

**LONGITUDINAL CHANGES IN HURRICANE  
HAZARD PERCEPTION\***

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*Hurricane hazard perception data, periodically collected over a twelve year period from the same sample of Lower Florida Keys residents, were analyzed to determine what changes in hazard perception and mitigation behavior had occurred. Contrary to hypotheses that hazard concerns decline with length of residence in hazard zones, overall perceptions that both hurricane winds and flooding are problems facing local residents have increased. Awareness of the hurricane threat remains high, with two-thirds of the residents stating that it is likely that the area will experience a damaging hurricane within the next ten years, even though a major hurricane has not occurred within the area for nearly three decades.*

Hazard perceptions have attracted considerable interest, with numerous surveys conducted to describe the perceptions of various populations to a wide assortment of natural and technological hazards. Nearly two decades ago, Kates (1971, p. 446) postulated that once a hazard perception threshold was reached, the hazard adjustment process began. Although some challenges to and modifications of Kates' model have been suggested, it appears clear that hazard perceptions play an important--albeit sometimes indirect--role in the hazard adjustment process. For purposes of this study, hurricane hazard perceptions will be

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broadly defined, including the residents' hurricane expectations, their expressed concerns about the hazard, and their beliefs about their relative hurricane vulnerability. This is not meant to perpetuate the oftentimes confusing definitions of hazard perception which frequent the literature (Mitchell 1984, pp. 36-37 and Bertness 1986), but to permit a broad-based evaluation of hazard perception, suitable for comparisons with previously reported results.

### ROLE OF EXPERIENCE: PREVIOUS RESEARCH

Numerous geographers and other social scientists have speculated how hazard perceptions may change with time, with many arguing that the greater the elapsed time since a hazardous event and concomitantly, the less experience with an event, the lower the public's perception of the threat (Kates 1971, p. 441, White and Haas 1975, p. 100, Mileti et al. 1975, p. 24, and Drabek 1986, pp. 323-327). Even among residents who have never experienced a particular hazardous event, links between length of residence and hazard perception have been noticed. Saarinen (1966, p. 71) observed that newcomers were more concerned about agricultural drought. Palm (1981, p. 48) noted that the longer residents had lived in the San Francisco Bay area, the less important was distance from a fault in the selection of a home. Although Windham et al. (1977, p. 30) similarly claimed that newcomers were more likely to flee hurricanes than old-timers, terming this the Anderson Experience Adjustment Paradox, Baker (1979, p. 18) demonstrated that their conclusions were based upon faulty statistical analysis. However, Baker (1979, p. 18) also noted, "The Camille study does, however, suggest that people who had lived at the same address . . . for less than five years were slightly more likely to evacuate than people living at the same address five years or more." Another study with hurricanes (Cross 1980, p. 158) indicated a tendency for expressed concerns about hurricanes to diminish with length of residency within a vulnerable coastal community.

Negative influences between experience and perception have also been noted. For example, Meltsner (1978, p. 174) stated, "The longer one lives in California, the less one is likely to care about earthquakes. Long-term residency provides information and experience to the citizen. It provides the opportunity to experience earthquakes and then to discount that experience." Several studies have indicated that perceived hurricane experience may actually be experience with minor storms or the periphery of a storm (Drabek 1986, pp. 324-326). Moore (1964, p.

195) and Osborn (1970, p. 13) describe the development of "disaster cultures" into which newcomers to the Gulf Coast become increasingly absorbed over the years, as they gain what Windham and colleagues (1977, p. 32) call "artificial hurricane experience."

These claimed relationships between length of residence and hazard perception are based upon correlations between perception parameters and length of residence, not upon longitudinal collection of hazard perception data. This paper reports the results of a longitudinal study of hurricane hazard perceptions conducted over a twelve year time period among the same survey population.

### THE LOWER FLORIDA KEYS STUDY AREA

Residents of the Lower Florida Keys (those islands from Big Pine Key West through the Saddlebunch Keys, just east of Key West) were first surveyed in 1976, resurveyed in 1982, and those still remaining in the area were last surveyed in 1988. This site provides an excellent location for such a longitudinal study because of the area's high probability of hurricane occurrence. Simpson and Lawrence (1971, pp. 9 and 13) estimate that an average of eighteen tropical cyclones strike the Lower Keys every century, of which thirteen are of hurricane force and two have winds of 125 miles per hour. Nearby Key West can expect the eye of nine hurricanes to pass within 150 miles every decade (Milo Smith and Assoc. 1967, p. 34a). Nevertheless, while it is highly vulnerable to hurricane destruction, the study area has not experienced a major damaging hurricane in over two decades. However, the centers of six hurricanes and tropical storms tracked within one hundred miles of the study area since 1976. On August 19, 1976 tropical storm Dottie formed over the Middle Florida Keys. Tropical Storm Dennis crossed the Lower Florida Keys on August 17, 1981. Hurricane Alberto passed to the west on June 4, 1982, only causing gales in the Lower Florida Keys. In 1985 two storms traveled along the north coast of Cuba--Tropical Storm (later Hurricane) Elena (August 29) and Hurricane Kate (November 19-20). Most recently, minimal strength Hurricane Floyd moved through the Keys on October 12, 1987, injuring no one and totaling less than a half million dollars in damages. A direct hit by a major hurricane would be far worse. Although the highest elevation is eight feet and 96 percent of the land lies below the five-foot contour (Florida Coastal Coordinating Council 1974, p. 1), the one in a hundred year hurricane would inundate the entire study area, with flooding ranging from nine to twelve feet

(Federal Emergency Management Agency 1983). Because only one highway, consisting of over thirty bridges, including the Seven Mile Bridge, links this area with the mainland, it is estimated that evacuation of area would require up to 31.5 hours (Post et al. 1983, p. 118).

Longitudinal hazard perception data--concerning the hurricane threat--were obtained from mail surveys conducted between 1976 and 1988. Only the responses of individuals who responded both to the 1988 survey and to at least one previous survey are considered within this study. From the 525 survey respondents in 1976, 222 surveys were obtained in 1982, and 61 surveys were received in 1988. The 1976 sample was obtained by a systematic random sampling of subscribers to the local telephone company and from a complete list of customers of the local electric utility serving the study area. Most of the drop-off between these three surveys was represented by death or emigration from the study area, as the response rate (determined by comparing the number of respondents to the number of persons remaining in the study area who received the mailed surveys) to the 1982 and 1988 surveys were 79 and 77 percent, respectively. Thus, in comparing the 1988 perception data with that collected in 1976, only the responses given in 1976 by the 61 individuals who also responded to the 1988 survey are included within this analysis.

A larger population, mostly composed of new residents, was surveyed with a more detailed questionnaire in 1983. The 1983 sample was obtained from property ownership records within the Monroe County Property Appraiser's Office, which indicated the dates that various residential properties were obtained. Half of the 1983 survey respondents who remained in the area were sent new surveys in 1988, generating over 200 additional responses. Although the 1988 survey respondents do not represent an actual cross-section of current residents--being obviously biased towards established residents and those who had responded to previous probability surveys, it is ideally suited for the measurement of perception changes, inasmuch as the previous responses of specific individuals can be matched with their 1988 responses. Thus, in this article we will examine the responses of 61 individuals to surveys in 1976, 1982, and 1988 and the responses of 205 individuals to surveys conducted in both 1983 and 1988. All of the surveys were conducted during the hurricane season; questions were worded identically to permit longitudinal comparisons of the residents' responses.

## OBSERVED HAZARD PERCEPTION CHANGES

Perceptions of hurricane winds and hurricane waves and flooding as being problems facing Florida Keys residents have steadily increased over the twelve year period (Table 1). For example, 41 percent of the respondents increased their ranking of hurricane winds as a problem between 1976 and 1982, 39 percent raised their evaluation of hurricane winds between 1982 and 1988, and 57 percent increased their ranking of these winds between 1976 and 1988. Conversely, the hurricane wind concerns of only one in eight residents fell over the past twelve years. Similar changes occurred in the residents' perception of hurricane waves and flooding (Table 2). Twenty-one percent of the respondents considered hurricane waves and flooding a major problem in 1976. In 1988 34 percent of these same respondents viewed hurricane waves and flooding as a major problem. Only one-quarter of the residents voiced unchanged concerns about hurricane waves and flooding, with those expressing increased concerns outnumbering those with declining concerns by better than 2.5 to 1.

**TABLE 1**  
**PERCEPTION OF HURRICANE WINDS**  
**(1976, 1982, and 1988)**

"For each of the following items, please indicate whether you feel it is a Major Problem, Somewhat a Problem, a Minor Problem, or Not a Problem at All to your household in living in the Florida Keys."

Hurricane Winds Considered:	1976	1982	1988
Major Problem	15.9%	20.6%	41.0%
Somewhat a Problem	33.3%	42.9%	32.8%
Minor Problem	27.0%	23.8%	23.0%
Not a Problem at All	23.8%	12.7%	3.3%

### Percent of Residents Changing Their Evaluations

	1976-82	1982-88	1976-88
Increasing Problem Evaluation	41.3%	39.3%	57.4%
No Change in Problem Evaluation	44.4%	49.2%	29.5%
Decreasing Problem Evaluation	14.3%	11.5%	13.1%

**TABLE 2**  
**PERCEPTION OF HURRICANE WAVES AND FLOODING**  
**(1976, 1982, and 1988)**

"For each of the following items, please indicate whether you feel it is a Major Problem, Somewhat a Problem, a Minor Problem, or Not a Problem at All to your household in living in the Florida Keys."

Hurricane Waves and Flooding Considered:	1976	1982	1988
Major Problem	20.6%	23.8%	34.4%
Somewhat a Problem	30.2%	31.7%	34.4%
Minor Problem	22.2%	27.0%	23.0%
Not a Problem at All	27.0%	17.5%	8.2%

Percent of Residents Changing Their Evaluations

	1976-82	1982-88	1976-88
Increasing Problem Evaluation	34.9%	42.6%	52.5%
No Change in Problem Evaluation	42.9%	37.7%	27.9%
Decreasing Problem Evaluation	22.2%	19.7%	19.7%

Analogous, but less dramatic changes in the consideration of the hurricane problem were noticed among the homeowners who were first surveyed in 1983. Twenty-one percent of these homeowners had increased their evaluation of the hurricane wind problem by 1988 and 35 percent had increased their ranking of hurricane waves and flooding. Twenty-four percent and 21 percent, respectively, decreased their perception of the hurricane wind and flood problems between 1983 and 1988.

Changes in the residents' responses to several other hurricane hazard parameters between 1983 and 1988 were more evenly divided. For example, 27 percent of the residents surveyed had increased their estimation of the likelihood "that a damaging hurricane will occur within the Lower Florida Keys during the next 10 years," while 23 percent had decreased their estimation (Table 3). Thus, the proportion of residents believing that such a storm was likely or very likely grew from 61 to 64 percent. Likewise, when asked to compare the likelihood that the Keys would experience a hurricane with that of other locations along the U.S. Gulf and Atlantic coasts, 18 percent increased their responses while 13 percent reduced their evaluation (based on results reported in Table 4).

When asked the question "Compared with other locations along the Gulf and Atlantic Coasts of the U.S., do you believe that a hurricane hitting the Lower Florida Keys would be more, less, or equally likely to cause property damage?" Twenty-two percent increased their ranking between 1983 and 1988, while the same percentage decreased their estimation.

**TABLE 3**  
**EXPECTATION OF DAMAGING HURRICANE**  
**WITHIN TEN YEARS (1983 and 1988)**

How likely do you think it is that a damaging hurricane will occur within the Lower Florida Keys within the next 10 years?

	1983	1988
Very Likely	28.1%	28.1%
Likely	32.7%	36.2%
Neither Likely nor Unlikely	31.2%	30.2%
Unlikely	5.5%	3.0%
Very Unlikely	2.5%	2.5%

Percent of Residents Changing Their Evaluations 1983-88

<b>Increasing</b> Hurricane Likelihood	26.6%
<b>No Change</b> in Hurricane Likelihood	50.3%
<b>Decreasing</b> Hurricane Likelihood	23.1%

**TABLE 4**  
**CHANGES IN PERCEIVED HURRICANE VULNERABILITY**  
**(1983-1988)**

Compared with other locations along the Gulf and Atlantic Coasts of the U.S., do you believe that the Lower Florida Keys are more, less, or equally likely to be hit by hurricanes?

	1983	1988
Keys are <b>More</b> likely to be hit	5.4%	10.3%
Keys are <b>Less</b> likely to be hit	21.7%	21.2%
Keys are <b>Equally</b> likely to be hit	72.9%	68.5%

Table 4 continued

Compared with other locations along the Gulf and Atlantic Coasts of the U.S, do you believe that a hurricane hitting the Lower Keys would be more, less, or equally likely to cause property damage?

	1983	1988
Hurricane in Keys <b>More</b> likely to cause damage	31.5%	34.0%
Hurricane in Keys <b>Less</b> likely to cause damage	17.7%	18.2%
Hurricane in Keys <b>Equally</b> likely to cause damage	50.7%	47.8%

Compared with other locations in the Middle and Upper Keys, do you believe that the Lower Florida Keys are more, less, or equally likely to suffer hurricane damage?

	1983	1988
Lower Keys <b>More</b> likely to suffer damage	8.8%	13.2%
Lower Keys <b>Less</b> likely to suffer damage	39.7%	30.9%
Lower Keys <b>Equally</b> likely to suffer damage	51.5%	55.9%

#### OBSERVED HAZARD MITIGATION CHANGES

Residents have become more knowledgeable about their flood zone location (Table 5). Although 42 percent of the residents in 1983 either denied or indicated uncertainty about whether their homesite was within a designated coastal flood zone, only 27 percent so responded in 1988. On the other hand, this greater flood zone knowledge did not translate into greater acceptance of hazard mitigating land use controls. More dissatisfaction was expressed in 1988 about the flood zone ordinance, the building code, and the mixing of stilt and ground level housing within the same neighborhood. For example, 35 percent of the residents surveyed in 1988 said that the building elevation requirements were "too restrictive," while only 21 percent had felt this way in 1983. Furthermore, in 1988 "government land use regulations" were viewed as a "major problem" in living within the Keys by 43 percent of the households. In contrast, five years earlier 45 percent indicated they were "not a problem at all," with only 21 percent indicating the regulations as a "major problem."

TABLE 5  
RESIDENTS' ATTITUDES TOWARDS HURRICANE  
MITIGATION MEASURES (1983 and 1988)

Is your home located within a designated coastal flood zone?

	1983	1988
Yes	58.0%	73.4%
No	8.5%	6.4%
Uncertain	33.5%	20.2%

Do you personally believe that stilt houses are less vulnerable to destruction by hurricane waves and flooding?

	1983	1988
Yes	56.2%	63.0%
No	28.4%	24.7%
Uncertain	15.4%	12.3%

Do you believe that you could safely ride out a hurricane within your own Florida Keys home?

	1983	1988
Yes	39.7%	45.7%
No	22.6%	19.6%
Uncertain	37.9%	34.7%

How do you view the present building elevation requirements in the Lower Keys?

	1983	1988
Too Restrictive	21.0%	34.9%
About Right	69.9%	58.6%
Not Restrictive Enough	9.1%	6.5%

How do you view the present building code and its enforcement within Monroe County?

	1983	1988
Too Restrictive	17.7%	29.9%
About Right	44.8%	41.8%
Not Restrictive Enough	37.6%	28.2%

It is possible that these changes in response to the mitigation measures are more a reaction to increases in the base flood levels of the Federal Insurance Rate Maps and stricture enforcement of the building

code since the 1983 survey. However, when asked in 1983 whether they favored the adoption of new flood maps which would increase the building elevation regulations, 58 percent of the residents indicated they favored the action, 13 percent were opposed, with the remainder expressing "no opinion." Many residents in 1988 also complained about uneven enforcement of these regulations and the building code.

Greater confidence is expressed by the residents about the hurricane-resistance of their homes. The proportion of residents who believed that they could safely ride out a hurricane within their Florida Keys home rose from 40 percent to 46 percent between 1983 and 1988. When asked, "If a hurricane warning was issued for your area of the Florida Keys, which of these actions would you take?" the proportion indicating "Plan to ride out the storm in your own Keys home" rose from 31 to 41 percent in the past five years. Such changes may reflect either the fact that recent "hurricane experience" has been with minimal events or the residents' greater confidence in the integrity of their dwellings.

The magnitude of a potential hurricane would be expected to influence the residents' decisions, because of the length of time required to evacuate the area, the extremely low elevations, and because considerable intensification of a hurricane could occur within a time frame. Unfortunately, this qualifier, that is hurricane severity, was not included in the question used. However, in their 1989 survey of the Lower Florida Keys (including Key West) Nelson et al. (1989, p. 116) discovered that 41.2 percent of their respondents would not evacuate from an imminent Category 3 hurricane (winds exceeding 120 miles per hour), even if local officials had ordered such an evacuation. Similarly, when explicitly asked on my 1988 survey, "If the center of a major hurricane (with winds over 125 miles per hour) were to pass over your area of the Florida Keys, how much damage do you expect your home would suffer?" 25 percent indicated either "no damage at all" or only "minor damage," while 37 percent expected "moderate damage." Only 7 percent expected "total destruction," with the remainder anticipating "major damage."

When asked the same question in 1983--but without information on the hurricane severity, 21 percent of these same respondents expected either minor or no damage and 43 percent anticipated only moderate damage. These observations seriously challenge the notion that the residents' greater expectations of hurricanes are accompanied by any increased understanding of the potential for hurricane damage. Indeed, a fifth of the residents of mobile homes anticipated no more than minimal damage during a hurricane with winds exceeding 125 miles per

hour, although mobile home residents were significantly more likely to expect major damage to total destruction.

The residents have become more likely to expect that, if their homes were to suffer damage during a hurricane, it would come from winds, and not flooding or waves. Indeed, 62 percent of the respondents thought winds would be the greater cause of damage in 1983. By 1988 this had risen to 73 percent. Residents have become more confident that stilt houses are less vulnerable to hurricane waves and flooding, but over a third of the residents still express doubts. Many residents believe that stilt houses have a greater vulnerability to destruction by hurricane winds. Although the proportion of residents having windstorm insurance was unchanged over the five year period, flood insurance coverage declined from 70 percent to 64 percent of the respondents between 1983 and 1988.

#### PERCEIVED CHANGES IN HURRICANE CONCERNS

Residents in 1988 were asked "Are you more or less concerned about the potential for hurricane damage in the Florida Keys now than you were five years ago?" (Table 6). Twenty-four percent indicated that their concerns had risen, 13 percent felt that their concerns had declined. (In 1983 when asked if their concerns had changed since they first began living in the Keys, similar responses were obtained, with 22 percent indicating increased and 19 percent noting decreased concerns about hurricanes.) The changes in hurricane concerns which the residents claimed were generally unrelated statistically to the actual changes in their response to the hurricane perception questions. For example, of those residents whose evaluation of hurricane winds as being a problem had actually increased between 1983 and 1988, 63 percent claimed in 1988 that their concerns about hurricanes over the past five years was unchanged, while 14 percent thought that their concerns had dropped.

Likewise, of those respondents whose estimates of the likelihood of a damaging hurricane within the next decade actually declined from the 1983 to the 1988 survey, 22 percent claimed in 1988 that their concerns about the potential for hurricane damage had risen over the same time period. Such apparent contradictions indicate that caution must be exercised in drawing conclusions from such data at the individual level and that no single question can encompass all the parameters which define an individual's perceptions. It may also be argued that residents' perceptions have changed so subtly that many individuals are unaware

that their hurricane concerns have changed. Such a conclusion would be consistent with the acquisition of artificial hurricane experience and acculturation within a disaster subculture. Nevertheless, it is clear that overall concern expressed about hurricanes, by the entire survey population viewed as a group, has risen, but the appropriateness of the residents' responses to the hazard has not risen.

**TABLE 6**  
**RESIDENTS' PERCEPTIONS OF CHANGE IN THEIR**  
**HURRICANE CONCERNS (1983 and 1988)**

Are you more or less concerned about the potential for hurricane damage now than you were when you first began living (either full-time or part-time) in the Lower Florida Keys? (1983)

More Concerned	22.4%
Less Concerned	19.4%
Equally Concerned	58.2%

Are you more or less concerned about the potential for hurricane damage in the Florida Keys now than you were five years ago? (1988)

More Concerned	24.0%
Less Concerned	12.8%
Equally Concerned	63.3%

#### EXPLANATION OF HAZARD PERCEPTION CHANGES

Who are these individuals whose perceptions of hurricanes have changed? Statistical tests between changes in hurricane concern (either self-reported or observed by comparing the respondents answers to the various surveys) and a variety of homesite and socio-economic variables indicate that few were significantly related. The sex of the respondent was significantly associated with changes in response to several (but not all) hurricane perception parameters. Females as a group were more changeable (both in increases and decreases) in their expressed concerns than males. Household income and education level of the household head were not significantly related to changes in hurricane perception. Age was only related to the residents' own perceived change in hurricane concern, not to any differences observed between the surveys. Homesite characteristics, including type of house (stilt house, ground level house, or mobile home) and homesite location (inland or on the shore or a

canal), elevation (above or below five feet), and Federal Insurance Rate Map flood zone were not significantly related to any of the reported or observed changes in hurricane concerns.

#### Factors Prompting Changes in Concern

What factors prompted the changes in the respondents' evaluations of the hurricane hazard? Residents who indicated that their concerns about the potential for hurricane damage within the Lower Keys had either increased or decreased over the past five years were asked in an open-ended question to explain what prompted their change (Table 7). The most commonly cited explanation--by both groups, was the fact that the area has gone for over two decades without any significant hurricane damage. The following was typical of those residents citing a reduced concern: "In the past five years there has been practically no damage." On the other hand, misconceptions about probabilities can also enhance hazard concerns, illustrated by the respondent who wrote, "The odds are less in our favor each year we don't have a hurricane. "Environmental observations influenced changes in hurricane concerns among others. Increased concerns were explained with "higher tides," and the change in climate and weather conditions." Decreased concerns were related to "Climatic changes which have decreased storms, "The Pacific seems to get more now" or to the belief that the mountains of Cuba shield the Keys from hurricanes.

**TABLE 7**  
**FACTORS INFLUENCING CHANGES IN**  
**RESIDENTS' HURRICANE CONCERNS**

What caused your concerns about potential hurricane damage in the Keys to change during the last five years? (Questions only directed to residents who indicated that their concerns had changed.)

**More Concerned** (Percent of this group indicating factor)

Increased probability, "Storm Due"	38.0%
Population Growth	23.9%
Greater investment in property now	9.9%
Poor construction methods	7.0%
More construction in vulnerable areas	7.0%
Complacency--too long without hurricane	7.0%
Recent hurricane experiences	5.6%
Evacuation difficulties with U.S. 1	5.6%

Table 7 continued

## Less Concerned (Percent of this group indicating factor)

No major hurricane effects in decades	55.2%
Better building code	13.8%
Trend of recent hurricane paths	13.8%
Homesite location considered safe	6.9%
Population growth	6.9%

\*Figures do not add to 100 percent because some residents gave no explanations for their change in concern.

Just as geographers note that natural hazards are an interaction of the natural and human use systems, such a relationship was also noted--albeit sometimes in a distorted manner--by local residents in explaining their changing perceptions. Most residents who commented about the area's population growth believed that it would increase the potential hurricane danger and make evacuation more difficult if not impossible. Nevertheless, several others speculated that such growth--especially more building by wealthy individuals--would not occur if there was any danger. Another resident wrote that his concerns had decreased because there are now "more houses to break the wind before it hits mine!"

### Influence of Hurricane Floyd

Few residents (of either survey group) mentioned Hurricane Floyd which moved directly across the Lower Florida Keys in October 1987 in their explanation of their changed concern about the potential for hurricane damage over the five year period. This storm, barely rated as a Saffir-Simpson 1 (the weakest hurricane strength) caused very little damage as it tracked along U.S. Highway 1, which incidentally is the area's sole evacuation route. When asked later in the survey, "What effect, if any, did your experiences with Hurricane Floyd have upon your concerns about potential hurricane damage in the Lower Florida Keys?" three-quarters of the respondents indicated "no effect." Hurricane Floyd increased the concerns of 19 percent, and reduced those of 6 percent of the respondents. When asked to rate the storm on a scale of 1 to 5, with 1 being the least damaging, 69 percent correctly noted that it was in the least damaging category. Nevertheless, the respondents' evaluation of the effects of Hurricane Floyd upon their hurricane concerns was

significantly related to their perceived changes in their own concerns about the hurricane damage potential over the past five years.

### CONCLUSION

The findings from this study provide further knowledge about how hazard perceptions change among long-time residents of a low-lying hurricane prone coastal location which has gone unscathed from several decades. Awareness remains high, and if anything, has slightly increased. Two-thirds of the residents think a damaging hurricane is "likely" or "very likely" within the next ten years. Thus, we cannot conclude that in the absence of a damaging hazard event that perceived hazard concerns will decline. Nor can we argue that experience with minor hazard occurrences has diminished overall perception of hurricanes as threat. Although a minor event like Hurricane Floyd did reduce concerns for a minority, it increased concerns of over twice as many individuals.

Regardless of the parameters used to measure the hazard perception--likelihood of hurricane occurrence, belief that the area experiences hurricanes and could suffer hurricane damage, concerns about potential hurricane damage, and evaluations of hurricane winds and hurricane waves and flooding--no declines in hazard perception among the survey population as a whole were noted. These longitudinal findings somewhat corroborate those of Baker (1976) who noted that following Hurricane Eloise the public's awareness and acceptance of hazard-mitigating land use controls actually increased over a one-year period, a finding which Baker at the time found surprising. This much longer term longitudinal study demonstrates that residents of one of this nation's most hurricane vulnerable locations do not display a reduction over time in their expressed concerns about hurricanes. Unfortunately, many residents increasingly underestimate the vulnerability of their homes to such destruction and may under-rate the threat from hurricane waves. Awareness of the threat is high, but awareness cannot always be equated with reliable knowledge nor assure that residents will appropriately respond to the threat.

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