

RESIDENTS' AWARENESS OF THE COASTAL FLOOD HAZARD:  
LOWER FLORIDA KEYS CASE STUDY\*

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The rapidly growing coastal population's awareness of coastal flood hazards has become a topic of great interest to planners, civil defense personnel, and hazards researchers. The population within the coastal areas of the U.S. has not only been growing at three times the national rate, but most of this population lacks experience with coastal storm flooding.

This paper reviews the public awareness of the hurricane flood hazard in one of the most vulnerable areas of the United States, the Lower Florida Keys. This area, in which the highest elevation is a mere eight feet and in which over 90% of the homesites are below the five-foot contour, has experienced hurricanes in an average of one in seven years, although the last direct hit occurred in 1966. Furthermore, the minimum base flood elevation shown on the Federal Insurance Rate Maps for the area is nine feet, and it could take 31.5 hours to evacuate the Keys (Post, et al. 1983:117). Nevertheless, the population of the Florida Keys, excluding Key West, increased by 66% between 1970 and 1980. This paper summarizes the responses of approximately 700 recent home buyers to a survey conducted during the 1983 hurricane season and compares their attitudes with those expressed by nearly 200 long-term residents.

Awareness of the Hurricane Flood Hazard

Residents who purchased their houses or mobile home sites within the Lower Florida Keys since 1979 are generally aware that hurricane destruction may occur, with 60.6% believing that a damaging hurricane is "very likely" or "likely" within the next ten years. Furthermore, two-thirds of the residents felt that "hurricane

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\* This paper is based upon work supported by the National Science Foundation under Grant No. CEE-8211441. Any opinions, findings, conclusions, or recommendations expressed in this paper are those of the author and do not necessarily reflect the views of the National Science Foundation.

waves and flooding" were either a "major problem" or "somewhat a problem" facing their households in living in the Florida Keys, although like residents of the Florida Panhandle (Baker et al. 1976:18), they anticipate that property damage would be more likely from hurricane winds than coastal flooding. Other problems were of greater salience to most recent home purchasers. For example, larger proportions of the survey population indicated that public water supplies, mosquitoes, and even hurricane winds were "major problems" than was the potential for hurricane waves and flooding. When asked to indicate the "single most important problem to their household in living in the Florida Keys," 80.1% mentioned conditions other than hurricanes, 11.0% claimed hurricane flooding; 7.5% hurricane winds; and 1.4% both hurricane flooding and winds. Indeed, everyday problems are of far greater concern.

Long-term residents (those who purchased their homes before the county adopted Ordinance 3-1975 which first required homes to be elevated above the base flood levels) were nearly twice as likely as recent residents to view this potential flooding as not a problem at all, although similar proportions considered hurricane flooding as a major problem. The concerns reported in 1983 by both the recent homebuyers and the long-term residents were, nevertheless, considerably greater than the responses of Lower Florida Keys residents in 1976 to the same survey question. Then 59% considered hurricane flooding as either a minor problem or not a problem at all (Cross 1980:157), while in 1983 only 32% of the new residents expressed such minimal concerns.

Respondents to the 1976 survey were resurveyed in 1982. Responses to the same questions showed a small overall increase in concern, with 47% claiming that hurricane flooding was at least somewhat a problem in 1976, compared with 53% in 1982. Individually, 64% of the respondents expressed different evaluations on the two surveys, with 37.5% indicating heightened concern and 26.7% expressing diminished concern.

The recent homebuyers' storm awareness does not reflect the high probabilities of storm flooding. Indeed, 21.5% believed that the Florida Keys are less likely to be hit by hurricanes, "compared with other locations along the Gulf and Atlantic coasts of the U.S.," while 68.6% thought that the area is equally likely to experience hurricanes. Furthermore, if a hurricane were to hit the area, only 34.9% of the respondents felt that it would be more likely to cause property damage than in other coastal locations, notwithstanding the area's very low elevation. Compared with other portions of the Florida Keys, the Lower Keys were viewed as either less

likely or equally likely to suffer damage by 90.3% of the new homeowners. Long-term residents and recent homebuyers did not significantly differ in their evaluations of the Keys' probability of experiencing hurricanes or vulnerability to damage should a storm hit, although long-time residents were more likely to feel that the Lower Keys were less vulnerable to damage than the Middle or Upper Keys.

Over one-third of the recent homebuyers were uncertain as to whether or not their homes were located within a designated hurricane flood zone, with 6.5% indicating that they were not. However, the entire study area has no natural elevations above the base flood levels, and 83% of the survey respondents' homes were on lots either along the shore or canals. Old and new residents did not differ in their knowledge of their own flood zone location.

If a hurricane were to directly strike the Lower Keys, 78.6% of the house owners and 94.7% of the mobile home buyers expect that their homes would suffer at least "moderate damage." Nevertheless, 37.0% of the house buyers, compared with 8.5% of the mobile home owners, believed that they could safely ride out such a storm within their homes. Furthermore, 23.4% of the households occupying houses and 6.4% within mobile homes indicated that if hurricane warnings were issued for their area of the Florida Keys, they would "plan to ride out the storm in their own Keys home."

#### Awareness and Adoption of Flood Mitigation Measures

The adoption of various flood hazard mitigation measures is now fairly high. Although realtors reported that homeseekers were often ignorant of flood insurance requirements when they began their home search, 74.5% of the recent house buyers and 62.9% of the mobile home owners had acquired flood insurance in 1983, up from 53% and 31%, respectively, in 1976. Only 56% of the long-time residents had insurance, however. Even among those new residents without home mortgages, and thus not legally required to obtain insurance, 66.5% had acquired flood insurance. Indeed, coastal flood plain residents are far more likely to have obtained flood insurance coverage than residents within river floodplains (Kusler 1983:7). Nevertheless, these figures were less than the 88.3% windstorm insurance coverage reported by recent homebuyers. Seventy-one percent of the residents acquiring their homes since 1979 selected stilt houses, compared with 37% of the households who purchased their homes in 1975 or earlier. Furthermore, 90.5% of the houses built since 1976 are upon stilts, with

most of the remainder being built upon fill. However, the additional safety for which stilt houses were promoted has been substantially negated by enclosure of the space beneath many of these homes, by what often cannot be considered break-away walls. Indeed, 40% of the over one thousand stilt houses constructed within the study area since 1976 have at least half their lower levels enclosed for storage, garages, and living space.

Flood protection was not the primary motivating factor in the choice of a home. When asked to indicate the importance of various factors in the selection of their homes, the home price, beauty of the neighborhood area, investment potential, crime rate, and particularly, access to deep water boating and nearness to shore or canals were all considered more important than elevation of the house above ground, the safety of home during a hurricane, or the vulnerability of the homesite to storm flooding. Even when realtors informed homeowners that houses were in a flood zone or that flood insurance might be required (a disclosure given to 49% of the home buyers since 1979), only 12.4% of the recipients indicated that it made any difference in their choice of home or homesite. The disclosures dissuaded few potential residents, with fewer than one in five realtors able to recount losing a sale because of the potential for hurricane flooding. On the other hand, the provision of hurricane flood zone information by the realtor or home seller was significantly associated with the homebuyers' flood insurance coverage, even with those residents lacking mortgages (Cross 1985).

Recent buyers of both houses and mobile homes generally favored the local flood mitigation regulations. Three-quarters of the residents felt the "present 8 feet minimum elevation requirements" were "about right," although they were "too restrictive" for nearly a fifth. Nevertheless the majority of the residents were in favor of the county using the new Federal Insurance Rate Maps (in preliminary form at the time of the survey) to set minimum elevation levels for new home construction, even though they require greater elevation with the inclusion of wave action effects.

#### Factors Associated with Coastal Flood Hazard Awareness

The environmental setting of the homesites, including their flood hazard zones (V vs. A Zones), base flood elevations, lot elevations, and proximity to the shore, were generally not associated with variations in the residents' evaluation of the Keys' vulnerability vis-a-vis other coastal areas, the expectation of a damaging

storm in ten years, the knowledge of their home's flood zone location, or the perception of hurricane flooding as a problem. However, residents, particularly owners of houses, whose homes were located along either canals or the shore were significantly more aware (60.1% vs. 42.1%) that their homesites were within flood zones.

The awareness that Lower Florida Keys residents have concerning hurricane flooding and their perception of this hazard as a problem are related to few socio-economic parameters, not unlike observations among river floodplain residents (Smith and Tobin 1979:43). Indeed, the homeowners perception of hurricane flooding as a problem was not related to their age, income, educational level, or the sex of the respondent. On the other hand, recent home buyers who previously lived outside the South Atlantic states were more likely (29.3% vs. 20.3%) to consider hurricane flooding as a major problem. Residents migrating from other coastal counties had higher expectations that a damaging hurricane was "likely" or "very likely" within ten years. Furthermore, the expectations of a damaging hurricane were significantly related to the respondents' income and educational levels, although not to their age or sex.

Fifty-five percent of the post-1979 homebuyers claim to have experienced a hurricane. Although their descriptions of the events indicate that many of these experiences were with hurricanes which threatened and then missed the area or with tropical storms--similar to pseudo-experience reported by residents throughout southeastern Florida (Post, et al. 1983:61) and the Bahamas (Lewis 1975:29)--these experiences are related to their concerns about hurricane damages. Although experienced and inexperienced residents did not differ in their expectations of future hurricanes, larger proportions of the "experienced" residents claimed the Lower Keys were less likely to receive damages during a hurricane than either other U.S. coastal areas or the other areas of the Keys. Furthermore, 12.9% of the "experienced" residents claimed hurricane flooding was no problem at all within the Lower Keys, a claim made by only 6.6% of the inexperienced homebuyers. Experience has generally had a negative impact upon the residents' hurricane concerns. Thirty-five percent of those residents without hurricane experience claim to be more concerned about hurricane damages now than when they first began living in the Keys, a claim made by only 20.6% of the "experienced" residents.

### Conclusions

These findings clearly indicate that coastal residents are highly aware of the

coastal flood hazard and are willing to accept many hazard mitigating adjustments. Indeed, their awareness and willingness to purchase flood insurance far exceeds that found within riverine floodplains. At the same time the awareness which these residents have raises many severe problems for planners. Just because they are aware of coastal flooding does not mean residents will faithfully maintain flood resistant housing or evacuate if urged, nor that they fully appreciate their risk. While residents' hazard perceptions change with time, it is not clear that experience leads to heightened awareness, particularly when minor events are construed as experience leading residents to underestimate their vulnerability to the rarer, but far more dangerous flood event.

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