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# Reflections on Katrina: 20 years down the road

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## Abstract

This essay responds to a request for personal reflections based on my experiences in the wake of Hurricane Katrina and lessons learned from that storm. The essay begins with comments on how I was swept into the disaster's aftermath, and reflects on the quest for resilience in a shattered city, some of the lessons learned and unlearned at the local level from the response and recovery to Hurricane Katrina in 2005. It concludes with two important lessons learned that have a bearing on climate change adaptations in coastal areas globally.

### Keywords

Hurricane Katrina, Resilience, Climate migration

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# 1 Katrina Introduced

Hurricane Katrina made its devastating landfall on August 29, 2005. Heading northward, its eye swept ashore near the Louisiana-Mississippi border with wind speeds at the nearby New Orleans airport of 143 kilometers (89 miles) per hour, which were greatly diminished from peak speeds over the Gulf of Mexico, and storm surge on the Mississippi Gulf coast of over 7 meters (21 feet). Although a massive hurricane protection levee system surrounded the city, a combination of factors contributed to waves and storm surge overwhelming the barriers around New Orleans. Among them were the path of the storm and its sizable surge, the failure of protective floodwalls in the Lower Ninth Ward, and the collapse of two levees along the outfall canals connected to Lake Pontchartrain. The subsequent flooding inundated some 80 percent of the city and contributed to some 1800 fatalities and billions of dollars in damage.

This disaster unfolded in a city and region accustomed to the irregular arrival of tropical cyclones. In the years before this event, local newspapers had warned residents that the city was susceptible to massive impacts and the National Hurricane Center advised that New Orleans was one of the highest risk cities in the country due to its perilous location near the warm waters of the Gulf of Mexico that fueled hurricanes, its low lying urban footprint, and its reliance on infrastructure that, by design, offered protection only against the "standard project storm or levees designed to guard against a storm with 100 mph winds and a return frequency of about 200 years" (Colten, 2009, p. 42). Awareness of the risks and with urgent warnings, some 800,000 people evacuated the city and surrounding communities as the storm bore down on the Louisiana coast. An estimated 100,000 remained within the ring of levees, many without personal vehicles to enable them to flee.

# 2 In Katrina's Wake

As the storm roared inland, I was hunkered down in my Baton Rouge home some distance from the coast and well west of the most intense winds. I was a professor of geography at the local state university and had recently published a book on New Orleans's environmental history (Colten, 2005). This publication positioned me as an authority on New Orleans's struggles with flooding. My home had lost electrical power, and blustery winds were pushing the giant live oak limbs hanging over our bungalow in frighteningly wide arcs. Even without electricity, our trusty land-line phone remained operational and made me one of the few local authorities who could be reached by the national media. With the lights out, I received a call from a New York Times reporter. I tried to answer his questions while having no direct knowledge of conditions on the ground 80 miles away in New Orleans. Such is the fog of disaster.

Over the next few months, I spent hours each day in conversation with journalists from around the world. My understanding of Katrina's impact was shaped by their questions and limited news coverage obtained from radio and the local newspaper. My historical research proved to be my best source of insight. While distant reporters had to seek details about the emergency response elsewhere, I was able to address many of the longer-term issues about the city's historical settlement and development. I tried to explain why people would choose to live in a place like New Orleans, why the impacts proved to be so frighteningly inequitable, and how the city, state, and region would rebuild in a way to minimize the recurrence of such a shocking disaster.

# 3 Katrina and Resilience

One word that became a hallmark for the Katrina response and recovery effort was "resilience". Social scientists had begun to deploy the term, borrowed from ecology, to examine the ability of society to rebound from disruptions - such as a hurricane. In the wake of Katrina, resilience became one of the most overused but also misunderstood terms in the arena of hazards - both in an applied sense and in academic studies.

Those who tutored me on the term's meaning considered resilience to have four elements: the capacity to anticipate significant multi-hazard threats, to reduce or mitigate a community's overall susceptibility to hazard events, and to respond to and recover from specific hazard events when they occur. This applies at all scales, although our work focused on community resilience which is the focus of this essay. Fundamental to recovery was the pursuit of goals to simultaneously restore the familiar built environment and socio-economic activities rapidly and to aspire to reconstruct

in safer, better, and more equitable ways (Wilbanks, 2008; Colten et al., 2008). While laudable, this definition was not shared universally. On the ground efforts often prioritized only some of these elements of resilience, and others tended to adopt meanings that served the purposes of what some have called the New Orleans "growth machine" which prioritizes economic growth over safe and equitable development for the wider society. Consequently, as the term resilience became the term de jour, there was little consensus on what it meant or how to achieve it (Cutter, 2016). The lack of consensus contributed to disagreements and delays on the fundamental goals for both the short- and long-term recoveries.

In the United States disaster response and recovery, which have been typically included in formal resilience, received a certain degree of structure with the passage of the Disaster Act of 1950 which offered federal funds when states and localities were unable to meet their immediate response needs. While resilience was not a term found in the act, the legislation indirectly recognized that extreme events could overwhelm local capacities. Unspoken was the acknowledgment that a type of informal resilience existed historically. Even without pre-event plans and prior to the dedication of federal funds for response and recovery, citizens, voluntary organizations, and local governments mobilized to launch response and recovery efforts following extreme events. This constitutes what my colleagues and I have referred to as inherent resilience – local capacities, with no dedicated funding or explicit plans, that resides in social memory and is activated when needed (Colten et al., 2012). These informal, spontaneous, locally driven efforts, along with assistance from the Red Cross, National Guard, Coast Guard, and Civil Defense in the latter half of the 20th century, provided the basis for community resilience during the first stages of response and recovery. Specific congressional appropriations commonly assisted communities to regain their footing in the long run.

In the wake of disaster, community and state leaders commonly have made public proclamations that they were poised to recover quickly, that disasters could not diminish their economies or undermine their civic spirit – such statements have adopted resilience as a key term in recent decades. This type of political posturing serves to motivate local populations, to dissuade trade partners from diverting their business elsewhere, and to display confident leadership. Yet, while statements that deploy the term resilience sought to ensure full recovery, they were often statements of defiance that did not reflect the four elements of long-term, sustainable resilience. They often sought to gloss over the full impact of a disaster and to protect powerful local economic interests (Colten, 2015).

Defiant statements followed the passage of major hurricanes in New Orleans in 1915, 1947, 1965, and 2005. Mayors and governors asserted there were few fatalities, that commerce would continue uninterrupted, and that the fortitude of citizens would enable a full recovery. Efforts to build structural protections with federal assistance and eventually evacuation plans sought to mitigate the impacts of future storms, and thereby provide a form of resilience, before the widespread use of that term (Colten, 2015). Disasters commonly inspire deliberate efforts and public investments in infrastructure and programs to assure improved mitigation (levees) and preparedness (emergency plans) – such are lessons learned. Over time, it is common for the sense of urgency spawned by disaster to erode, and maintenance of infrastructure may lapse as emergency preparedness stagnates. This erosion represents what I refer to as lessons lost (Colten & Giancarlo, 2011; Colten, 2012).

Efforts to reduce future storm impacts abounded in New Orleans after historical storms. Local organizations completed a protective barrier along the shore of Lake Pontchartrain after the 1915 hurricane. Following the 1947 storm, structural protections were extended across the post-war suburbs in Jefferson Parish. After Hurricane Betsy in 1965, a previously proposed Corps of Engineers region-wide hurricane protection plan received funding and construction commenced. While formidable, this levee system was not quite complete when Katrina struck in 2005 and there were multiple failures that contributed to the extensive inundation of the city (Colten, 2009). Despite the statements of defiance and the ensuing investments in fortifications, resilience was not perpetuated from one storm to the next and, in fact, contributed to suburban subsidence and encouraged development in low-lying sections of the city. Furthermore, economic development behind the levees brought more people and businesses into areas of risk - with the false impression that they were safe. Katrina demonstrated that building a structural protection system with design limits was not resilient.

# 4 Lessons Learned and Lost

Two key lessons learned from Katrina were that the levee system had shortcomings and evacuation options for the city's residents were inadequate. These both exposed inadequacies in sustaining resilience. So, after Katrina, authorities rushed forward with repairs and modifications to fortify the protection system. The Corps of Engineers built a major

barrier east of the city to intercept future surges; they repaired the levees along the outfall canals and added pumps to lift rainwater around the gates erected at the mouth of these canals; and they repaired and reinforced other damaged levees. When Hurricane Isaac struck Louisiana in 2012, it flooded unprotected areas upstream in St. Charles Parish. Appeals went out almost immediately for new levees to protect this suburban community. This work is underway and will stretch the Corps' maintenance budget in years to come. Historically, the ever-expanding levee system has encouraged more development in risky areas and creates greater challenges for federal funding in an era of fiscal restraint with heightened risk due to climate change. The continuing investment in sprawling and expensive hurricane protection levees repeats a common urge to rely on an unsustainable structural system and represents lessons from the storms in 1915, 1947, and 1965 that have been lost in the years since 2005.

In 2021 when Hurricane Ida brushed the city, much ado was made about how the post-Katrina improvements proved successful. However, such proclamations were more misguided than deceptive. While the storm protection system proved effective, Ida did not fundamentally test its design or construction. Nonetheless, these statements typified the defiant rhetoric that followed past storms: the city was stronger than the storm (Colten, 2009; Colten, 2015) and did not represent a lesson preserved.

In addition, a local organization organized a complex evacuation system after Katrina: Evacuteer. Intended to provide a reliable means for residents without personal vehicles to assemble at designated locations where buses could then carry them to safety. Touted as an improvement in resilience, it also exemplifies a well-meaning and well-designed but defiant posture - readiness on paper does not translate into readiness in action. For the system to operate its managers needed more time than allowed by the rapid advance of Ida, and they were unable to mobilize both the necessary public announcements and evacuation procedures. A program put in place to provide greater resilience was not activated and the overall evacuation response to Ida earned criticism after the storm, despite moderate impacts in the city. The storm's path that spared the city was more important in protecting those without vehicles than the evacuation system (Kyle, 2019; Garfield, 2025). The inability to mobilize the evacuation system reflects its inflexibility to accommodate a rapidly moving storm, and therefore an operational ineffectiveness of a lesson learned in 2005.

Alongside the position that a locality is stronger than the storm is a common belief that economic strength will allow a place to re-build both bigger and better than before a disaster. Such explicit comments followed Katrina. In a very public statement broadcast from Jackson Square, President George W. Bush emphasized the need to re-build better and that entrepreneurs would lead the way (Bush, 2005). But does building more expensive economic infrastructure and enticing more people into New Orleans make it more resilient? Planner Raymond Burby considers the contrasting post-disaster goals of safe development vs. economic development (Burby, 2006). The former embraces elements of resilience and acknowledges that the "levee effect" spurs investment in unsafe locations when levees offer a false sense of security. Redevelopment commonly assumes that all the economic investment and the assumed prosperity it will bring assures safety. Such thinking contributed to the vast economic inequities in New Orleans that Katrina exposed for the world to see. For the post-Katrina actions, sociologists have presented urban growth in New Orleans as opportunistic, crisis driven, and most beneficial to those with greater wealth (Gotham & Greenberg, 2014). New Orleans, after Katrina, unambiguously prioritized economic development over safety and did not achieve greater equity as is evident in many quarters of the city. By not adequately addressing economic inequities, a lesson from Katrina was lost.

As the city struggled through the fraught process of finalizing a recovery plan (Olshansky & Johnson, 2010), it refused to cede territory to open space as flood retention areas and prioritized re-investment in areas severely damaged by Katrina's flooding. Early measures of recovery touted the rebound of tourism and the soaring number of new businesses. Granted, redevelopment was a hybrid plan that sought federal funding for mitigation in the form of levee repairs and other structural safeguards to protect the rejuvenated commercial districts. Nonetheless, more economic activity translates into more risk exposure. Recognizing the public's expectation that the structural safeguards should protect against all storms, the Corps of Engineers now refers to the levee system as a "risk reduction" system. They make no assertions of unlimited protection. The realization that levees were not a failsafe protection system has largely faded from public view in the last 20 years: another lesson lost.

With over 140,000 homes suffering damage, housing was a key concern after Katrina. The Road Home program administered by the state with significant federal funding provided aid for homeowners to rebuild or relocate. Over 90% of those accepting funds opted to rebuild on the property where their damaged homes stood. Only a small fraction opted to relocate to safer neighborhoods. Additionally, charitable organizations worked to build houses for the city's

disadvantaged. The Make It Right Foundation constructed houses in areas where flooding destroyed much of the previous housing stock. In recent years, those new dwellings literally have been falling apart (Keller, 2022). The Habitat for Humanity houses intended for musicians, and their families were plagued with defective drywall that damaged appliances and harmed the health of residents. Volunteerism and charitable organizations, especially as it relates to housing, are vital to the most needy residents, but even the most experienced groups were subject to substandard supplies and contractors without adequate expertise in local conditions. Despite grand hopes, some housing programs have either planted families back in areas of risk or proven to be uninhabitable, and only marginally beneficial to the lower-income population that suffered disproportionately (Sapien, 2010; Keller, 2022). Lessons about safe housing were not satisfactorily retained

# 5 Lessons for Coastal Cities Globally

Beyond the local lessons discussed here, the Katrina disaster offers some larger lessons. Hazards research and emergency response agencies took note of many aspects of the post-Katrina efforts. Among many lessons learned two things stand out to me. Migration of individual families after Katrina, without government assistance or guidance, offers a model for future disasters tied to sea-level rise. The city's population is around 20 percent lower than its pre-storm total. There has been some relocation within the city away from the areas that suffered the most – such as Hispanics moving to Jefferson Parish and the growth of circum-Pontchartrain suburbs (Zaninetti & Colten, 2012). I think this pattern offers a view to how coastal populations will migrate inland - pulses of population following disasters, not complete abandonment of large cities. The broader question in terms of migration is how response and recovery plans support a more cohesive migration option that ensures communities remain intact when moving towards safety rather than contributing to community disintegration.

There were notable aid organizations that emerged spontaneously when FEMA and other aid organizations such as the Red Cross were slow to establish an effective presence in the city. These groups provided food and medical assistance and evolved to serve additional needs in terms of housing and employment (Colten et al., 2008). Such informal, grass-roots efforts reflect the type of inherent resilience that existed before FEMA and state emergency response agencies. Their effectiveness suggests the need for the expansion of opportunities for state and federal agencies to coordinate with emergent organizations and to integrate inherent and formal resilience.

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# Author contributions (CRediT)

C.E.C: Conceptualization, Research, and Composition.

# Use of AI

During the preparation of this work, the author(s) used no AI tools in order to prepare the manuscript.

# Declaration of interests

The author reports no conflict of interest.

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