August 2015

Conveniently Located Disaster: Socio-Spatial Inequality in Hurricane Sandy and Its Implications for the Urban Sociology of Climate Change

Gordon Douglas
New York University, gordon.douglas@sjsu.edu

Liz Koslov
New York University

Eric Klinenberg
New York University

Conveniently Located Disaster

Socio-Spatial Inequality in Hurricane Sandy and Its Implications for the Urban Sociology of Climate Change

Gordon Douglas, Liz Koslov, and Eric Klinenberg
New York University

Abstract

Hurricane Sandy was a major event with major implications for how sociologists think about the relationship between climate change and crisis in urban areas. The storm's impact on New York provides a valuable case for considering how to study the impacts of climate change on large, densely settled cities with vulnerable hard infrastructure and highly complex social conditions that produce differentiated experiences across many different communities. This working paper considers data at several levels of analysis with the aim of assessing neighborhood inequalities in the impacts of such extreme weather. Drawn from the authors' ongoing research project on unequal vulnerability to climate change in New York after Sandy, the paper presents findings from data in three thematic areas: impacts on transportation and other vital systems; the performance of select public services, including subsidized housing and the police; and local, grassroots responses to the disaster. Across all of these factors we focus on neighborhood-level variations in storm impact and recovery. We also highlight differences between official reports on the storm's impact and response and the accounts of community groups, activist organizations, and individuals. In doing so, we invite discussion about the most effective approaches and conceptual frameworks for the urgently important project of connecting a sociology of climate change to the study of the social experience of extreme events in major cities.

Conveniently Located Disaster

Socio-Spatial Inequality in Hurricane Sandy and Its Implications for the Urban Sociology of Climate Change

Gordon Douglas, Liz Koslov, and Eric Klinenberg
New York University

To say that climate change is a social issue, a local issue, and an urban issue – and therefore in all these ways a sociological issue – is thankfully not so rare a claim. Existing research has gone a long way toward advancing our understanding of the social impacts of extreme weather and other disasters. However, in bringing a sociological eye to the study of what appear likely to be increasingly common impacts of extreme weather on human populations in the coming years, an obvious but so far little debated matter is what levels of analysis are most appropriate, what methodological approaches are most valuable, and what types of data may be missing. The 2012 case of Hurricane Sandy in the New York metropolitan area presents an opportunity to consider what new things can be learned from this example of an extreme weather disaster, the largest Atlantic hurricane on record and popularly perceived as a "sign" of climate change,[1] striking a highly populous, diverse, and infrastructurally complex urban region. New York's experience of Sandy offers new opportunities to think about additional approaches and to broaden our understanding of the social impacts of climate change, especially on major metropolitan areas.

This working paper, part of an ongoing research project on inequality in the impacts of and responses to climate change in New York after Sandy, presents findings from our data in

[1] See for instance the November 1st, 2012, issue of *Bloomberg Businessweek*, with the cover story "It's Global Warming, Stupid."

three thematic areas: (1) impacts on transportation and other vital systems; (2) the performance of select public services, including subsidized housing, schools, and emergency responders; and (3) local organizing and grassroots responses to the disaster. Each of these factors is effectively a type of urban social infrastructure (whether physical, public, or community-based), and across them all we focus on neighborhood-level variations in storm impact and recovery. We also highlight differences observed between official reports on the storm's impact and response and the accounts of community groups, activist organizations, and individuals. In doing, so we offer a conceptual framework for examining extreme events in a major city, and suggest some of the broader implications of our findings about New York's experiences for understanding what seems likely to become increasingly common urban collision between extreme weather and urban areas.

Hurricane Sandy and a Sociology of Extreme Weather in the Anthropocene

Many elements of the Sandy's impact on New York and the way that the city responded are of course specific to the unique circumstances in question, but they nonetheless provide an invaluable case study with much greater relevance for understanding future extreme weather events in major cities. As such, we focus here on those new data that can inform how we think about climate change's impacts on large, densely settled metropolitan areas with vulnerable hard infrastructure and highly complex social conditions – the types of places that have seen comparatively little attention in hazards research but are increasingly likely to experience more extreme weather events in the future.

For one thing, Hurricane Sandy (popularly rebranded "Superstorm Sandy" for its tremendous size, even as it was officially downgraded to a "post-tropical cyclone" before making

landfall in New Jersey) was not perceived as any workaday natural disaster taking its human and economic toll. As the largest recorded Atlantic hurricane by sheer size, for its unusual hybrid "Frankenstorm" characteristics (created in merging with a separate winter storm front in the Northeast), and following remarkably closely on the heels of 2011's Hurricane Irene, Sandy was quickly taken up as another "sign" of climate change by many public officials, media outlets, environmentalists, and effected community members alike. However imperfect this characterization may be,[2] in many ways Sandy is valuable as an example of types of extreme weather impacts that geologists have suggested may become "the new norm" on the Atlantic seaboard and in other major metropolitan areas by the middle of this century (see Mason 2012).

What is more, the circumstances of Sandy and New York City provide information and opportunities for research on factors that have received little attention in prior studies, from the experiences of high-rise public housing residents and the role of grassroots relief responses to the sheer scale of vital systems and advanced infrastructure affected. Existing social science research on hazards and disaster vulnerability has suggested many productive avenues of research, establishing an important discourse on inequality in disaster vulnerability and other concerns. And sociologists have produced notable work on subjects ranging from the social production of environmental knowledge (Buttel & Taylor 1992) to the political economy of disaster recovery (e.g. Gotham & Greenberg 2014) and the sociology of climate change itself (see e.g. Urry 2009 for a review). Yet missing from this body of work are some factors that the case of Sandy can help to clarify. Among them, the effects of extreme weather on the physical and social infrastructures of the most populous and diverse megapolitan regions and a consideration of the

[2] A more accurate explanation would appear to be that all weather is impacted by global warming trends and that Sandy, while no more "caused" by climate change than any other storm, was nonetheless "enhanced" to some degree by these trends (see, e.g., Trenberth 2012a, 2012b).

important differences in the perceptions of disaster preparedness and response between the officials responsible and the everyday residents experiencing them. Also missing is an analysis of neighborhood-level variations in these indicators. Things like storm surges impact different areas in different ways due to the vagaries of geography, geology, and climate conditions. But their differentiated effects are also shaped by local decision making, the performance of infrastructure and public services, and the uneven presence of social capital and local organizing capacity at local levels.

Addressing such factors is the goal of this paper. It makes use of recent empirical research by the three authors and other members of NYU's Superstorm Research Lab, as well as our new analyses of published "after action" reports from city, state, and government agencies and a variety of non-governmental actors assessing the impacts of the storm and the response to it in the New York area. We explore questions about the neighborhood-level differences in Sandy's impacts and its aftermath across several different thematic areas: How did complex systems of hard infrastructure perform under the extreme conditions presented by Sandy? How did differences in organizational decision-making produce vastly different experiences for different communities? What were the unique advantages and disadvantages of "big city" features like transit-dependent publics and high-rise housing? How do frayed relationships between wary citizens of color and the police forces there to protect them complicate the provision of services during an emergency? How did local organizing vary across neighborhoods? What role does social infrastructure play in short- and medium-term responses to crisis, and in longer-term efforts to mitigate and adapt to climate change on a local level? Our aim here is not only to better understand the processes at work but to explore what sorts of data are most valuable and what levels of analysis most productive for future research.

Vital Systems: Transportation and Hard Infrastructure

With stronger and more frequent storms, foundational urban infrastructure will be more stressed. The hard infrastructure that keeps a city running and the social services that keep people safe and healthy are enormous considerations even on a good day. Even at their best these vital systems are complex and unwieldy, their limitations tested by comparatively minor complications or surges in demand. The performance of these systems before, during, and after Hurricane Sandy's impact offer an important metric for assessing differentiated outcomes – and a number of lessons for preparing for future storms. We focus here on the region's transportation systems as an example of the geographic unevenness of the storm's impacts on hard infrastructure.

Transportation networks fundamentally define the physical morphology and cultural character of cities. Due to their intrinsic role in mobility and everyday life as well as their hard-set limitations in terms of capacity and adaptability, they are vital aspects of urban infrastructure that are liable to be stressed to the point of breaking in any type of disaster. During Hurricane Sandy and its aftermath, New York's rail, air and automobile transportation systems were all crippled, albeit in very different ways and with very different impacts on people and communities.

For instance, the region's airports were closed by the storm, stranding tens of thousands of travelers and reverberating grounded flights and days of backlog around the world (LaGuardia airport was especially hard-hit, with flood waters submerging the tarmac and reaching terminal gates). This, combined with closed Amtrak and regional rail lines (not to mention seaports) hugely impacted visitors, industry and commerce, and those most mobile New Yorkers who depend upon intercity and international travel. At the same time, the lack of mobility options at

this scale meant relatively little to most New Yorkers. For them, it was the widespread but far more uneven impacts on transportation infrastructure *within* the city that were of greatest concern.

Vehicular transportation networks in the city were utterly crippled during the storm, with ten major bridges and three of four tunnels closed by the end of the evening on October 29th. At this point, the Lincoln Tunnel was the only major Manhattan entry point; the outer boroughs and the rest of Long Island (more than 7.5 million people) were temporarily cut off from the U.S. mainland. Though bridges quickly reopened after the event, with subways closed they became jammed with traffic and carpooling or ridesharing was mandated. Within days, the biggest challenge to private automobile users (at least those whose vehicles were not among the 250,000 destroyed by the storm) became finding gasoline. With power outages widespread and freight and commercial transportation into the city massively curtailed, gas stations found themselves empty or unable to keep up with the long lines that formed; police were required to manage the queues and respond to fights that broke out in several locations. A year later, New York became the first state to establish its own strategic fuel reserve.

As for the subways and commuter rail networks, the contrast between two of the region's major mass transit agencies in terms of system-wide preparedness and impacts speaks volumes. New Jersey Transit, the most expansive state-run transportation system in the county, was hit hard by Sandy and incurred more than $400 million in damages. Especially costly was the decision to leave hundreds of trains parked in two highly-exposed waterfront rail yards during the storm, resulting in some $120 million in damages to the unprotected rolling stock. Reports faulted decision makers for poor communication, incorrect calculations, and a demonstrating a

broad lack of concern and coordination (including ignoring explicit warnings from government agencies and their own studies) before and during the event.

New York's Metropolitan Transportation Authority, itself the single largest transit agency in the U.S., was comparatively well-prepared and has been applauded for its response. Due to improvements made following prior flooding events in recent years, the MTA's tracks and stations were better-protected and emergency plans recognizing the increasing likelihood of climate change-induced extreme weather were in place. The agency's response to the coming storm, including removing electrical signals from tunnels and getting trains to protected areas, for instance, limited damages to far less than they might have been: only 19 of the MTA's 8,000 rail cars were flooded. During the height of the storm, MTA personnel even built a "makeshift dam" in Manhattan's Rail Yards to protect Penn Station from flooding (Kaufman et al. 2012). Damage to New York City's public transportation system was extensive, but it limped back to working order far more quickly than its counterpart across the Hudson, with many subway lines reopened within days.

Of course, due to the geography of the city and the direction and timing of the storm itself, impacts even on regional-scale systems like transportation must be understood more locally as well. In the days after Sandy, the impact on the city's transportation system was felt widely but unevenly. Although 80 percent of MTA subway service was restored by the weekend after the storm, several crucial lines between Brooklyn and Manhattan, like PATH subway lines between New Jersey and Manhattan, were closed or limited in service for much longer. Tracks serving Coney Island and the Rockaways were especially hard hit. Residents of the latter far-flung peninsula, relatively isolated and underserved even on good days, had few options for getting anywhere. The MTA, to its credit, demonstrated a focus on restoring service system-

wide, with a public emphasis on the Rockaways in particular, and the city's Economic Development Corporation launched a ferry service to get people from the peninsula to Manhattan as well. As a report from NYU's Rudin Center for Transportation notes, despite the considerable damage to a transportation network built to accommodate more than 10 million daily commuters, "New Yorkers managed to reach their places of work in impressively large numbers following Hurricane Sandy, not only as a result of transportation providers' major efforts, but also through residents' own adaptability and ingenuity" (Kaufman et al. 2012: 25).

The slow restoration of regular subway service to these communities only highlighted how vulnerable and underserved they are to begin with. Announcing a "transportation emergency" days after the storm, New York's governor, Andrew Cuomo, promised "we will not just rebuild, we will build back better […] we will rebuild the subway and we will build it better." Yet if Sandy's destruction offered such an opportunity (and indeed the state has announced funding aimed at further modernizing and weather-proofing the subway system), rebuilding efforts more than two years after the storm have done little to improve things beyond the inadequate status quo in places like the Rockaways.[3]

Power failures, like transit closures, were also geographically disparate due to the storm's path and essentially random vulnerabilities. The New York City areas with the largest numbers of people without power in the days after the storm include the southern Brooklyn neighborhood of Sheepshead Bay, many parts of Staten Island, and the whole of Lower Manhattan, where more than 200,000 people were affected. Circumstantial geographic variation was also the case for sewage systems and treatment plants, gas leaks, and, relatedly, fires. Areas along the heavily-

[3] Even recent public discussion of the potential in repurposing a disused rail right-of-way to assuage transportation woes in southern Queens has been largely swept aside by (nonetheless impressive) plans to turn the tracks into an elevated park.

polluted Gowanus Canal and Newtown Creek waterfronts faced not only extensive flooding but the added threat of toxic water and "sludge" from these unremediated Superfund sites. But again, because different utility companies provide service to different areas, varying organizational responses also shaped experiences across the region. An electricity provider in New Jersey, for instance, was criticized for an inadequate response that left some customers without power for 11 days. An investigation by the *New York Times* found that "deep rooted problems" at the Long Island Power Authority, including a persistent failure to plan for extreme weather, left hundreds of thousands of customers vulnerable to potentially avoidable outages; at a two-hour meeting just days before Sandy struck, the agency's trustees spent a mere 39 seconds discussing the storm (Hakim, McGeehan & Moss 2012). For an especially unlucky 10,000 Long Islanders, it took more than two weeks for the power to come back on.

Access to information was another major infrastructural problem that exposed itself nakedly in the context of 21st Century, Bloomberg-era New York City. While the city government prided itself on its social media achievements, including during the storm (see Gibbs & Holloway 2013), it conceded that it suffered from a lack of access to crucial systems-level information on things like gas and power (indeed, by the city's own account, this was perhaps its greatest failing during the event). Having outsourced vital services from healthcare to energy, the availability of information was at best scattered; it took days to get a complete picture of what was happening throughout the five boroughs. (Meanwhile, average citizens used tools like Twitter to find up-to-the-minute information on what gas stations were open, the lengths of lines to fill up, and where fights were breaking out or where police were present.)

All told, New York City's major post-Sandy governmental evaluation spends surprisingly little time on the storm's actual effects on vital systems or how they might do better next time.

New York City's "after action" report, for instance, essentially cheers the MTA for closing early and deflects responsibility for power outages and gasoline shortages to utility companies and to the general unpredictability of the storm. It also applauds the fact that emergency shelters were open "early" enough ("more than a full day") that transit-dependent residents were able to use the subway to reach them before the MTA shut down (Gibbs & Holloway 2013). This report does note that the provision of emergency power generators, which the City helped to organize, was prioritized first on "life and safety" with the next highest priority being public housing residents. The experiences of these latter individuals and others dependent on vital public services provided by the city are the subject of the next section.

Subsidized Housing and Other Public Services

In a city like New York, public services are as essential a part of the day to day life of millions of people as hard infrastructure. One of the most revealing levels of analysis to come out of Sandy was its impact on New York's low-income subsidized housing projects. Unlike many of the poor areas of New Orleans and other cities that were devastated by Hurricane Katrina and other storms, many of the hardest-hit New York neighborhoods, from the Lower East Side to Far Rockaway, feature large clusters of high-rise public housing. On the one hand, an inherent benefit of these buildings' height and structural integrity was that few New York City Housing Authority (NYCHA) residents were permanently displaced by Sandy or lost personal belongings to flooding (in comparison to the thousands of New Orleans public housing units that were lost to Katrina and the thousands of families who evacuated and never returned). But the sheer number of NYCHA residents impacted by the storm in other ways is staggering:

some 80,000 individuals in more than 400 buildings lost crucial services for some amount of time (Alliance for a Just Rebuilding 2014; Lipton & Moss 2012).

The most common problem, in 402 buildings, was a loss of power. This not only had the generic impacts on safety and everyday life that a power outage has on any home, but also meant crippled elevator services and utter nighttime darkness in buildings that can be dozens of stories tall. And, because pumps don't work without power, water was unavailable above the sixth floor as well. (This incapacitated fire sprinklers as well.) Many basements were inundated with water and 386 buildings also lost heat and hot water. Emergency generators and temporary boilers had to be brought in from all around the country, creating further logistical issues. About half of the affected NYCHA residents had power, heat, and hot water restored a week after the storm, with services completely restored in all buildings by November 18th, almost three weeks after Sandy hit. Malfunctioning elevators and sporadic heat and hot water have continued to trouble residents in some buildings since the storm and mold remains an enormous problem for many.

Of course these experiences were different from neighborhood to neighborhood. Projects in Coney Island, Red Hook, and the Rockaways suffered the additional difficulties of more widespread power outages in their areas, and those in Coney Island also "sustained substantial sand and saltwater infiltration" (House 2013: 6). Sandy produced stark differences within neighborhoods as well. Residents in Brooklyn's high-rise Red Hook Houses suffered much less from flooding and property damage than some of their neighbors on the gentrifying blocks closer to the water, but thousands of these NYCHA residents were without heat, water, and power for far longer. And if Red Hook in general has "rebounded" rather spectacularly, there is little evidence that the real-estate and economic development has benefited public housing residents.

Sandy also exacerbated the countless preexisting problems that many NYCHA buildings faced *before* the storm. For instance, a study of NYCHA residents conducted by a group of social justice non-profits (Alliance for a Just Rebuilding 2014) found that 55 percent of its respondents had repair needs in their units prior to the storm (40 percent had new repair needs as a result of Sandy). As one local organizer in Red Hook said in an interview with the Superstorm Research Lab team:

> [Sandy] was this very graphic sort of sped up lens into the kind of grinding need that's always there. […] There's always income insecurity. There's always crappy food supply, lousy schools, no good public transportation, daily, right? All those things got really magnified during the storm, and there was a lot of attention on addressing them in the short-term. In the long-term there's still no high school in the neighborhood. There's still—people don't have jobs.

In general, wealthier residents and landowners fared better during the storm in terms of the quality and preparedness of their housing and related infrastructure. Heavily invested-in buildings were of course the best prepared, with contingency plans like emergency generators that were fortified and elevated to protect them from storm water, keeping whole companies running while others sat in the very wet dark. An especially stark example can be found in Lower Manhattan, where Goldman Sachs famously kept the lights on at its state of the art headquarters while surrounded by a sea of darkness in which four hospitals that lost power were forced to evacuate many hundreds of patients.

Public housing and other such services are also places where the difference between the "official" understanding of events and people's on-the-ground experiences is especially visible. To be sure, there are both successes and failures visible in these outcomes, but many are issues of perception. For those tens of thousands of public housing residents for whom power and heat

took more than a week to be restored, NYCHA's response felt slow and inadequate. The Housing Authority's General Manager, on the other hand, was proud that the agency had done well by its residents and restored these services "before many landlords in the city" (see House 2013: 8). Likewise, while NYCHA's representatives were not uncritical in their reports and public testimonies following the disaster, they largely patted themselves on the back for their evacuation efforts and other communications, even as a survey of their impacted tenants found that "communication to residents before, during, and after the storm was inadequate" (Alliance for a Just Rebuilding 2014: 2).

A central part of the city's response to Sandy was the role played by the municipal police force. The NYPD were, not surprisingly, major actors during the pre-storm evacuation and the emergency response. Officers helped organize people to leave their homes and risked their lives rescuing others trapped by rising floodwaters. Yet the visible presence of the police may also have been counter-productive in some contexts, something that city reports give no recognition to. For instance, the city's after action report notes the role of the police in making "announcements with bullhorns from marked vehicles with flashing lights" to load public housing residents onto NYPD buses during evacuation procedures. During the response, police officers helped to staff shelters as well. As valuable as most of officers involved undoubtedly were as individuals, these accounts lack any critical awareness of how the use of uniformed police may actually have discouraged cooperation or aid-seeking in communities with long-established (and in many cases well-justified) low levels of trust in the NYPD. By contrast, FEMA's own after action report recognizes the significant problem with reserve Homeland Security personnel who "wore law enforcement agency apparel from their home DHS component, which were unsuited for the FEMA mission and may have deterred survivors from

approaches them" (FEMA 2013: 34). In light of the seemingly increasing levels of tension and distrust between communities of color and local police forces in cities across the United States today, this issue is sadly one that emergency responders cannot afford to ignore.

At the same time, first responders such as fire, police, and EMT personnel were also stretched thin by both fundamental storm conditions and some dangerous decisions by people in the communities they serve. Most worryingly, many people in the flood zones did not evacuate, whether due to the inadequacies of outdated flood zone maps, mild experiences with Hurricane Irene the previous year, physical obstacles to their mobility, or things like distrust of authorities or fears of crime. As a result, not only were emergency personnel responding to a large volume of calls due to the storm itself (from downed power lines and traffic accidents to fires and hospital evacuations), emergency personnel were forced to devote attention and resources to those who might otherwise not have needed assistance. In a world of increasingly frequent extreme weather conditions, lackadaisical citizens and overtaxed emergency responders, this too could be an increasingly frequent consequence.

Finally, it is also notable that the storm's impacts on schools is mentioned only in a footnote to the city report, despite the fact that 57 New York City schools were damaged by Sandy, some heavily. (All told, thousands of schools were closed for one or more days along the East Coast due to the storm.) With hundreds of schools also temporarily powerless and others serving as shelters for evacuees, classrooms were forced to relocate throughout the city – a major challenge for working families, transit-dependent households, and students already impacted by the storm itself. Changes to the school calendar for "make-up days" extended these complications. Families with one parent, limited resources, or little flexibility or security in their jobs are disproportionately impacted by school closures and other changes to the important

predictable supervision that school provides for children (Christensen, Schneider & Butler 2011; Schneider 2011; Clampet-Lundquist et al. 2004). And school closures do not only take away supervision (and, of course, classroom learning time): New York City public schools serve 800,000 meals a day. Five days without school means four million missed meals, in many cases for children who depend on free and reduced-price breakfast and lunch offerings for basic nutrition.

Local Organizing and Social Infrastructure

In the moments, days, and weeks after Sandy's initial impact, people in hard-hit neighborhoods like Far Rockaway, Red Hook, Coney Island, or Midland Beach had a wide range of needs and faced highly uneven levels of official response. Fortunately, responders to Sandy came not only from public servants and well-known relief agencies, but from local volunteers and community-based organizations. In some communities, pre-existing organizations with entirely different mission effectively repurposed themselves to respond to the storm. In other areas, communities created new organizations and coalitions in Sandy's aftermath, from neighborhood civic associations and relief hubs to borough-wide long-term recovery groups. Contrasts quickly became apparent between places where relief efforts were able to mobilize rapidly thanks to their preexisting social infrastructure and those where residents remained isolated for a longer period of time. The first part of section offers examples of how differences in these sorts of local social infrastructure and organizing influenced outcomes, and then discusses the fascinating story of Occupy Sandy, a citywide grassroots response to the storm.

In several communities, we found examples of organizations that existed before the storm taking on the roles of relief providers. Some have since even changed what they do in order to

focus on increasing preparedness and resilience in their communities or have incorporated planning for climate change and its effects into their previous missions. In Red Hook, for instance, staff and volunteers at the Red Hook Initiative, a local service organization devoted primarily to health, job, and educational programming for the neighborhood's low-income youth, were able to repurpose their resources for disaster relief and provide a physical space for residents to gather, share information, and help each other. Farther south, in Gerritsen Beach, a longstanding neighborhood nonprofit known primarily for its annual Halloween festival transformed virtually overnight into a disaster relief operation and was soon joined by other community organizations, such as the local Ancient Order of Hibernians. Gerritsen Beach Cares has continued to provide assistance (everything from manual labor to assistance with insurance and aid requests) throughout that neighborhood and even beyond. Preexisting local organizational infrastructure like this, along with more subtle elements of social capital that we are currently investigating through ethnographic and interview-based research in a number of communities, clearly provided real benefits for people in the neighborhoods that had it. Indeed, as a survey conducted six months after the storm found quite succinctly: "Neighborhoods lacking in social cohesion and trust more generally are having a difficult time recovering from Sandy" (Thompson et al. 2013: 2).

Some communities also found themselves more able to attract outside assistance than others. Many of the worst-affected areas were in comparatively far-flung (or simply unsexy) parts of the city. But others, like Red Hook, had both location and reputation going for them. A local organizer explained in an interview:

> What I would say about Red Hook is that it was the most conveniently located disaster. […] It was a very easy jaunt over from Brownstone Brooklyn, so there were a lot of just individuals bringing over trays of ziti, and cleaning out their closets. […] And then I also

> think that because Red Hook has this kind of hipster thing going too, it was just a more appealing place for people to come tour through and bring their resources, and it's nice if you can go do your good deed and then go to IKEA all in the same trip.

In communities without the benefit of community-based non-profits or outside appeal, new local organizations have been formed since the storm to work on recovery and longer-term resilience. In the Staten Island neighborhood of New Dorp, for instance, there was a civic association prior to Sandy, but not in the part of the neighborhood that was most affected, New Dorp Beach. Seeing how crucial civic associations were for getting out information and identifying local needs in other hard-hit neighborhoods along Staten Island's shore, residents started one of their own. Their inaugural president explained the benefits of this new social infrastructure in an interview about six months after Sandy:

> And now having like the civic association, you have a structure for communicating with people that you didn't have before which presumably will be really good. I mean like Oakwood Beach and certain other areas, even though they were devastated, they had that communication. They had that trust in each other. They had been fighting this together for so long that right after it happened they all got together and said this is not happening, they're going to fix this. They're going to take of it, it needs to happen.

Interestingly, as time goes on these new organizations have also had to repurpose and expand what *they* do as they move from being responsive to Sandy-specific needs to finding a more permanent mission in their communities.

Dynamic social infrastructure was also crucial to one of the most unique and innovative success stories to come out of New York's experience with Sandy: Occupy Sandy, a network of volunteer responders that emerged out of the Occupy Wall Street (OWS) movement and captured substantial media attention for their rapid and vast response after the storm. Occupy

Sandy volunteers focused their efforts on areas and populations that were viewed as especially vulnerable or underserved by formal emergency relief efforts, providing food, blankets, temporary shelter, reconstruction efforts, assistance with relocation and aid claims, and other services. They are especially notable for offering much-needed medical services after the storm, conducting home visits, refilling prescriptions for homebound residents, and staffing makeshift clinics. Indeed, official documents describe FEMA and Red Cross personnel working Occupy Sandy volunteers on a number of important issues, from the sharing of local knowledge to the distribution of food and medicine to places that the official agencies were unable or unwilling to access directly (see Homeland Security Studies and Analysis Institute 2013).[4]

In both the lead-up and response to Hurricane Sandy, person-to-person interactions founded on preexisting social networks and organizations played a crucial yet underappreciated role. This is especially apparent given the near-total communications breakdown that occurred in many areas, where cell towers and landlines went down and power was out for days or even weeks. Although reporting on Occupy Sandy (including that by the Department of Homeland Security) has emphasized participants' technical aptitude for social media and information technology – the stereotype of the newly desirable creative urban citizen – more analogue connections that existed prior to the storm were also central to Occupy Sandy's rapid organization and effective response. In interviews, key members of the informal effort attributed much of their success to past collective activism with Occupy Wall Street and particularly experiences in Zuccotti Park (the site of OWS's main occupation in 2011). Occupy Sandy participants spoke of the personal ties they forged in the shared space of the park, and their

[4] Occupy Sandy participants interviewed by Superstorm Research Lab members demonstrated ambivalence about being lauded for filling this gap in government service provision. Some expressed concern about whether their work could even enable or perpetuate government failures and emphasized the need for public resources rather than simply volunteer/private responses.

ability to replicate the familiar organizational structure of a distributed network with various hubs and consensus-based working groups driven by a shared philosophy of horizontal mutual aid. One participant described how people from the "overlapping communities" who had a connection before the storm joined together to respond in its aftermath:

> We have people from like the Burning Man community, we have people from Reverend Billy and the Stop Shopping Choir community, from Time's Up, which is a bike coalition. We know each other and when we make a call people from all these communities come to one place, and it happens that the guy from Burning Man is driving an RV to the Rockaway, so everybody rides with this guy.

In addition to drawing on connections internal to the OWS movement, Occupy Sandy also depended on the social infrastructure already present in hard-hit neighborhoods. They quickly sought to make connections with trusted local groups and joined up with community organizations to gain spaces in which to collect and distribute supplies, share information, and coordinate volunteers. This extended Occupy Sandy's ability to impact different places and shaped the character of each local response. Local partnerships also informed the longer-term impacts of Occupy Sandy's efforts, whether through setting up more permanent organizations or donating the funds they received to community organizations or projects.

Official accounts alternately lauded and ignored Occupy Sand's work. "The Resilient Social Network," the Department of Homeland Security report (which runs to more than one hundred pages), opens with a thrilling description of Occupy Sandy's mobilization:

> Within hours of Sandy's landfall, members from the Occupy Wall Street movement – a planned social movement comprised of social activists who protested income inequality in the United States – used social media to tap the wider Occupy network for volunteers and aid. Overnight, a volunteer army of young, educated, tech-savvy individuals with time and a

> desire to help others emerged. In the days, weeks, and months that followed, 'Occupy Sandy' became one of the leading humanitarian groups providing relief to survivors across New York City and New Jersey. At its peak, it had grown to an estimated 60,000 volunteers – more than four times the number deployed by the American Red Cross. (Homeland Security Studies and Analysis Institute 2013: 1).

Yet despite this impressive response from an unprecedented number of volunteers, Occupy Sandy does not receive a mention in New York City's after action report (Gibbs & Holloway 2013). The Homeland Security and New York City reports offer quite disparate accounts of volunteer responses after Sandy, even if they share a similar way of representing effective disaster relief. And neither report provides a comprehensive view of local organizing on the ground after the storm, instead presenting a picture of a coordinated "army" of outside volunteers. Vague references to "survivors" and unspecified "community-based organizations" downplay the reliance of outside volunteers on local social infrastructure. And while the Homeland Security report (like one from its subsidiary relief agency, FEMA) celebrates Occupy Sandy for its novel, innovative, and technologically sophisticated approach to mobilizing volunteers, there is less attention to how the group worked in different places and the extent to which they relied on existing community-based organizations and social infrastructure.

More than anything, the reports emphasize large numbers that suggests a comprehensive response, obscuring the uneven impacts and time to recovery across neighborhoods, as well as the importance of one-to-one, in-person interactions and mutual aid. Also dangerously absent from all of the government reports about local, grassroots responses that we reviewed is an acknowledgement of just how important large-scale public responses, resources, and investments remain in spite of them (for everything from emergency relief to long-term resilience). Occupy Sandy participants expressed concern in interviews about work like theirs even enabling or

perpetuating a more flawed government response, emphasizing the need for public resources in addition to any volunteer or privately-funded recovery. A grassroots response would seem to be highly valuable, even essential, but is by no means sufficient to ensure the equitable distribution of assistance and long-term resilience.

Conclusion

Sandy was a major event with major implications for how we think about climate change as sociologists and for how we think about the relationship between crisis and climate change in urban areas. The storm's impact on New York provides an invaluable case for considering how we might study the impacts of climate change on large, densely settled cities with vulnerable hard infrastructure and highly complex social conditions. The performance of these physical and social systems before, during, and after Hurricane Sandy's impact offer one important metric for assessing differentiated outcomes and a number of lessons for preparing for future storms. Differences across neighborhoods, across housing types, and across the myriad organizations responding all merit close attention. The case of Sandy also revealed differences between the ways that response and recovery activities are viewed in official reports and the accounts of community members and other non-governmental actors. These disparities should be cause for concern among officials and activists alike.

The data and analysis offered in this working paper are only a beginning. For one thing, each of the factors described above also have ongoing and longer-term implications that demand further attention (and indeed are the subjects of our continuing research). In the longer terms of post-disaster redevelopment and climate change adaptation, for instance, vital systems are also powerful indicators of inequality. If we recognize that resilience efforts can be divided

conceptually into local or individualized projects and more regional or collective ones, it becomes obvious how many individual fixes may do little for others – they can even displace damaging conditions, such as storm surge waters, to other areas. The same can be said of short-term fixes that are unhelpful to the city in the long-term. For instance, New York's recovery process has so far missed many opportunities for real improvement in areas that were underserved prior to Sandy. The sort of building-by-building inequality in preparedness demonstrated during the storm are being reproduced in redevelopment efforts since, with many people still in precariously unsustainable housing (not to mention bureaucratic limbo) while an enormous amount of new economic development – largely in the form of market-rate housing – is currently taking place in desirable riverfront flood zones.

For Occupy Sandy, expanding their network led to challenges, including conflicts over how to work with more official aid agencies, ideological purity, and what its missions should be going forward. Meanwhile, official reports on Occupy Sandy from FEMA and the Department of Homeland Security are focused on how to replicate such a response elsewhere, implicitly suggesting the benefits of cultivating the kind of tech-savvy "creative class" that these reports emphasize. However, a closer reading of Occupy Sandy's activities and relationships show that underlying social infrastructure in the neighborhoods where they worked was key to their ability to respond effectively to the storm. Resilience will not come from attracting more tech-savvy, educated youth to a city (and, in the process, contributing to the displacement of people already living there), but from providing resources to cultivate the social infrastructure of existing groups and residents in the most vulnerable places.

Furthermore, the various social indicators described here are only some of the distinct yet revealing findings to emerge from our ongoing examination of Sandy's impacts on New York

and the response and recovery activities that followed. Other important issues raised by this case include the unique plights of renters (many of whom were ignored by aid processes aimed at homeowners), and of undocumented immigrants (many thousands of whom are ineligible for aid and faced numerous other challenges during and after the storm). These vulnerable populations, among others, were likewise distributed unevenly across neighborhoods and communities in the affected region, further demonstrating the complex social factors at work in shaping the uneven impacts of climate change on metropolitan regions.

Over the next century, our society will likely face the daunting challenge of protecting, adapting, or relocating massive numbers of people, institutions, structures, and infrastructures from rising seas and more extreme weather conditions. It is time for sociology to make this tremendous problem our own, and to do so with the urgency that it deserves. Our hope is that that this paper (along with multiple other related research initiatives at NYU's Institute for Public Knowledge and elsewhere), can contribute in part to this project. By continuing to critically examine New York's experience with Sandy – as well as the region's ongoing efforts at redevelopment, adaptation, and resilience in the face of rising sea levels and other global warming trends – we can feed back informed sociological insights not only for New Yorkers, but for all cities facing future challenges that may begin to look frighteningly familiar.

References

Alliance for a Just Rebuilding. 2014. *How Sandy Rebuilding Can Reduce Inequality in New York: A Plan of Action for Mayor de Blasio from Sandy Survivors*. New York: Alliance for a Just Rebuilding.

Buttel, Frederick H. & Peter J. Taylor. 1992. "Environmental Sociology and Global Environmental Change: A Critical Assessment." *Society and Natural Resources* 5(3): 211-30.

Christensen, Kathleen, Barbara Schneider & Donnell Butler. 2011. "Families with School-Age Children." *The Future of Children* 21(2): 69-90.

Clampet-Lundquist, Susan, Kathryn Edin, Andrew London, Ellen Scott & Vicki Hunter. 2004. "'Making a Way Out of No Way': How Mothers Meet Basic Family Needs While Moving from Welfare to Work," in A. C. Crouter & A. Booth, eds. *Work-Family Challenges for Low-Income Parents and Their Children*. New York: Lawrence Erlbaum Associates.

FEMA. 2013. *Hurricane Sandy FEMA After-Action Report*. Washington, D.C.: U.S. Department of Homeland Security.

Gibbs, Linda & Cas Holloway (Chairs). 2013. NYC *Hurricane Sandy After Action: Report and Recommendations to Mayor Michael Bloomberg*. New York: New York City Office of the Mayor.

Gotham, Kevin Fox & Miriam Greenberg. 2014. *Crisis Cities: Disaster and Redevelopment in New York and New Orleans.* Oxford and New York: Oxford University Press.

Hakim, Danny, Patrick McGeehan & Michael Moss. 2012. "Suffering on L.I. As Power Agency Shows Its Flaws," *The New York Times*, New York Ed., 14 Nov. A1.

Homeland Security Studies and Analysis Institute. 2013. *The Resilient Social Network: @OccupySandy #SuperstormSandy.* Report prepared for the Dept. of Homeland Security. Falls Church, VA: Homeland Security Studies and Analysis Institute.

House, Cecil. 2013. "Testimony from NYCHA General Manager Cecil House: NYCHA's Planning and Response for Superstorm Sandy," Testimony to New York City Council Public Housing Committee, 17 January. Retrieved 3 December 2014 from http://www.nyc.gov/html/nycha/downloads/pdf/superstorm-sandy-testimony-1-17-13.pdf.

Kaufman, Sarah, Carson Qing, Nolan Levenson & Melinda Hanson. 2012. *Transportation During and After Hurricane Sandy*. New York: The Rudin Center for Transportation, NYU Wagner School of Public Service.

Lipton, Eric & Michael Moss. 2012. "Housing Agency's Flaw's Revealed by Storm," *The New York Times*, New York Ed. 10 December: A1.

Mason, Edward. 2012. "Hello Again, Climate Change," *Harvard Gazette*, 6 Nov. Retrieved 5 Jan. 2014 from http://news.harvard.edu/gazette/story/2012/11/hello-again-climate-change/.

Perry-Jenkins, Maureen. 2004. "The Time and Timing of Work: Unique Challenges Facing Low-Income Families," in A. C. Crouter & A. Booth, eds. *Work-Family Challenges for Low-Income Parents and Their Children*. New York: Lawrence Erlbaum Associates.

Schneider, Barbara. 2011. "The Human Face of Workplace Flexibility." *The Annals of the American Academy of Political and Social Science* 638(1): 103-122.

Thompson, Trevor, Jennifer Benz, Jennifer Agiesta, Kate Cagney & Michael Meit. 2013. Resilience in the Wake of Superstorm Sandy. Chicago: The Associated Press-NORC Center for Public Affairs Research.

Trenberth, Kevin. 2012a. "Framing the Way to Relate Climate Extremes to Climate Change," *Climate Change* 115(2): 283-90.

Trenberth, Kevin. 2012b. "Hurricane Sandy Mixes Super-Storm Conditions with Climate Change," *The Conversation*, 28 Oct. Retrieved 5 Jan. 2014 from http://theconversation.com/hurricane-sandy-mixes-super-storm-conditions-with-climate-change-10388.

Urry, John. 2009. "Sociology and climate change." *The Sociological Review* 57: 84–100.