fisher indicated that a study of the "man in the streets" evaluation of performance of the news media and public agencies before, during, and after the hurricane might be useful.

With this information Paredes then assembled a research team consisting of a social psychologist, John C. Brigham; a sociologist,

Donald Smith; and a geographer, Earl J. Baker to begin preparing a plan of research. Baker had had considerable prior experience in disaster research and, in fact, had already collected some data on attitudes of Panama City Beach and Fort Walton Beach property owners regarding attitudes about land use controls; Baker's research had been done immediately following the hurricane with the intention of doing several follow-up studies within succeeding months to detect any changes in attitude. The research team agreed immediately that Baker's work should be supported as a separate phase of the project, and so indicated in their letter of proposal to the Sea Grant coordinating office in Gainesville.

During the month of October the team met several times to discuss and design the research. Smith as well as Baker was familiar with the literature in disaster research; thus these two investigators were able to suggest specific questions for research in order to achieve some comparability with previous hurricane studies, such as those conducted following the Camille disaster in 1969. Apart from these recommendations the team took an open approach, "brain storming" to arrive at a plan for providing better understanding of public reaction to Hurricane Eloise and its effects. Consequently the resulting proposal reflected a synthesis of the various areas of expertise, rather than being narrowly focused on issues of particular interest within any one of the several disciplines represented by the members of the team.

Three major areas of investigation were selected for study in Phase I of the project. (Phase II consists of the follow-up of

Baker's original research.):

- (1) Factors affecting individual decisions to evacuate and selection of routes, means, and destinations for those who did decide to evacuate;
- (2) Beliefs, attitudes, and knowledge of hurricane forecasting.
- (3) Attitudes about the performance of the news media before and after the storm and its impact on the local economy, with particular reference to tourism.

As the development of the research project proceeded, it was also decided that an examination of perceptions about the impact of the storm itself on community life would be important.

Once the proposed research was approved, on November 14, 1975, general research objectives had to be translated into an appropriate survey research instrument for collecting the necessary data.

Development of the Research Instrument

Smith developed a preliminary draft of a survey interview schedule, then the entire research team met on several occasions to revise and amend this working draft. Finally an interim questionnaire was developed for pretesting in Panama City. Student interviewers (from geography, sociology, psychology, and anthropology) were hired for the actual interviewing in Panama City. The student interviewers met with the principal investigators on several occasions to discuss and receive instructions in the use of the research instrument. The interview schedule was compiled in such a manner as to elicit tight specification of details of individual experiences immediately before, during, and following the hurricane. However, the use of a series of open-ended questions allowed ample latitude

for expressions of opinions by respondents, although the questionnaire did contain some "forced choice" items dealing with perceptions of weather reports, the effect of the hurricane on tourism, and other matters.

Even though this interview schedule proved quite serviceable for collecting basic information indicated in the original research proposal, the instrument had its shortcomings. With the benefit of hindsight, it becomes apparent that more rigorous specification of demographic and socioeconomic variables would have permitted more sophisticated analyses of factors affecting individual behavior and perceptions regarding the hurricane and its aftermath. If there had been more opportunity for in-depth, open-ended interviews with community officials and other key individuals before the research instrument was developed, questions in the survey could have been directly pointed to specific issues in the handling of recovery from the hurricane by public and private agencies. (Some general interviews with agency personnel in Panama City were conducted, with assistance from consultants Paul Doughty and Anthony Oliver-Smith of the Department of Anthropology at the University of Florida — both of whom have studied disasters in Latin American, but these interviews were done during the same days that the sample survey was being conducted.) A copy of the interview schedule is included as Appendix A.

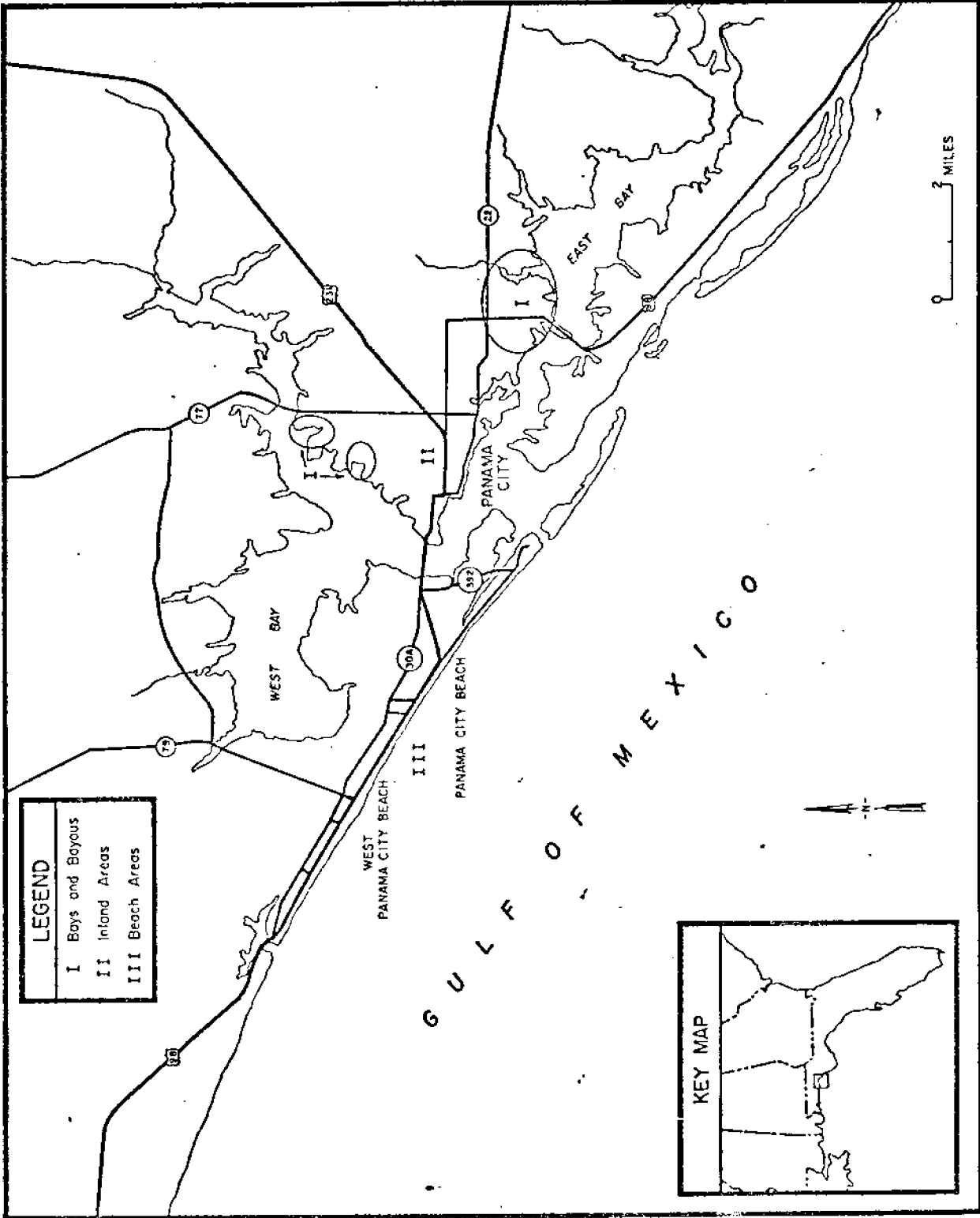
Sampling and Interviewing Procedures

Three different sectors of the Panama City area which might have been differentially affected by Hurricane Eloise were identified.

Approximately one-third of the interviews were conducted in each of these three sectors. One sector comprised the areas which front directly on the open waters of the Gulf of Mexico: Panama City Beach westward to the intersection of highways S 30A and U.S. 98. All persons who were interviewed in this sector resided within three or four city blocks of the Gulf waters. This will be called the "beach area".

A second sector, referred to here as the "bay area", consisted of residences in Panama City which were close to somewhat more protected waters, namely St. Andrew Bay, North Bay, East Bay, and the bayous which extend from these bays. All persons who were interviewed in this sector resided within three blocks of a bay or bayou. It was thought that persons residing in this sector might have quite different perceptions of, or reactions to, the hurricane than would persons residing in the beach areas or those who lived further inland. The third sector, the "inland area" comprised residences in Panama City which were located more than three blocks from any large body of water.

Within each of these three sectors, (see Figure 1) city blocks were randomly identified by the researchers on a 1974 map of the Panama City area (Picto-Map of Bay County, Florida). Interviews were then conducted with an adult resident (18 years of age or older) at every third residence on each of these selected city blocks beginning at the southeast corner of each selected block and proceeding clockwise. The sample included only persons who either resided in or owned property in the Panama City area at the time the hurricane struck.



Residents were generally quite interested in the survey and eager to speak with the interviewers; less than 10% of the time did a resident refuse to take part in the interview situation. In part this may be a result of the fact that an article describing the research (submitted by Paredes) appeared in the local newspaper the day before interviewing began.

Interviews were conducted during the period from Thursday, January 15, through Sunday, January 18, 1976, between the hours of 9:00 a.m. and 8:00 p.m. If the selected residence proved to be an apartment building, interviews were conducted at every third apartment building up to a maximum of five interviews per apartment building. Since in the beach area residences tended to be farther apart and were more likely to be unoccupied, this necessitated that a much larger number of blocks be covered in this area so that a satisfactory number of interviews could be obtained.

As previously described, graduate students at Florida State University were trained to conduct the interviews. The final sample of interviewers consisted of 5 white males and 5 white females, all between the ages of 20 and 30. Each interview was conducted by a single interviewer, although a two-person "team", one male and one female, worked in each of several sections of selected blocks at the same time. Each of the five teams conducted interviews in all three of the sectors during the four-day interviewing period. Most interviews took from 20 to 35 minutes to conduct. Two of the co-principal investigators also conducted several interviews.

A total of 205 interviews were conducted; 49 in the beach sector,

75 in the bay sector, and 81 in the inland sector. Detailed analyses of the demographic characteristics of the respondents will be presented in the Results section which follows.

RESULTS

A few notes of caution should be mentioned in considering the results of the survey. The interviews were conducted almost four months after Eloise struck. Thus, memories may have failed, and other processes may have occurred during that interim which might have affected responses.

In several places in this section of the report, descriptive data (proportions and percentages) are compared for various groups of respondents. It should be kept in mind that those parameters are exact only for the sample, and differences do not necessarily exist in the same magnitudes for the population from which the sample was drawn. In general, a conservative rule for interpreting the estimates is this: if 100 additional samples of the same size were drawn, approximately 90 of them would yield parameter estimates within about 5% of the values given by this sample (i.e., a 90% confidence interval with 5% reliability).

Numerous bivariate analyses were performed in search of systematic relationships between variables. Few of the results are reported here, because few associations were found. It should be noted that even for the cases in which some relationship was found to exist between pairs of variables, there is no basis for concluding that the relationships are causal, as no controls were employed. Nevertheless, the data do provide some interesting insights.

Table I shows the demographic characteristics of the sample interviewed in this study. The sample is quite similar to the

national U.S. population and to the Panama City area on most socio-demographic characteristics (according to 1970 U.S. census data). One characteristic of the sample and of the Panama City area (relative to the U.S. population as a whole) is the high number of retirees. This factor will have some relevance later in this report as these retirees cluster prominently in the Beach area of Panama City, the area particularly hard hit by Hurricane Eloise. A further characteristic of this sample that is somewhat unique to the Panama City area, and which also played a particular role in the response of the population to Hurricane Eloise, is the high number of military families in that area. Many of the respondents listing "housewife" as occupation are married to military personnel, and many of the retirees are ex-military personnel as well.

The total sample is composed of 205 respondents. Ninety-three percent (191) of these respondents were in Panama City during the day immediately prior to Hurricane Eloise and these comprise the sample for the examination of Hurricane preparedness and evacuation behavior, perceptions of the hurricane, and perceptions of media performance and public agency performance during the hurricane. The total sample of 205 respondents is used in the examination of the public's perception of the effects of Hurricane Eloise on community life, the perceived effect of the hurricane on tourism, and the public perception of the influence of media coverage of the hurricane on tourism.

TABLE I

Socio-Demographic Characteristics of the Sample Interviewed

<u>Sex</u>	<u>%</u>	<u>Marital Status</u>	<u>%</u>	<u>%</u>
Male	44	Married	78	Own Residence
Female	56	Single	8	Rent Residence
		Divorced	3	15
		Separated	1	
		Widowed	0	
<u>Age</u>	<u>%</u>	<u>Occupation</u>	<u>%</u>	<u>Religion</u>
18-25	17	Professional	8	Baptist
26-40	24	Business	4	Methodist
41-50	20	Managerial	4	Presbyterian
51-60	16	Sales	5	Lutheran
61 +	23	Clerical	9	Other Prot.
				Catholic
<u>Education</u>	<u>%</u>			Believer
-H.S.	28			Other
H.S.	30	<u>Craftsmen</u>	4	
some coll.	28	<u>Operatives</u>	5	<u>Political Affiliation</u>
coll. grad.	13	<u>Laborers</u>	2	Democrat
		<u>Service</u>	5	Republican
				Independent
<u>Own Boat</u>	<u>%</u>	<u>Housewife</u>	25	Other
Yes	35	<u>Retired</u>	22	None
No	65	<u>Student</u>	3	
		<u>Military</u>	4	

The results comprise nine topic areas:

- (1) Hurricane preparedness;
- (2) Evacuation behavior;
- (3) Comparison of people who evacuated with those who did not evacuate;
- (4) Previous hurricane experience;
- (5) Perceptions of weather forecasting and weather reporting;
- (6) Perceptions of public agency performance;
- (7) Perceptions of the effects of the hurricane on community life;
- (8) Perceptions of the effects of the hurricane on tourism;
- (9) Perceptions of media coverage of the hurricane on tourism.

Not all topics included in the interview schedule are represented in this analysis, since some questions produced only limited results.

Hurricane Preparedness

The data indicate a public which was rather well-informed concerning the approach of Hurricane Eloise and a public that kept alert about the progress of the hurricane. Almost three fourths (73%) of the sample had heard about the hurricane at least several days before its arrival (despite the fact, as will be noted below, that few of them thought at that time that it might hit Panama City), and another 21% learned of it a day before its landfall. Less than 2% of the sample had not heard of the hurricane until just a few hours before its arrival. The mass media were the main source of information about the hurricane in this early phase, with 59% of the respondents first hearing of Hurricane Eloise through television reports and another 19% learning of it by

radio. One-tenth of the respondents initially learned of the hurricane through interpersonal communications with friends, relatives or neighbors.

A further indication of a rather well-informed and alert public is the fact that 79% of the respondents started monitoring weather reports about the hurricane immediately after first hearing about it with 57% of them relying on television, 28% using radio, and the remainder checking with the weather bureau, reading newspapers, etc. By Monday, the day before Hurricane Eloise hit Panama City, 58% were listening to weather reports every hour, another 35% listened several times during the day (again with over half using television as their main source of information and one-fourth using radio). One-fourth (26%) of the people even kept a hurricane tracking chart (an article in the September 22 issue of the Pensacola News Journal advised readers that a Hurricane tracking chart could be purchased for 25¢ from the National Weather Service at Sherman Field Naval Air Station, Pensacola.)

By Monday night, 71% of the respondents were monitoring weather reports at least every hour, 13% checked weather reports about the hurricane several times during the evening, and another 12% reported consulting weather reports about the hurricane's progress "once or twice during the night."

One interesting note is that there was little difference between residents of the three sampled areas (beach, inland, and bay) in their hurricane watchfulness and preparedness, despite the fact that the three areas differed in their vulnerability to potential damage from the hurricane. Residents of the beach area were no more attentive to

the hurricane's progress than residents of the other two areas. In fact, on some items there was a slight tendency for residents of the beach area to be even less "active" in their hurricane watching and preparedness. For example, while 83% of the bay residents first learned of the hurricane several days before its arrival, 66% of the beach residents learned of the hurricane this early -- only slightly more than the 64% of the inland residents who knew of the storm several days in advance. During the day before the hurricane hit, almost two-thirds of the bay residents, for example, were listening to weather reports every hour, but only 61% of the beach residents and 53% of the city residents were monitoring weather reports that frequently. Thirty-two percent of the bay residents kept a hurricane tracking chart, compared to 21% of the city and beach residents.

One-fourth of the respondents made no hurricane preparations of any sort, with the remainder making preparations ranging from securing property to laying out emergency supplies. Again, some tendency for a less "active" response in hurricane attentiveness by beach residents may be noted in the fact that while only 20% of the bay respondents and 29% of the city residents made no preparations, 32% of the beach respondents made no preparations of any sort for the hurricane. Stated another way, although a majority of people in all three areas reported making some preparations for the hurricane, it was in the beach area where the largest percentage of respondents (who were on the scene the day before the hurricane) stated that they made no advanced preparations for the hurricane.

These slight trends among beach residents might be attributable to the different sociological composition of beach residents in Panama City from other areas of the city. Compared to the people of the other sampled areas (bay, inland) the beach residents were more likely to be elderly and/or retired. One-third of the beach respondents were retirees, compared to only one-fifth of the total sample. Similarly, one-fourth of the beach residents were over 63 years of age compared to one-fifth of the residents of the inland area, but less than one-tenth of the bay area respondents.

Not quite half (46%) of the respondents stayed up past midnight to listen to the progress of the hurricane (53% feeling that there was very little or only slight chance that it might hit Panama City in the early evening of September 22.) In a reversal of the areal trend noted above, 62% of the beach residents, 47% of the bay residents, and 43% of the city residents stayed up past midnight to watch the progress of the hurricane.

Consequently, over half (57%) of the respondents did not learn until after midnight that the hurricane was headed for Panama City. Significantly, interpersonal contacts played an important role in learning of the hurricane's arrival: 29% of the sample learned that Hurricane Eloise was likely to land near Panama City through friends, relatives, neighbors and other person-to-person contacts (one-third learned of the storm's change of course through TV, 24% by radio and the remainder learned of it through public officials, neighborhood warnings, telephoning the weather bureau, etc.), suggesting that even in the presence of mass media systems, interpersonal contact continues

to play an important "back-up" role in times of disaster.

In the days prior to Hurricane Eloise, 83% of the respondents reported that they knew Panama City had public shelters to be used by the public in the event of a natural disaster; further, 86% of these (or 72% of the total sample) knew also where these shelters were usually located. (There was little difference between the bay, beach and city residence in their awareness of public shelters.)

Evacuation Behavior

Fifty-eight percent of the sample reported that they had heard media announcements urging evacuation of certain areas. Further, four-fifths of these respondents recalled being informed where they should go and how to get there. (Forty-one percent of the beach residents, and forty-four percent of the bay residents report they did not hear any such media announcements -- despite the fact that these were the areas most directly vulnerable and the ones to which media announcements made specific reference, whereas only 39% of the inland residents did not recall hearing such announcements.) Thirty-nine percent of the bay residents, 32% of the beach residents and 17% of the inland residents (cumulatively 31% of the total sample) say they were aware that public officials had passed through their neighborhoods advising people to evacuate.

Immediately prior to and/or during the hurricane, three-fourths of the sample heard media announcements about public shelters in Panama City and two-thirds of these also recall they heard at that time how to get to those shelters in Panama City (24% of the beach residents,

15% of the inland people and 17% of the bay residents did not hear any such announcements -- again a slight tendency for the more-often retired and/or elderly beach residents to be less "wired-in" to hurricane preparations and response.

In actual behavior, 59% of the sample report that they evacuated their residences; 87% of the beach residents, 55% of the bay residents, and 47% of the city residents. Only 15% of those evacuating left their homes prior to midnight; 20% in the beach area, 12% in the bay area, and 12% in the inland area left before midnight. Three-fourths of all evacuees left their homes between the hours of 2:00 a.m. and 4:30 a.m., on September 23, 1975, compressing the evacuating population into a very short period of time (according to a newspaper account an estimated 10,000 Panama City residents evacuated). Not too surprisingly, then, 26% of the evacuees report they had trouble reaching their desired destination, with the bulk of these citing traffic congestion as the principal difficulty. (Almost all respondents mentioning such problems were evacuating to out-of-town points, those people going to in-town locations experienced little difficulty in reaching their destination.)

More evacuees (31%) cited sheer safety as the chief motivation for leaving their homes than any other reason -- but almost one-fifth of the respondents cited the influence of friends and relatives as their main reason for leaving. Six percent indicate media instructions as their chief reason for going, and 4% indicated orders of public officials as their reason for going. Twenty-seven percent cited combinations of these factors as their motivation for evacuating and the remainder indicate other factors such as having to report for work.

Despite the high level of awareness about public shelters in Panama City, and the fact that three-fourths of the respondents had heard media announcements about the shelters during the hurricane period, only 20% of the evacuees went to public shelters in Panama City. Another 15% went to friends' and relatives' homes in the Panama City area. Most significantly, 64% of all evacuees left Panama City for out-of-town locations, with 27% of them heading out of the state. Included in this out-of-state percentage are a number of military personnel (and dependents) ordered to do so by Tyndall Air Force Base authorities. They were ordered to evacuate to Fort Rucker, Alabama. Awareness of this military order was also cited by some civilian residents as their reasons for leaving the state.

Table II shows the evacuation destination by area of residence of respondents.

Table II: Destination of Those Evacuating

	Beach	City	Bay/Bayou
Public Shelters in Panama City	13	34	19
Friends/Relatives in Panama City	13	23	7
Out-of-town locations	<u>74</u>	<u>43</u>	<u>74</u>
	100 %	100 %	100 %

From this table it is clear that the inland residents were the ones most likely to take advantage of public shelters in Panama City; it was the beach and bay residents who headed for out-of-town refuge -- travelling mainly by private automobile, and experienced most of the evacuation difficulties. Significantly, in response to an open-ended

question, 44% of the evacuees cited interpersonal connections and social contacts with friends and relatives as the reason for choosing their evacuation destination. Ten percent indicated they went to the place they did because it was an officially designated refuge, 15% simply said the location was safer and the remaining 25% gave a wide variety of reasons.

Of those respondents that did not evacuate their residences, a surprising 19% said that nothing could have made them leave their homes, 13% said that if they had received official orders to evacuate, they would have done so, 7% said they would have evacuated had the storm been headed directly for their house, 6% would have done so had they known about it earlier (before bed-time), 6% if the storm had been worse, with the remaining 16% giving other diverse reasons. Significantly, among those respondents reporting that public officials did not come to their neighborhoods urging them to evacuate, 67% said they would have left had such an official request been made (22% said they would not have responded to such a request), very closely paralleling the 66% of those respondents who evacuated from neighborhoods in which public officials did come through with loud speakers urging residents to evacuate.

Comparison of People Who Evacuated with Those Who Did Not Evacuate

Not surprisingly, the single most powerful predictor of whether or not people evacuated their homes was the area in which they lived. As noted above, people residing in the exposed beach area were significantly more likely to have evacuated (87% evacuated) than were people in the bay-bayou area (55% evacuated) or the inland regions

(47% evacuated).

Another important factor ($p < .04$) was whether public officials came through the neighborhood and told residents to evacuate. Of those respondents who said that public officials had come through their neighborhood, two-thirds (66%) evacuated. In neighborhoods where officials apparently did not come through, only about half of the residents (52%) evacuated. Interestingly, as described in the preceding section, when asked "would you have evacuated if public officials had come through your neighborhood?", 67% of the respondents in these latter neighborhoods said they would have. In a similar vein, the actions of the respondents' neighbors were significantly related ($p < .001$) to their own actions. In neighborhoods where respondents stated that all their neighbors evacuated, 76% of the respondents themselves evacuated too. In neighborhoods where none of the neighbors were said to have evacuated, on the other hand, only 22% of our respondents evacuated.

Most other factors were not related significantly to likelihood of evacuation. Thus, residents who evacuated were no more or less likely to have listened to weather reports, to have known about the location of public shelters, to have had previous experience in hurricanes, and so forth, than persons who did not evacuate.

Most demographic variables (e.g. sex, marital status, religion, political affiliation, occupation, education) were not significantly related to likelihood of evacuation. One such factor, however, age, was significantly related ($p < .03$) to evacuation. As Table III indicates, persons in the youngest (18-25) and oldest (61 and over) age

TABLE III

Percentage of Respondents of
Different Ages Who Evacuated
Before Hurricane Eloise Struck

	<u>Age</u>				
	18-25	26-40	41-50	51-60	61 & Over
Evacuated	85.7%	50.0%	52.5%	56.3%	61.0%
Did not evacuate	14.3%	50.0%	47.5%	43.7%	39.0%

groups surveyed were more likely to have evacuated than were people in the middle age groups. Factors such as size and types of houses, location of residence (e.g. a large segment of the elderly on the beach), numbers and ages of children, might be "hidden" in this apparent relationship between age and evacuation.

Previous Hurricane Experience

Two-thirds of the respondents said they had been in a hurricane prior to experiencing Hurricane Eloise. Of these, only forty-one percent had evacuated in the previous hurricanes, but 59% of those people with prior hurricane experience evacuated from Hurricane Eloise.

Fifty-eight percent felt that Hurricane Eloise was worse than any previous hurricane they had experienced (Hurricane Eloise was slightly more severe than a 100-year hurricane). Three-fourths of those respondents that had been in a previous hurricane felt that their experiences in those hurricanes had led them to take more precautions and preparations for Hurricane Eloise. One-half of the total sample indicated they learned something from Hurricane Eloise that would help them deal more effectively with future hurricanes (with most of these respondents indicating an increased respect for the damage and injury a hurricane can do.) Coincidentally, the local Civil Defense Director expressed the opinion that individual experiences with previous, milder hurricanes in the area had helped to prepare many citizens for Eloise. Nonetheless, statistically, there was not a significant association between having been in a previous hurricane and evacuation during Hurricane Eloise.

Perceptions of Weather Forecasting and Weather Reporting

Despite the fact that announcements that Hurricane Eloise would come ashore at Panama City were not made until 6 to 8 hours before it hit, little loss of confidence in weather forecasting is indicated by these respondents. Although 42% of the respondents stated that Hurricane Eloise proved to be worse than they had expected, 85% of the interviewees felt that the weather reports issued were "sufficiently" accurate. Seventy-six percent felt that weather bureaus are "usually" or "almost always" accurate in predicting where a hurricane is likely to go and how severe it is likely to be.

Four-fifths of the sample felt that the news media had performed satisfactorily in reporting the conditions and characteristics of the approaching hurricane. Eighty-five percent had no criticism of the manner in which the news media had performed, either before, during, or after the hurricane. (Six percent of the respondents wanted more information from the mass media before and during the storm on evacuation procedures.)

Perceptions of Public Agency Performance

Responses of participants in the survey indicate general approval of the manner in which public agencies responded to the hurricane. Less than 10% of the respondents could think of anything that public agencies might have done differently in helping people deal with the effects and aftermath of the storm. Further, less than 10% of the respondents could suggest anything such agencies might have done differently during the storm. In preparing for the arrival of the hurricane, however,

one-fifth of the respondents felt that there could have been some improvement in the manner in which public agencies helped people deal with the approach of the hurricane. The majority of these respondents cited traffic control and other evacuation assistance as their major suggestion.

Perceptions of the Effects of Hurricane Eloise on Community Life

When asked about the effects of the hurricane, a very differentiated interpretation and response to the hurricane on the part of the Panama City residents emerged, depending in large part on the particular area of the community in which the respondents live. Although seemingly a common sense point, this may be very significant, as it creates a very diverse public opinion about the hurricane and its effect. Of this total sample, 47% reported that they were affected personally by the hurricane, with the effects ranging from various degrees of property damage to minor inconveniences and missing work for a day or so. Slightly over half the respondents (53%) reported no effect on them personally from Hurricane Eloise. As might be expected, this factor varies depending upon the particular area in which the respondent lived: three-fourths of the respondents living in the beach area reported that they were personally affected; 41% of those in inland areas said they were personally affected; and 37% of those in bay areas said they were affected (although 55% evacuated).

There clearly is no community consensus on the hurricane, its effects, or local responses to any such hurricane effects. (a) Significantly, less than half the respondents (42%) see detrimental

economic consequences to the community (ranging from affecting business and lost jobs to physical damage). Interestingly, twenty-three percent of the respondents perceived the hurricane to have had a beneficial effect on the economic life of the community. One noticeable finding here is that those in the area most severely damaged by Hurricane Eloise were those most likely to perceive beneficial economic effects; 27% of the beach residents perceived beneficial effects of the hurricane on the economic life of Panama City. (Informally, one beachside tavernkeeper who remained open for business despite major damage to his building, reported that in the months immediately following the hurricane hundreds of construction workers patronized his place, and, indeed, his bar became an important labor and job contracting center.) Only 20% of the residents of inland areas and 15% of the bay residents thought the hurricane had beneficial effects on the economy. Similarly, it is the bay residents who saw the hurricane as having the most detrimental consequences on tourism and business. (b) Three-fourths of the respondents, regardless of area, viewed Hurricane Eloise as having had little consequence for the political life of the community. Of those who did perceive consequences for the political life of the community, 6% cited negative consequences, such as politicians reaping publicity and other self-serving interests, with the remainder seeing more legitimate community political impacts such as highlighting public debate on setback legislation. (c) Again, regardless of area, approximately three-fourths of the respondents saw Hurricane Eloise as having little consequence on the social life of the community. Seventeen

percent perceived Hurricane Eloise to have negative effects on social life in the sense of disrupting social activities or destroying facilities. Six percent of the respondents saw beneficial social consequences stemming from the hurricane, in that the storm may have provided a common bond to strengthen community solidarity in rebuilding and brought "new and exciting activities and people" into the community.

(d) One-third of the people saw negative recreational consequences of the hurricane on the community (noting loss of facilities, beaches, fishing, etc.). Strikingly, two thirds of the people did not perceive the hurricane to have any negative consequences on the recreational life of the area. Residents of all three areas (beach, bay-bayou and inland) were similar in these perceptions. (e) One-fifth of the sample felt a greater religious feeling had been engendered in the community because of the hurricane; the remainder saw little consequence of the hurricane on the religious life of the community. (It might be noted that by national standards, the Panama City sample is more highly "church-going" with slightly over half the respondents reporting church attendance at least once a week.) It is the bay group and inland groups that were most likely to perceive this effect on religious life; 27% of the bay respondents perceived more religious feeling, and 22% of the inland people expressed such sentiments, while only 14% of the beach residents viewed religious life as having been affected in any way by the hurricane.

Perceived Effect on Tourism

Questions designed to elicit the respondents' perception of the consequences of the hurricane on tourism in the area revealed a lack of

consensus in the community on the issue. Less than half (41%) of those responding to the survey felt that tourism had decreased because of Hurricane Eloise. Another 41% did not feel that the storm had had any effect on tourism one way or the other. (It might be noted that the hurricane hit during the off-season for tourists -- after the summer season but before the beginning of "snowbird" season.) Over half (56%) of the respondents felt that there would be no adverse effect on tourism for the rest of the winter (i.e., late January through March 1976). Only one-fourth felt that tourism during the winter would be adversely affected by the hurricane -- a point to be explained again perhaps by the fact that this was the off-season. When asked about tourism for the coming summer (1976), one-third felt that tourism would be off; one-half did not feel it would be. A small consistent group of respondents (7%) felt that Hurricane Eloise was going to help tourism throughout the year and into the summer because it would publicize and draw attention to the area, show what is there and, in fact, provide wide publicity to the area that would attract more tourists.

Perception of Media Influence on Tourism

Eighty percent of the sample felt the Panama City mass media had accurately portrayed the effect of Hurricane Eloise on the community. At the time of this survey (January), a surprising sixty percent of the respondents said they had not yet seen anything about Hurricane Eloise in "out-of-town" news media. (It is suspected that the nearby Fort Walton Beach and Pensacola media were not viewed by the sample respondents as "out-of-town" media in responding to the questionnaire.)

Of the forty percent of the sample that said they had seen something about the hurricane in out-of-town media, one-fourth felt that the hurricane damage to the community had been depicted as worse than it acutally was. However, just as we noted in community opinion about the effects of the storm on tourism, their opinion was evenly divided as to whether or not this "erroneous" media content would help or hurt tourism for Panama City.

CONCLUSIONS

Patterns of response to Eloise, especially response to warnings, were very similar to those in other hurricane situations which have been studied. Although the death and injury tolls were quite low, that is not justification for complacency about the existing warning system. Our data show that approximately 40% of the people did not relocate to safer quarters (one-of-seven did not evacuate the beach area), which differs with earlier reports of "almost total" evacuation.

Why did so "few" evacuate? One might argue that the others did not need to, as evidenced by the low loss of life. After all, some pattern of rationality was suggested by the fact that evacuation rates were highest in the most hazardous areas. There were probably a number of other factors operating, however. Fifty-seven percent of the people didn't learn until after midnight that the storm was to hit Panama City. They obviously did not interpret earlier warnings for the much larger area, including Panama City, as being adequate evidence that they may be in danger, despite the fact that the National Weather Service advised relocation from low-lying areas in Bay County at 9:45 p.m.

The public might quite possibly be depending too heavily on NWS advisories and warnings, especially several hours before expected landfall. Perhaps broadcasts should stress the fact that twenty-four hour forecasts of landfall, and even 12-hour forecasts, are subject to error and that residents throughout the entire warning "lane" should make preparations for possible relocation. There may actually be more

confidence by the public in hurricane forecasting than is merited.

As in most previous hurricane situations, the great majority of people received most of their information about the hurricane from radio and television. Almost everyone reported checking weather reports at least once or twice Monday night (71% almost every hour) and the media provided a great deal of attention and information concerning the storm and hurricanes in general. Nevertheless, the 9:45 P.M. relocation advisory was apparently unheard, not remembered, or not given much weight by most people. Also, almost one-out-of-three respondents reported learning that the hurricane was to hit Panama City, not from the media, but from friends and personal contacts.

These data suggest two points: First, some information is not reaching listeners and viewers. This is not to say the information is not broadcast; perhaps listeners and viewers miss it or misinterpret it. Significant messages should be repeated, repeated, repeated and explained each time. Second, the presumption should not be made that everyone is monitoring the storm closely. Apparently word-of-mouth and personal contact continue to play a significant role in warning dissemination. In some coastal cities, social connections may not be so well developed as in northwest Florida, and that mode of dissemination may not be as reliable.

Although the great majority of people interviewed were satisfied with the performance of public agencies dealing with warning and evacuation, there is some cause for concern. Only 15% of the respondents who evacuated did so before midnight (although 43% knew before midnight that the storm was to hit Panama City), and three-out-of-four evacuees

left between 2:00 and 4:30 a.m. This temporal concentration so near landfall time is alarming and makes the job of traffic controllers extremely difficult. This is particularly disturbing if the same behavior occurs in other coastal areas having even higher concentrations of people and even fewer evacuation routes.

Perhaps it may have been fortunate that most people did not evacuate. A fourth of the respondents had difficulty reaching their destinations, and a fifth complained of poor traffic movement, but the consequences might have been much worse if the number of vehicles on the streets and roads had been almost doubled. Informal conversations with police officers and Highway Patrol officers also gave some cause to question the planning and coordination of traffic control activities.

A very interesting phenomenon was that people living in the most hazardous areas -- the beach and bays -- were much more likely to evacuate out-of-town than go to shelters or elsewhere within the city. This was not true of non-beach and non-bay dwellers who evacuated. No reasonably certain explanation is obvious. If this is a general phenomenon, and not just symptomatic of some unidentified variable in Panama City, the implications could be significant for planning public shelters and evacuation routes.

Two notes on warning response concern the use of public "officials" in advising evacuation. First, there is evidence that perhaps two-thirds of the non-evacuees could have been induced to relocate by a personal appearance and announcement in their neighborhood by Civil Defense or other official representatives. While this obviously poses tremendous personnel and logistical problems, greater use should be

made of this form of dissemination when possible in areas which should be evacuated.

Second, high ranking officials with the responsibility and authority to make "evacuation orders" should consider well in advance the conditions under which they would order or advise evacuation and what the likely consequences would be under various scenarios. Obviously there is a delicate trade-off between the consequences of an "unnecessary" evacuation and the consequences of waiting too long. The chances of a catastrophe appear to increase dramatically the longer people wait to leave (or try to leave), and many people appear to wait for an official announcement before leaving. Nonetheless, results of this survey suggest that approximately thirty percent of the people of Panama City did not, or would not, respond to official instructions to evacuate.

Also, there is some evidence that the general public may have been influenced by preparation and evacuation orders given to the nearby Air Force base. This potential exists in a number of coastal areas, and suggests that military response to the disaster should not be taken without regard to its possible impact on the local civilian population.

As in previous studies, in general, no pronounced differences were found between leavers and stayers. This was true when Chi-square tests were performed on pairs of variables, and despite a rather large sample size (205) for significance testing, few differences were detected at the .05 or better significance level. The magnitudes of even the significant differences were very small when viewed as a measure of association using Goodman and Kruskal's Lambda. This is discouraging

and makes one wonder whether the right questions are being asked and whether the research designs are adequate in studies of this type.

Finally, there are a fair number of people who may not have seen Eloise as being all that bad. When asked open-ended questions about the effects of the hurricane about a fifth of the respondents gave a positive economic or political effect, and only a third of those interviewed believed tourism would be hurt. Less than half of the respondents specified any negative effects at all. Obviously, not too much should be made of this point; if questions had been phrased differently, responses may have differed considerably. The point may have some significance, however, in that if public perception of the hazard is not so negative, public concern with it over the long run may be less, and there may be less support in the community for hurricane-coping activities and planning.

This study suggests that in general the people of Panama City responded well to Hurricane Eloise and the citizenry was generally satisfied with official and media response to the disaster. However, neither these results nor the absence of loss of life during Hurricane Eloise should be taken as reasons for complacency in preparing for any future disasters.

Appendix A

Interviewer _____ Area _____
 Date _____ Site Address _____
 Time _____

Statement of Introduction by Interviewer.
 (name, purpose of study, sponsorship, confidentiality)

1. Are you a resident of Panama City (Beach)? Yes ___ No ___
2. Hurricane Eloise hit this area around 8:00 AM on Tuesday, September 22.
 Were you living (Did you own property) in Panama City (Beach) last
 September? Yes ___ No ___
3. How many years have you lived (owned property) in Panama City (Beach)? _____
4. Where did you live before moving to Panama City (Beach)?

 _____ city _____ state
 Not applicable _____
5. How many people live in this household? _____
 What is their relationship to you and their age?

Relationship	Age
_____	_____
_____	_____
_____	_____
_____	_____
6. Were you or anyone in your household personally affected in any way by
 Hurricane Eloise? Yes ___ No ___ Don't Know ___
 If yes: In what way?
7. Do you think that over the past several months, Hurricane Eloise has had any
 effect on the general economic life of this community?
 Yes ___ No ___ Don't Know ___
 If Yes: In what way?
8. In general, do you think that over the past several months Hurricane Eloise has
 had any effect on political life of the community? Yes ___ No ___ Don't Know ___
 If Yes: In what way?

9. How about the social life of the community? In general, do you think Hurricane Eloise has had any effect on that over the past several months?

Yes ___ No ___ Don't Know ___

If Yes: In what way?

10. Recreational life? Do you think Hurricane Eloise has had any effect on that over the past several months? Yes ___ No ___ Don't Know ___

If Yes: In what way?

11. And, do you think that over the past several months Hurricane Eloise has had any effect on religious life in general of the community?

Yes ___ No ___ Don't Know ___

If yes: In what way?

12. So far, do you think Hurricane Eloise has increased, decreased or made no difference on tourism in Panama City Beach?

Increased ___ Decreased ___ No difference ___ Don't Know ___

13. How about for the rest of this winter? Do you think Hurricane Eloise will increase, decrease or make no difference on tourism in Panama City Beach?

Increase ___ Decrease ___ No difference ___ Don't Know ___

14. And this next summer? Do you think Hurricane Eloise will increase, decrease or make no difference on tourism in Panama City Beach this summer?

Increase ___ Decrease ___ No difference ___ Don't Know ___

15. Were you actually in the Panama City area the day and/or night before Eloise hit? Yes ___ No ___

If "no", where were you? _____

If "No" to No.15, skip to No.46

16. Can you tell me about when it was that you heard about Hurricane Eloise for the first time?

- Several days before it hit Panama City _____
- About a day before it hit Panama City _____
- A few hours before it hit Panama City _____
- When it hit Panama City _____
- Don't Know _____

17. Do you remember how you first heard about it?

- Panama City radio stations _____
- Out-of-town radio stations _____
- Television stations _____
- Newspaper _____
- Family/Relatives _____

17. (continued)

Neighbors _____
 Other people _____
 Don't Know _____

18. About how many miles from here was the Hurricane when you first heard about it? _____ If "Don't Know", encourage to take a guess: _____

19. Did you begin listening to weather reports about the Hurricane right after you first heard about it? Yes _____ No _____ Don't Know _____

If Yes: Where did you usually get these weather reports?

Panama City radio _____
 Out-of-town radio _____
 Television _____
 Family/Relatives _____
 Telephoning weather bureau _____
 All of these _____
 Other _____

20. During the day before the Hurricane hit, where did you usually get weather reports?

Panama City radio _____
 Out-of-town radio _____
 Television _____
 Family/Relatives _____
 Telephoning weather bureau _____
 All of these _____
 Other _____
 None, didn't listen _____

a. During the day before the Hurricane hit, about how often would you say you listened to weather reports?

Once _____
 Several times _____
 Almost every hour _____

21. Did you keep a hurricane tracking chart? Yes _____ No _____

22. When was it that you first heard that Hurricane Eloise was going to hit Panama City for sure? _____ Don't Know _____

23. Do you remember how you first heard that the Hurricane was going to hit Panama City for sure?

Panama City radio station _____ (Do you remember what station? _____)
 Out-of-town radio station _____ (Do you remember what station? _____)
 Television _____ (Do you remember what station? _____)
 Family/Relatives _____
 Neighbors _____
 Friends _____
 Other _____

24. Do you remember what was said about the Hurricane when you first heard that it was going to hit Panama City?

25. During the night before the Hurricane hit, about how often would you say you listened to weather reports about the Hurricane? Once or twice during the night ____, several times during the night ____, almost every hour ____, None ____.

a. How long did you listen? _____ (hours; until what time?)

26. The night before the Hurricane hit (say, about 10:00 PM), did you think there was a good chance, some chance or very little chance that it might make a direct hit in the Panama City area?

A good chance ____, some chance ____, very little chance ____.

27. Did you stay up past midnight to watch the weather and listen to weather reports? Yes ____ No ____

If Yes: Is there anything that stands out in your mind about what you heard-- anything you remember that really impressed you? Yes ____ No ____

If yes: What?

28. Did anyone else in your household stay up past midnight to watch the weather and listen to weather reports? Yes ____ No ____

If Yes: Who? _____

29. Did you make any emergency preparations, no matter how minor, for the Hurricane? Yes ____ No ____

If Yes: What? _____

30. Before or during the Hurricane, did you hear any announcements over radio or tv that you should evacuate? Yes ____ No ____ Don't Know ____

If Yes: Do you remember what was announced? _____
Where to go? _____
How to get there? _____
Was that on radio or tv? _____
Do you remember what station that was? _____

31. Did you leave your home before or during the storm? Yes ____ No ____

If Yes: (a) For what reason did you leave? _____
(b) When did you go? _____ (time)
(c) Where did you go? _____
(d) How far from here is that? _____
(e) Why did you decide to go to that particular place? _____
(f) By what means of transportation did you go there? _____

31. (continued)

(g) Did you have any problems getting there? Yes ___ No ___

If "Yes", what problems? _____

(h) Did you eventually get there? Yes ___ No ___

If "Yes", when? _____

If "No", where did you go? _____

(i) Did anyone go with you? Yes ___ No ___

If "Yes", who? _____

(j) Did anyone stay here at home during the storm? Yes ___ No ___

If "Yes", who? _____

(k) When did you return home? _____

If "no": (a) What did you do during the storm? _____

(b) What would it have taken to make you leave your home and go
somewhere else? _____32. What really influenced you to leave or to stay in your home--what were the
most important influences?

_____33. Did public officials (for example, police, civil defense) come through your
neighborhood advising people to get out? Yes ___ No ___ Don't Know ___If "no" or "Don't Know": If they had come through advising you to get out,
would you have left? Yes ___ No ___

If "no": Why not? _____

34. Do you think the weather reports on radio and television were accurate about
the coming of the Hurricane? Yes ___ No ___ Don't Know ___

(If "no": In what way weren't they accurate? _____

35. Is there anything the radio/television stations could have done that would
have helped people deal better with the Hurricane?

Yes ___ No ___ Don't Know ___

If "yes": What? _____

36. Is there anything the radio/television stations did that they shouldn't have
done to help people deal better with the Hurricane? Yes ___ No ___

If "yes" What? _____

37. Based on what you heard about the Hurricane from radio and television stations, would you say that you will have a lot of confidence, some confidence or little confidence in what they tell you about another one?

a lot _____
 some _____
 little _____
 Don't Know _____

38. Prior to Hurricane Eloise, did you know that the Panama City areas had public shelters where the public can go to be in a safe place when a storm hits?

Yes _____ No _____

(If "yes": Did you know where any of these public shelters are located in the Panama City area?) Yes _____ No _____

39. Before or during Hurricane Eloise, did you hear any announcements over radio/television about public shelters in the Panama City area where you could go to be in a safe place? Yes _____ No _____ Don't Know _____

If "yes": Were you told how to get there? Yes _____ No _____ Don't Know _____

40. How many of your neighbors evacuated before the Hurricane?

none _____ about half _____ all _____
 a few _____ most _____ Don't Know _____

41. Had you ever been in any other Hurricanes before? Yes _____ No _____

If "yes":

Year (or Name of Hurricane)	Where	Did you leave or stay during that storm?	Was anything of yours damaged/destroyed in that hurricane?
-----------------------------------	-------	---	--

(a) _____

- (b) Was Hurricane Eloise worse, about the same, or not as bad as the worst Hurricane you've ever been in before?

Worse _____ Same _____ Not as bad _____

- (c) Do you think your previous hurricane experience had any effect on what you did during Hurricane Eloise? Yes _____ No _____ Don't Know _____

If "yes": In what way? _____

42. After you first knew Eloise was going to make a direct hit in the Panama City area, you probably had some opinion about how bad it would be. Was Eloise worse than you expected it would be, about the same or not as bad?

Worse _____ about the same _____ not as bad _____

43. Do you own any pets? Yes _____ No _____
If "yes": What did you do with them during the storm? _____

44. Do you know for a fact of any "hurricane parties" during the storm?
Yes _____ No _____
45. During your experience with Eloise, did you learn anything that will help you deal more effectively with future hurricanes? Yes _____ No _____
If "yes", what? _____
46. In the months since the Hurricane Eloise hit Panama City, do you recall anything you've read in local newspapers or seen on local radio/television that you think was inaccurate about the Hurricane and its effect on Panama City?
Yes _____ No _____
If "yes": What? _____
47. Have you seen or heard any of the stories in out-of-town newspapers/radio/television about Hurricane Eloise and its damage to Panama City?
Yes _____ No _____
If "yes": (a) Do you think these stories carried around the country by the media will cause an increase, a decrease or make no difference on tourism in Panama City?
(a) Increase _____ Decrease _____ No difference _____ Don't Know _____
(b) Do you think those stories in out-of-town media have made the storm seem worse than it actually was, have pictured it as it actually was or haven't really shown how bad it actually was?
as it actually was _____
worse than it really was _____
not as bad as it actually was _____
(c) Do you recall anything you've heard or read in the out-of-town media that you think was inaccurate about Eloise's effect on Panama City?
Yes _____ No _____
If "yes": What? _____
48. How accurate do you think the weather bureau is when it comes to predicting where Hurricanes are going to go? almost always accurate _____, usually accurate _____, sometimes accurate _____, rarely accurate _____.
49. How accurate do you think the weather bureau is when it comes to predicting how bad a hurricane is going to be?
almost always accurate _____, usually accurate _____, sometimes accurate _____, rarely accurate _____.

50. In general, how often do you usually listen to weather reports?
 several times a day _____
 about once a day _____
 every other day or so _____
 rarely ever _____
51. Do you have any weather instruments other than a thermometer on which you check the weather yourself? Yes _____ No _____
 If "yes": What? _____
52. Are there any natural signs you know of that usually indicate a change in weather is coming? Yes _____ No _____
 (a) If "yes": What? _____
 (b) Did you rely on any of these other ways for information about Hurricane Eloise? Yes _____ No _____
 If "yes": What were these signs? _____
53. Do you think there are things the police, civil defense, or any other public agencies could have done differently before Hurricane Eloise to help people in Panama City in dealing with the Hurricane?
 Yes _____ No _____ Don't Know _____
 If "yes": What? _____
54. How about during the storm? Anything the police, civil defense or other public agencies might have done differently to help people in dealing with the Hurricane? Yes _____ No _____
 If "yes": What? _____
55. And after the Hurricane was over? Anything they might have done differently to help people deal with the effects of the Hurricane?
 Yes _____ No _____ Don't Know _____
 If "yes": What? _____

And now we would like a little background information:

56. Sex: Male _____ Female _____
57. Age: _____
58. How far did you go in school? high school not complete _____
 high school graduate _____
 some college _____
 college graduate _____
59. What is your marital status?
 married _____
 single _____
 divorced _____
 separated _____
 widowed _____

60. What is your occupation? _____ (If needed:) What kind of things do you do in that work? _____
61. Do you own or rent this residence? Own _____ Rent _____
62. On the whole, would you describe your general health as good, about average, or poor?
 good _____
 average _____
 poor _____
63. Do you own a boat? Yes _____ No _____
 If "yes" what length boat is it? _____
64. What religion would you say you are? _____
65. About how often would you say you attend a church service?
 once or more times a week _____
 once or twice a month _____
 several times a year _____
 rarely ever _____
 never _____
66. Politically, what do you consider yourself to be? Democrat _____
 Republican _____
 American Independent _____
 Independent _____
 Other _____ (What?)
67. We've asked you an awful lot of questions about Hurricane Eloise and about yourself. In your opinion is there anything else that we should know to better understand the impact of Hurricane Eloise on Panama City?
 Yes _____ No _____ Don't Know _____
 If "yes": What? _____
68. Name _____
69. Respondent's address _____

Appendix B

The following is a brief summary of coverage of Hurricane Eloise by Panama City and Pensacola newspapers. The report is based on a systematic review of issues of the two newspapers during September 1975 to March 1976. George P. Foster, a masters degree candidate in anthropology and one of the interviewers for this study, prepared this report as part of an individual, supervised research project under the direction of J. Anthony Paredes.

SUMMARY OF COVERAGE OF HURRICANE ELOISE
BY PANAMA CITY AND PENSACOLA NEWSPAPERS

Prepared by George P. Foster

Coverage by the Panama City News Herald

Hurricane Eloise was covered by the only daily newspaper in Panama City, Florida, the Panama City News Herald, for a period of from three days before the storm struck until the present time (March 1976). Coverage ranged from full page one stories to short comments on the later pages of the main section of the newspaper.

The first mention of hurricane Eloise was on September 20, 1975, from a short AP story on the location (south of Cuba) of the storm. Daily coverage increased in the number of page one stories as the storm approached Panama City, and on September 23, 1975, the storm received front page headline attention. On September 24, 1975, the day after the storm hit, there were ten front page Eloise stories.

Stories prior to the storm were concerned mainly with location information. On September 23, 1975, a status report was given for all military installations around the Panama City area, and preparation by agencies such as the Civil Defense and Red Cross was also covered. All later issues of the News Herald praised the efforts of these agencies and other organizations, including Gulf Power and Southern Bell. At no time were critical remarks printed concerning the reconstruction efforts of these agencies or the evacuation and security measures of the Panama City Police Department or the Florida National Guard. The News Herald ran stories on the availability of relief centers for about one week after the storm struck. On September

25 it was announced that the Bay County Chapter of the American Red Cross would open a disaster assistance clinic at the Panama City Beach civic center. On September 29, 1975, the National Flood Insurers Association set up a claims office in order to handle damage claims. On September 30, 1975, an assistance center was set up in the national guard armory, the agency involved was not mentioned in the News Herald.

Also reported in the newspaper were comments and announcements concerning visits by VIPs such as Governor Reubin Askew, Congressman Robert L.F. ("Bob") Sikes, Secretary of State George Smathers, State Representative Earl Hutto, and Harmon Shields, Director, State Department of Natural Resources. The status of the request by Governor Askew to declare Panama City a disaster area received heavy coverage.

On September 29, the News Herald sold a special "Eloise Issue" that contained stories that were summary versions of the previous week's Eloise stories. This special issue had several full page pictorials to illustrate the damage caused by the storm. It also had stories on the lack of damage to the sport fishing fleet and the large number of motel units still functional. Motel owners said that they had enough units to take the usual number of Canadians for the fall season. This was the only issue to contain a large number of advertisements from hardware stores for reconstruction purposes. No other issues had any difference in the types of ads printed. The Society pages were also unchanged, the only major social event changed by the storm being the Bay County Fair, which had been scheduled for

the week of September 25th but was postponed until the first week in October.

The newspaper gave announcements about the curfew on the beach to prevent looting, and about the strength and effectiveness of the National Guard and Panama City Police patrols in the area. The 7:00 P.M. to 7:00 A.M. curfew was in effect from September 24 until September 27 while homeowners and motel owners tried to secure their storm-tossed possessions.

The "setback issue" received attention in many post-Eloise editions. On October 1, 1975, Representative Hutto asked the cabinet to purchase lands from owners who didn't want to restore damaged buildings within the beach. Askew and Hutto viewed the damage by Eloise as vindication of their 1974 "setback policy" which sought to save the beaches from over-building.

According to the News Herald, damage to businesses other than motels was negligible except for an experimental shrimp farm called Marifarms, which had \$2 million in damages.

In summary, the News Herald served as a positive influence on public opinion in regard to the performance of public agencies, as no articles were negative in their comments on these agencies. The only editorial, "We Must Rebuild," was non-critical of assistance and reconstruction agencies.

Coverage by the Pensacola News Journal

Overall, the Pensacola News Journal had more complete coverage of Hurricane Eloise than the Panama City News Herald. This was due, in part, to the fact that initial reports stated that the hurricane

would strike near Pensacola instead of near Panama City.

Initial coverage consisted of a small article on September 15, 1975, under the weather column, on the existence of a tropical depression reported by the National Weather Service (NWS). On September 16, 1975, a similar article stated that the depression had caused heavy rainfall, and small craft warnings had been issued in Puerto Rico and the Virgin Islands. The same day an AP article stated that the depression had hit St. Croix. On September 17, 1975, hurricane warnings were issued for the north part of the Dominican Republic. On this same day the depression was declared a hurricane by the National Hurricane Center and named Eloise. Another AP article stated that Eloise had killed 6 Puerto Ricans and had caused \$1 million damage in Puerto Rico.

On September 18 the first page-one story appeared from the AP. It reported on damage in Puerto Rico and the loss of life. On September 19 and 20 maps appeared on page one to show the location and strength of the storm. The 21st of September saw no front page coverage. On September 22 a wire service reports article stated that Eloise was stronger, and was heading toward the Gulf Coast. This article also mentioned that the NWS at Sherman Field, Naval Air Station, Pensacola, would sell tracking charts for 25¢ each.

The first day of full page 1-A coverage was on September 22, 1975, when the front page headline read "Eloise Expected to Hit Perdido Bay Area". On the same page an evacuation notice of low lying areas was announced, a hurricane checklist was printed and a list of Civil Defense Shelters was printed. Page two carried stories on the status of Gulf Power Co. repair crews. No change in ads was noted for this

day.

On September 23, 1975, the day Eloise struck between Ft. Walton Beach and Panama City, the morning News Journal had an article about Eloise being forced eastward by a cold front. Also included was picture coverage of preparations, a story on Mobile, Alabama preparation for Eloise, and an article on heavy purchasing of lights, candles, canned foods, masking tape, etc. by area residents. Also included was an article on shelters available to residents of neighboring counties. The afternoon edition of the News Journal stated on page one that Eloise had caused millions in damage to the Miracle Strip. The same edition carried an article entitled "Storm Catches Panama City off Balance." Other articles were about past hurricanes, relief agencies, and the history of Eloise.

September 24 was the day of the Hurricane Issue with full coverage in the entire "A" section of the Pensacola News Journal. At least ten Eloise related articles appeared. The afternoon edition of the same day carried stories about VIP visits (Askew and Sikes), damage to crops (peanuts, pecans, soybeans), and the plight of the poultry industry in Walton County due to lack of power and water.

The September 25 issue carried similar articles to those found on September 24, with articles on clean up, problems with Georgia Power Co., Alabama crop losses in peanuts, corn and soybeans. On September 26 the newspaper carried the headline, "Ford Declares Disaster Area in Five Panhandle Counties". Other articles in the "B" section, which now included a special Eloise section, reported on military efforts at clean up, damage to the shrimp farm in Panama

City, and activities of relief agencies. The September 27 issue had stories on a damaged sewage system in Okaloosa County that caused the evacuation of sixty families, and an editorial by E.W. Carswell of Chipley on natural signs as indicators of an approaching hurricane. The writer declared that he did not see, hear or feel any of the signs at the approach of Eloise. It was also announced that Eloise had caused the postponement of the Ponce de Leon festival scheduled for October 18, which was postponed until the Spring of 1976. On September 28 there were articles on the sewer damage in Okaloosa County and human interest stories on people affected by Eloise. On page 2-E was an editorial by the News Journal Staff on "Eloise Confirms Need for Coastal Setbacks." The September 29 issue carried only four Eloise articles, three of these in the Eloise section and one page-one story entitled "Rivers Recede, Northeast Cleaning Up." From September 30 until the close of specific Eloise coverage with the October 4 edition, all articles covered the same basic subjects: damage reports, reports on relief agencies, human interest stories, and reports on government action on Eloise.

Comparison of Panama City News Herald and the Pensacola News Journal

The Pensacola News Journal enjoys a much wider circulation than the Panama City News Herald, the Pensacola paper circulating in Walton, Escambia, Okaloosa, Santa Rosa and Bay counties, the News Herald selling mainly in Bay County. The larger staff and circulation of the Pensacola paper probably allowed more comprehensive coverage, as seen in day to day coverage, the Pensacola paper including stories and

reports from several counties.

The city of Pensacola seems to have been better prepared to avoid damage by Eloise. Newspaper coverage of safety and emergency procedures was excellent for the Pensacola paper. On September 22, 1975, a Hurricane Checklist was printed on page 1-A to aid residents in dealing with the hurricane. The checklist gave procedures for actions before, during, and after the hurricane struck. Next to the checklist was a list of available shelters for residents of low lying areas.

The Pensacola News Journal also carried several hurricane related editorials, one by the News Journal editorial staff on the damage to businesses caused by high winds. Another was by E.W. Carswell on September 27 was concerned with natural indicators of hurricanes. A September 28 editorial argued for the establishment of a setback line for subsequent beach construction.

The News Journal, like the Panama City News Herald, printed a special Hurricane Eloise issue on September 24, 1975. A total of fifteen Eloise related articles appeared in this issue. The Pensacola paper gave coverage of relief efforts in all panhandle counties west of and including Holmes and Washington Counties. Also covered extensively was the damage to crops in northwest Florida and south Alabama.

Of particular interest was the article of September 23, "Storm Catches Panama City Off Balance." This does not coincide with the News Herald's stories of how well the city was prepared. The Pensacola paper expressed the view that Panama City was unprepared and described how a panic evacuation caused problems on Hwy 231 out of Panama City. In contrast the Panama City News Herald appears to have deemphasized any deficiencies in evacuation and warning procedures which may have occurred.

Appendix C

Previous Research Into Hurricane Warning-Response

Previous research dealing with public response to warnings of natural disaster have been rather unsuccessful at providing generalizations useful in predicting future responses to warnings. However, the following three conclusions are probably merited:

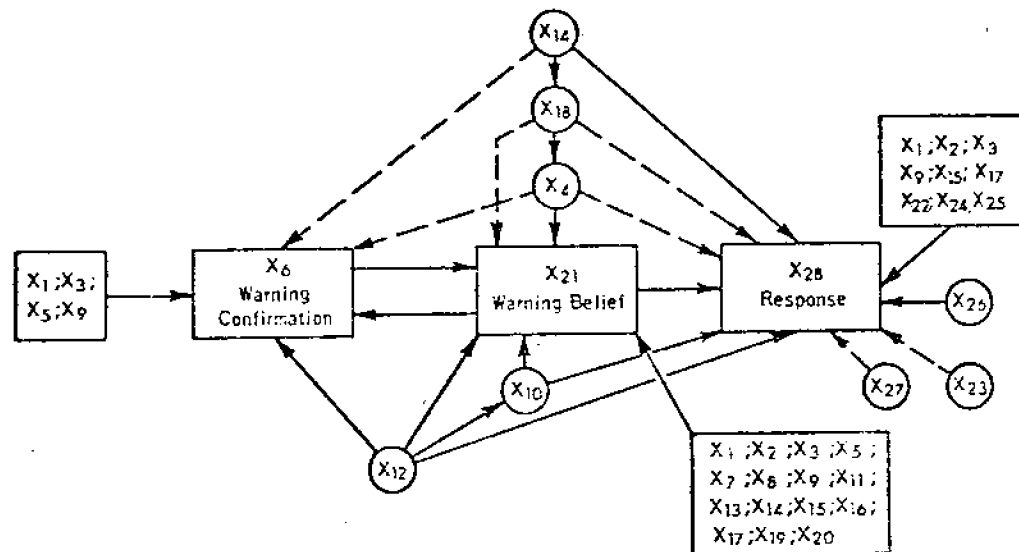
- (1) although everyone may be listening to the same message, individuals may interpret the message differently;
- (2) a person's response to the warning will depend on how his interpretation of the message stimulates him to behave; and
- (3) there are several variables which influence how a person will be stimulated by his interpretation of the message. (Mileti, 1975)

Figure 2 was compiled by Mileti (1975) to summarize the findings of twenty years of warning-response literature. The difficulty is that the findings do not apply universally to all situations, and it is largely unknown under what circumstances the generalizations are appropriate. For example, there have been some studies which have found socio-economic status to affect response, and others which have failed to find that relationship.

The literature dealing specifically with public response to hurricane warnings is fairly scanty. While there have been numerous studies dealing with psychological and sociological responses to hurricane hazard in the U.S. (Baker, 1972; Baker and Patton, 1974; Baumann & Simms, 1974; Bates et. al., 1963; Burton, Kates & Snead, 1969; Capore and Bartick, 1975; Killian, 1954; Martin, 1973; Moore et. al., 1963; Moore, 1964; Rayner, 1953;

Figure 2

MODEL OF RESPONSE TO PRE-IMPACT WARNINGS
SUGGESTED BY THE RESEARCH REVIEW



Where: - - - = indirect relationship; — = direct relationship or no direction specified; X₁ = warning source; X₂ = warning content; X₃ = communication mode; X₄ = number of warnings received; X₅ = perceived warning certainty; X₆ = warning confirmation; X₇ = interpretation of environmental cues; X₈ = observed action of others; X₉ = primary group context; X₁₀ = situational hazard perception; X₁₁ = previous hazard perception; X₁₂ = personal experience; X₁₃ = experience of others; X₁₄ = geographical proximity to target area; X₁₅ = socioeconomic status; X₁₆ = organizational membership; X₁₇ = sex; X₁₈ = age; X₁₉ = urban/rural residence; X₂₀ = race; X₂₁ = warning belief; X₂₂ = normative context; X₂₃ = perceived time to impact; X₂₄ = role conflict; X₂₅ = ethnicity; X₂₆ = psychological locus of control; X₂₇ = fear; and X₂₈ = response.

(After Mileti, 1975)

Schaffer & Cook, 1972; Wilkinson & Ross, 1970), we will review briefly only those which have dealt most explicitly with response to warnings.

The public's principal sources of information regarding imminent hurricane danger are television and radio, and these intermediaries between meteorological experts and the public can play a key role in public response. Sometimes individuals may be tuned to broadcasts from non-local stations and receive information which is inappropriate for their own area. Different stations often attach differing degrees of emergency to the situation, and people may fail to distinguish the reporter's interpretations from those of the National Weather Service (Bates, et. al., 1963; Wilkinson & Ross, 1970).

Even official sources of information can fail in their intention, however. Simpson (1971) has pointed out that radar or satellite pictures of the hurricane system on TV may be misinterpreted by the public. Residents have been unable to estimate the elevation of their homes accurately enough to tell whether they would be safe from flooding by forecast storm surge heights (Bates, et. al., 1963; Wilkinson & Ross, 1970). Weather Service advisories give the location of a hurricane in terms of longitude and latitude and in terms of its bearing and distance from some well-known point of reference. There is some evidence, however, that this information does not enable the public to understand its situation with respect to the hurricane (Baker, 1972). Nevertheless, the public has expressed satisfaction with the warning system (Wilkinson & Ross, 1970).

One of the major issues in warning response research is the role of

previous experience with hurricanes. Probably as with riverine flooding, experience can be either a good teacher or a bad one (Kates, 1962). Residents of Cameron Parish, Louisiana were reluctant to evacuate before Audrey in 1957 because they had weathered previous hurricanes. After catastrophic losses from Audrey, however, the population was much more responsive to hurricane warnings (Bates et. al., 1963; Moore et. al., 1963). In response to warnings of hurricane Carla, 97% of the residents of Cameron Parish evacuated, while in Chambers County, Texas, only 65% evacuated. This was despite the fact that Carla was forecast to hit Chambers County harder. Audrey was a good teacher.

In Mississippi in 1969 residents prepared for a storm similar to the one they had experienced in 1947 (Wilkinson & Ross, 1970). That storm proved to be a poor teacher, however, because the 1969 hurricane, Camille, proved much worse, and preparations proved inadequate.

Wilkinson and Ross (1970) were unable to differentiate conclusively between Mississippi residents who evacuated and those who did not. They conducted chi-square tests on evacuation and numerous other variables, but the proportion of people who evacuated was similar, regardless of the category of the independent variable being tested. There were some obvious exceptions, such as anticipation of water damage. Residents felt the area would be better prepared for future hurricanes.

Another issue involves experience not with previous hurricanes necessarily, but with previous warnings of hurricanes. The concern is that people who have been warned of a hurricane, only to have the storm change its course and leave them unharmed, may put less faith in future

warnings. There is little evidence one way or the other, but at least one study suggests the problem may not be as great as many fear (Killian, 1954).

A recent monograph on hurricane research called for further research on the following subjects (Brinkmann, 1975):

1. Modes of delivering forecasts and character of the message content
2. Individual and family response to hurricane threat information
3. More efficacious ways of evacuating people to safe areas

These research recommendations suggest how little we presently know about warning response behavior.

REFERENCES CITED

- Baker, Earl J. 1972. Cognitive Factors Relating to Response and Adjustment to Hurricane Hazard. Tallahassee: Florida State University. Unpublished M.S. thesis.
- Baker, Earl J. and Donald J. Patton. 1974. "Attitudes Toward Hurricane Hazards on the Gulf Coast." In Gilbert F. White, ed. Natural Hazards: Local, National, Global. New York: Oxford University Press.
- Bates, F.L., C.W. Fogleman, V.J. Parenton, R.H. Pittman, and G.S. Tracy. 1963. The Social and Psychological Consequences of a Natural Disaster: A Longitudinal Study of Hurricane Audrey. Washington: National Academy of Sciences, National Research Council (Publication 1081). (Disaster Research Group, Disaster Study Number 18).
- Baumann, Duane D. and John H. Sims. 1974. "Human Response to the Hurricane." In Gilbert F. White, ed. Natural Hazards: Local, National, Global. New York: Oxford University Press.
- Brinkmann, Waltraud A.R., et. al. 1975. Hurricane Hazard in the United States: A Research Assessment. Boulder: University of Colorado Institute of Behavioral Science (Program on Technology, Environment and Man, Monograph #NSF-RA-E-75-007).
- Burton, Ian, Robert W. Kates, and Rodman E. Snead. 1969. The Human Ecology of Coastal Flood Hazard in Megalopolis. Chicago: University of Chicago (Department of Geography Research Paper No. 115).
- Capone, Donald L. and Howard A. Bartnick. 1975. "Perception of the Hurricane Hazard in South Florida." Unpublished paper presented at 13th Annual Meeting of Southeastern Division of the Association of American Geographers, Biloxi, Mississippi.
- Kates, Robert William. 1962. Hazard and Choice Perception in Flood Plain Management. Chicago: University of Chicago (Department of Geography Research Paper No. 78).
- Killian, L.M. 1954. Evacuation of Panama City Before Hurricane Florence. Washington, D.C.: NAS-NRC, Committee on Disaster Studies.

- Martin, Walter E., Fr. 1973. The Perception of Storm Hazard Along the Outer Banks of North Carolina. Greenville: East Carolina University. Unpublished M.A. Thesis.
- Mileti, Dennis S. 1975. Natural Hazard Warning Systems in the United States: A Research Assessment. Boulder: University of Colorado Institute of Behavioral Science (Program on Technology, Environment and Man, Monograph #NSF-RA-E-75-013).
- Moore, Harry Estill. 1964. And the Winds Blew: A Study of Response to Hurricane Carla. Washington D.C.: NAS-NRC, (Disaster Research Group, Disaster Study Number 19).
- Moore, Harry Estill, Frederick L. Bates, Marvin V. Layman, Vernon J. Parenton. 1963. Before the Wind: A Study of the Response to Hurricane Carla. Washington: NAS-NRC (Publication 1095). (Disaster Research Group, Disaster Study Number 19).
- Rayner, J.F. 1953. Hurricane Barbara: A Study of the Evacuation of Ocean City, Maryland. Washington: National Academy of Sciences, National Research Council. Committee on Disaster Studies, unpublished report.
- Schaffer, R.C., and Cook, E. 1972. Human Response to Hurricane Celia. Collect Station: Texas A&M University Environmental Quality Program.
- Simpson, R.H. 1971. The Decision Process in Hurricane Forecasting. NOAA Technical Memorandum #NWS SR-53. Washington: U.S. Department of Commerce.
- Wilkinson, K.P. and P.J. Ross. 1970. Citizens' Responses to Warnings of Hurricane Camille. Social Science Research Center Report #35. State College: Mississippi State University.

A Longitudinal Study of Public Attitudes
Toward Hazard Zone Land Use Controls

Earl J. Baker

Final Report
Social Impact of Hurricane Eloise
on Panama City, Florida Stage II

Immediate Response Project
State University System of Florida
Sea Grant Program

Florida Resources and Environmental Analysis Center
The Florida State University
Tallahassee, Florida

November, 1976

LIST OF TABLES

	Page
Table 1. Attitude toward Setback Line.....	8
Table 2. Attitude toward Flood Zone Restrictions....	9
Table 3. Attitude toward Building Code for Hurricane Wind.....	11
Table 4. Attitude toward Mobile Home Tie-Down Law...	12
Table 5. Awareness of Land Use Legislation.....	13
Table 6. Level of Government Preferred to Regulate Land Use.....	16
Table 7. Average Preference for Level of Governmental Regulation.....	16
Table 8. Relationship between Attitudes and Selected Independent Variables.....	17
Table 9. Percent of Sample Displaying Attitude Shifts between First and Second Responses.....	25
Table 10. Percent of Sample Displaying Attitude Shifts between First and Third Responses.....	25

Preface

Without the cooperation of students enrolled in GGY 580 at FSU in the Fall of 1975, this study would have been infeasible. Bill Barnette, Wanda Beard, Dave Kameny, Frank Longo, Bonnie Sue Nelson, Don Neubacher, Fran Vargas, and R. C. Whitman have my sincere thanks. Marshall Mott-Smith and Ben Nelson were similarly most helpful in the follow-up. Funding from the State University System of Florida Sea Grant Program made the longitudinal aspects of the investigation possible. Finally, I would like to thank the residents of Panama City Beach and Ft. Walton Beach, Florida who participated in the study, especially those who took time to respond during the follow-up stages.

Introduction

Numerous research problems dealing with human response to natural hazards require immediate data collection, but there are few opportunities to do so. That requires not only the occurrence of an extreme (and rare) natural event, but also the ability to mobilize quickly a research team. A temporal coincidence made that possible in the fall of 1975, however. On September 22 Hurricane Eloise hit the northwest Florida panhandle. During that academic term at nearby Florida State University, a course was being taught dealing with research methods in human geography. After Eloise the class was conducted so as to apply a number of the techniques and concepts normally taught in the course to a research problem in the stricken area. Thus it was possible to mobilize a research team for data collection very quickly and (initially) without funding.

The purpose of the research was to investigate a generally held but undocumented belief about public reaction to natural disasters. For years it has been posited and generally substantiated that as time passes after a disaster, individuals' concern with the risk posed by living in the hazardous area diminishes (White, 1942; Kates, 1962). That is, immediately after

a disaster, awareness of the hazard is heightened, but the awareness decays with the passage of time between disasters. It follows that individuals should be more likely to adopt loss-mitigating adjustments to the hazard soon after a disaster. This certainly appears to be the case with respect to evacuation behavior in coastal communities when hurricane warnings are issued. Places with relatively recent major disasters (with considerable loss of life) respond very affirmatively when a hurricane is forecast for their location, and the evacuation rate is high (Moore, 1963; NOAA, 1975).

A similar phenomenon is believed to exist with respect to public attitudes toward legislation which would restrict the use of hazardous areas. That is, soon after a disaster, the people in the affected community may receive somewhat favorably legal measures to control land use in the hazard zone. With the passage of time, however, as the drama and trauma of the disaster faded from memory, public support for such legislative proposals would diminish. The research undertaken after Eloise was designed to test that hypothesis and to achieve some estimate of the rate of the predicted decay in support.

Methodology

Initial Sampling

Eloise was a major storm with a peak storm surge of 18 feet and maximum sustained winds of 125 mph. Landfall occurred between Panama City and Ft. Walton Beach, Florida. Panama City Beach, a resort area, was hit hard. There were no deaths attributed to Eloise in the area, but property damage was large. Commercial and residential structures directly on the beach were flooded by storm surge, and some completely collapsed due to undermining by waves. Further inland wind damage, especially to roofs, was widespread.

Panama City Beach was chosen as one site for the investigation. Most interviewing was conducted within a few blocks of the water's edge. Residential development on the beach is relatively sparse, and many of the houses there are second homes, not occupied year-round. Furthermore, many of those were seriously damaged by the hurricane, and owners were inaccessible.

The other site used in the study was the Dons Bayou-Cinco Bayou area of Ft. Walton Beach. Ft. Walton Beach was hit less hard than Panama City Beach, but damage was apparent in many areas. The bayou area is not on the Gulf of Mexico and was not directly affected by storm surge. The area is poorly drained, however,

and rains from Eloise caused flooding in several neighborhoods. Neighborhoods where evacuation was necessary were used in the study.

Sampling was random by city blocks. In Panama City Beach 66 interviews were obtained, while 54 were conducted in Ft. Walton Beach. Sample size and selection procedure were constrained by resources. The interviewing was carried out on a weekend two weeks after the hurricane. While the sample size of 120 is not impressive (even less so for generalizations to subsamples), matters were helped considerably by the small variance found in the attitudes measured. Generally speaking, the principal parameters estimated herein can be expressed with a 90% confidence interval with 5% reliability. That is, if 100 additional samples of the same size were taken, 90 of them would yield parameter estimates within 5% of the values reported here.

These reliability figures apply to the areas from which the sample was drawn: Panama City Beach and the Dons Bayou-Cinco Bayou area of Ft. Walton Beach. The extent to which generalizations can be applied to other places will be discussed later.

The Instrument

The entire interview schedule appears in the Appendix to this report. The principal dependent variables of interest appear in Section 7. Four different types of laws designed to restrict construction in hurricane-prone areas were described very briefly and non-technically, and a statement advocating each was read to the respondent:

- a. Structures built near the beach should be required by law to be a certain distance away from the water where erosion might occur.
- b. Structures built in areas that have a "good" chance of being flooded should be required by law to be built so as to keep the flood waters from getting inside the buildings.
- c. There should be a law requiring that new homes built in this area be able to withstand hurricane winds without suffering major damage.
- d. There should be a law requiring all mobile homes in this area to be tied-down so that hurricane winds cannot move them.

Several other questions also provided data which will be reported here, but the above constitute the main dependent variables.

Attitudes were measured on a 5-point scale. Respondents were asked whether they would strongly disagree with the statement, disagree, agree, strongly agree, or whether they were neutral about it. The responses were scaled -2, -1, +1, +2, and 0, respectively.

Follow-up

Six months after the original interviews were conducted, attempts were made to contact the same respondents again. Still six months later a third contact was attempted. This longitudinal phase of the study was supported by the State University System of Florida Sea Grant Program concurrently with another post-hurricane research project (Baker, Brigham, Paredes, and Smith, 1976).

Letters were initially sent to the original respondents, including the questions listed above, identical to the way they appeared on the first interview schedule. Those were the only questions asked in the follow-ups. A substantial portion of the original respondents did not return the mailed questionnaires (approximately 50%), so interviewers returned to Panama City Beach and Ft. Walton Beach to seek out the remaining individuals personally. Eventually responses were obtained from 90 people of the original 120 (75%) at the end of the first follow-up and from 82 people (68%) at the end of the second. Despite the reduced numbers, confidence intervals for parameters estimated from these samples are generally comparable to those of the first sample, due to a reduction in the variance in the later samples.

Results

Initial Attitudes

The first surprise in the data was the degree of support found for all four types of land use controls. The setback line, generally expected to be the most controversial of the four land use measures, was favored or strongly favored by 91% of the respondents (93% in Panama City Beach and 89% in Ft. Walton Beach) (Table 1). It should be noted, however, that very few of the people in the sample would be directly affected by a setback line, as most own property or reside slightly inland from the beach. (The state does in fact have a coastal construction setback line.)

There was also strong support for flood zone restrictions: 78% either favored or strongly favored such legislation, the distribution being approximately the same at both interview sites (Table 2). Surprisingly the most frequent reason given for opposing the legislation had nothing to do with property rights or individual freedoms. Rather, opposition was usually motivated by the belief that the law could not be complied with. That is, people opposing the flood zone restrictions most often did so because they believed it to be impossible to construct structures "so as to keep flood waters from getting inside the buildings." Both communities

Table 1 .--Attitude toward Setback Line

Panama City Beach and Ft. Walton Beach

Percent of Sample

Attitude Category	Initial Responses (N = 120)	Second Responses (N = 90)	Third Responses (N = 82)
Strongly Opposed	.8	1.1	0
Opposed	5.0	3.3	4.1
Neutral	3.3	2.2	1.4
Favor	43.3	24.2	25.0
Strongly Favor	47.5	68.9	69.4
Favor or Strongly Favor	90.8	93.1	94.4

Panama City Beach

Attitude Category	Initial Responses (N = 66)	Second Responses (N = 48)	Third Responses (N = 43)
Strongly Opposed	1.5	2.1	0
Opposed	1.5	4.2	5.3
Neutral	4.5	2.1	0
Favor	33.3	20.8	21.1
Strongly Favor	59.1	70.8	73.7
Favor or Strongly Favor	92.4	91.6	94.8

Ft. Walton Beach

Attitude Category	Initial Responses (N = 54)	Second Responses (N = 42)	Third Responses (N = 39)
Strongly Opposed	0	0	0
Opposed	9.3	2.4	2.9
Neutral	1.9	2.4	2.9
Favor	55.6	28.6	29.4
Strongly Favor	33.3	66.7	64.7
Favor or Strongly Favor	88.9	95.3	94.1

Table 2.--Attitude toward Flood Zone Restrictions

Panama City Beach and Ft. Walton Beach

Percent of Sample

Attitude Category	Initial Responses (N = 120)	Second Responses (N = 90)	Third Responses (N = 82)
Strongly Opposed	.8	0	2.8
Opposed	8.3	8.9	6.9
Neutral	12.5	7.8	4.2
Favor	46.7	23.3	29.2
Strongly Favor	31.7	60.0	56.9
Favor or Strongly Favor	78.4	83.3	86.1

Panama City Beach

Attitude Category	Initial Responses (N = 66)	Second Responses (N = 48)	Third Responses (N = 43)
Strongly Opposed	1.5	0	2.6
Opposed	7.6	14.6	10.5
Neutral	12.1	6.3	5.3
Favor	43.9	27.1	28.9
Strongly Favor	34.8	52.1	52.6
Favor or Strongly Favor	78.7	79.2	81.5

Ft. Walton Beach

Attitude Category	Initial Responses (N = 54)	Second Responses (N = 42)	Third Responses (N = 39)
Strongly Opposed	0	0	2.9
Opposed	9.3	2.4	2.9
Neutral	13.0	9.5	2.9
Favor	50.0	19.0	29.4
Strongly Favor	27.8	69.0	61.8
Favor or Strongly Favor	77.8	88.0	91.2

have laws similar to the one described.

Public support for building codes designed to cope with hurricane winds was at a level of 70% (65% in Panama City Beach, 76% in Ft. Walton Beach) (Table 3). It had not been anticipated that support for this sort of law would be less than that for setback lines and flood zone restrictions. The probable explanation is the same as the reason for opposition to flood zone restrictions: most of the 15% of the sample opposed to such a law did not believe that houses could be built to withstand hurricane force winds. The building codes in the two areas have special provisions for hurricane wind.

Very strong support also existed for mobile home tie-down requirements (Table 4). Ninety percent of the sample were in favor or strongly in favor (86% in Panama City Beach, 94% in Ft. Walton Beach). Very few respondents were mobile home owners, and Florida does have such a law.

Awareness of the existing laws governing hazard zone land use was very poor at the time of the survey (Table 5). Only 15% of the respondents were aware of the state's coastal construction setback line, although almost an equal number were aware of the law but thought

Table 3.—Attitude toward Building Code for
Hurricane Wind

Panama City Beach and Ft. Walton Beach

Percent of Sample

Attitude Category	Initial Responses (N = 120)	Second Responses (N = 90)	Third Responses (N = 82)
Strongly Opposed	2.5	1.1	1.4
Opposed	11.7	8.9	4.2
Neutral	15.8	12.2	6.9
Favor	47.5	26.7	36.1
Strongly Favor	22.5	51.1	51.1
Favor or Strongly Favor	70.0	77.8	87.4

Panama City Beach

Attitude Category	Initial Responses (N = 66)	Second Responses (N = 48)	Third Responses (N = 43)
Strongly Opposed	4.5	0	0
Opposed	13.6	14.6	7.9
Neutral	16.7	18.8	7.9
Favor	36.4	25.0	34.2
Strongly Favor	28.8	41.7	50.0
Favor or Strongly Favor	65.2	66.7	84.2

Ft. Walton Beach

Attitude Category	Initial Responses (N = 54)	Second Responses (N = 42)	Third Responses (N = 39)
Strongly Opposed	0	2.4	2.9
Opposed	9.3	2.4	0
Neutral	14.8	4.8	5.9
Favor	61.1	28.6	38.2
Strongly Favor	14.8	61.9	52.9
Favor or Strongly Favor	75.9	90.5	91.1

Table 4.--Attitude toward Mobile Home Tie Down Law

Panama City Beach and Ft. Walton Beach

Percent of Sample

Attitude Category	Initial Responses (N = 120)	Second Responses (N = 90)	Third Responses (N = 82)
Strongly Opposed	3.3	1.1	1.4
Opposed	1.7	4.4	0
Neutral	5.0	1.1	1.4
Favor	35.8	21.1	23.6
Strongly Favor	54.2	72.2	73.6
Favor or Strongly Favor	90.0	93.3	97.2

Panama City Beach

Attitude Category	Initial Responses (N = 66)	Second Responses (N = 48)	Third Responses (N = 43)
Strongly Opposed	6.1	2.1	2.6
Opposed	1.5	6.3	0
Neutral	6.1	0	2.6
Favor	15.2	16.7	23.7
Strongly Favor	71.2	72.9	71.1
Favor or Strongly Favor	86.4	89.6	94.8

Ft. Walton Beach

Attitude Category	Initial Responses (N = 54)	Second Responses (N = 42)	Third Responses (N = 39)
Strongly Opposed	0	0	0
Opposed	1.9	2.3	0
Neutral	3.7	2.3	0
Favor	61.1	25.6	23.5
Strongly Favor	33.3	69.8	76.5
Favor or Strongly Favor	94.4	95.4	100.0

Table 5.---Awareness of Land Use Legislation

Panama City and Ft. Walton Beach
(N = 120)

Level of Government Believed to Regulate

(Percent of Sample)

	<u>None</u>	<u>Local</u>	<u>State</u>	<u>Federal</u>	<u>More than one level</u>
Setback Line	72.5	7.5	15.0	.8	4.2
Mobile Home Tie Down	67.5	4.2	19.2	.8	8.3
Flood Zone Restriction	94.2	2.5	0	.8	2.5
Hurricane Building Code	83.3	14.2	0	0	2.5
Panama City Beach (N = 66)					
Setback Line	57.6	12.1	24.2	1.5	4.5
Mobile Home Tie Down	68.2	6.1	15.2	1.5	9.1
Flood Zone Restriction	95.5	3.0	0	1.5	0
Hurricane Building Code	77.3	19.7	0	0	3.0
Ft. Walton Beach (N = 54)					
Setback Line	90.7	1.9	3.7	0	3.7
Mobile Home Tie Down	66.7	1.9	24.1	0	7.4
Flood Zone Restriction	92.6	1.9	0	0	5.6
Hurricane Building Code	90.7	7.4	0	0	1.9

it was a local or Federal restriction. Predictably, almost all the respondents indicating awareness of the law were in Panama City Beach, where sampling was executed much closer to the beach.

Only two and a half percent of the sample knew about the local flood zone restrictions (which had been passed to comply with Federal Flood Insurance Administration requirements), with another 3.3% believing the law was at some other level of government.

Sixteen and a half percent of the sample, most of them from Panama City Beach, believed there is a building code designed to cope with hurricane wind, when in fact there is.¹ Only 19% were aware of the state mobile home anchorage law, but an additional 13% knew of a law but did not know the correct level of government administering it.

The respondents were asked, "If laws like those were going to be passed would you prefer that they be passed by the local, state, or Federal government?" Therein lay another surprise. The conventional wisdom is that there is greatest support for local regulation of land use, where elected officials are presumably closest to the local problems. Such has been the rationale for local domination of land use control in the United States. Respondents in this study, however, clearly

preferred state level legislation. Taken together, respondents in the two sites most often specified the Federal government as their first choice (Table 6). It was also the most popular third (last) choice, however. Overall, the average rank for the state level was 1.74, compared to 2.10 for local and 2.13 for Federal (Table 7). That pattern was even more pronounced in Panama City Beach (1.69, 2.01, 2.28), but differed in Ft. Walton Beach. There the state ranked 1.84, with Federal close behind at 1.96, and local a poor last at 2.22. Both sites have large military bases nearby, which may have been conducive to a favorable attitude toward the Federal government. An added factor in Ft. Walton Beach was the belief on the part of some residents that their drainage problem was caused by practices of the local government. Therefore, their attitude toward the local government was probably influenced accordingly.

Attitudes were grouped into three categories for χ^2 -tests and measures of association with several independent variables (Table 8). The five-point attitude scale was used for calculation of correlation coefficients. No important relationships were detected.²

Table 6.--Level of Government Preferred to Regulate Land Use

Panama City Beach and Ft. Walton Beach
(N = 121)

	1st Choice	2nd Choice	3rd Choice
Percent of Sample			
Local	31.2	26.6	42.2
State	33.0	59.6	7.3
Federal	36.7	13.8	49.5

Panama City Beach
(N = 66)

Local	31.0	36.2	32.8
State	39.7	51.7	8.6
Federal	29.3	13.8	56.9

Ft. Walton Beach
(N = 55)

Local	31.4	15.7	52.9
State	25.5	68.6	5.9
Federal	45.1	13.7	41.2

Table 7.--Average Preference for Level of Governmental Regulation

	Panama City and Ft. Walton Beach (N = 121)	Panama City Beach (N = 66)	Ft. Walton Beach (N = 55)
	Average Rank	Average Rank	Average Rank
Local	2.10	2.01	2.22
State	1.74	1.69	1.84
Federal	2.13	2.28	1.96

Table 8.--Relationship between Attitudes
and Selected Variables

<u>Dependent Variable</u>	<u>Independent Variable</u>	<u>Probability of X</u>	<u>λ</u>	<u>r</u>	<u>Probability of r</u>
Setback Attitude	Distance of Home from Beach	.20	.00		
	Site of Year-Round Residence	.22	.00		
	Knowledge of Setback Law	.48	.00		
Length of Residence in Interview Site				.04	.33
	Length of Residence in Gulf Region			.01	.47

<u>Dependent Variable</u>	<u>Independent Variable</u>	<u>Probability of X^2</u>	λ	r	<u>Probability of r</u>
Flood Zone Restriction Attitude	Distance of Home from Beach	.28	.00		
	Site of Year-Round Residence	.57	.00		
Flood Zone Restriction Attitude	Amount of Flood Damage from Eloise	.93	.00		
	Whether Home Built Against Flooding	.32	.00		
Flood Zone Restriction Attitude	Knowledge of Flood Zone Law	.67	.00		
	Whether Flood Insurance Purchased	.13	.06		
Length of Residence in Interview Site					

--.04 .33

<u>Dependent Variable</u>	<u>Independent Variable</u>	<u>Probability of X</u>	λ	r	<u>Probability of r</u>
	Length of Residence in Gulf Region			-.09	.16
Building Code Attitude	Site of Year-Round Residence	.90	.00		
	Whether Home Built Against Hurricane Wind	.09	.00		
	Knowledge of Building Code	.34	.00		
	Length of Residence in Interview Site			-.06	.27
	Length of Residence in Gulf Region			-.06	.27
Mobile Home Tie-Down Attitude	Whether Home is Mobile Home	.03	.04		

<u>Independent Variable</u>	<u>Probability of X^2</u>	<u>λ</u>	<u>\bar{x}</u>	<u>Probability of x</u>
Site of Year-Round Residence	.32	.00		
Knowledge of Tie-Down Law	.46	.00		
Length of Residence in Interview Site			.09	.17
Length of Residence in Gulf Region			.12	.09

Attitude Changes

The surprisingly high degree of support for the land use controls reflected in the survey of initial attitudes might have been explained away by the emotions found just two weeks after the disaster. The hypothesis had predicted that the event would increase such support. Subsequent polling of the same individuals was expected to show a return to near the baseline which had existed prior to the hurricane. Seventy-four percent of the sample had said the hurricane had had no effect on their attitudes toward land use controls, but such introspective self reporting is of dubious validity. One fear by researchers was that return to baseline may be so fast that it may have occurred completely before the first follow-up, thus making it impossible to track the decay rate.

The concern was unwarranted. Six months after the hurricane, public support was stronger than it had been two weeks after the storm. Proportion favoring the setback line increased slightly overall (3.3%), less than a point in Panama City Beach but 6.4% in Ft. Walton Beach (Table 1). Support for flood zone restrictions increased almost 5%, mostly in Ft. Walton Beach, where the increase was 10% (Table 2). Hurricane wind build-

ing codes were almost 8% more popular, again most of the increase coming in Ft. Walton Beach where the measure registered almost a 15% increase (Table 3). There was little room for support for the mobile home tie-down law to grow, but it did register a 3.3% gain in favor, that coming primarily in Panama City Beach (Table 4).

The trend continued six months later. The setback provision grew another point, to where almost 95% of the respondents either favored or strongly favored it (Table 1). Flood zone restrictions grew almost three more points to a total of 86.1% (Table 2). Greatest support was in Ft. Walton Beach, where most of the respondents had been directly affected by flooding. The most dramatic increase in support was for the building code designed to cope with hurricane winds (Table 3). There was a 9.4% increase, thanks primarily to Panama City Beach, where support grew by 17.5%. Total support was now at 87.2%, a level comparable to that of the other controls. Finally, popularity of the mobile home tie down law continued to increase (Table 4). Overall support was now 97.2% with all of the Ft. Walton Beach respondents favoring such legislation.

Thus, from two weeks after the hurricane to a year later support for the setback line had grown by 3.6%; for floodzone restrictions by 7.7%; for hurricane wind building codes by 17.2%; and for mobile home tie down by 7.2%.³

Unmistakable as the above figures appear, one might argue that they are spurious. There was a drop-out of 25% from the first to second polls and 32% from the first to third. If a substantial majority of the people not included in the subsequent samples had expressed negative attitudes initially, the apparent change in attitude on the part of the remaining sample would not be real. In fact, however, the drop-out rate was the same for supporters and opposers.

Nevertheless, computations were performed to deal only with people included in both the first and second or first and third samples (Tables 9 and 10). Clearly, changes were not attributable to changes in sample composition. The average attitude shift ranged from one-fourth a point to over half a point between the first two polls and from .30 to .66 between the first and third polls. The maximum possible shift would have been four points, with someone's attitude changing from strongly against (-2) to strongly in favor (+2).

Most people either had no change in attitude or had a small positive shift. Few people had either a strong negative or a strong positive shift, but even in that category the positives outweighed the negatives.

Table 9. ---Percent of Sample Displaying Attitude Shifts between First and Second Responses

Panama City Beach and Ft. Walton Beach (N = 89)

<u>Attitude Object</u>	<u>Magnitude of Shift</u>							\bar{X}		
	-4	-3	-2	-1	0	+1	+2		+3	+4
Setback Line		1.1		10.1	58.4	24.7	3.4	2.2		+ .25
Flood Zone Restriction		1.1	4.5	13.5	36.0	30.3	10.1	4.5		+ .38
Hurricane Building Code			2.2	13.5	30.3	38.2	11.2	4.5		+ .56
Mobile Home Tie Down		1.1		12.4	47.2	37.1	1.1		1.1	+ .28

Table 10. ---Percent of Sample Displaying Attitude Shifts between First and Third Responses

Panama City Beach and Ft. Walton Beach (N = 82)

<u>Attitude Object</u>	<u>Magnitude of Shift</u>							\bar{X}		
	-4	-3	-2	-1	0	+1	+2		+3	+4
Setback Line										+ .30
Flood Zone Restriction		1.4		12.3	45.2	37.0	2.7	1.4		+ .42
Hurricane Building Code				11.0	38.4	34.2	11.0	2.7		+ .66
Mobile Home Tie Down			1.4	13.7	28.8	34.2	15.1	6.8		+ .33

Conclusions

There is substantially more public support for governmental restrictions on the use of hazardous areas in the two communities studied than many of us had previously believed. When opposition does arise it is more often a result of lack of confidence in the efficacy of the law than a perceived infringement on property rights. It may also surprise some observers that state-level regulation was preferred over local. This is despite the fact that both communities would probably be categorized as politically conservative on most issues.

A number of cautions are in order, however. Most respondents had not been directly affected by the legislation in force. That is, the regulations to which they were responding had not generally placed hardship or inconvenience on them personally. The exception is the hurricane-wind provision of the building code, but most respondents were unaware that the construction of their houses had been affected by such a law. The regulations described in the study, except for the setback law, were rather mild in their restrictions. They applied

more to construction standards than to prohibition of land utilization. Furthermore, most respondents may have given little prior consideration to the laws. Thus, more information and deliberation about the impact of such restrictions may have resulted in a different attitude.

The attitude change was in a direction opposite that which had been hypothesized, and any explanation at this point is speculative.⁴ The psychological literature provides little insight. Most evidence would support the original hypothesis that attitude change would be only temporary, although the change tends to be more permanent if the individual is actively involved in the attitude-changing event (Zimbardo and Ebbesen, 1969). Although some experiments have revealed a delayed change in attitude (Kelman and Hovland, 1953; Brehm and Mann, 1975), but neither set of circumstances appears applicable to this case. The bulk of the attitude change studies have dealt with persuasive communications as the stimulus for change.

One possibility is that the hurricane had had little or no effect on the attitudes measured, so

there would be no "return to baseline" with passage of time afterward. This seems unlikely due to the impact of hurricane occurrence on other attitudes indentified in other studies, however. Twenty-six percent of the sample reported that the storm had influenced their attitudes toward the regulations, and that introspection probably understates the case considerably. Nor would it account for the increase in support for the restrictions.

Another possibility is that the initial attitude measurement--two weeks after the disaster--was too late to detect the change; that is, return to baseline had occurred very quickly. That too is unlikely, given the attitude-change literature and the fact that attitudes continued to change positively a year later. Still another possibility is that support will eventually diminish in the future, but the time frame of the study was too short to detect it. Even if that event is true, it is significant that the change persists as long as it does.

One can go on and on with this process of retro-duction, but the following is the explanation which will be endorsed here. As time passed after the

disaster, individuals were exposed to new information from the mass media and personal contacts about the effectiveness of existing controls in reducing damages. Respondents were very unaware of the existence of the restrictions two weeks after the storm, and the principal objection to the hypothetical regulations was that they would not succeed in preventing losses. Thus, the hurricane may have heightened support for the laws initially as hypothesized, but then support was sustained and nurtured by positive reinforcement later in the form of information consistent with the new attitudes. The data lends some support to this explanation. There appears to have been a trend for support to increase most for the laws about which the public was least aware initially. Participation in the research may have even conditioned the respondents to be more alert to new information concerning the attitude objects.

The significance of these findings are twofold. First, political and bureaucratic decision makers may hold inaccurate beliefs about the level of support extant in the general public for hazard zone regulations. The two sites studied are not necessarily representative of other areas, but they are generally conservative politically.

The attitude-change process, however, is probably more generalizable to other populations. It is important in seeking public support for initiation of hazard zone regulations after a disaster, that favorable public opinion does not necessarily diminish quickly. Support may even increase if the community's experiences with the hazard are similar to those in the places included in this investigation.

Notes

¹Both communities have adopted the Southern Standard Building Code which specifies more stringent wind load performance standards for areas near the coast. The requirements are not as severe as the specially developed South Florida Code, however.

²The attitude categories used for the χ^2 -tests and Goodman and Kruskal Lambdas were "positive, neutral, and negative." The analysis may have been unrevealing due to the distribution of the data; there were very few cases at some levels of both dependent and independent variables.

³All of these changes except the first (set-back attitude) were statistically significant at the .05 level. It may be argued that there was so little margin for positive change in setback attitude (9.2% possible, 3.6 attained), that a significance test is unrevealing given the sample size.

⁴Respondents are being recontacted to ask the reason for their individual change in attitude.

References

- Baker, E. J., J. Brigham, J. A. Paredes, and D. D. Smith. 1976. The Social Impact of Hurricane Eloise on Panama City, Florida. F. R. E. A. C. Technical Paper 76-1. Tallahassee: Florida State University.
- Brehm, J. W. and M. Mann. 1975. "Effect of Importance of Freedom and Attraction to Group Members on Influence Produced by Group Pressure," Journal of Personality and Applied Psychology, 31, pp. 816-824.
- Kates, R. W. 1962. Hazard and Choice Perception in Flood Plain Management. Department of Geography Research Paper No. 78. Chicago: University of Chicago.
- Kelman, H. and C. Hovland. 1953. "Reinstatement of the Communicator in Delayed Measurement of Opinion Change,," Journal of Abnormal and Social Psychology, 48, pp. 327 - 335.
- Moore, H. E. et al. 1963. Before the Wind: A Study of the Response to Hurricane Carla. Disaster Study No. 19. Washington: NAS-NRC.
- N. O. A. A. 1975. Hurricane Eloise: The Gulf Coast. Natural Disaster Survey Report 75-1. Rockville, Md.: U. S. Department of Commerce.
- White, G. F. 1945. Human Adjustment to Floods. Department of Geography Research Paper No. 29. Chicago: University of Chicago.
- Zimbardo, P. and E. B. Ebbesen. 1969. Influencing Attitudes and Changing Behavior. Reading, Mass.: Addison-Wesley.

RECEIVED:
NATIONAL SEA GRANT DEPOSITORY
JUN 7 1983
DATE: _____