

CHAPTER 12



New Orleans, Louisiana, and Resilience after Katrina

HURRICANE KATRINA STRUCK THE Louisiana and Mississippi coast on August 29, 2005, causing more than \$200 billion in damages and killing over 1,800 people. It was the most costly natural disaster in U.S. history and highlighted the extent to which the U.S. coastline is vulnerable to such massive (yet predictable) natural events.

Nature of the Hazards

Burby (2006, 4) describes well the history of federal support for levee construction, especially following Hurricane Betsy in 1965, and the effects of these investments in allowing, and indeed encouraging, risky urbanization. He notes that “protection of existing development accounted for only 21 percent of the benefits needed to justify the project. An extraordinary 79 percent were to come from new development that would now be feasible with the added protection provided by the improved levee system.” Along with federal flood insurance, the levee construction led to massive new urban growth that converted wetlands into houses. Burby refers to this levee-induced growth as the “safe development paradox.” In New Orleans, and elsewhere, the “safe development paradox” has been accompanied by the “local government paradox,” as the city government has also helped

NOTE: Much of the information presented in this case was collected through a site visit and interviews with local officials in January 2007.

facilitate dangerous development there. (New Orleans' most recent pre-Katrina city plan, Burby tells us, fails to even mention the city's flood hazard).

The Mississippi coastal delta has been losing wetlands at a dramatic rate, through a combination of hydrological changes and ecological alterations. Day et al. (2005) have estimated a total loss of 4,800 square kilometers (1,853 square miles) of coastal lands since the 1930s, and estimate an additional 1,329 square kilometers (513 square miles) loss of wetlands by 2050. The following reasons for these losses have been identified:

- Building of flood control levees
- Closing of most active tributaries, and dredging of river mouth, resulting in “loss of most river sediments, which once sustained the wetlands, directly to deep waters of the Gulf of Mexico” (p. 255)
- Dam construction in the upper Mississippi River, resulting in a reduction of suspended sediment
- Extensive dredging of canals for drilling access, pipeline canals, deep-draft navigation channels (an estimated 15,000 kilometers, or 9,320 miles, of canals in wetlands)

Much study of the Mississippi delta ecosystem has been done, and some bold ecosystem restoration plans have been formulated. Coast 2050, and most recently the Louisiana Coastal Area (LCA) Ecosystem Restoration Study, lay out a vision of a restored ecosystem and a number of specific actions and projects that would help to bring about this restoration (U.S. Army Corps of Engineers 2004). The LCA Ecosystem Study, prepared by U.S. Army Corps of Engineers and incorporating the findings of Coast 2050, identifies key near-term “critical restoration features,” including flow diversions, bayou reintroductions, and shoreline restoration work. Some of these are recommended for implementation, others for further study.

Many individuals and organizations have recommended an emphasis on the restoration of the region's important and declining wetlands ecosystem. According to Costanza, Mitsch, and Day (2006, 317), an estimated 1,800 square miles (4,662 square kilometers) of wetlands have been lost since the 1930s.

due to a combination of combination of land subsidence, sediment deprivation due to levee construction, sea level rise, and oil and gas exploration and extraction activities, . . . the blanket of freshwater, sediments and nutrients from the Mississippi River Basin that used to spread across the Louisiana delta no longer does, as the heavily managed Mississippi River was forced to dump most of its load off the continental shelf into the deep waters of the Gulf of

Mexico. It is not only the sediments that help build coastal marshes; the freshwater counteracts salt water intrusion and nutrients spur organic soil formation—the major way that new soil is formed in the delta. When the river flow is not delivered to the wetlands to counteract subsidence and sea level rise, the wetlands disappear along with their storm protection function.

Resilience Actions and Planning

Costanza, Mitsch, and Day (2006, 319) recommend converting areas below sea level back to wetlands or allowing only buildings that are able to adapt to occasional flooding conditions; rebuilding wetland systems outside of the levees as flood protection; restoring much of the natural flow and functioning of the Mississippi River; rebuilding the social capital of the city; and viewing the city's renewal and rebuilding as a way of demonstrating what a future sustainable city could look like:

We should restore the built capital of New Orleans to the highest standards of high-performance green buildings and a car-limited urban environment with high mobility for everyone. New Orleans has abundant renewable energy sources in solar, wind, and water. What better message than to build a 21st-century sustainable city running on renewable energy on the rubble of a 20th-century oil and gas production hub. In other words, New Orleans should be built higher, stronger, much more efficient, and designed to make extensive use of renewable energy. One can imagine a new pattern for the residential neighborhoods of New Orleans with strong, multistory, multifamily buildings surrounded by green space, each with enough water and fuel storage for several weeks, operating principally on wind and solar energy.

Much of the discussion on rebuilding has centered around the question of how to provide adequate housing for those who has been displaced. The emergence of Federal Emergency Management Agency (FEMA) trailer-villes has been a disturbing development and has led some to search for alternatives to putting families in such trailers for long periods of time. The so-called Katrina Cottages were developed as an alternative approach to this problem. More substantial and designed by architects, but about the same size as a trailer, these cottages are viewed as a much more acceptable way to house families for extended periods of time.

One obstacle to using Katrina Cottages is that FEMA has been unable to fund them as an alternative. The agency feels it is restricted from funding them because, under the Stafford Act, Katrina Cottages would not be considered temporary hous-

ing, and FEMA cannot fund “permanent” housing. Mayor Connie Moran of Ocean Springs, Mississippi, has been a big proponent of the cottages and would like to see Congress change the law to grant funding for their purchase.

If communities were able to fund and build Katrina Cottages, these cottages would provide short-term housing and would also add to the stock of permanent housing in a community, and would on many levels probably be more sustainable housing than trailers. As New Orleans mayor Ray Nagin notes: “How much sense does it make to invest millions upon millions of dollars into FEMA travel trailers that are only going to end up on the trash heap in a couple of years?” (Norris 2006).

In addition, new revelations suggest that living in these trailers may be profoundly unhealthy. As many as 120,000 households lived in FEMA trailers at the peak, and even today some 66,000 families continue to live in them (Hsu 2007, A8). Tests suggest, however, high levels of formaldehyde off-gassing in the trailers, as high as seventy-five times the federal health standards. FEMA apparently knew of this problem but failed to engage systemic testing for fear of liability (see Hsu 2007). Few would expect or advocate that large numbers of people remain living in trailers for long periods of time. Thus postdisaster housing—the difficulty in providing it and the need for better, more creative, and healthier options—has become a major lesson following Katrina.

How and in what ways the city and region should rebuild have, of course, been major topics of study and analysis, and a number of different rebuilding and recovery plans have been issued by various government and nongovernmental organizations. The Urban Land Institute (ULI) assembled its own visiting team and issued a recommended rebuilding plan called the Bring Back New Orleans Plan. The Unified New Orleans Plan, a “broad-based citizen planning process” funded through the Greater New Orleans Foundation, has resulted in the development of a Citywide Strategic Recovery and Building Plan. This plan integrates the earlier plans; provides a detailed recovery assessment (hurricane impacts, population trends, future flooding risks, etc.); lays out a “recovery vision” and recovery goals; and provides a detailed set of recovery projects and programs intended to meet these goals and vision. The latter is extremely comprehensive, addressing flood protection, transportation, housing, community services, historic preservation, and urban design, among others (see City of New Orleans 2006).

The latest chapter in the rebuilding efforts and vision for the city of New Orleans is a new redevelopment plan unveiled in the spring of 2007 by the city’s new director of the Office of Recovery Management, Ed Blakely, a respected aca-

demarc and planner. The plan identifies seventeen redevelopment areas spread throughout the city, each about 0.5 mile (0.8 kilometer) in diameter. These areas are envisioned as catalysts for development and will be where public and private investment will be focused. The cost of this plan, \$1.1 billion, makes it much less ambitious (and more realistic to many observers) than previous plans. It will be funded through a combination of bonds with the hope that the federal government will relieve the city of its 10 percent share of disaster assistance funds (an



FIGURE 12.1
The first Global Green House and an early rendering of Global Green's Holy Cross Project in New Orleans' Lower Ninth Ward reflect principles of sustainability and resilience.
Photo by Lever Rukhin. Early rendering by workshop/apd.



exception made following 9/11 and other disasters, so some precedence exists). Interestingly, these redevelopment zones are centered on the historic location of the city's old markets, which used to be the centers of neighborhood life. And while one of the zones includes the Lower Ninth Ward, some fourteen of the seventeen are sited in the less flooded western areas of the city (see, e.g., Nossiter 2007a, 2007b).

Many of the organizations and agencies involved in rebuilding activities in New Orleans have been advancing a "green agenda." This new "green building" includes a project supported by the Enterprise Foundation to rebuild the Lafitte public housing project, based on their Green Communities green design criteria. Global Green USA has just completed the first homes in its Holy Cross Project, a mixed-use development in the Holy Cross neighborhood in the Lower Ninth Ward with major funding from the Home Depot Foundation (see fig. 12.1). Brad Pitt's Make It Right Foundation is also working on a larger green project that will eventually provide some 150 green homes, also in the struggling Lower Ninth.

According to Walker Wells (pers. comm.), who runs the Green Urbanism Program at Global Green, the Holy Cross houses and project will incorporate some key resilience features:

- They are located on high ground close to the river and levee, which is about 6 feet (1.8 meters) above sea level.
- A pier foundation system addresses weak soils and possible lifting from the foundation due to buoyancy during flooding.
- The first floor is elevated another 3 feet (0.9 meter) above grade.
- Rigid foam insulation is used that is less easily damaged by water and dries out more quickly.
- Insulation is placed on the exterior between the sheathing and siding so, if necessary, it can be replaced without damage to the interior.
- Paperless drywall is used on the ground floor to preclude or limit mold growth.
- Mechanical equipment and the electrical switch box are placed on the second floor to reduce risk of water damage.
- Windows and solar panels are rated to withstand impact from hurricane-force winds.

The first of the Holy Cross homes has been completed, according to Wells, and has received Platinum certification under the U.S. Green Building Council's LEED certification process. Work has just begun on the next two homes in early 2009, and there are plans to seek certification for the entire development under USGBC's LEED-ND (Neighborhood Development) program.

Resilience Challenges

Following Hurricane Katrina, much of the city's population relocated to other cities, and New Orleans' current population is still less than half what it was pre-Katrina. Many demographers and economists are not surprised; they believe that the social ills of New Orleans—very high levels of unemployment and poverty, a high crime rate, and what one recent observer described as a 'basket case' economy—suggest the merits of a poststorm population readjustment. These prestorm conditions, moreover, illustrate the high degree of social vulnerability that existed in this coastal city.

The inability of many residents to evacuate (there is no viable mass transit system, and some 25 percent of the city's residents did not own automobiles), coupled with the city's inadequate plans for transporting these residents out of harm's way, has become a major issue. Significant efforts have been made during the last two hurricane seasons to arrange bus and train transportation in the event of another storm evacuation (though not without logistical and planning difficulties). Katrina demonstrated vividly the vulnerability of urban coastal populations and coastal cities that have few nonauto transportation options.

Hurricane Katrina has highlighted other significant ways in which New Orleans' population is vulnerable, with lessons for other major coastal cities. Food availability and food security have emerged as significant concerns; even today, many grocery stores have not reopened in the city, and those that have reopened require a car to reach them. Immediately following the hurricane, a coalition of organizations called the New Orleans Food and Agriculture Network prepared a New Orleans Food Map to assist residents in locating food in the city. This map has been updated and placed on the Web (see www.nolafoodmap.com), and is being used as a kind of diagnostic tool for food planning in the city. Moving the city and its residents in the direction of greater food security has taken a number of tacks, including work to reactivate several community farmers' markets in the city and to incorporate food production and education into city schools. Schools became a major source of food, indeed the major source, for many children in the city. A pilot effort to incorporate a garden and food production has been underway in one school—Green Elementary—with the help and sponsorship of Alice Waters, who started the Edible Schoolyard program in California. Kids at Green Elementary are already growing some produce, and a large food-producing garden is envisioned.

Despite New Orleans' long and distinguished food and cooking heritage, it is

interesting that there is so little connection with local food and so many food security challenges. At one point in the city's history, as recently as the 1950s, there were some thirty-four publicly owned markets, which were the lifeblood of communities and neighborhoods. These are all gone at this point. There are no functioning community-supported agriculture organizations (CSAs, a kind of subscription farming) in the city, and, with the exception of several small and temporary farmers' markets, there is relatively little direct connection between local and regional producers and consumers. A food policy council has, however, been proposed, and the food vulnerabilities and insecurities uncovered by Katrina will likely need to be further addressed in the future.

But there are hopeful signs nonetheless. A number of prominent restaurants in the city have now rekindled what ideally will be long-term relationships with area growers. These connections are good for resilience and sustainability and, from the restaurant's point of view, provide considerable benefits in terms of taste, freshness, and health.

Hurricane Katrina was a devastating event for New Orleans, but if there is any silver lining to the disaster, it is that the impacts and difficult recovery have served to highlight the many ways in which many other coastal cities are not resilient. Profound inequalities related to income and race were brought out in the patterns of vulnerability and the impacts of the storm, as well as ineffective and inadequate federal disaster response, severe difficulties in rebuilding and stimulating the recovery of this historic city, and ongoing struggles to return it to its earlier population and economy. Yet there have been a number of new resilience ideas, innovative planning efforts, and pilot initiatives that have arisen from the circumstances of New Orleans. These include, for instance, the concept of passive survivability (discussed extensively in chapter 6) and new ideas for building green and resilient buildings and neighborhoods. And while the story of New Orleans is still being written, the city may in the end bounce back and become a model of future resilience and sustainability. Whatever happens, New Orleans will serve as a cautionary tale, a visceral and moving testament to the vulnerabilities of coastal life signaling an urgent need to confront the serious issues of coastal resilience faced up and down the U.S. coastline.