Poor and African American in Flint

The water crisis and its trapped population

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Introduction

> *"We've had a city in the United States of America where the population, which is poor in many ways and majority African American, has been bathing and drinking in lead-contaminated water. And the governor of that state acted as though he didn't really care. He had requests for help that he basically stonewalled. I'll tell you what: If the kids in a rich suburb of Detroit had been drinking contaminated water and being bathed in it, there would've been action."*
>
> **Hillary Clinton, 17 January 2016**

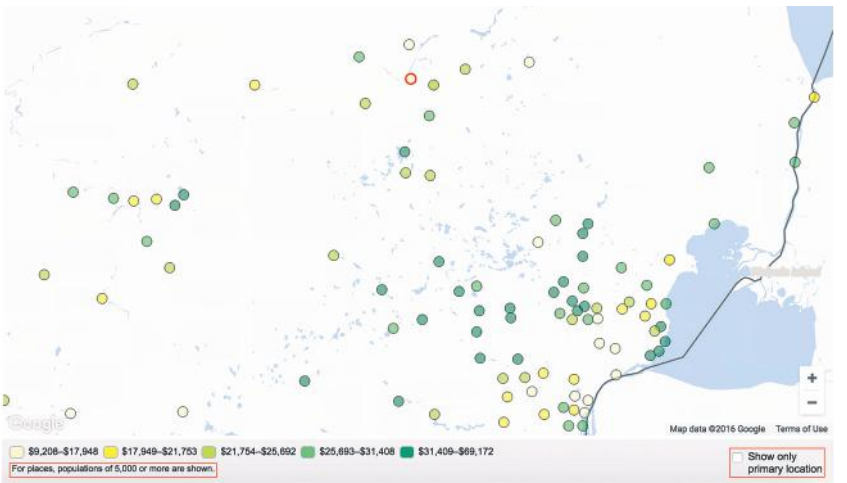
The presidential candidate declared this during the Democratic debate in Flint on 17 January 2016 and the statement spread rapidly through the Twittersphere and the media. They resounded with many in a United States of America (U.S.) grappling with a deeply divided society on many levels, particularly raw and sensitive during the current circus-like presidential election campaign. The Flint Water Crisis is a "story of government failure, intransigence, unpreparedness, delayed inaction and environmental injustice" (Flint Water Task Advisory, 2016: 1). This lethal combination culminated in the lead contamination of the city's water supply, with grave consequences ranging from public health to economic failure, to a plummeting in the trust placed by citizens in their government. Although the events leading up to the lead contamination took place in 2013 and 2014, the crisis was finally acknowledged by the state government in 2015 and gained more exposure in the public eye that same year, thus meriting discussion in this publication.

This paper will focus on the Flint Water Crisis, analysing the existence of a trapped population, an invisible facet of migration, and deconstructing the intersections between race and socio-economic factors in cases of environmental injustice. In order to do this, the events leading up to the water crisis will be detailed, followed by an examination of the evidence pointing to a case of environmental injustice as well as the discourse surrounding the trapped population. Finally, the policy challenges will be discussed and recommendations will be given.

Context

Flint, the largest city and county seat of Genesee County, Michigan, located approximately 100 kilometres northwest of Detroit, is no stranger to hardship, even before the ongoing water crisis. The city has suffered a dramatic decline in the population with a peak of more than 200,000 in 1960

Map 1. Per capita income in past 12 months (in 2014 dollars)



Source: United States Census Bureau, 2015

falling to 99,000 in 2014, 57% of which is Black or African American (United States Census Bureau, 2015; Flint Water Task Advisory, 2016). According to the latest census undertaken in 2010, a staggering 41.6% of its population lives in poverty[1]—2.8 times the national average—and its per capita income in 2014 was US$14,527 (United States Census Bureau, 2015). Map 1 below, showing the per capita income of cities in Michigan in 2014, demonstrates that Flint, circled in red, is among the poorest in the region. The median value of own-occupied housing is US$37,000, a figure that is one fifth of the national average (Flint Water Task Advisory, 2016). In addition, it is the second most dangerous city in Michigan (after Detroit) with, according to the Federal Bureau of Investigation (FBI) (2010), a violent crime[2] rate of 2,207 per 100,000 of the population. Years of disinterest in the automobile industry and associated manufacturing activities plunged the city and its surrounding area, known as Greater Flint, into financial distress: the region has lost 77% of its manufacturing employment and 41% of employment overall since 1980 (Jacobs, 2009; Rosner, 2016b). The harmful effects of General Motors' (GM) decline, which at its height employed as many

[1] Poverty, measured by the U.S. Census Bureau, is done so by using a set of income thresholds that vary by family size and composition and the age of the individuals (U.S. Census Bureau, n.d.). For example, in 2014, a family of three (two parents and a child below the age of 18) is considered to be living in poverty if its income threshold is below US$19,055.

[2] Violent crime includes murder, non-negligent manslaughter, forcible rape, robbery and aggravated assault (FBI, 2010).

as 80,000 workers in factories along the Flint River, remain etched in the collective memory of the town (Roger and Me, 1989). This drawn-out financial struggle and its consequences are indirectly at the root of the lead contamination disaster.

The Role of Emergency Managers

In 2011, Michigan Governor Rick Snyder signed Public Act 4. This measure broadened Public Act 72, which was passed in 1990, and provided an emergency financial manager, an unelected official with near-total control over the city's finances, for financially distressed cities and school districts (Coyne, 2016). Michigan voters, concerned that Public Act 4 placed too much power into one person's hands, repealed it through a referendum in 2012 (Hakala, 2016). However, the Republican-dominated state legislature reacted by introducing Public Act 436 (Coyne, 2016). The implementation of this bill saw emergency financial managers renamed emergency managers, retaining their original responsibilities but paid by the state instead of local funds (*Ibid*).[3] However, what did change is that legislators included an appropriation in their bill, meaning that the public cannot repeal it in the same way Public Act 4 was.[4] The lethal combination of Public Act 4 and Public Act 436 meant that, from 2011 to 2015, Flint officials had no real control over municipal policy, with emergency managers retaining the power to veto any decision with which they did not agree (*Ibid*).

As the city stared into the abyss of bankruptcy, Governor Snyder, desperate to save money, appointed an emergency manager with the sole mandate of being cost-effective (Nelson, 2016). One of the first manager's decisions was to suspend the local government, a measure that remained in force until the departure of the last manager in 2015. This not only removed the democratic system of checks and balances, ensured when local representatives participate in decision-making, but it also removed any trace of public accountability (Flint Water Advisory Task Force, 2016).

One of the measures adopted was drawing water from the Flint River instead of the pre-treated water source in Detroit, which charged Flint US$21 million in 2011 (Nelson, 2016). Originally, the plan had been to draw water from Lake Huron by building a new water pipeline, thereby alleviating

[3] These include suspending and overruling local government by reversing pre-negotiated or signed city contracts, liquidating assets, as well as drafting policy or disincorporating (Coyne, 2016).

[4] That said, local governments can vote to remove an emergency manager with a 2/3 majority vote, but only after 18 months (State of Michigan, 2012).

the financial pressure (*Ibid*). This was approved in 2013, voted 7-1 by the Flint City Council, but emergency manager Edward Kurtz overruled the decision and decided to use the Flint River water until the new system was ready (Coyne, 2016). The subsequent emergency manager, Darnell Earley, rejected offers from Detroit to continue selling water to Flint, and validated the filtration and use of Flint River water (Coyne, 2016). Thanks to the release of Governor Snyder's emails in January 2016, it has been possible for the Flint Water Advisory Task Force (FWATF) to compile a timeline and provide clarity on the events leading up to the change in water source.

One of the aforementioned emails shows that several staff members from different departments in the Michigan Department of Environmental Quality (MDEQ) voiced concerns and warned of the acidity risks in the Flint River water (Flint Water Advisory Task Force, 2016). In addition, an employee of the Flint Utilities Department warned the MDEQ of the "unpreparedness" of the Flint Water Plant, notifying them of the "political pressure" to start distribution as soon as possible (*Ibid*: 17). Despite these warnings, in April 2014, as the city's contract with Detroit Water and Sewerage Department came to an end, Flint began using treated water from the Flint River as a temporary solution. Two years down the line, with rumours spreading of lead-contaminated water, the city council once again voted 7-1 to "do all things necessary" to switch back to Detroit water; a decision vetoed by another emergency manager, Jerry Ambrose, who claimed it was incomprehensible (Coyne, 2016, no pagination).

Turning a Blind Eye: Disregarding Proof

The Flint River water is highly corrosive and the Flint Water Treatment Plant failed to properly treat the water and the state failed to properly test it (Flint Water Advisory Task Force, 2016; Roy, 2016). Inevitably, the compounds in the water started to eat through the aging water distribution system's lead pipes and plumbing. The network delivering water to Flint residents was being poisoned.

After the change of water source, the state desperately tried to sweep citizens' growing complaints about the taste, colour and smell of the water under the rug, fervently denying any wrongdoing. On 5 August 2014, *Escherichia coli* bacteria (more commonly referred to as *e-coli*) were detected in the distribution system leading to a local boil water advisory[5] (Flint

[5] This public health directive given by health authorities to consumers recommends that water be brought to a boil before use, in order to kill bacteria (Centres for Disease and Control Prevention, 2009).

Image 1. Water from Flint resident Patty Warner's heater

Source: © Patty Warner, 2016

Water Advisory Task Force, 2016). Shortly afterwards, on 2 January 2015, eight months after switching water sources, the MDEQ issued a notice of violation of the Safe Drinking Water Act for maximum contaminant levels for trihalomethanes (TTHM),[6] a group of four chemicals that are formed as a by-product of disinfecting water (Flint Water Advisory Task Force, 2016; Fonger, 2015). The notice in question, although warning those who have a "severely compromised immune system, [who] have an infant or are elderly" to seek medical advice about drinking water, nonetheless claims there is no need to boil water or take other action for those who do not fit into the aforementioned categories (Fonger, 2015: no pagination).

On 1 July 2014, Flint began its first 6-month monitoring period for lead and copper in drinking water, which ended on 31 December. Although there is no safe level to begin with, it is important to bear in mind that the standard set by the Environmental Protection Agency (EPA) is 15 parts per billion (ppb) (Roy, 2016). This first round of monitoring used 100 samples and these were not necessarily drawn from the highest risk homes, as is required by the Lead and Copper Rule (LCR) (Fonger, 2015). The outcome of the tests found that the 90th percentile lead level result was 6 ppb with two samples

[6] TTHM have been proven to cause liver, kidney or central nervous system problems as well as an increased risk of cancer in case of exposure over a long period of time (Flint Water Advisory Task Force, 2016).

above action levels for lead with 15 ppb (*Ibid*). In light of these results, the LCR dictates that Flint would have to implement corrosion control treatment, regardless of the next batch of testing, a regulation regarding which the MDEQ does not inform the Flint Water Treatment Plant (*Ibid*).

One of the key actors in flagging the lead poisoning was Flint resident LeeAnne Walters, who contacted the EPA in February 2015 regarding high levels of lead found in the drinking water in her home (Flint Water Advisory Task Force, 2016; Roy, 2016). In April of the same year, Miguel Del Toral, then-Regulations Manager of the Ground Water and Drinking Water Branch of the EPA and a concerned employee, visited Walters to test her water (Flint Water Advisory Task Force, 2016). Del Toral (2015) sent a memo to his head of department, Thomas Poy, highlighting that the lead results were "especially alarming", ranging in value from 200 ppb to 13,200 ppb, as demonstrated by the Graph 1 below, with an average of around 2,000 ppb (Roy, 2016). Despite this warning and Del Toral's (2015) accompanying recommendations to remedy the water issues, the EPA ignored the evidence and Del Toral was "silenced", no longer allowed to talk to the media, prompting Walters to leak the aforementioned memo to the press (Roy, 2016).[7]

Despite the memo now being in the public sphere, the MDEQ did not change their stance and continued to insist that the water was safe. In fact, the MDEQ is being accused of having purposefully manipulated samples in order to downplay the situation. Their results contrast starkly with those presented by the Virginia Tech team of researchers, who published the Flint Water Study, investigating water lead levels as well as those published by paediatricians at Michigan State University on blood lead levels in children under five (Nelson, 2016).

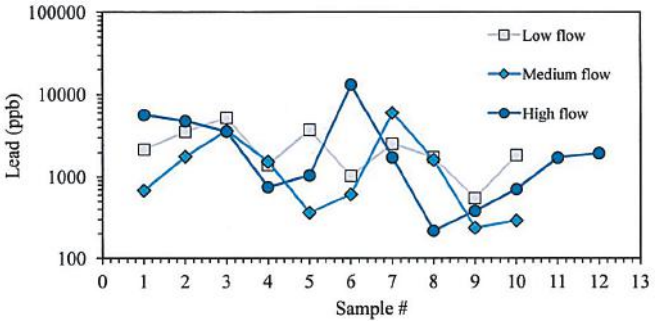
Lead Contamination

These paediatricians include Dr Mona Hanna-Attisha, who conducted several tests investigating the elevated blood lead levels (BLLs) in children younger than five years old before (2013) and after (2015) the water source change (Hanna-Attisha et al., 2016).[8] The results of this study reinforced Flint residents' prior worries and protests concerning the quality of the

[7] Quote from Skype interview, see bibliography.

[8] Testing BLLs of individuals is challenging: when one is exposed to lead for a given amount of time, and has high BLLs, but is then, for whatever reason, no longer exposed to lead, the BLLs go back down, even though the damage has already been inflicted (Redlener, 2016). This means it is difficult to give an accurate number of those, children or otherwise, who have had high BLLs.

Graph 1. Drinking water samples collected from the Walters' residence on April 28, 2015



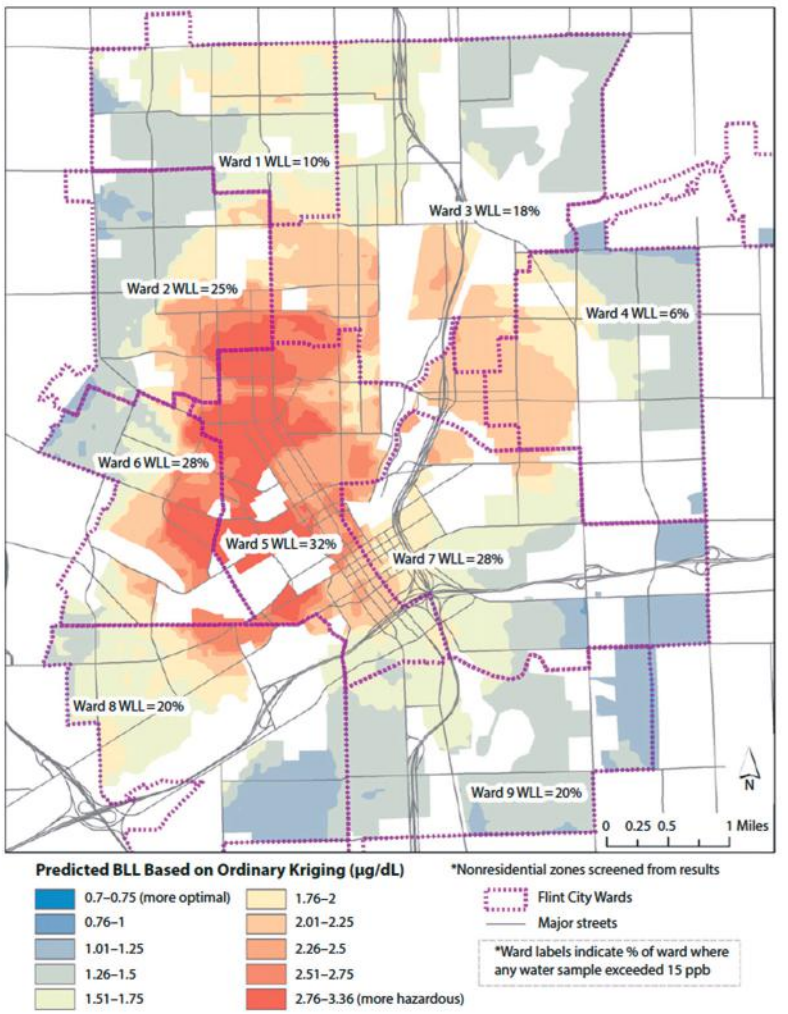
Source: Del Toral, 2015, based on results and graph provided by Virginia Tech

water: the incidence of elevated BLLs increased from 2.4% to 4.9% after the change of water source, with neighbourhoods with the highest BLLs experiencing a 6.6% rise (*Ibid*). According to the report, the neighbourhoods with the greatest elevated BLL increases are also the most disadvantaged socio-economically speaking (*Ibid*). Image 1 below shows the distribution of BLLs and water lead levels in Flint—the areas in which the highest water lead levels were recorded had the highest population of African American children at 76.8% as opposed to 67% in lower water lead level areas (*Ibid*). As the map demonstrates, the areas with the highest water lead level coincide with those where BLLs were highest amongst children tested; these areas, shaded in red, have seen a significant demographic change, an increase in poverty and a hike in vacant properties (*Ibid*). The neighbourhoods in the far north and south of the city, where most middle-class citizens reside, observed a decreasing trend of the BLLs as these residents could afford certain prevention efforts in response to the use of the Flint River water, notably purchasing bottled water (*Ibid*).

Following the findings published on the lead-poisoning of many of Flint's children, in October 2015, the State of Michigan admitted that there was lead in the water: "We, and our children, were being poisoned" (Coyne, 2016, no pagination). This was followed, on 12 January and 16 January 2016 respectively, by Governor Snyder and President Barack Obama declaring a state of emergency, allowing the city access to state and federal financial aid (Flint Water Advisory Task Force, 2016; Egan and Spangler, 2016).

In June 1986, Congress enacted the Safe Drinking Water Act Amendments, of which two sections dictate the lead ban; Section 1417 and 109 prohibit the instalment of lead pipes or any other lead-bearing plumbing material in

Image 2. Predicted Surface of Child Blood Lead Level and Ward-Specific Elevated Water Lead Level After (Post) Water Source Change From Detroit-Supplied Lake Huron Water to the Flint River: Flint, MI, 2015



Note. BLL = blood lead level; WLL = water lead level.

Source: Hanna-Attisha et al., 2016

both private and public housing (EPA, 1989). Given that no new homes have been built in Flint since the mid-1980s, it has been estimated that almost all homes have some form of lead in them and that Flint has between 10,000 and 15,000 lead pipes, although some estimates point to 70,000 pipes that need to be removed (Roy, 2016; Milman, 2016). It is therefore assumed that the majority of the population has been exposed to lead (*Ibid*). As for the children affected, there are 9,000 children under the age of 6 in Flint therefore the same number have been potentially exposed to lead poisoning (Roy, 2016; Redlener, 2016; Dyar, 2016).

Immobility and (In)Justice: The Case of Flint

This section of this paper will explore the concepts of environmental injustice and trapped populations in relation to the case of Flint. It will demonstrate how the existence of a trapped population in Flint reinforces the notion exposed by environmental injustice; communities most likely to be affected by manmade environmental disasters are minorities and the poor.

Environmental (in)justice

One of the issues identified by the FWATF (2016) is the existence of environmental injustice. Their report explains that environmental justice embraces two principles: the fair, non-discriminatory treatment of all people and the provision for meaningful public involvement of all people, regardless of race, colour, nationality or income, in government decision-making regarding environmental laws, regulations and policies (*Ibid*). The circumstances in which environmental injustice unfolds are when responsible parties for the protection of public health fail to do so in the context of environmental considerations. Those who fall victim to environmental injustice are guaranteed three basic rights: the right to information, the right to a hearing and the right to compensation (Cutter, 1995).

Environmental justice was born out of the 1982 protests over a PCB (polychlorinated biphenyl)[9] dump, located in Warren County, North Carolina, near a community of mostly African-American, rural and poor individuals (Northridge et al., 2003; Cutter, 1995). Originally dubbed "environmental racism", the term has since evolved to move beyond race

[9] PCB is a product that was used as a coolant fluid for machinery as well as in certain pesticides and plasticiser in paint and cement.

and include others who can also be deprived of their environmental rights, such as women, children and the poor (Cutter, 1995: 112).

As a result of political activism on the matter, in 1990, the EPA established an Environmental Equity Workgroup (EEW) tasked with the evaluation of evidence that racial minority and low-income groups bear a disproportionate burden of environmental risks (*Ibid*). The EEW were assigned the research of factors that contributed to different risk burdens as well as the elaboration of strategies for improvement (*Ibid*). The EEW's first report was released in 1992, confirming earlier studies that demonstrated a strong correlation between the location of toxic industry facilities and the percentages of minority residents in those communities (*Ibid*). Following this, in 1994, President Bill Clinton signed Executive Order 12898, obliging federal agencies to identify and address disproportionately high and adverse human health or environmental effects of their programmes, policies and activities on people of colour and impoverished communities in the U.S. (Northridge et al., 2003; Cutter, 1995).

Environmental injustice includes the natural and man-made environment and, although not focused on lead poisoning, Allen (2001) provides insight as to the socio-economic implications observed in case of toxic releases in American counties. Indeed, he diagnoses an "environmental classism" that is such that poor communities are more often affected by toxic releases that harm their environment, due to the fact that land is cheaper in areas with existing industry as well as in poorer neighbourhoods (*Ibid*: 15). On the other hand, wealthier and well-educated residents, in a bid to protect themselves against the polluting industries in question, will organise opposition or political mobilisation, which will capture the attention of decision makers due to their affluence (*Ibid*). Such a fervent reaction to the polluting industry means the company will most likely have to relocate elsewhere or lower their toxic outputs.

Northridge et al. (2003) concur with this analysis, however, point out that there is limited health research done vis-à-vis environmental injustice. To remedy this gap, a literature analysis is conducted to investigate the range of environmental exposure borne by certain population groups. In a case study focused on BLLs of children in rural and urban regions of the U.S., results using the National Health and Nutrition Examination Survey (1988-1994) data show that it is predominantly poor children in both areas that test for levels that are 10 ng/dL (nanograms per decilitre) or higher: 12% of children living in poor families had elevated BLLs, as opposed to 2% in high-income families (*Ibid*). Moreover, when the data are disaggregated by racial/ethnic

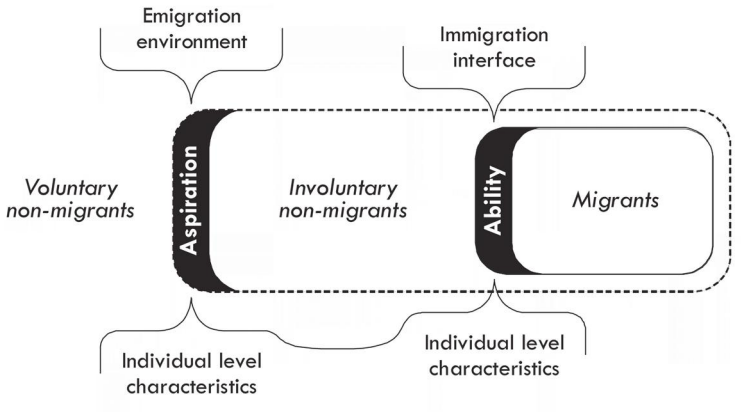
group, African American children are more likely to have elevated BLLs in each income group (*Ibid*). Interestingly, when discussing the complexities of assessing local threats, Northridge et al. (2003) find that research has indicated that it is the nature of the official responses to the environmental event that highlight racist tendencies, not the polluting activity itself.

Trapped Populations

After natural or man-made disasters, a common reaction is to leave the area affected, sometimes out of choice and other times out of obligation. However, an oft-overlooked reaction, or lack thereof, is that of trapped populations, defined as those "who lack the ability to move but also either want or need to move" (Black and Collyer, 2014: 52). Indeed, the consistent and assumed focus on movement in migration studies "renders the involuntarily immobilised invisible", a trend that applies to the Flint case study (*Ibid*: 52). Jónsson (2011) reinforces this notion and points out that the socio-economic implications this immobility entails are subsequently rarely examined. Carling (2002: 1) discusses this phenomenon, underlining that in the so-called "Age of Migration", little attention is paid to the explorations and explanations of the act of non-migration. Although his focus is mainly on international migration and the Cape Verdean example, his model, illustrated by Image 3 below, dubbed the aspiration/ability model, provides clarification and insight into the characteristics of migrants in comparison to those who stay behind, either voluntarily or involuntarily. Through a dual-analysis strategy, Carling breaks down the many factors that determine one's aspiration or ability, on both a macro- and a micro-level, that can lead an individual to voluntarily or involuntarily stay, or migrate.

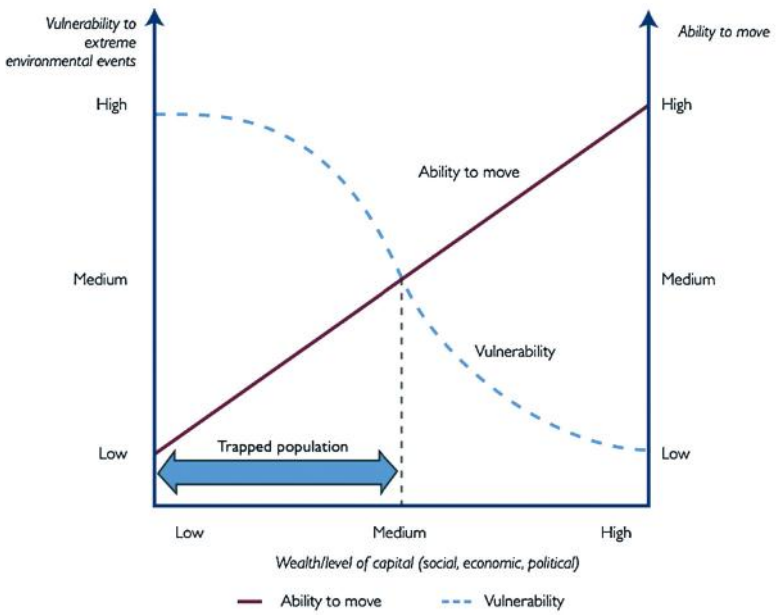
Lubkemann (2008), who focuses on the context of wartime situations, echoes this perspective underlining that there is a direct link between migration and displacement. He argues that the use of the two terms interchangeably conceals those who suffer a form of "displacement in place" through involuntary immobilisation (*Ibid*: 453). Immobile populations, usually the most vulnerable, are more likely to be trapped, a reality clearly demonstrated by Image 4 below; those with the lowest ability to migrate, the highest vulnerability to extreme environmental effects and the lowest wealth/level of capital, finds themselves trapped. Also, although not included in Image 4, in an indirect way, these populations have heightened vulnerability due to their low involvement in social networks beyond the

Image 3. The aspiration/ability model



Source: Carling, 2002

Image 4. Vulnerability to extreme environmental events and ability to move



Source: Foresight , 2011, used in Black et al. 2013

area immediately affected by the crisis, thus preventing them from relying on assistance from further afield (*Ibid*).

Much like the many categories of those who migrate, multilayered nuances are important to take into account when determining whether or not a population is trapped, if that is at all possible on a meso level. Similar to Carling's (2002) model, these include ability, desire and need: "trapped populations are those people who not only aspire but also need to move for their own protection but who nevertheless lack the ability" (Black and Collyer, 2014: 54). It is also important to add that it is possible to be trapped on the move, particularly in refugee/internally displaced persons (IDP) camps, however, as this point does not apply to the case of Flint, it shall not be discussed in the framework of this paper (*Ibid*).

An infamous example of a trapped population is the underprivileged African-American population of New Orleans after Hurricane Katrina devastated the city: those with financial resources and/or vehicles left in advance, as did those with friends and family elsewhere, whereas those without resources found themselves trapped as floodwaters rose (Black and Collyer, 2014; Masquelier, 2006). This example, although different by virtue of being a natural disaster, is particularly pertinent as Governor Snyder admitted, during an interview with *The National Journal* in January 2016, that the Flint Water Crisis was "his Katrina", referring to then President George W. Bush's poor handling of the natural disaster (National Journal, 2016, no pagination).

The Varying Degrees of Flint's Trapped Population

As explained above, a trapped population is characterised by a desire[10] to migrate, a need to migrate and the ability to do so. To explore the link between environmental injustice and trapped populations, these characteristics will be explored vis-à-vis the situation in Flint through the examination of articles published in the press.

Firstly, the desire to leave Flint City resurfaces in many articles and interviews; in *The New York Times*, Bosman (2016, no pagination) explains that "untold numbers of them are *desperate to leave* [emphasis added]", denoting a clear aspiration to leave their hometown, with 'desperate' indicating a sense of urgency. However, this statement is followed by: "few see a way to pick

[10] It is challenging to draw conclusions regarding the desire of an individual in a given situation; especially considering the geographical constraints that are such that the author of this article was not able to conduct interviews with those affected by the lead contamination.

up and move to a place where the water that flows from the taps is clean and safe", pointing to the notion of being immobile (*Ibid*). This sentiment is also conveyed in a *Vox* article, nearly word-for-word: "many Flint residents are desperate to leave" (Nelson, 2016, no pagination). Similarly, *The Washington Post*'s Emily Badger (2016, no pagination) reiterates the residents' wish to migrate, then dashed by the affirmation that they are incapable of doing so: "ask families in Flint and many *want to leave* [emphasis added] [...] but the same problems that harm them *trap them there* [emphasis added], in the middle of an environmental disaster". Patty Warner (2016, no pagination), a Flint resident who has chosen to stay in her hometown, explains during a phone interview that "there are other people who do feel trapped and they feel like they want to escape, they want a better life for themselves, for their children".

Secondly, the need to leave will be discussed taking into account the severity of the situation and the complex interlinking factors that interact to discuss the urgency with which many residents feel the necessity to escape. Brittny Giles, interviewed by *The Washington Post*, admitted that she would rather stay, but the lack of quality public services for her children mean that it is imperative to migrate: "I don't want to leave [...] but if there is no water or schools for my children, I have to give them a better future" (Bernstein, 2016, no pagination). Likewise, in an op-ed by Dr Irwin Redlener (2016a, no pagination) published in *The Washington Post*, a "deeply frustrated" mother admitted to being "so afraid for [her] kids" adding that "all of [her] friends say the same thing: if we could afford it, we would be out of Flint".

Charles White, a father and carpenter in Flint City, told Bosman (2016, no pagination) that "[he's] prepared to sell everything [he] own[s] to get out and save [his] children" but recognises "he is as good as trapped". In these cases, the heightened effects lead poisoning has on children and the extra attention they already do and will need in the future—be it physical or mental—are considered by many families as a factor making migration necessary. Moreover, whilst Cheryl Farmer also admits she "needs to leave", she points not only to the high lead levels in her 8-year old daughter's blood, but also to the "poverty, crime, gunshots that ring out at night and send her daughter running to her room" (Simon and Sidner, 2016, no pagination).

After having already established the desire and need to migrate, the last characteristic of a trapped population is an analysis of the ability of the affected community to do so, financially speaking. Given that 41.6% of the

population lives in poverty, the press is littered with examples of residents citing financial difficulties as an inhibitor to their potential plans to move, supported by the socio-economic context laid out in the first section of this chapter. For example, Terraca Rogers, interviewed by Villalobos (2016), stated "I want to move but don't have the funds to go". Echoing this sentiment, Sandra Ballard, a retiree, lamented the fact that she already struggles to pay her monthly rent of US$350: "You've got to put first and last month's rent down. Believe me, I wish I could get out of here" (Bosman, 2016, no pagination). These financial difficulties are often directly linked to the trouble residents face when trying to sell their homes. No one wants to buy property in an area that has been making headlines for poisonous water as well as the pre-exiting levels of crime and poverty (Nelson, 2016). Kala Green, a retiree interviewed in *The Washington Post*, asked dejectedly "What are we going to do? [...] Ain't nobody gonna buy our homes" (Bernstein, 2016, no pagination). Warner (2016) cites her neighbourhood's Facebook page, describing that many people have written saying they felt frustrated by the depreciation in the value of their property, claiming they cannot sell their house because of the water situation.

Another important element in the ability to move, as mentioned above, is the social network needed outside the place of residency of the population affected, which can often provide a temporary home and support during migration. Many of those who identify as being trapped, as well as citing the expenses of moving, also point to an attachment to their town:

> It kills him to say it, but Darren Bentley is thinking about leaving town. He was born here, went to Kearsley High School and rents a place near a couple of college campuses. He has never lived anywhere else (Bernstein, 2016, no pagination).

Also, the testimony of Demetrius Williams is telling as it establishes the two sides of this issue: on the one hand, in his interview, he announces that he plans to move to Tulsa, Oklahoma, where he had lived before and could find work easily, pointing to a pre-established social network (Bosman, 2016). On the other hand, he explains that one of his friends would leave too were he not too "established", owning several houses in Flint (*Ibid*, no pagination).

To return to the example of Hurricane Katrina, Masquelier's (2006) analysis of the discourse surrounding the damage and, in some cases, the displacement caused by the floods is pertinent when compared to the situation in Flint. Masquelier (*Ibid*: 736) is particularly interested in the use of the term 'refugee' to refer to New Orleanians, be they displaced or not; a

word that, in this context, is technically incorrect and projects an image of vulnerability that "contradicted everything that the United States—and its citizens—supposedly stood for". Paralleling the socio-economic situation of Flint, 28% of New Orleans' residents pre-Hurricane Katrina lived below the poverty line, and of that percentage, 84% were African American (*Ibid*). She argues that the rejection of the term 'refugee' by those homeless or displaced post-Katrina and the discomfort felt by the American public points to the exposure of vulnerability and poverty suffered by a fraction of the population, which is not usually apparent: "If the poverty of so many New Orleans residents was suddenly exposed, [...] it is largely because in the aftermath of Katrina social suffering became newsworthy" (*Ibid*: 741).

Although none of the residents of Flint have been referred to as refugees, the poverty and vulnerability of many Flint residents have been broadcast and exposed to the rest of the US. Bernstein (2016, no pagination) touches upon the many layers of Flint residents' trapped characteristic: "It wasn't simply the decision to switch the city's water supply that *prevents children there from reaching the American dream* [emphasis added]". The projection of a sudden emergence of a trapped population is thus incorrect, as Dr Redlener (2016) points out during a Skype interview:

> You are trapped before the problem and, unless it is so dramatic and visual that there is no choice but to get you out like with the Katrina flooding, [...] the mobility to make a decision to move to do something different or interesting is a privilege of people with enough resources and money to do so.

Indeed, the population most affected by the lead contamination, poor and African American, and thus that which suffered environmental injustice was already trapped in Flint given their precarious financial state and their limited social network. To be 'trapped' is a fluctuating process, which can be amplified by an event, be it a man-made disaster or a natural disaster, which is then determined a case of environmental injustice. Similar to the case of Hurricane Katrina, the struggles of this particular demographic were highlighted to the rest of the country by the lead contamination disaster and the media's subsequent coverage of it. Congressman Dan Kildee admitted in an interview with *The Huffington Post* that the "president's visit [came] at a really crucial time, at least for the people from Flint [...] it was beginning to feel like the urgency was fading" (Delaney, 2016: no pagination). This was echoed by the mayor Karen Weaver who told *The Detroit Free Press* that the president's visit "brought attention to her city that had been waning

since Democratic presidential candidates brought a national spotlight to the struggling city" (Riley, 2016).

However, it is important to stress that, when it comes to the determination of how 'trapped' a population is, not all those affected by the lead contamination have a desire or feel the need to leave Flint. As Patty Warner (2016), who lives in the 48503 zip code, which had some of the highest levels of lead, explained over a phone interview:

> Personally, we are not happy [...] but I like my house, I like Flint, like my friend says, his slogan is—he's also staying—"Flint is a great place to make better". So most of my friends, *as disappointed and frustrated as they are*, [emphasis added] they've chosen to stay.

Given the difficulties associated with producing figures on trapped populations, the absence of an international body (or a national U.S. institution) that is able to measure trapped populations, and the little attention paid to the subject within migration studies, there are no estimates regarding how many people consider themselves 'trapped'. Moreover, in the case of Flint, as those who have been able to leave are not crossing international borders, requiring an identity check or a formal visa application process, it is not possible, at this time, to procure numbers as to how many residents have left the area, nor determine how far they moved and how long they intend to stay. That said, as Siddarthra Roy (2016), researcher at the Flint Water Study, explained in a phone interview, when the team of engineers returned to Flint to collect water samples from the same homes they tested in the first round, they found that many people had moved.

The Environmental Injustice Trap

Given these challenges, the question therefore is how is this situation magnified by the environmental disaster at hand? As detailed in the context section of this chapter, Flint is a city where, according to the U.S. 2010 Census, 41.6% of the population lives in extreme poverty and 57% of its residents are African American (United States Census Bureau, 2015). Moreover, as mentioned above, Hanna-Attisha et al.'s (2016) study investigating the BLLs in children younger than five demonstrated that the areas with the highest water lead levels recorded, and thus the highest BLLs, had the highest proportion of African American residents at 76.8%; these areas were also the most disadvantaged socio-economically. This further confirms a trend analysed by Northridge et al. (2003): in the U.S., children

from poor families and from African American families are more likely to have elevated BLLs.

Indeed, this demographics' higher exposure to the man-made lead crisis points clearly to an instance of environmental injustice as the population did not enjoy the same degree of protection from environmental and health hazards as that afforded to other communities, considering the use of emergency managers, the subsequent denial by officials of the lead levels in the water and their refusal to investigate the allegations thoroughly (Flint Water Task Force, 2016). In addition, the use of emergency managers and the power they exercised was such that Flint residents did not have equal access to or meaningful involvement in the government decision-making process, thus fulfilling the second component of environmental injustice (*Ibid*). However, as argued by Northridge et al. (2003), it is the nature of the official responses to an environmental event that highlight racist tendencies, not the polluting activity itself, and thus qualify for a case of environmental injustice. Indeed, the entire population of Flint was exposed to lead poisoning but the socio-economically disadvantaged community, chiefly African American and poor, did not have the financial means to protect itself by buying bottled water, as established in Hanna-Attisha's study, and their complaints were ignored.

As such, the sharp increase in lead-poisoning rates has increased the vulnerability of an entire generation of Flint children, many of whom are already burdened with stress contributors: poverty, violence, unemployment and food insecurity (Hanna-Attisha et al., 2016). The consequences of lead-poisoning, which is a potent neurotoxin, are far-ranging, particularly on children: intelligence, behaviour and overall life achievement can be affected, as evidenced by Table 1 below, which attempts to offer threshold exposure levels for certain effects (CDC National Centre for Environmental Health, 2015: viii). According to the Agency for Toxic Substances and Disease Registry (2010), children absorb more ingested lead than adults, meaning they are more affected by lead exposure; the percent of lead absorbed in the gut is estimated to be five to ten times greater in infants and young children than in adults (*Ibid*). Lead poisoning also has tremendous societal costs and disproportionately affects low-income and minority children, as is the case in Flint (*Ibid*).

In addition to the outcomes listed in Table 1, children who have had high BLLs can also display a longer reaction time and poorer hand-eye coordination (*Ibid*; CDC National Centre for Environmental Health, 2015). Also, for foetuses and children up to 36 months of age, the incomplete development

Table 1. Studies on Lead and Educational Outcomes

Blood Lead Levels	Educational Impact	Size of Study	Location of Study
≤ 3 μg/dL	Decreased end of grade test scores	More than 57,000 children	North Carolina (Miranda et al. 2009)
4 μg/dL at 3 years of age	Increased likelihood learning disabled classification in elementary school Poorer performance on tests	More than 57,000 children 35,000 children	North Carolina (Miranda et al. 2009) Connecticut (Miranda et al. 2011)
5 μg/dL	30% more likely to fail third grade reading and math tests	More than 48,000 children	Chicago (Evens et al. unpublished data)
	More likely to be non—proficient in math, science, and reading	21,000 children	Detroit (Zha ng et al. 2013)
5-9 μg/dL	Scored 4.5 points lower on reading readiness tests	3,406 children	Rhode Island (McLaine et al. 2013]
≥ 10 μg/dL	Scored 10.1 points lower on reading readiness tests	3,406 children	Rhode Island (McLaine et al. 2013)
10 and 19 μg/dL	Significantly lower academic performance test scores in 4th grade	More than 3,000 children	Milwaukee (Amato et al. 2012)
≥ 25 μg/dL	$0.5 million in excess annual special education andjuvenile iustice costs	279 children	Mahoning County, Ohio (Stefanak et al. 2005)

Source: CDC National Centre for Environmental Health, 2015

of the brain increases the likelihood of lead entry into the developing nervous system, which can result in prolonged or permanent neurobehavioral disorders (Agency for Toxic Substances and Disease Registry, 2010). Another particularly vulnerable population is pregnant women; their BLLs are an important factor in the probability that neurological problems exist in newborns (*Ibid*). Pregnant women with elevated BLLs have an increased chance of preterm labour, miscarriage, spontaneous abortion or stillbirth, and low birth weight of the baby (*Ibid*). A much-mediatised example of this is Nakiya Wakes' miscarriage; the Flint resident and mother of two explained to *CNN*'s Simon and Sidner (2016) that she believes it is the lead in the water that caused her to miscarry twins, although this has not been proven.

Policy Challenges

Flint's trapped population, further immobilised through the lead contamination of the water, is a hidden facet migratory reaction, or lack thereof, to a man-made environmental disaster and the policy challenges they present merit discussion in this chapter's last section.

Identifying the Immobilised

Delmont Jackson, a Flint retiree, admitted during an interview that he thinks the state should relocate him, given he does not have the funds to do so (Bosman, 2016). Resettlement is a policy response oft considered when officials are faced with an environmental disaster. However, when it pertains to trapped populations, Black et al. (2013) explain it is should be anticipatory, implying a pre-identification of the community in question and a pre-determination of what it means to be trapped. As Ian Dyar (2016), the regional disaster officer for the Michigan Red Cross, explained in a phone interview, there has not been much discussion concerning large-scale resettlement in the case of Flint due to the necessity to maintain Flint's tax base, especially given the city had been in a phase of redevelopment prior to the water switch. Indeed, the series of events, detailed in the context section of this chapter, that lead to the neglect of Flint in the decades leading up to the water contamination is partly to blame and the revitalisation of the city and its infrastructure is crucial to 'untrap' the population in question.

Furthermore, it would be a highly political decision to dictate that remaining in place is impossible. What criteria would the federal government use to determine who qualifies for resettlement? Where would these people go? According to the UNHCR (2015) guide to planned relocation, the government's plan should provide the community with the opportunity to voice alternative options; indeed, their perspective would have to be taken into consideration if the option of resettlement was to be entertained. Although Dr Redlener (2016) calls for the resettlement of Flint's children and stresses that they are gravely threatened by this disaster, he admits that it is a complex process and, at the current time, no agency—federal or otherwise—has the budget to do so. Moreover, he explains that the invisibility of the threat is such that it keeps the pressure off politicians to fix it, as opposed to a natural disaster like Katrina or a warzone (*Ibid*). This further emphasises the perceived temporality of a trapped population, as opposed to a state of being that is a culmination of socio-economic factors.

Environmental injustice

Flint's trapped poor, majority African American, population has suffered from a case of environmental injustice and are thus guaranteed three basic rights: the right to information, the right to a hearing and the right to compensation by law (Cutter, 1995). However, officials need to be able to identify populations that are more exposed to falling victim to environmental injustice and, depending on the circumstances pertaining to trapped

populations, may potentially immobilise a particular demographic. The FWATF (2016) rightly advocates that an Executive Order should be issued mandating guidance and training on environmental injustice across all state agencies in Michigan, highlighting the Flint Water Crisis as a key case study. The team also underscores the importance of updating the implementation of an environmental justice plan for the State of Michigan (*Ibid*). Meanwhile, Northridge et al. (2003) underline the necessity of mobilising public health professionals with urban planning, environmental protection, and civil rights adherents to articulate and guide informed decision-making. This last point would be particularly important in the pre-identification mentioned by Black et al. (2013) of a population that has the potential to be trapped should there be a disaster. Indeed, Flint will provide a "book of lessons", especially the lesson of poor governance and unintended consequences of their actions (Redlener, 2016).[11]

Conclusion

The Flint Water Crisis presents a clear case of environmental injustice and this paper has shown that the disaster also includes the migratory dimension of a trapped population that both needs and wants to leave, yet does not have the ability to do so. The testimonies of residents have established the emergence of a discourse of a particular section of the population that feels trapped following the infiltration of lead into the city's water system. This has exposed an entire community to lead poisoning, with the gravest consequences affecting socio-economically disadvantaged children and pregnant women. However, in examining the intricate layers of factors pertaining to trapped populations and varying examples of environmental injustice, this paper has sought to further research examining the overlap the two issues. Indeed, it appears that the socio-economic situation of the poor, majority African American, population of Flint is such that they were trapped before and during the crisis as well as continuing to be so. The environmental disaster heightened their immobility as well as beamed it across the country, much like the post-Katrina situation discussed by Masquelier (2006).

In a country as unequal[12] as the U.S., the issue of involuntary immobility reflects "the different hierarchies of globalisation" (Carling, 2002: 34). As

[11] Quote from Skype interview, see bibliography.

[12] According to the World Bank's classification of the Gini index, which is a measure of inequality by income dispersion, in 2013, the U.S. scored 41.1, making it the 15th most unequal country in the world.

documented by the press, of which a selection of articles were explored in the course of this study, in Flint, the poor, majority African American, population most affected by the lead contamination belong to a lower strata of the globalisation hierarchies because they cannot leave even if they manifest a desire and need to do so. Experts predict that the city will emerge as a case study on lead poisoning and the effects it has on different segments of a population, becoming a laboratory for academics keen to explore the political and socio-economic consequences of lead. In the meantime, Flint residents and its government, still in deep water, will attempt to rebuild their city and will have to develop it in such a way that the poor and African American trapped population can be mobile, should they feel a desire for it or need it.

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