

Redevelopment After The Storm: Hazard Mitigation Opportunities and Obstacles in the Post-Disaster Setting

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In their cogent analysis of three coastal communities devastated by hurricanes, Hegenbarth and Brower detail the obstacles and consequences of development management planning in disaster-prone areas. The summary of findings presented in this article offers surprising insight into the disincentives for "preemptive storm planning". Notably, severe storms can provide unique opportunities for developers and public recreation offices in cases where land has been "naturally cleared" and thereby made available for new uses. These case studies also illustrate the organizational problems which face many communities in their post-disaster response efforts.

Over 600 communities on the Atlantic and Gulf coasts are vulnerable to the devastating impacts of severe hurricanes. While there are many communities at risk, relatively few have experienced the major recovery and reconstruction process that follows a major storm. Many communities are unprepared for the pressing issues that will face a community after a disaster. This lack of pre-storm planning can affect a community's ability to recover quickly and smoothly should a coastal disaster occur. With more readily predicted community disasters, such as riverine flooding, decision-makers can build on their community's past experience to plan for and mitigate the impacts of future occurrences. Hurricanes, on the other hand, have a low probability of striking particular communities in any given year. As a result, they do not provide a good base from which local officials and policymakers can "learn from experience." The severity of a hurricane's economic and psychological impact, furthermore, demands an examination of the post-disaster and reconstruction efforts of hurricane stricken communities from which disaster planning techniques can be developed.

Severe hurricanes destroy existing development so effectively that they have been called "the purest form of urban renewal." Communities often use hurricane demolition as a means of altering their pre-storm development patterns. Development is moved away from hazardous areas to reduce private property loss and to minimize the amount of public infrastructure at risk. A community may have the opportunity

to acquire prime waterfront property and thereby expand its public beach areas, alter undesirable development trends and reconstruct severely damaged areas in more attractive and less vulnerable ways than existed previously. While a disaster may present opportunities for changing development patterns, it also creates a number of pressures on the community which may work against the enactment of development management policy changes. In an effort to better understand these pressures and obstacles in the post-storm reconstruction process, three communities heavily impacted by recent hurricanes were studied as cases of development management. The three communities included: Harrison County, Mississippi (Hurricane Camille, 1969); Gulf Shores, Alabama (Hurricane Fredrick, 1979); and the Galveston Bay area (Hurricane Alicia, 1983). This article will briefly discuss the redevelopment and reconstruction trends observed in these communities.

Harrison County, Mississippi

Hurricane Camille, which battered the Gulf coast in August 1969, is one of two "category 5" storms on the Saffir-Simpson scale ever recorded to strike the United States (category 5 is the most severe). The

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a lack of preparation

learning from experience



Jack Upton

Bob and Janet Helm, right, face off against Carol and Nancy Cash in a game of cards at the evacuation center set up at West Brunswick High School.

storm had a seven mile wide storm center, winds of over 200 miles per hour, and a storm surge that ranged from 17-23 feet in the coastal communities of Harrison County, Mississippi. While older stately homes in the sheltered higher areas on the coast survived the storm, almost all construction in the lower lying lands was destroyed. This included a "hurricane proof" house which was totally destroyed, killing the owner and the friends who had sought shelter with him.

Four of the communities most severely hit by Hurricane Camille were in Harrison County. Gulfport and Biloxi are sizable towns of almost 50,000 residents; Long Beach and Pass Christian are considerably smaller with only 6,000 and 3,000 residents, respectively. These communities have been plagued by storm damages since their founding. After a hurricane caused extensive damage to the beach highway in 1915, a seawall was constructed along the entire length of Harrison County's 26 mile shoreline. Subsequent coastal storms and hurricanes caused the shoreline to erode dramatically. In 1951, construc-

tion began on an artificial sand beach to act as a protective barrier for the seawall highway and low-lying development. Today, a costly annual beach nourishment program sustains the beach.

The National Flood Insurance Program was instituted one year before Hurricane Camille hit the Gulf Coast. Unfortunately, at that time, there were no communities yet participating in the program. After the storm, the Governor of Mississippi established a 12-member commission — the Governor's Emergency Council (GEC) — to act as a temporary overseer of long range regional development of the impacted coastline. This role was later expanded to include the coordination of Federal Disaster Relief efforts when President Nixon designated the GEC as the single contact for federal aid. Despite the equal representation of coastal residents and federal administrators on the GEC, its policies were subject to frequent attack and condemnation by residents of these extremely conservative coastal communities.

The lack of adequate flood insurance was a primary factor in the slow reconstruction process of

hurricane-proof homes
destroyed



Seawall at Galveston Bay

Harrison County. Many property owners did not ever rebuild. According to interviews conducted with local realtors during the summer of 1984, land prices fell dramatically after the storm. For many years prices remained depressed. In the period immediately following the storm, development was concentrated in the rural, upland area of the county. To this day, developers and local realtors admit that they are conscious of the dangers of building in the most low-lying lands. There has been a general reluctance to redevelop along the shoreline.

Biloxi and Gulfport had both adopted a building code a number of years before Camille. As part of the requirement for acceptance into the National Flood Insurance Program, these Building Codes were strengthened and extended county-wide. General confusion resulted from a waiver of the building permit procedures immediately following the storm, several rounds of revisions to the new code, and lack of compliance on the part of lending institutions such as Farmers Home Administration. The end result was that a large (but unknown) number of buildings

severely damaged by the storm throughout Harrison County were reconstructed without conforming to the more restrictive building code standards.

With the influx of federal disaster relief, the larger towns used the storm as an opportunity for downtown revitalization. The most severely damaged areas were rezoned for more intense uses. Forty-six properties in the Biloxi downtown waterfront area which were completely destroyed by the storm were acquired by the town. The land was used for a substantial urban renewal development. Hazard mitigation was not, however, the community goal behind this post-storm property acquisition.

The smaller communities of Long Beach and Pass Christian did not recover as well as their larger counterparts. Biloxi and Gulfport were better equipped to handle the disaster and were more successful in applying for grants to aid in their redevelopment.

Today, hurricane hazard mitigation is a primary concern of planners in the Harrison County area. Despite this concern, local decision-makers remain unsatisfied with public evacuation plans and public education programs. Long range comprehensive planning has few supporters in these communities. Most of the cities' current development regulations, for example, were federally mandated for inclusion in the National Flood Insurance Program. There is little local initiative to bolster hazard mitigation policies (Leyden 1985).

Gulf Shores, Alabama

Hurricane Fredrick, a category 4 storm on the Saffir-Simpson scale, struck the Alabama coastline in September 1979. It sustained winds of 130 miles per hour and caused an estimated \$1.7 billion in property damage. In Gulf Shores, about 30 miles from the storm's landfall, the first two tiers of waterfront development were almost entirely destroyed or so severely damaged that they could not be repaired. The main beach highway was breached in a number of sections. The water and sewer lines running alongside the highway were extensively damaged.

Compared to many coastal areas, Gulf Shores and the surrounding Baldwin County area were relatively undeveloped in 1979. The town had only 2,000 permanent residents, although this swelled manyfold in the summer months. The Gulf Shores area had been growing through the 1960's and 1970's as a vacation resort area. At the time of the storm,

community condemnation

a reluctance to
redevelop

it had a few small motels and two condominium developments. Single family vacation homes and rental cottages were the most common type of construction. The town joined the regular phase of the National Flood Insurance Program in 1971. In that year a building code was adopted to comply with the minimum program requirements. Buildings built before 1971, however, were not built to any minimum elevation or structural requirements. State or local regulation of shoreline development was non-existent and many buildings were sited too close to the shore to be adequately protected even from long-term erosion. The lack of a professional planning staff and an unwieldy zoning ordinance compounded the town's disaster preparedness problems.

After the storm, sixteen counties in the Mobile Bay and Florida Panhandle area were declared a Federal Disaster Area. FEMA set up local disaster assistance centers to coordinate disaster relief activities. In Gulf Shores, federal funds were used for debris cleanup and removal, and for the restoration and repair of damaged public facilities. Eligible public expenses included public water and sewer services, roads, recreation and park facilities, and other damaged public property such as public buildings.

The community's ability to recover quickly from the storm's severe impact was clearly related to the generous level of financial and technical assistance provided by FEMA. There were frustrations expressed, however, over the lack of effective communication between federal and local officials. Local officials lacked the knowledge and experience to deal with strict, often unwieldy federal regulations and federal bureaucratic channels.

The first action the city took after the storm was to place a building moratorium on reconstruction in the beach areas. The moratorium lasted until public facilities were restored to the area. Minor repairs were allowed without a permit, but new construction and repairs to heavily damaged structures needed building permits. Large numbers of residences built prior to the minimum elevation and building code requirements were heavily damaged. As nonconforming structures, they were required to be rebuilt to FEMA standards if the damage required improvements of fifty percent or more than their pre-storm value. As might be expected, inspectors were under considerable pressure to underestimate the damages to these structures, particularly if their owners did not have insurance to cover the losses.

FEMA used 1362 funds to acquire five beach front parcels adjacent to the town's public beach and transferred them to the city. In addition, FEMA funded the preparation of a supplemental building code which detailed appropriate construction techniques for high hazard coastal areas. FEMA also provided funds for a land use plan. The consultant hired to prepare the plan, however, worked instead on the more immediate problem of revising the outdated zoning ordinance. Over two years of reconstruction and development took place before these became effective. Finally, in 1981, the Building Code supplement was passed and, in 1982, the zoning ordinance was approved with revisions.

The town's economy and municipal budget recovered quickly from the storm. "Freddy," as the residents refer to the storm, is partly credited with initiating a lucrative development boom which began while reconstruction was still underway. Local realtors suggest that development pressure had been growing in the Gulf Shores area and that the storm created an excellent opportunity for developers to acquire beach front property with the older structures conveniently removed. Numerous property owners, many who were receiving flood insurance payments for their destroyed buildings, apparently could not resist offers for their vacant land at ten to twenty times its original value. In the two years following the storm, the town issued 77 permits for multi-family developments. Many of the units were located in the Gulf front area.

The pace of development sparked public protest over the lack of aesthetic and environmental controls assigned to beachfront building. Minimum sideyard setback regulations, for example, were successfully added to the zoning ordinance when it became increasingly apparent that continued lot-line to lot-line building was blocking the view of the Gulf. Despite their disdain for private property regulations, Gulf Shores decision-makers became increasingly receptive to development management measures as the pace and density of development reached overbearing levels. Recent problems with poor water quality and an inability to provide water service at a rate equal to demand has added to local interest in development management.

Galveston Bay, Texas

Galveston, Texas is located on a barrier island twenty-eight miles long and one-half to three miles wide. It is immediately south of Galveston Bay and

revisions to the code

disaster-inspired urban
renewal

unwieldy bureaucracy

ignoring rules to speed
rebuilding

the Houston Metropolitan area. The city has a long history of storm disasters. In 1900, a very severe storm killed more than 6,000 people. Following this storm, the town was rebuilt, elevated with fill, and a massive seawall was constructed in front of the city for protection against future storms. After successive storms, and as the city expanded, the seawall was strengthened and extended to its current 9.7 mile length and fifteen foot height. In this century, hurricanes have struck the Texas coast an average of every two and a half years. Galveston Island, in particular, has been hit by eight severe storms preceeding Alicia (1900, 1915, 1919, 1933, 1942, 1961, 1967, and 1970).

Given the city's maligned history, it is not surprising that the area has a high degree of hurricane hazard awareness. Unfortunately, government response to these storm hazards has been oriented to improved barriers and improved evacuation plans rather than loss prevention efforts. The state is known for its large structural protection works and its comprehensive hurricane evacuation and education program. The use of planning techniques to reduce the amount of property at risk from storm damage, however, has not been seriously considered.

Hurricane Alicia struck the Texas coast on August 17, 1983. The eye of the storm passed just south of Galveston Island. It was a medium size storm with winds up to 115 miles per hour, and a storm surge of 6 to 10 feet. The land protected by the seawall was the only area on the island that escaped flooding. The structures behind it suffered only moderate wind and rain damage. Low lying areas did not enjoy such protection, however. In the north end of the bay, a twelve foot storm surge from Galveston Bay destroyed 300 homes in the Brownwood subdivision of Baytown. Throughout the island, over 1000 single family homes were destroyed and an additional 6,700 received major damage (McCloy and Huffman 1985).

In the aftermath of the storm, a 1362 acquisition project was suggested by the FEMA Interagency Hazard Mitigation Team for the Galveston Bay area (FEMA 1983a). The teams were established to promote a comprehensive, intergovernmental approach to flood hazard mitigation during the post-flood recovery process. Under the guidelines of the program, the FEMA regional director appoints a team of FEMA experts, key federal agency representatives, and state and local representatives to study mitigation strategies for local areas. Specifically, the team's

recommendations are to emphasize non-structural mitigation measures, and to better ensure that the various federal agencies involved in post-disaster aid emphasize mitigation of future flood damages. In a recent article on Disaster Recovery and Hazard Mitigation, Rubin (1985) indicated that the teams have had a significant effect on the identification and implementation of mitigation measures at the city and county levels after a major flood-related disaster.

The Team issues two reports: (1) the Interagency Flood Hazard Mitigation Report, which is released fifteen days after the disaster with its suggestions for post-flood mitigation measures, and (2) the Interagency Post-Flood Recovery Progress Report, released 90 days after the disaster which details progress on each of the original mitigation proposals (see FEMA 1983a, 1983b). The Hazard Mitigation Team following Alicia suggested a number of non-structural mitigation techniques, including a land acquisition project for the Brownwood area.

For Galveston Island, the report suggested that the city prepare a comprehensive land use plan to guide development on the largely vacant west end of the island. It was argued that this plan should take account of the environmental needs of the barrier island system by using carrying capacity principles. Those long range planning recommendations were the suggestions of hazard mitigation planning experts who observed the recovery process and volunteered as participants on the Hazard Mitigation Team. The remaining recommendations for the Galveston area centered on improvements to the building code, increasing local evacuation awareness, and holding seminars for local builders on hurricane resistant construction. The Hazard Mitigation Team's recommendations were advisory, and had no financing or enforcement power. According to section 406 of the Disaster Relief Act which authorized the teams, long term implementation of the team's suggestions are the responsibility of the affected states.

Another change in federal policy since 1980 involves the size of the reimbursement allowance from Federal Disaster Relief. Today, the FDR will reimburse local communities for only seventy-five percent of their eligible expenses; local or state government are responsible for the remainder. This policy was especially burdensome for the City of Galveston because of a locally mandated cap on budget increases and the large proportion of tax-exempt property within the city.

After the storm, Galveston adopted a three week development moratorium on reconstruction in the

a maligned history

comprehensive
intergovernmental
approaches

non-structural mitigation
techniques

increasing evacuation
awareness

west end of the island. The prohibition did not apply to structures that only needed minor repairs or for structures landward of the main beach highway. The moratorium was extended for two more weeks for property that was between the beach highway and the Gulf which included most of the V zones where the damage was heaviest. The storm had eroded the beach front property and shifted the vegetation line as much as 200 feet landward. The extended moratorium was requested by the State because the Texas Open Beaches Act stipulates that the public beach extends from the water's edge to the vegetation line. After this large landward shift, hundreds of homes were situated on property which the State Attorney General claimed was public, and rebuilding was prohibited if structures were more than 50 percent damaged.

In addition to the building moratorium, the city created a Recovery Task Force. The Task Force was comprised of a number of subcommittees covering a range of concerns from insurance problems to building code modifications. The subcommittees were mainly staffed by community leaders and citizens who volunteered their expertise to help the recovery process. The work of the Task Force seems to have served a number of important functions: 1) it diverted pressure away from the overworked city council; 2) it provided an excellent mechanism for channelling local expertise (such as architects, builders, mental health experts) into the policy-making arena; and 3) it provided the community with a much needed sense that their issues and concerns were being addressed and that the city government was responsive and organized despite the post-disaster confusion. The most effective subcommittees were those that addressed immediate recovery concerns such as insurance problems, or short term housing needs. The longer-range subcommittees (such as one for redevelopment of the west end of the island) were less effective in producing substantive recommendations; members indicated that interest flagged in the months following the storm as the most pressing community issues were resolved.

Sixteen months after Hurricane Alicia, the storm was credited with initiating economic revitalization of the seawall-tourist area. Many of the hotels along the strip were badly in need of remodeling, and the convention business had been decreasing in recent years. Although protected from the storm surge by the seawall, most of the motels and hotels received extensive wind and rain damage. Insurance payments provided remodeling and refurbishing capital.

Galveston, in a continued attempt to bolster its property tax base, is now encouraging higher density developments on the west end of the island through tax-increment financing. The financing scheme uses the increased property taxes which result from the new development to finance the development's infrastructure costs. There are nine zones in Galveston: seven in areas unprotected by the city's seawall; two on the east end of the island, in an accreting beach area in front of the protective seawall; and five on the low-lying west end of the island (Hegenbarth 1985b).

the value of task force decision-making



Chip Taylor of Carolina Beach has his daughter, Kelli, all wrapped up as they wait to see if they can return home.

Jack Upton

Discussion

Each of the community experiences discussed above is a unique situation. The cities are of varying sizes, in different states, with different economic trends and community values. The recovery and reconstruction experiences were heavily influenced by the current forms of federal disaster assistance. In this manner, the communities represent a chronological sketch of changing federal disaster relief policy: before the NFIP and FEMA; with the NFIP and early FEMA; and with the NFIP, FEMA, and the new Interagency Hazard Mitigation Team. Nevertheless, there are a number of reconstruction trends and similarities within these communities.

One of the most obvious is the desire of the community to recover and reconstruct as quickly as possible in an attempt to return to normalcy. Haas et al (1977), in the landmark piece *Reconstruction Following Disaster*, states that during the reconstruction period, "[t]he central issues and decisions are value choices that give varying emphasis to the early return to normalcy, the reduction of future vulnerability, or to opportunities for improved efficiency, equity, and amenity." After a storm, some repairs will begin immediately, such as those to public water and sewer, electricity, and the road system. Unless plans have been made preceding the storm to relocate or redesign these facilities, the sense of urgency to replace these may preclude hazard mitigation opportunities, as evidenced in Gulf Shores. This sense of urgency also affects residential reconstruction. Homeowners living in temporary housing want to repair their homes and move back in as soon as possible. Haas mentions that the strongest pressure of all for a prompt return to normalcy comes from the existence of impacted and displaced families and businesses, and adds that these pressures do not create a positive environment for orderly, well-planned reconstruction processes.

These pressures were particularly felt by those members of the community who were in positions to either speed or delay the reconstruction period. Building Inspectors in both Galveston and Gulf Shores felt strong pressures to be lenient in issuing building permits to allow rebuilding. This was most intense when the building was non-conforming to current codes, and heavily damaged. In Gulf Shores, structures damaged more than 50 percent by law had to conform to the new building code and NFIP elevation requirements, which could have added substantially to the reconstruction costs of a non-

conforming building. Particularly when the homeowner did not have insurance to cover the losses, much less the cost of rebuilding to higher standards, officials felt severe pressure to be lenient with neighbors who had "suffered enough already." In Texas, the Open Beaches Act prohibiting reconstruction was only applied to structures more than 50 percent damaged, but sympathetic local inspectors generally issued rebuilding permits to structures which had any exterior walls remaining. Policies set in place before a disaster regarding these decisions and specifying explicit criteria would help ease the discretionary pressure felt by local officials. In addition, bringing in temporary inspection officials would help reduce the massive workload increase, and non-members of the community would be able to make politically difficult decisions more objectively.

In addition to the psychological stresses created during the initial recovery and reconstruction period which may work against new hazard reducing development policies, the storm may also produce some long-term community perceptions that could work as obstacles to the enactment of new hazard mitigation policies. A post-storm perception expressed in all three communities was that damages were a function of substandard construction. Indeed, all the communities had large numbers of severely damaged homes which were constructed prior to building code and elevation requirements. Building codes, elevation requirements, and hurricane resistant construction will, of course, help reduce the level of damages but as the hurricane-proof house in Harrison County dramatically illustrated, they should not be regarded as a panacea for safe shoreline development.

In Galveston and Gulf Shores, it is possible that the newer requirements for building codes and minimum elevations are perceived as having had a significant effect on reducing storm damages. Attitudes expressed in interviews, however, indicate that these may have had the detrimental effect of lulling the communities into a false sense of security regarding their ability to survive another major storm without sustaining heavy damages. Policy makers concerned with hazard mitigation may have to overcome this community perception before other development management techniques become politically viable.

Well-publicized evacuation plans and procedures can also add to a false sense of community security. People may be less likely to actively support hurricane-hazard mitigation policies if they perceive that they are no longer in any danger. In an area with

economic revitalization

reduce future
vulnerability

returning to normalcy

lenient damage
assessment

limited access, this will become increasingly important as the population size at risk increases beyond the evacuation capacity of the road system. In Galveston, the evacuation demand is already greater than the current evacuation capacity, and evacuating residents could be placed in severe danger during a full scale evacuation of the island. Residents, however, seem to express an attitude that if there is a storm threat, "they will just get up and leave the island," not taking into account that the rest of the local population has similar plans.

Another community perception evident in both Galveston and Gulf Shores was that the hurricane had assisted in producing an economic revitalization and development boom. After a storm, the large influx of non-local funds from federal and insurance sources seems to create a heady, almost "boomtown" atmosphere. With the stress and tension of the immediate recovery period behind them, the post-storm impressions of community inhabitants seemed to concentrate on positive economic impacts that the storm initiated. Even in Harrison County, which did not experience a significant development boom following Camille, there was a "renewed spirit in the communities to build back bigger and stronger than before" (Leyden 1985). The mayor of Gulf Shores commented that, for his community, there was "a definite silver lining to the storm."

While the hurricanes did not *produce* the economic boom that occurred afterwards, the storms appear to have stimulated the processes and shortened the time span over which development might have otherwise taken place. The coastal disaster created excellent opportunities for developers to acquire cheap land, and to approach numerous land owners who might be more receptive to selling their land after their homes were severely damaged and after they had received insurance payments. Policymakers will have to consider these economic development forces for two reasons. First, the stronger the development forces in the private marketplace, the more likely that these forces may work against innovative mitigation efforts, particularly non-structural flood-hazard mitigation efforts (see Rubin 1985). Second, and more subtly, it appears that the economic boom and financial benefits which residents enjoy as a perceived result of the storm, may tend to overshadow and downplay the damaging and painful effects that the severe storms produced in the community. This may lessen the community-based support and interest for hazard mitigation and pre-storm disaster planning.



While each coastal community will respond and react to different forces following a severe storm, planners and policymakers in hurricane prone communities need to acknowledge underlying perceptions and trends which may act as obstacles to enacting hazard mitigation policies. The communities discussed here were all Gulf coast communities: traditionally very conservative regarding regulation of private property, and not historically innovative in planning techniques. In areas similar to these, the greatest success for the adoption of hazard mitigation regulations appears to occur when the proposed regulations will further other community objectives which are capable of arousing sufficient community support to overcome the obstacles to their enactment. Examples of community goals which might receive a broader based support are aesthetics, or open space and beach acquisition.

Where development interests are strong and the localities conservative, the few coastal development

a false sense of security

a boomtown atmosphere

downplaying the damage

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regulations existing have been state or federally mandated. State and federal programs need to continue to provide muscle for the adoption of hazard mitigation policies, and should perhaps be assessed to insure that existing programs are not providing any additional incentives for unwise coastal development.

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