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Prefabricating marginality: long-term housing impacts of displacement in post-disaster Montserrat

Michael Hooper 

Associate Professor of Community and Regional Planning, University of British Columbia, Vancouver, BC, Canada

ABSTRACT

This paper investigates the long-term housing impacts of displacement and explores how these vary across disaster-affected populations. The Caribbean island of Montserrat, an overseas territory of the United Kingdom, provides an excellent setting for examining this relatively understudied topic. Following the eruption of the Soufrière Hills volcano, beginning in 1995, most Montserrat residents were displaced and the island's south was declared an exclusion zone. The paper draws on interviews with 89 randomly selected residents, including displacees and non-displacees, and with 10 Montserratian and United Kingdom officials charged with responding to post-disaster needs. The paper seeks to understand variation in long-term housing conditions with a focus on the impact of housing type. The results show that interviewees living in housing built for, rather than by, displacees had significantly lower housing satisfaction scores, with residents of prefabricated houses reporting the lowest scores. Interviewees argued that the top-down provision of these houses was problematic due to limited local input and use of materials poorly suited to local conditions and traditions. The paper concludes by situating the findings in the context of the literature on post-disaster housing and by arguing for increased attention to how such housing is provided in terms of both process and materials.

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Housing; disaster; displacement; recovery; volcano; Montserrat

Introduction

Background: economic instability and disasters in Montserrat

This paper investigates the long-term housing impacts of displacement. Relatively little research has focused on the displacement of sizable populations following natural disasters and their housing implications (Levine et al., 2007), and most of the literature on post-disaster housing has focused on the short term. For example, the Internal Displacement Monitoring Center (2015) states that “Knowledge about the duration of displacement following disasters is ad hoc and unconsolidated, as is more detailed identification and analysis of cases of particular concern” (p. 17). Recent reviews of this topic have highlighted the relative lack of research on long-term housing recovery following disasters (Peacock et al., 2007, 2014). Furthermore, where long-term studies of

CONTACT Michael Hooper  michael.hooper@ubc.ca  Associate Professor of Community and Regional Planning, University of British Columbia, Room 433, Lasserre Building, , 6333 Memorial Road, Vancouver BC, V6T 1Z2, Canada

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displacement have been conducted, the literature has primarily drawn on experiences related to development-induced displacement rather than disasters (Badri et al., 2006). This study seeks to address this gap in the literature.

The paper focuses on the island of Montserrat, an overseas territory of the United Kingdom (UK), located in the Leeward Islands of the Eastern Caribbean's Lesser Antilles region (Figure 1). As with other UK overseas territories, Montserrat's locally elected government generally has responsibility for day-to-day decision-making and policy, but defers to UK authorities over issues concerning security, defense, external affairs and, if local capabilities are surpassed, emergency management (Wilkinson, 2015). With a length of 16 km and a width of 11 km, Montserrat has a total landmass of only 102 km². Montserrat is a little researched setting, despite being a unique laboratory for the study of disaster-induced displacement and resettlement. The island's unique context stems, in part, from the eruption of the Soufrière Hills volcano, which began in 1995. As a consequence, Montserrat's capital, Plymouth, was permanently abandoned in 1997 and approximately two-thirds of the island's population left the island (McLeman, 2011). While volcanic activity continues at Soufrière Hills, the volcano has been relatively quiet since 2010.

The complete destruction of Plymouth and displacement of the majority of the population make Montserrat relatively distinctive, as only a very small number of cities have not been rebuilt on site following disaster or war (Haas et al., 1977; Hooper, 2015; Vale & Campanella, 2005). Following the capital's destruction, an exclusion zone was established in the south of the island, which is now considered uninhabitable and to which access is restricted. Residents of this area relocated to the island's north or to other destinations, including the UK and other Caribbean islands. A temporary capital was established at the town of Brades and a new capital is planned for Little Bay (Montserrat Development Corporation [MDC], 2015). The scale of displacement experienced in Montserrat makes it an excellent, and currently understudied, laboratory for understanding how processes of displacement, resettlement and reconstruction unfold.

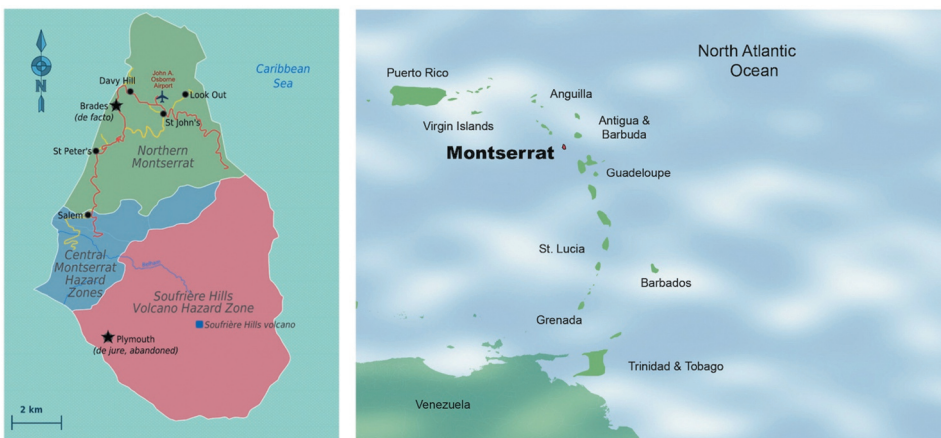


Figure 1. The island of Montserrat (left) and its location in the Caribbean region (right) (Sources: Left, "Montserrat regions map" by Kafnova, licensed under CC BY-SA 3.0; Right, map created by Hung Vo, licensed under CC BY 4.0, using data from USGS, 2004).

In 2012, Montserrat had an estimated population of 4,900 people, a considerable decline from its maximum population, in 1946, of 14,333 people (Hicks & Few, 2015; Philpott, 1973). Since its founding as a British colony in 1632, Montserrat has tried repeatedly to establish a sustainable economic base in the face of disasters and economic change (Fergus, 2003). Inability to maintain sugar cane as a profitable crop, as other countries invested in new technologies and larger-scale operations, led the island to convert much of its arable land to lime production by the 1870s. After devastating hurricanes in 1899 and 1928 and the introduction of new plant diseases, the island turned to cotton production as a source of revenue. However, with increasing exports of cheaper cotton from the United States (US) to the UK in the 1930s, the cotton industry declined (Fergus, 2003). Prior to the volcanic eruption, Montserrat had developed a distinctive tourism economy, focused on small, low-density facilities with visitors spending relatively long periods on the island and often building second homes for retirement living (McElroy & De Albuquerque, 1992). As of 1987, there were approximately 200 year-round-retired expatriates living in Montserrat (McElroy & De Albuquerque, 1992).

In 1989, Hurricane Hugo damaged much of the island's infrastructure, including 98% of buildings on the island (International Rescue Corps, 1989). As rebuilding neared completion in 1995, the Soufrière Hills volcano became active. As a consequence of this long-term economic instability and the natural disasters of the late 20th century, Montserrat remains heavily dependent on the UK for financial support. The UK contributed \$28 million US dollars (USD) to the recurring 2015/16 Montserrat budget and noted in its 2016 budgetary report that the territory currently lacks the technical capacity to manage its own medium-term expenditures (Department for International Development [DFID], 2016). It is against this backdrop of economic instability and natural disasters that this paper examines the long-term housing impacts of displacement.

Post-disaster emergency shelter and housing responses

Emergency shelter and housing responses to the Soufrière Hills eruption took a variety of forms and were introduced over different timescales. Initially, emergency shelters, in the form of tents and repurposed public buildings and churches, housed nearly 1,600 displaced individuals (Government of Montserrat, 2010). Between July and September 1997, the government authorized a \$9 million USD¹ Immediate Housing Programme to resettle displaced families living in emergency shelters. Progress was considered slow, with 100 units completed by November 1998 and costs rising to an estimated 19.2 million USD² (Clay et al., 1999). Early efforts to provide such housing involved simple, timber-framed buildings with plywood floors and walls and corrugated steel roofing (Fox, 2002). The bulk of houses built for displacees in the late 1990s was prefabricated structures and concrete, block-built structures constructed by local contractors (Figure 2); delivery of both was managed by Brown and Root, a US engineering and construction company that was, until 2006, a subsidiary of the US multinational Halliburton Company (Clay et al., 1999). Other notable housing efforts included the European Union (EU)-funded Montserrat Resettlement Project, which completed 60 concrete houses in 2007. Funds from the sale of these houses were deposited into the Montserrat Housing Revolving Fund for investment in other housing projects. Forty-three units were also constructed between 2003 and 2007 to house some vulnerable residents, including those with mental



Figure 2. Housing in Montserrat. From left, a concrete block house built at Lookout, a Force 10 prefabricated house at Lookout and an upscale villa at Old Towne (Sources: Left and center, Ross Eisenberg, licensed under CC BY 4.0; Right, “Luxury villa” by Member #56594, licensed under CC BY 4.0).

disabilities and others who remained in the remnants of early shelters (Government of Montserrat, 2010).

The UK’s Department for International Development (DFID) and the Government of Montserrat differed in their preferred approach to post-disaster housing. The Government of Montserrat preferred concrete, block-built houses, which they considered more permanent, while DFID preferred prefabricated housing (Clay et al., 1999). Ultimately, the dominant design took the form of an Australian-produced prefabricated structure referred to as “Force 10” housing after the company that built them. These buildings consisted of fiber-cement board and polyurethane wall panels, referred to by many people as “sheetrock,” and a steel trussed roof with corrugated alloy roof sheeting (Fox, 2002). As of 2014, a total of 100 Force 10 houses had been constructed (Government of Montserrat, 2014). An internal Government of Montserrat report acknowledged the inadequacy of these prefabricated homes in 2007. The report states that, due to poor construction and use of improper materials for Montserrat’s climate, “unless the substantial and immediate and expensive, maintenance or reconstructive action is taken, many of the Force 10 houses ... are likely to have to be abandoned as unsafe for human occupation,” (Greaves, 2007, p. 4). At the time of this research, however, such abandonment had not happened.

The limited housing stock of the island still poses significant hurdles. The island’s population dropped from 10,324 in 1995 to 2,726 in 1998, with 70% of the population migrating outward during the volcanic crisis (Government of Montserrat, 2010). Many of those who were able to migrate were middle-class professionals, while those who remained were often the most vulnerable populations, including among other groups the elderly (Government of Montserrat, 2010). Government-led housing efforts and home-ownership initiatives are still underway to entice those who left to return (Government of Montserrat, 2015). Efforts to encourage private home construction include a preferential mortgage program and a building supplies subsidy program. Notably, many poor Montserratians were unable to participate in these housing programs, referred to as “direct build” programs, as applicants were generally required to have access to land and to have the capital to complete the structures (Clay et al., 1999).

Over the longer term, one approach to rebuilding involved the development of a new capital for the island. Planning of a new capital at Little Bay was led, until 2015, by the Montserrat Development Corporation (MDC), a so-called “Government Company,” an agency ostensibly operating at arms-length from the Government of Montserrat but by

whom it was also wholly owned. The MDC was closed in April 2015, before significant construction began, due to concerns over corporate governance and management, and no clear successor agency has been established (Roach, 2015). At the time of its dissolution, the MDC was responsible for national infrastructure development and served as lead developer of the Little Bay project. Plans developed for Little Bay appear to draw heavily on the esthetics of resort development, as does the language of the MDC's description of the future capital.

Vulnerability in Montserrat

The population of Montserrat includes a number of vulnerable groups, including displaced and individuals experiencing low incomes and other forms of socio-economic marginality (Government of Montserrat, 2011a). Government documents highlight that, among other locations, vulnerable individuals are found notably in the Lookout settlement. Located in the northeast of the island. Lookout was constructed in the late 1990s to address the lack of adequate housing for displaced Montserratians, many of whom were living in emergency shelters in poor conditions, and is now Montserrat's largest settlement (Government of Montserrat, 2011a, 2011b; Pulsipher, 2001). Prefabricated housing comprises much of the housing stock at Lookout.

Another vulnerable group that plays a considerable role in the population dynamics of Montserrat is the large number of immigrants who have moved from the wider Caribbean region, particularly Jamaica, Guyana and the Dominican Republic (Government of Montserrat, 2011a). Currently, 34% of the Montserrat population is composed of such immigrants, the majority of whom have arrived since 2000 (Government of Montserrat, 2011a). Many of these individuals migrated to Montserrat to take up jobs made available due to Montserratian out-migration (Sword-Daniels et al., 2014).

Turning to less vulnerable populations, of the employed population, one-third work for the government (Government of Montserrat, 2011a). The acting capital of Montserrat since 1998, Brades, has become the center of government and commerce on the island. Wealthier individuals in Montserrat tend to live on the island's west coast, for example, in the Old Towne District. Since the 1960s, the settlement at Old Towne, and other communities in the coastal zone known collectively as the "beachette areas," have also served as a home for foreign retirees (Dittmer, 2004). It continues to be a base for Montserrat's residential tourism sector (Dittmer, 2004; Government of Montserrat, 2011a). Old Towne and other relatively wealthy areas did not entirely escape the destruction of the volcano. Many residential villas in the south were destroyed by the eruption and high-end and tourist amenities such as the golf course at Old Towne were damaged by mudflows (Dittmer, 2004). As of 2004, the tourism industry had collapsed to one-sixth of its size in 1997 (Dittmer, 2004).

Literature review: variation in post-disaster housing impacts

The literature suggests that post-disaster challenges are not borne equally across affected groups. Studies conclude disasters "impose unequal impacts ... [and] losses tend to accumulate most among the poor, the elderly and members of a community's lower-income groups" (Edgington, 2011, p. vii). The differential impact of disasters on vulnerable

groups has been shown in a variety of contexts (Fothergill et al., 1999; Fothergill & Peek, 2004). Members of minorities, women and other marginalized groups have been found to often bear greater impacts from disasters. In some instances, this has been a result of these individuals' pre-disaster housing conditions, with marginalized groups sometimes living in older buildings with unreinforced masonry (Bolton et al., 1993) or other forms of vulnerable accommodation, such as mobile homes in the United States (National Weather Service, 1995).

Patterns of post-disaster response and recovery are also uneven. Broadly, groups that receive less assistance have been found to fare worse over the long term (Kamel & Loukaitou-Sideris, 2004). Individuals who receive less assistance are often members of groups that were marginalized and vulnerable prior to a disaster. For example, marginalized groups sometimes receive lower insurance settlements (Peacock & Girard, 1997). Furthermore, they may be excluded from post-disaster planning processes and lack awareness of relevant institutions, which can further worsen outcomes (Phillips, 1998). For example, Rovai (1994) shows that higher-income residents were better able to acquire necessary resources after California's 1992 Humboldt earthquake as compared with lower-income residents, who did not apply for funds for which they were eligible. Likewise, following Hurricane Katrina, lower-income populations experienced higher levels of damage and were more vulnerable during the recovery process (Masozera et al., 2007). Consequently, scholars have argued that disasters deepen and exacerbate pre-disaster vulnerabilities (Mustafa, 2003).

The way that post-disaster planning is undertaken can affect the outcomes of different groups. For example, Santiago et al. (2018) argue that reconstruction led by relief agencies often results in lower levels of empowerment for those displaced as compared with owner-led processes. Within owner-led approaches, which prioritize the involvement of property owners, challenges have also been identified for those that do not own property and low-income groups (Tafti, 2015). Community participation in post-disaster rebuilding has been closely linked to increased satisfaction with outcomes (Bouraoui & Lizarralde, 2013; Felix et al., 2013) and community well-being (Barakat, 2003). In contrast, lack of participation has been associated with lower community investment and reduced maintenance of housing (Abulnour, 2014). For example, greater satisfaction was reported in an owner-driven housing program implemented following the 2004 Sri Lankan tsunami, as compared with beneficiaries who received donor-driven prefabricated units. However, the owner-driven program did not reach marginalized populations such as the poor, women-headed households and the elderly, who lacked access to financial resources and physical labor (Hidellage & Usoof, 2010). In Gujarat, India, higher satisfaction with house location and size, quality of materials and construction quality were reported in owner-driven reconstruction when compared with contractor-driven programs (Barenstein, 2006).

Within many recovery processes, two of the most important decisions are, first, whether to pursue in-situ reconstruction versus resettlement and, second, whether to focus on temporary or permanent housing. These choices are complex and often affect residents differently. For example, resettlement to new sites has often been associated with resident dissatisfaction (Andrew et al., 2013). With regard to temporary versus permanent housing provision, it has been found that a focus on temporary housing can slow the recovery process (Peacock et al., 1987). Some argue that temporary housing may

siphon resources and time away from constructing permanent housing (United Nations Disaster Relief Organization, 1982). Furthermore, temporary housing often ignores local needs, climate and family size (United Nations Disaster Relief Organization, 1982), and may introduce a foreign living environment (Gulahane & Gokhale, 2010). With respect to prefabricated structures, a major focus of this study, although they are often considered easier to construct, they have been criticized for their inflexibility, inability to respond to diverse needs and high costs (Abulnour, 2014).

Methodology

This study adopts an empirical, mixed-methods approach to examining the issue of long-term, post-disaster housing outcomes. Recognizing that the body of literature examining this topic is relatively modest, it does not adopt an explicit hypothesis testing approach. Rather, building on the frontier of knowledge established in the introduction and on the paper's empirical findings, it seeks to identify points of overlap with existing literatures and identify new insights that might expand this base of knowledge and serve as the foundation for further inquiry.

The paper draws on extensive interviews with two categories of stakeholders. These categories, with numbers of interviewees shown in parentheses, are (1) displaced and non-displaced residents (89), and (2) officials responsible for post-disaster planning (10) (Table 1). The second of the two categories can be further broken down into Montserratian (7) and UK government officials (3), all of whom have extensive knowledge of and involvement in post-disaster planning.

To understand residents' housing conditions, a stratified random sampling approach was adopted. The goal was to ensure that individuals from each of the population groups described in the previous section were interviewed. In order to sample each of these groups, relevant districts were chosen from among Montserrat's 22 enumeration districts (Government of Montserrat, 2011b) (Figure 3). For relatively vulnerable Montserratians, the enumeration district selected was Lookout. For relatively less vulnerable Montserratians, particularly those associated with government, Brades/Shinnlands and Cudjoe Head districts, both of which represent the center of government and commercial activity, were selected. For the west coast, two adjacent, relatively wealthier districts from the Beachettes areas, namely Old Towne and Olveston districts, were selected. The three sample areas will be referred to as Lookout, Brades/Cudjoe and Old Towne/Olveston.

Within each of the selected enumeration districts, individual households were randomly selected for interviews. Households were selected using plot-level data on each district from the Montserrat Land Info database (Government of Montserrat, 2012).

Table 1. Interviewees by group.

Interviewee group	Number of interviewees
Residents	89
<i>Lookout</i>	30
<i>Brades/Cudjoe</i>	30
<i>Old Towne/Olveston</i>	29
Montserrat Officials	7
UK Officials	3
<i>Total</i>	99

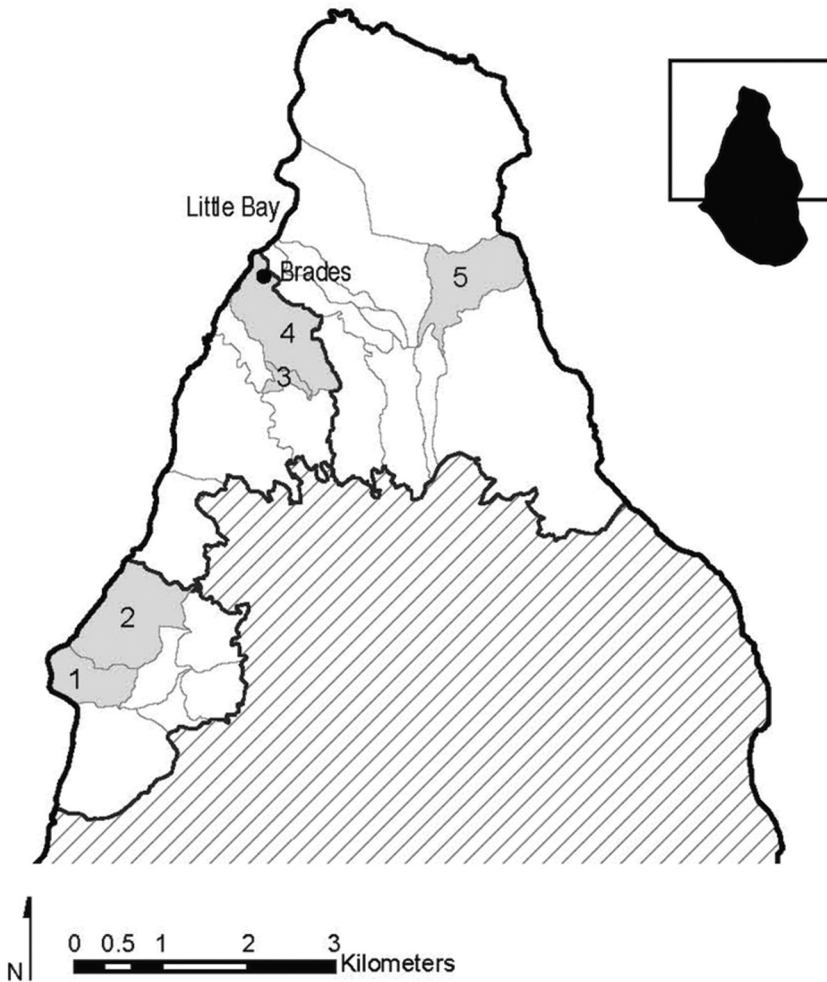


Figure 3. Montserrat's inhabited enumeration districts. Numbers indicate those purposively selected for interviews: Old Towne (1), Olveston (2), Cudjoe Head (3), Brades/Shinnlands (4) and Lookout (5). Inset shows the area of Montserrat included in larger map (Source: Map created by Ashley Thompson, licensed under CC BY 4.0, using data from the Montserrat Physical Planning Unit's Land Info database).

Employing a spatial sampling strategy (Gregory, 1978), random selection was undertaken by overlaying a 25 m by 25 m grid onto a 1:5000 base map of each of the three sampling areas. This generated a set of cells, most containing only one household, for each of the sampling areas. A random number generator was used to identify individual cells for interviews. If the cell did not contain a household, it was disregarded and a new cell was randomly selected. If the randomly selected cell contained more than one household, then a dice roll was used to break the tie and identify the interviewee household. In this way, a randomly chosen list of interviewee households was developed for each purposively selected enumeration district or set of districts. A flyer was left with detailed contact information at households when residents were not present on the first visit to schedule

an interview. When interviewers were unable to schedule a meeting or the household was absent on two consecutive visits a new cell was randomly selected.

Government officials were selected purposively and through snowball sampling. Montserrat and UK government officials recorded in public documents and media reports as being involved with housing and reconstruction issues were contacted for interviews. At the conclusion of each of these purposively chosen interviews, each interviewee was asked to recommend other interviewees. In this manner, the interviewee sample was expanded to the numbers reported.

Interviews were conducted in January 2017 by a team of six research assistants, working in two-person teams, all of whom were trained to use the same interview protocol. Interviews lasted approximately 45 minutes each, were conducted in English, in which all interviewees were fluent or highly conversant, and were based on a common set of questions in which interviewees were asked about their perspectives on housing and, to a lesser extent, neighborhood conditions. For residents, the questions addressed housing satisfaction and interviewees' perspectives on their housing trajectories since the disaster and on their housing conditions, needs and aspirations. Questions regarding satisfaction were answered using self-assessed ratings on a scale from 1 to 10 and were typically paired with follow-up questions that allowed interviewees to explain and expand on their quantitative responses. Officials were asked about the way in which post-disaster housing has been addressed and about how housing decisions have affected residents. The interviews also left scope for a more wide-ranging discussion of housing and settlement issues.

The interview results were transcribed and coded manually in Excel into a series of mutually exclusive response categories. These coded responses were analyzed using basic statistical techniques. Once patterns in the results were established, the contents of the extensive interviews were examined to put these trends into a broader context and to shed detailed light on the patterns observed. Because there is considerable debate over whether rating scale data should be treated parametrically or non-parametrically (Carifio & Perla, 2008; Harpe, 2015), both kinds of tests were employed when such scores were analyzed statistically. In all cases, the two test types yielded very similar results and, so, where tests of scores were conducted, only the parametric results are reported. Since all scoring data collected relied on scales ranging from 1 to 10, the decision to report results of parametric tests conforms with the recommendation of Harpe (2015), that such approaches are appropriate when scales have five or more categories.

Results

Quantitative patterns in resident satisfaction

The results reveal several surprising findings. Overall, there was no statistically significant difference, at the 95% confidence level, between the mean satisfaction of interviewed displacees and non-displacees with respect to housing. Displacees reported a mean score of 7.14 out of 10 as compared with 7.95 for non-displacees (Figure 4). In contrast, an ANOVA revealed statistically significant differences at the 95% confidence level in the mean housing satisfaction of displacees across the three study areas, $F(2, 46) = 15.085$,

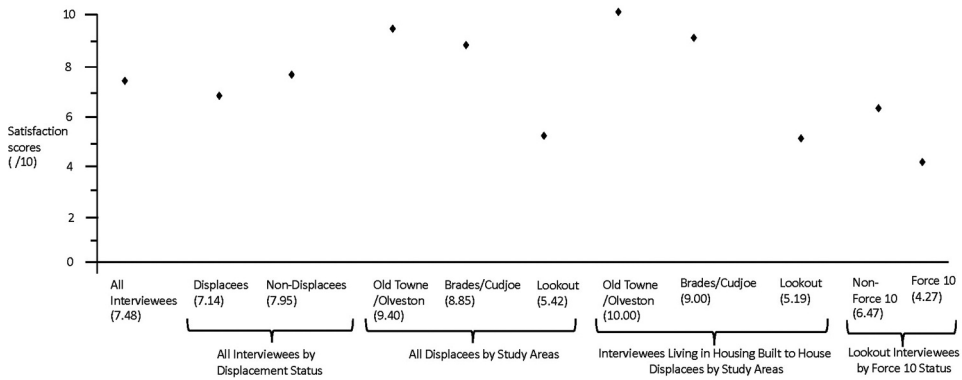


Figure 4. Housing satisfaction scores for interviewees, broken down by displacement status, study area and housing type.

$p = 0.000$. The mean scores for the three areas were 5.42 (Lookout), 8.85 (Brades/Cudjoe), and 9.40 (Old Towne/Olveston). In the paragraphs below, where statistically significant differences are mentioned, they are significant at the 95% confidence level.

The findings suggest that variation in housing satisfaction may be related to one of the key differences across the three areas, namely the type of housing in which displacees reside. This is supported, in part, by the finding that a number of other potentially important factors did not vary in statistically significant ways across the three areas, including gender, mean number of residences occupied since displacement, mean years in house and neighborhood, as well as employment status.

Of the 50 displaced interviewees, 26 (52%) live in Lookout, 14 (28%) live in Brades/Cudjoe and 10 (20%) live in Old Towne/Olveston (Table 2). In Lookout, 26 of 30

Table 2. Interviewee attributes by study area.

Study Area	Number of interviews	Number of displacees	Number of residents in displacee housing	Number of residents born in Montserrat
Lookout	30	26	26	25
Brades/Cudjoe	30	14	11	18
Old Towne/Olveston	29	10	2	6
Total	89	50	39	49

Table 3. Interviewee perspectives on what they do not and do like about their houses, by study area. Values report the number and percentage of interviewees providing each coded response.

Response	All	Lookout	Brades/Cudjoe	Old Towne/Olveston
“What do you not like about your house ...”				
Nothing	38 (43%)	3 (10%)	17 (57%)	18 (62%)
Design	26 (29%)	16 (53%)	6 (20%)	4 (14%)
Maintenance	13 (15%)	9 (30%)	3 (10%)	1 (3%)
“What do you like about your house ...”				
Setting	52 (58%)	15 (50%)	18 (60%)	19 (66%)
Design	33 (37%)	10 (33%)	8 (27%)	15 (52%)
Better than nothing	12 (14%)	7 (23%)	4 (13%)	1 (3%)

interviewees (87%) live in housing built to house displacees, as compared with 11 of 30 (37%) in Brades/Cudjoe and 2 of 29 (7%) in Old Towne/Olveston. Importantly, the structures built to house displacees at Lookout were generally built by the government and contractors for residents, while those at Brades/Cudjoe and Old Towne/Olveston were typically built by residents themselves, sometimes with financial and material support from the government. Of the houses built for displacees at Lookout, the two dominant types were prefabricated Force 10 houses and concrete block-built houses.

Looking specifically at displacees, there was no statistically significant difference in the housing satisfaction of those living in structures built to house displacees and those not, $t(46) = -1.868$, $p = 0.068$. However, the results show significantly lower housing satisfaction for interviewees living in structures built to house displacees at Lookout (5.19) as compared with at Brades/Cudjoe (9.00) and Old Towne/Olveston (10.00), $F(2, 36) = 10.870$, $p = 0.000$. This provides further evidence that differences in housing satisfaction may be related to housing conditions at Lookout and the kinds of structures in which displacees there reside.

Lookout differs from the other two study areas in several ways: it is where the largest number of houses have been built for displacees, rather than being built by displacees, and it is where the largest number of prefabricated Force 10 houses were constructed. At Lookout, the mean satisfaction score for residents of Force 10 houses, 4.27, is significantly lower than for displacees in non-Force 10, concrete housing (6.47), $t(28) = -2.262$, $p = 0.032$. The results illustrate a clear hierarchy in housing satisfaction, with residents, including displacees, having relatively high housing satisfaction in Brades/Cudjoe and Old Towne/Olveston, while residents of Lookout, the majority of whom are displacees, report significantly lower scores, with the lowest scores reported by residents of Force 10 houses.

Several factors could account for the low housing satisfaction at Lookout, and particularly for residents of Force 10 housing. Notably, the age of houses built to house displacees varies significantly across the three areas with mean ages of 17.81 years (Lookout), 11.41 years (Brades/Cudjoe) and 8.00 years (Old Towne/Olveston), $F(2, 30) = 7.709$, $p = 0.002$. This likely reflects that a considerable portion of early housing was constructed for displacees at Lookout. However, there is no significant difference in the age of Force 10 and non-Force 10 housing at Lookout. While displacees' housing is significantly older at Lookout, age doesn't account for why Force 10 housing is viewed so negatively.

Looking at coded responses to the question "What do you not like about your house and why?" the most common responses were nothing, mentioned by 38 interviewees (43%), design, mentioned by 26 interviewees (29%) and maintenance, mentioned by 13 interviewees (15%). While a majority of interviewees from both Brades/Cudjoe (57%) and Old Towne/Olveston (62%) reported disliking nothing, only 10% at Lookout gave this answer, $\chi^2(2, N = 89) = 20.310$, $p = 0.000$. Interviewees at Lookout were also significantly more likely to dislike their house's design, a sentiment shared by 53% of interviewees there, in contrast with 20% at Brades/Cudjoe and 14% at Old Towne/Olveston, $\chi^2(2, N = 89) = 12.914$, $p = 0.002$. Finally, a significantly higher percentage of interviewees at Lookout (30%) reported maintenance as a negative than at Brades/Cudjoe (10%) and Old Towne/Olveston (3%), $\chi^2(2, N = 89) = 9.037$, $p = 0.011$. At Lookout, there were no marked differences in the features disliked by residents of Force 10 and non-Force 10 houses.

Examining coded responses to the question “What do you like about your house and why?” the most common responses were setting, mentioned by 52 interviewees (58%), design, mentioned by 33 interviews (37%), and that one’s home was “better than nothing,” mentioned by 12 interviewees (14%). Relatively similar percentages of interviewees across the areas reported liking their setting, with 66% giving this answer at Old Towne/Olveston, 60% at Brades/Cudjoe and 50% at Lookout. A somewhat higher percentage of interviewees reported liking the design of their house at Old Towne/Olveston (52%) than at either Brades/Cudjoe (27%) or Lookout (33%), although the difference was not statistically significant. The only statistically significant difference across the areas was in the percentage answering that one’s house was “better than nothing,” which was provided by significantly more interviewees at Lookout (23%) than at Brades/Cudjoe (13%) and Old Towne/Olveston (3%), $\chi^2(1, N = 89) = 3.764, p = 0.049$. Across residents of Force 10 and non-Force 10 houses at Lookout, there was a stark difference in the percentage who said their house was better than nothing. For residents of Force 10 houses, 40% said their house was better than nothing, as compared 7% for non-Force 10 houses, $\chi^2(1, N = 30) = 4.658, p = 0.031$.

When interviewees were asked if Montserratians’ post-disaster housing needs had been met, a significantly higher percentage in Lookout and Brades/Cudjoe said no (70% in each) than in Old Towne/Olveston (46%), $\chi^2(2, N = 89) = 7.057, p = 0.029$. Similarly, when interviewees were asked if they still had needs because of their housing conditions, the percentage answering yes was significantly higher in Lookout (63%) than in Brades/Cudjoe (37%) or Old Towne/Olveston (17%), $\chi^2(2, N = 89) = 11.765, p = 0.008$. The highest percentage of interviewees answering that they had needs due to their housing were those residing in Force 10 houses, of which 87% answered affirmatively.

The lower satisfaction of Lookout residents and, particularly, of Force 10 residents takes on added importance when their identity is taken more fully into consideration. At Lookout, of interviewees in Force 10 houses, 87% were born in Montserrat, compared with 80% in non-Force 10 houses. In Brades/Cudjoe, 60% of interviewees were born in Montserrat and in Old Towne/Olveston the value was 21%. These differences, when combined with the lower satisfaction of interviewees at Lookout, mean that there was a statistically significant difference in the housing satisfaction of those interviewees born in Montserrat (6.89) and those who weren’t (8.18), $t(85) = -2.385, p = 0.019$. Notably, only one of the eight non-Montserrat-born individuals who were displaced lived in housing built to house displacees. That individual was born in South America, meaning no interviewees born in the Global North were displaced and now live in housing explicitly built to house displacees. In contrast, 34 of the 42 (81%) Montserrat-born displacees live in such housing.

Not only do Montserratian-born interviewees dominate displacee housing and, particularly, Force 10 houses, but they also report lower housing satisfaction than other vulnerable groups. The government of Montserrat notes that one particularly vulnerable group on the island consists of relatively recent migrants, particularly from elsewhere in the Caribbean, who have typically moved to Montserrat for work. The 13 individuals born elsewhere in the Caribbean who have moved to Montserrat since the volcanic eruption reported a mean housing satisfaction score of 7.08. This compares with scores of 6.08 for Montserrat-born residents of non-Force 10 houses at Lookout and 4.46 for Montserrat-born residents of Force 10 houses. An ANOVA shows the difference in scores between Caribbean-born migrants and Montserratian-born residents of Force 10 houses is

statistically significant, $t(24) = 2.932$, $p = 0.007$. This means that Montserratians living in prefabricated Force 10 houses have lower housing satisfaction than relatively recently arrived economic migrants. This is true despite the fact that 62% of those relatively newcomers are renters, as compared with 15% of Montserratians in Force 10 houses.

With regard to neighborhood satisfaction, several important results were observed. Notably, there was no statistically significant difference between the mean satisfaction of interviewed displacees and non-displacees with respect to their neighborhoods. Displacees reported a mean score of 8.19, as compared with 8.85 for non-displacees. There was also no statistically significant difference in displacees' neighborhood satisfaction across the three areas. Finally, at Lookout, there was no statistically significant difference in the neighborhood satisfaction scores of displacees living in Force 10 and non-Force 10 houses.

Residents' qualitative perspectives on housing

Building on the patterns described above, the extensive interview transcripts reveal a more nuanced picture regarding housing satisfaction, particularly with respect to Force 10 houses. Those in Force 10 houses had very distinctive sentiments regarding the materials from which these structures were constructed. Many people considered Force 10 houses unsuitable for Montserrat's climatic and weather conditions. For instance, one resident stated: "Not to sound stuck up, but it's not made of cement and with the hurricanes and all this is a problem." This sentiment was echoed by another resident who said: "These materials are not conducive to our climate here. When the materials get wet, they just stink." Others specifically targeted the sheetrock used in Force 10 houses for criticism, saying it was too weak to withstand storms. One resident remarked: "With sheetrock, if the wind is too heavy you can hear it banging back and forth." Another interviewee captured the sentiments of many, saying of their Force 10 house: "If there is a good hurricane, it would disappear."

In their comments, many interviewees explicitly connected concerns regarding participation, materials and safety. These comments often centered on the choice not to build in concrete, as in the case of Force 10 houses. For example, speaking of their Force 10 house, a Lookout interviewee said: "I wouldn't build that. For me, I would build concrete." The fact that Force 10 houses were not concrete was frequently raised by interviewees as a point of contention and they often argued that this made them unsafe and difficult to maintain. For example, a Lookout resident said: "When Montserratians build a house, it has concrete and steel." This sentiment was echoed by all interviewees in Force 10 houses, and is summarized by a resident who said: "Give me a concrete house instead of sheetrock." Emphasizing the connection between materials and local context, a Lookout resident captured a common sentiment, saying "When Montserratians build their houses they know exactly what they want. You've got to build a house according to the nature of the island. What they did here . . . it was designed not according to the way Montserrat is."

From a resident perspective, there was a strong sense that houses at Lookout, and particularly Force 10 houses, were a poor choice that failed to address longer-term housing challenges. An Old Towne/Olveston resident captured these opinions, saying: "You don't see people living on the street, but Force 10 houses in Davy Hill and Lookout are deficient houses." Another Old Towne/Olveston resident said the UK government had

made poor housing choices and hadn't "allocated money to basic things to make society work properly." This sense of poor planning, particularly over the long term, and lack of responsiveness to local needs was captured by a Lookout resident who said: "They have the money to do these things, but they aren't doing anything to spend it properly." More bluntly, an Old Towne/Olveston resident said of the UK's perceived unwillingness to contribute sufficient funds to meet long-term housing needs since the disaster, "If for 350 years you have raped and pillaged this island and others, then you have only paid for 20 years and owe 330 years."

Interviewees often spoke not only of the physical and material problems with their housing but also of other factors that made certain houses better than others. In frequently highlighting the role of agency and resident decision-making, these comments serve as a critique of the top-down approach to housing adopted around Force 10 housing in particular. For example, an interviewee at Lookout, in comparing the concrete block-built houses and Force 10 houses there, said that the former were preferred since "Alfred Dyatt [a local architect] designed it and he knows all about the island. The wind, the sun and all". Those who had built post-disaster homes according to their own designs often mentioned this as a source of pride and highlighted that these homes were therefore superior to others. A Brades/Cudjoe resident said, "I have more space now. Definitely more space, more comfortable, better housing. This was built to my specification, my design". Another interviewee at Brades/Cudjoe said of her house, "I like it all, it was my design!". These sentiments highlighted the importance of local involvement in decision-making around post-disaster housing, something widely considered lacking in the decision to adopt the Force 10 structures.

Officials' qualitative perspectives on housing

Tensions between the UK and Montserrat officials around housing were frequently emphasized in interviews with these decision-makers. In particular, Montserrat officials frequently referenced the choice of materials for the Force 10 houses as problematic. With respect to Force 10 houses, not only did individual residents feel they had little influence in deciding the features of their homes, but the Government of Montserrat officials also reporting feeling sidelined. In a representative quote, during their interview a Montserrat official remarked, "we're accustomed to a traditional type of concrete house, but with those houses, we had to take what we were given". Echoing residents' perspectives, the prefabricated houses in particular were felt to be poorly suited to both climate and local traditions, with another Montserrat official saying, "the person who designed the houses didn't design to a person's lifestyle". Another local official argued that the focus on providing houses for residents, rather than on supporting them to build their own homes was problematic. He stated, "We've seen a shift in our housing sector and it's not sustainable. We need a population that can help itself". These opinions were echoed by other Montserrat officials, one whom said of houses at Lookout, "The assistance you got was negligible, and not well thought-out and the housing was pre-defined and replicated".

The sentiments of Montserrat government officials were, in hindsight, generally supported by UK officials on the island. To this effect, a UK official stated, "it was a quick fix. Now the Force 10 housing is falling down. There's not been a proper maintenance strategy". Similarly, another UK official argued that, rather than looking long term, the

approach to housing was, and continues to be, “reactive to immediate needs.” This sentiment was captured by another UK official who stated, “There are various styles of houses, post-disaster. Some are awful; people have been living for 20 years in a 5 year solution”.

Discussion

The results suggest that the approach to post-disaster housing adopted in Montserrat led to certain groups experiencing particularly low housing satisfaction. Montserrat-born interviewees living at Lookout, and particularly those living in Force 10 houses, reported the lowest housing satisfaction. Notably, these scores were lower than for recent economic migrants to Montserrat, a group also considered particularly vulnerable. This is important because it shows that choices concerning post-disaster housing have implications for resident well-being and satisfaction. Furthermore, the fact that these adverse outcomes have persisted over more than two decades suggests the decision to provide certain kinds of houses, and particularly prefabricated houses, has entrenched a pattern of marginalization and vulnerability that may persist over the very long term.

Before discussing the decision to adopt the Force 10 housing type, and its implications, the results concerning neighborhood satisfaction merit attention. Unlike housing satisfaction, neighborhood satisfaction scores for displacees did not show statistically significant differences across the three study areas, nor, for those living at Lookout, between Force 10 and non-Force 10 houses. This is notable since a considerable body of evidence suggests that post-disaster relocation to new sites is often perceived negatively and is often associated with worsened socio-economic outcomes (Andrew et al., 2013; Cernea, 1997; Iuchi, 2014). Residents of the new settlement at Lookout generally had positive attitudes concerning their neighborhood. This suggests that, while attention should be paid to the locational aspects of resettlement, it is also important to consider the materials and manner of construction of houses themselves. As the following paragraphs describe, these factors can have stark implications for resident satisfaction and well-being.

Agency is a key theme in the findings. When displacees had greater agency over decisions concerning housing, it was viewed more positively, in part because displacees could ensure their houses were relatively well suited to their needs and to the local context. But why did local residents feel they had so little agency with regard to post-disaster housing? In considering this question it is important to recognize that it was not only residents who felt this way. Montserrat government officials also stated they felt sidelined in decisions around post-disaster housing. In trying to understand why this was the case, it can be seen in government reports that officials from the Montserrat and the UK often had very different priorities with respect to post-disaster housing. In these disagreements, the UK government often emphasized the speed of construction, while Montserrat officials emphasized durability. The tension between meeting short-term and long-term goals is one that is frequently encountered in post-disaster contexts (Ingram et al., 2006). In a DFID report on post-disaster response in Montserrat, Clay et al. (1999) summarize this tension saying:

The main differences – reflecting the priorities of each party – arose over the type of houses. DFID preferred prefabricated houses because of anticipated speed and cheapness. [The Government of Montserrat] preferred block built houses because they were more permanent, more hurricane-proof, more socially acceptable and used more local resources. (p. 42)

The impact of these different priorities was enhanced by the way in which Force 10 houses were provided. The contractor responsible for the provision of Force 10 houses, Brown and Root (B&R) has been critiqued for their lack of responsiveness to local needs and voices. As Fox (2002) states:

Conditions on the Island were not made any simpler by contractual arrangements that required decisions to be channeled through B&R's UK office ... with no [government] representative present on Island with delegated authority to oversee and manage B&R's contract, lapses in performance were slow to be addressed. (p. 12)

Interlaced with the power dynamics associated with post-disaster decision-making and the lack of responsiveness of the contractor responsible for Force 10 housing, questions regarding the permanence of post-disaster housing also likely contributed to the lack of agency experienced by local residents and officials. The belief that the prefabricated housing built for displaced was “temporary,” or at least not fully permanent, meant that: “not enough effort was made to help those accommodated to manage their activities and to be effectively represented in contacts with the Emergency Department” (Clay et al., 1999, p. 60). Ultimately, the emphasis on speed of construction and a perception that Force 10 houses were not fully permanent likely contributed to a sense that relatively minimalistic participation processes, in which local voices were given lower profile, were more acceptable.

As in Montserrat, the choice to adopt prefabricated approaches to post-disaster housing, often justified based on speed and efficiency, runs the risk of excluding or minimizing local participation in decision-making. However, the literature reports many examples of purportedly short-term housing solutions being used over the long term (Johnson, 2007). This phenomenon is captured by an adage that has been applied to post-disaster housing and other temporary interventions: “there is nothing so permanent as a temporary solution” (Boano, 2009, p. 769). Notable examples of people residing for long periods in short term, post-disaster housing have been reported in Turkey (Johnson, 2007), Colombia (Johnson et al., 2006), Sri Lanka (Boano, 2009) and California (Bolin & Stanford, 1991). These studies, and the findings of this paper, demonstrate the necessity of planners considering the time span over which residents are likely to live in the structures they provide, being mindful that this is likely to be longer than expected. Furthermore, given that short-term solutions are often used over the long term, the choice of prefabricated solutions should not serve to diminish the scope for public involvement in decision-making.

The results – revealing relatively limited agency and participation by residents in decision-making around post-disaster housing, particularly at Lookout and most especially for Force 10 housing – show clear points of overlap with the literature on post-disaster housing and on the challenges of planning in both humanitarian and development contexts. First, the literature shows that the impacts of disasters are born unequally. Second, the literature reveals that participation is critical to achieving positive outcomes and for ensuring fit between beneficiary needs and the goals of interventions. Finally, scholars and practitioners

have documented that top-down provision of housing, particularly of standardized approaches to housing, often leaves residents dissatisfied.

The case of post-disaster housing in Montserrat confirms a common pattern, described in the introduction, wherein the impacts of disasters are borne unequally and often most severely affect those who are already marginalized and vulnerable. In a review of the ways in which different groups are impacted by disasters, Fothergill and Peek (2004, p. 90) argue: "Poor people around the world suffer the greatest disaster losses and have the most limited access to public and private recovery assets, both in developing societies as well as wealthy industrialized nations like the United States". In addition to findings that show people of lower socioeconomic status face greater disaster losses (Aptekar, 1991), research also indicates that they often also have fewer resources following disasters, both in the immediate response period and during the longer recovery phase (Bolin & Stanford, 2006; Hewitt, 1997). This study documents a similar pattern of differential impacts, while also contributing a detailed explanation for how such a pattern emerged, and has been sustained over the long term through the intertwined factors of top-down planning and a strong focus on a physical solution that was not well suited to local conditions, traditions or preferences.

The results support the findings of other studies regarding the role of participation in the planning and design of post-disaster housing. As in other contexts, ranging from Tunisia (Bouraoui & Lizarralde, 2013) to Turkey (Abulnour, 2014) and Indonesia (Daly & Brassard, 2011), the results reveal that the houses over which residents had the least decision-making influence were considered least satisfactory. Furthermore, many of the concerns held by residents and Montserrat government officials, relating to the design and material suitability of Force 10 houses, in particular, proved to be realized over the long term. This highlights that participation is not only ethically important but also instrumentally important. This latter aspect is often overlooked but, as this study shows, considerable cost and dissatisfaction could have been avoided if the UK government had responded early on to critiques of more formulaic housing types and top-down modes of provision. The important role of participation in improving project outcomes has been highlighted in a number of studies, including research on wastewater (Ellis & Disinger, 1981), environmental projects (Beierle, 2000) and water provision (Isham et al., 1995; Prokopy, 2005). These studies document that involving beneficiaries in planning improves outcomes. Similarly, this study highlights the importance of participation, not only as an ethical practice but also as a means for ensuring good fit between the ambitions of interventions and outcomes.

The issue of agency relates closely to a second finding of this study, which showed that the materials used to build Force 10 prefabricated houses were seen as being poorly suited to Montserrat's weather, climate and building traditions. This supports research findings, summarized in the introduction, which have found that beneficiary satisfaction is often higher when housing is rooted in local building traditions and materials (Boyle, 2013). Furthermore, the choice to provide structures not reflecting local building traditions can have negative physical impacts, as such materials may not incorporate lessons gained from local knowledge of risks (Ortega et al., 2017; Twigg, 2006) and may be poorly suited to local environmental conditions (Audefroy, 2011). Paralleling the findings of this study, this has also been demonstrated by research which showed that many buildings constructed with materials perceived to be "modern" following a 1992 earthquake in Egypt were in fact highly seismically vulnerable (Degg & Homan, 2005) and by research in

Aceh, Indonesia, which showed that following the 2004 tsunami, community leaders opted for masonry buildings from a misperception that these materials must be safer than timber (Kennedy et al., 2008).

Ultimately, this study argues for deeper consideration of any housing designs that are deployed in post-disaster contexts, with particular attention given to unique local needs and conditions, and for closer attention to the input and perspectives of local populations. Such lessons are also relevant to other facets of planning in Montserrat and the wider Caribbean. For example, plans for Montserrat's new capital appear to be largely rooted in non-Montserratian esthetic and design principles. Given that the planning of the capital is on hold, this study can serve as a useful lesson to ensure that local voices are considered in any revitalized planning processes that might be initiated and to also simultaneously consider the material suitability of designs to the needs and interests of Montserratians. Positively, this study suggests that despite earlier tensions between different decision-makers over the best course for post-disaster housing, there is now widespread agreement among Montserrat and UK officials that enhanced participation of residents is vital and that housing satisfaction is likely to be higher when structures reflect local needs and building traditions. This agreement could serve as a useful entry-point to taking action on housing conditions at Lookout and for improving planning processes over the long term, both for a new capital and for any new disasters that strike.

Conclusion

This paper examined the long-term housing impacts of displacement and asked how these vary across disaster-affected populations. The Caribbean island of Montserrat, an overseas territory of the United Kingdom (UK), provides an excellent setting for examining this important and relatively understudied topic. The paper draws on interviews with 89 residents, including displacees and non-displacees, and 10 Montserratian and UK officials charged with responding to residents' post-disaster needs. The paper finds that interviewees living in housing built for, rather than by, displacees had significantly lower housing satisfaction scores, with residents of prefabricated houses reporting the lowest scores. Interviewees argued that the top-down provision of these houses was problematic due to limited local input and use of materials poorly suited to local conditions and traditions. Importantly, residents who live in prefabricated houses were more likely to be Montserratian-born. These residents had lower housing satisfaction than more recent economic migrants to the island, a group also considered by the government to be particularly vulnerable. The pattern of differential housing satisfaction can be traced, in part, to decisions taken by the UK government, which tended to favor speed and cost-effectiveness in housing delivery. Montserrat government officials and residents often argued for more permanent housing made from more durable materials more traditionally used in Montserratian housing. The paper concludes by situating the findings in the context of the literature on post-disaster housing and by arguing for increased attention to how such housing is provided in terms of both process and materials. Most importantly, the paper suggests that greater attention to the interconnected issues of participation and design, and particularly to materials, could ensure that future responses to disasters, in Montserrat and elsewhere, meet with greater success. The fact that this is now generally recognized in Montserrat, including by local and UK government officials,

means there may now be a strong political foundation for tackling remaining concerns over post-disaster housing and ensuring that similar approaches are not adopted in future planning efforts, including in the development of the new capital and in responses to future disasters.

Notes

1. £6.5 Million (Converted on 15 January 2018 to US dollars using xe.com).
2. £13.9 Million (Converted on 15 January 2018 to US dollars using xe.com).

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Notes on contributor

Michael Hooper is an Associate Professor of Community and Regional Planning at the University of British Columbia. His research focuses on the politics of housing, land use and urbanization.

ORCID

Michael Hooper  <http://orcid.org/0000-0001-8912-9414>

References

- Abulnour, A. H. (2014). The post-disaster temporary dwelling: Fundamentals of provision, design and construction. *HBRC Journal*, 10(1), 10–24. <https://doi.org/10.1016/j.hbrcj.2013.06.001>
- Andrew, S. A., Arlikatti, S., Long, L. C., & Kendra, J. M. (2013). The effect of housing assistance arrangements on household recovery: An empirical test of donor-assisted and owner-driven approaches. *Journal of Housing and the Built Environment*, 28(1), 17–34. <https://doi.org/10.1007/s10901-012-9266-9>
- Aptekar, L. (1991). *The psychosocial process of adjusting to natural disasters* (Working Paper No. 70). Boulder, CO: University of Colorado, Institute of Behavioral Science, Natural Hazards Research and Applications Information Center.

- Audefroy, J. F. (2011). Haiti: Post-earthquake lessons learned from traditional construction. *Environment and Urbanization*, 23(2), 447–462. <https://doi.org/10.1177/0956247811418736>
- Badri, S. A., Asgary, A., Eftekhari, A. R., & Levy, J. (2006). Post-disaster resettlement, development and change: A case study of the 1990 Manjil earthquake in Iran. *Disasters*, 30(4), 451–468. <https://doi.org/10.1111/j.0361-3666.2006.00332.x>
- Barakat, S. (2003). Housing reconstruction after conflict and disaster. Humanitarian Policy Group, Network Papers, 43, 1–40.
- Barenstein, J. D. (2006). *Housing reconstruction in post-earthquake Gujarat: A comparative analysis* (Humanitarian Practice Network, Network Paper 54). London: Overseas Development Institute.
- Beierle, T. C. (2000). *The quality of stakeholder-based decisions: Lessons from the case study record* (No. 1318-2016-103334). Washington, DC: Resources for the Future.
- Boano, C. (2009). Housing anxiety and multiple geographies in post-tsunami Sri Lanka. *Disasters*, 33(4), 762–785. <https://doi.org/10.1111/j.1467-7717.2009.01108.x>
- Bolin, R., & Stanford, L. (1991). Shelter, housing and recovery: A comparison of US disasters. *Disasters*, 15(1), 24–34. <https://doi.org/10.1111/j.1467-7717.1991.tb00424.x>
- Bolin, R., & Stanford, L. (2006). *The Northridge earthquake: Vulnerability and disaster*. Routledge.
- Bolton, P. A., Liebow, E. B., & Olson, J. L. (1993). Community context and uncertainty following a damaging earthquake: Low-income Latinos in Los Angeles, California. *The Environmental Professional*, 15, 240–247.
- Bouraoui, D., & Lizarralde, G. (2013). Centralized decision making, users' participation and satisfaction in post-disaster reconstruction: The case of Tunisia. *International Journal of Disaster Resilience in the Built Environment*, 4(2), 145–167. <https://doi.org/10.1108/IJDRBE-02-2012-0009>
- Boyle, C. (2013). Disaster resistant construction for small dwellings in the Solomon Islands. In Y. Aysan & I. Davis (Eds.), *Disasters and the small dwelling: Perspectives for the UN IDNDR* (2nd ed., pp. 183–189). Earthscan.
- Carifio, J., & Perla, R. (2008). Resolving the 50-year debate around using and misusing Likert scales. *Medical Education*, 42(12), 1150–1152. <https://doi.org/10.1111/j.1365-2923.2008.03172.x>
- Cernea, M. (1997). The risks and reconstruction model for resettling displaced populations. *World Development*, 25(10), 1569–1587. [https://doi.org/10.1016/S0305-750X\(97\)00054-5](https://doi.org/10.1016/S0305-750X(97)00054-5)
- Clay, E., Barrow, C., Benson, C., Dempster, J., Kokelaar, P., Pillai, N., & Seaman, J. (1999). *An evaluation of HMG's response to the Montserrat volcanic emergency: Volume 1* (DFID Evaluation Report). Department for International Development.
- Daly, P., & Brassard, C. (2011). Aid accountability and participatory approaches in post-disaster housing reconstruction. *Asian Journal of Social Science*, 39(4), 508–533. <https://doi.org/10.1163/156853111X597305>
- Degg, M., & Homan, J. (2005). Earthquake vulnerability in the Middle East. *Geography*, 90(1), 54–66. www.jstor.org/stable/40574029
- Department for International Development [DFID]. (2016). *Montserrat Budget Aid 2015/16*. Retrieved April 29, 2016, from <http://devtracker.dfid.gov.uk/projects/GB-1-204161/>
- Dittmer, J. (2004). The Soufriere Hills volcano and the postmodern landscapes of Montserrat. *Focus on Geography*, 47(4), 1–7. <https://doi.org/10.1111/j.1949-8535.2004.tb00044.x>
- Edgington, D. (2011). Reconstruction after natural disasters: The opportunities and constraints facing our cities. *Town Planning Review*, 82(6), v–xii. <https://doi.org/10.3828/tpr.2011.35>
- Ellis, R. A., & Disinger, J. F. (1981). Project outcomes correlate with public participation variables. *Journal of the Water Pollution Control Federation*, 53(11), 1564–1567. <https://www.jstor.org/stable/25041164>
- Félix, D., Branco, J. M., & Feio, A. (2013). Temporary housing after disasters: A state of the art survey. *Habitat International*, 40: 136–141. doi:10.1016/j.habitatint.2013.03.006
- Fergus, H. (2003). *Montserrat: History of a Caribbean Colony*. Macmillan Publishers.
- Fothergill, A., Maestas, E., & Darlington, J. D. (1999). Race, ethnicity and disasters in the United States: A review of the literature. *Disasters*, 23(2), 156–173. <https://doi.org/10.1111/1467-7717.00111>

- Fothergill, A., & Peek, L. A. (2004). Poverty and disasters in the United States: A review of recent sociological findings. *Natural Hazards*, 32(1), 89–110. <https://doi.org/10.1023/B:NHAZ.0000026792.76181.d9>
- Fox, A. (2002). Montserrat: A case study in the application of multiple methods to meet a post-disaster housing shortage. *Proceedings of the First International Conference on Post-disaster Reconstruction*. Montreal, QC: Universite de Montreal.
- Government of Montserrat. (2010). *Montserrat sustainable development plan 2008–2020*. Montserrat Ministry of Economic Development and Trade.
- Government of Montserrat. (2011a). *Consultation draft: Physical development plan for North Montserrat 2012–2022*. Physical Planning Unit, Montserrat Ministry of Agriculture, Land, Housing and the Environment.
- Government of Montserrat. (2011b). *Census 2011: Montserrat at a glance*. Statistics Department, Montserrat Ministry of Finance and Management.
- Government of Montserrat. (2012). *Montserrat land info database*. Retrieved June 1, 2016, from <http://landinfo.gov.ms>
- Government of Montserrat. (2014). *Force 10 homes to be reinforced*. Retrieved November 20, 2017, from <http://www.gov.ms/2014/04/11/force-10-homes-to-be-reinforced/>
- Government of Montserrat. (2015). *Housing policy of the Government of Montserrat*. Montserrat Ministry of Housing.
- Greaves, R. (2007). *Condition and sustainability survey of Lookout Force 10 houses built by Brown and Root, 1999–2000*. Internal report to the Governor: unpublished.
- Gregory, S. (1978). *Statistical Methods and the geographer* (4th ed.). Longman.
- Gulahane, K., & Gokhale, V. A. (2010). *Design criteria for temporary shelters for disaster mitigation in India. Proceedings of the 2010 Conference on Participatory Design and Appropriate Technology for Disaster Reconstruction*. Montreal, QC: Universite de Montreal.
- Haas, J., Kates, R., & Bowden, M. (1977). *Reconstruction following disaster*. MIT Press.
- Harpe, S. (2015). How to analyze Likert and other rating scale data. *Currents in Pharmacy Teaching and Learning*, 7(6), 836–850. <https://doi.org/10.1016/j.cptl.2015.08.001>
- Hewitt, K. (1997). *Regions of risk: A geographical introduction to disasters*. Longman.
- Hicks, A., & Few, R. (2015). Trajectories of social vulnerability during the Soufrière Hills volcanic crisis. *Journal of Applied Volcanology*, 4(10), 1–10. <https://doi.org/10.1186/s13617-015-0029-7>
- Hidellage, V., & Usoof, A. (2010). Scaling-up people-centered reconstruction: Lessons from Sri Lanka's post-tsunami owner-driven programme. In M. Lyons, T. Schilderman, & C. Boano (Eds.), *Building back better* (pp. 77–112). Practical Action Publishing.
- Hooper, M. (2015). Will the city rise Again? The contested geography of housing reconstruction in post-disaster Haiti. *Housing Studies*, 30(7), 1016–1035. <https://doi.org/10.1080/02673037.2015.1006184>
- Ingram, J., Franco, G., Rumbaitis-del Rio, C., & Khazai, B. (2006). Post disaster dilemmas: Challenges in balancing short-term and long-term needs for vulnerability reduction. *Environmental Science & Policy*, 9(7–8), 607–613. <https://doi.org/10.1016/j.envsci.2006.07.006>
- Internal Displacement Monitoring Center. (2015). *Global estimates 2015: People displaced by disasters*.
- International Rescue Corps. (1989). *Hurricane Hugo: Commander's report*.
- Isham, J., Narayan, D., & Pritchett, L. (1995). Does participation improve performance? Establishing causality with subjective data. *The World Bank Economic Review*, 9(2), 175–200. <https://doi.org/10.1093/wber/9.2.175>
- Iuchi, K. (2014). Planning resettlement after disasters. *Journal of the American Planning Association*, 80(4), 413–425. <https://doi.org/10.1080/01944363.2014.978353>
- Johnson, C. (2007). Strategic planning for post-disaster temporary housing. *Disasters*, 31(4), 435–458. <https://doi.org/10.1111/j.1467-7717.2007.01018.x>
- Johnson, C., Lizarralde, G., & Davidson, C. H. (2006). A systems view of temporary housing projects in post-disaster reconstruction. *Construction Management and Economics*, 24(4), 367–378. <https://doi.org/10.1080/01446190600567977>

- Kamel, N., & Loukaitou-Sideris, A. (2004). Residential assistance and recovery following the Northridge earthquake. *Urban Studies*, 41(3), 533–562. <https://doi.org/10.1080/0042098042000178672>
- Kennedy, J., Ashmore, J., Babister, E., & Kelman, I. (2008). The meaning of ‘build back better’: Evidence from post-tsunami Aceh and Sri Lanka. *Journal of Contingencies and Crisis Management*, 16(1), 24–36. <https://doi.org/10.1111/j.1468-5973.2008.00529.x>
- Levine, J., Esnard, A.-M., & Sapat, A. (2007). Population displacement and housing dilemmas due to catastrophic disasters. *Journal of Planning Literature*, 22(1), 3–15. <https://doi.org/10.1177/0885412207302277>
- Masozera, M., Bailey, M., & Kerchner, C. (2007). Distribution of impacts of natural disasters across income groups: A case study of New Orleans. *Ecological Economics*, 63(2), 299–306. <https://doi.org/10.1016/j.ecolecon.2006.06.013>
- McElroy, J., & De Albuquerque, K. (1992). The economic impact of retirement tourism in Montserrat: Some provisional evidence. *Social and Economic Studies*, 41(2), 127–152. <https://www.jstor.org/stable/27865081>
- McLeman, R. (2011). Settlement abandonment in the context of global environmental change. *Global Environmental Change*, 21(1), S108–S120. <https://doi.org/10.1016/j.gloenvcha.2011.08.004>
- Montserrat Development Corporation [MDC]. (2015). *Little Bay and Carr’s Bay*. Retrieved April 20, 2016, from <http://Mdc.ms>
- Mustafa, D. (2003). Reinforcing vulnerability? Disaster relief, recovery, and response to the 2001 flood in Rawalpindi, Pakistan. *Global Environmental Change Part B: Environmental Hazards*, 5(3), 71–82. <https://doi.org/10.1016/j.hazards.2004.05.001>
- National Weather Service. (1995). *A summary of natural hazard fatalities for 1994 in the United States*. U.S. Government Printing Office.
- Ortega, J., Vasconcelos, G., Rodrigues, H., Correia, M., & Lourenço, P. B. (2017). Traditional earthquake resistant techniques for vernacular architecture and local seismic cultures: A literature review. *Journal of Cultural Heritage*, 27, 181–196. <https://doi.org/10.1016/j.culher.2017.02.015>
- Peacock, W. G., & Girard, C. (1997). Ethnic and racial inequalities in hurricane damage and insurance settlements. In W. G. Peacock, B. H. Morrow, & H. Gladwin (Eds.), *Hurricane Andrew: Ethnicity, gender and the sociology of disasters* (pp. 171–190). Routledge.
- Peacock, W. G., Dash, N., & Zhang, Y. (2007). Sheltering and housing recovery following disaster. In H. Rodriguez, E. L. Quarantelli, & R. Dynes (Eds.), *Handbook of disaster research* (pp. 258–274). Springer.
- Peacock, W. G., Killian, C. D., & Bates, F. L. (1987). The effects of disaster damage and housing aid on household recovery following the 1976 Guatemalan earthquake. *International Journal of Mass Emergencies and Disasters*, 5(1), 63–88. <http://ijmed.org/articles/298/download/>
- Peacock, W. G., Van Zandt, S., Zhang, Y., & Highfield, W. E. (2014). Inequities in long-term housing recovery after disasters. *Journal of the American Planning Association*, 80(4), 356–371. <https://doi.org/10.1080/01944363.2014.980440>
- Phillips, B. D. (1998). Sheltering and housing of low-income and minority groups in Santa Cruz county after the Loma Prieta earthquake. In J. Nigg (Ed.), *The Loma Prieta, California, earthquake of October 17, 1989: Recovery, mitigation, and reconstruction* (pp. D17–D28). U.S. Government Printing Office.
- Philpott, S. (1973). *West Indian migration: The Montserrat case*. Athlone Press.
- Prokopy, L. S. (2005). The relationship between participation and project outcomes: Evidence from rural water supply projects in India. *World Development*, 33(11), 1801–1819. <https://doi.org/10.1016/j.worlddev.2005.07.002>
- Pulsipher, L. M. (2001). Our “maroon” in the now-lost landscapes of Montserrat. *Geographical Review*, 91(1/2), 132–142. <https://doi.org/10.2307/3250813>
- Roach, B. (2015, January 23). *MDC ‘shut down’*. The Montserrat Reporter. Retrieved April 17, 2019, from <https://www.themontserratreporter.com/mdc-shut-down/>

- Rovai, E. (1994). The social geography of disaster recovery: Differential community response to the North Coast earthquakes. *Yearbook of the Association of Pacific Coast Geographers*, 56(1), 49–74. <https://doi.org/10.1353/pcg.1994.0002>
- Santiago, J. S. S., Manuela, W. S., Jr, Tan, M. L. L., Sañez, S. K. B., & Tong, A. Z. U. (2018). Agency-driven post-disaster recovery: A comparative study of three Typhoon Washi resettlement communities in the Philippines. *International Journal of Disaster Risk Reduction*, 27, 480–489. <https://doi.org/10.1016/j.ijdrr.2017.11.012>
- Sword-Daniels, V., Wilson, T. M., Sargeant, S., Rossetto, T., Twigg, J., Johnston, D. M., Louglin, S. C., & Cole, P. D. (2014). Consequences of long-term volcanic activity for essential services in Montserrat: Challenges, adaptations and resilience. *Geological Society, London, Memoirs*, 39(1), 471–488. <https://doi.org/10.1144/M39.26>
- Tafti, M. T. (2015). Housing assistance distribution after disasters: Does it enable affected households to recover? *Environmental Hazards*, 14(4), 361–377. <https://doi.org/10.1080/17477891.2015.1080655>
- Twigg, J. (2006). *Technology, post-disaster housing reconstruction and livelihood* (Disaster Studies Working Paper No. 15). London, UK: UCL Benfield Hazard Research Center.
- United Nations Disaster Relief Organization. (1982). *Shelter after disaster: Guidelines for assistance*. United Nations.
- USGS. (2004). *Caribis - Caribbean island nations coastline boundaries: Open-file report 2004–1400*. United States Geological Survey.
- Vale, L., & Campanella, T. (2005). *The resilient city: How modern cities recover from disaster*. Oxford University Press.
- Wilkinson, E. (2015). Beyond the volcanic crisis: Co-governance of risk in Montserrat. *Journal of Applied Volcanology*, 4(3), 1–15. <https://doi.org/10.1186/s13617-014-0021-7>