Landmarks

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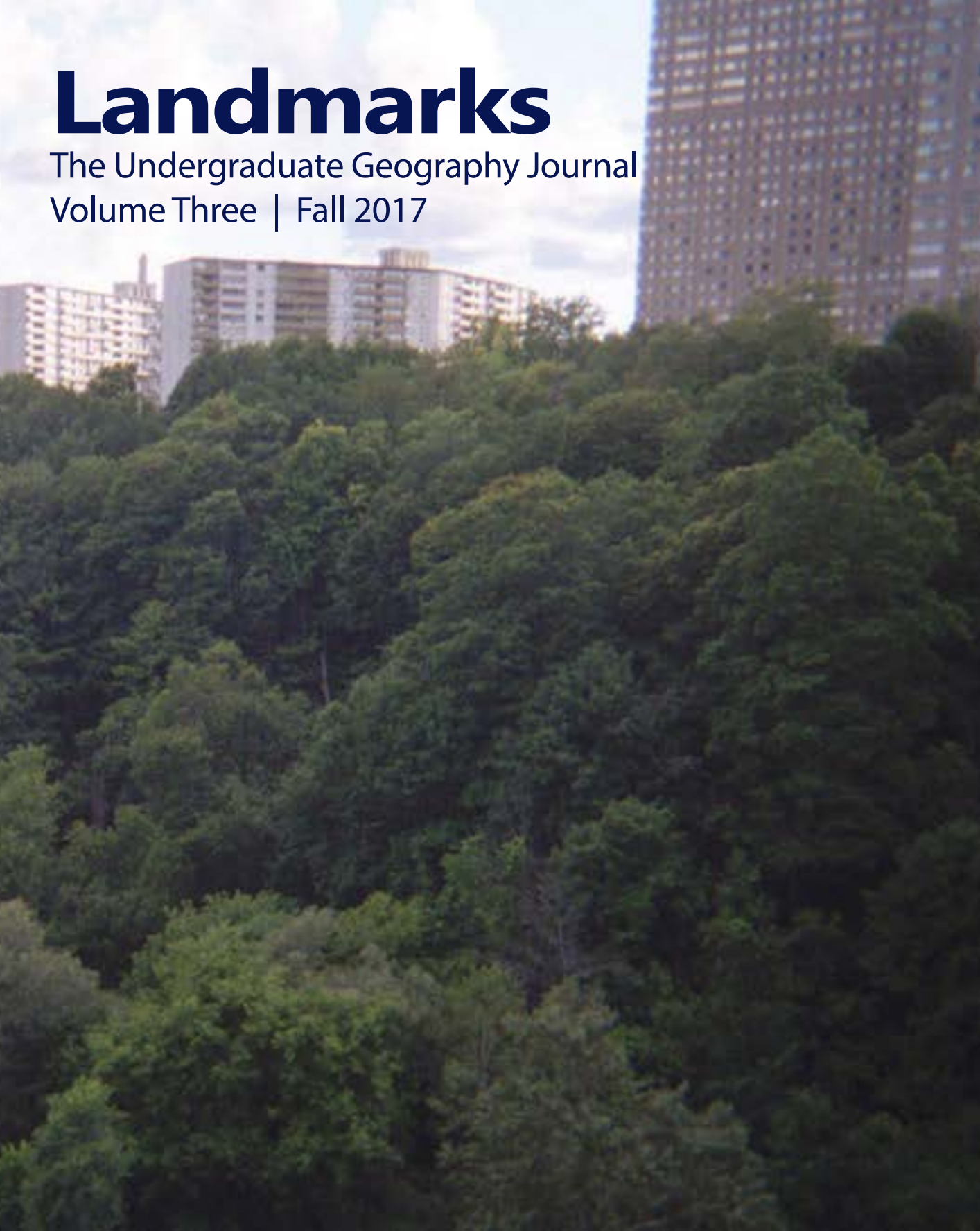

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UNIVERSITY OF
TORONTO

ABOUT THE COVER

"THE CITY WITHIN A PARK"
Cover Art by Aayesha Patel

The neighboring communities of Thorncliffe and Flemingdon are split by a bridge that runs over E.T. Seton Park, referred to by locals as simply "the Valley." The photo encapsulates both human and physical aspects of Toronto's geography; modernist high rise apartment towers stand tall behind the extensive system of ravines, two distinct elements of the Toronto landscape. The neighbourhood of Thorncliffe Park sits on the edge of the Don River Valley and is home to one of the highest concentrations of immigrants in Toronto.

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Geography & Planning
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EDITORIAL TEAM AND CONTRIBUTORS

AUTHORS
Jacob Dimen-Wagner
Jennifer Del Riccio
Kimberly Hill-Tout
Tian Wei (Sarah) Li
Sonia Ralston
Martin Marchiori-Wong
Vanessa Opassinis
Erina Baci
Josie Costantini
JayLynn Hines, ARe, AIS
Bronwen Hunter

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INTRODUCTORY NOTE

The Editorial Board is proud to present the third volume of Landmarks: The Undergraduate Geography Journal. Launched in 2015, Landmarks is an annual publication that brings together exemplary undergraduate work from across the diverse field of geography at the University of Toronto. We want to extend a big thank you to the many students who submitted their papers for publication this year. As always, 2016-2017 presented us with many excellent papers on a wide range of fascinating topics. All were a pleasure to read.

The submissions featured in this volume speak to the expansive diversity of our field. They take us from the green rooms of the theatre to the composite pavement of the streets below our feet, from 1970's Peru to contemporary Corktown, and from auto-ethnography to spatial analysis. There are also compelling interconnections and complementarities. For example we have authors approaching the everyday realities of water management in Canada from both environmental justice and physical design perspectives, highlighting the potentials of geography to bridge social and physical concerns. Authors also draw attention to common experiences accross difference and distance, for example of precarity in gendered agrarian and peripatetic performance livelihoods, or architectural histories of Toronto and Lima, providing ground for conversation and collaboration. As always, there is also a strong demonstration of the interest in critical, locally-oriented studies as authors tackle the changing urban landscape of the city around us. These papers offer a variety of strategies for analysing and negotiating processes of uneven development and its implications for community change and social justice.

This third volume of Landmarks would not have been possible without the collaborative efforts of our dedicated editors and authors who took time during busy semesters to bring the journal together. We would also like to thank the Toronto Undergraduate Geography Society, the Department of Geography & Planning, and the Arts & Science Students Union at the University of Toronto for assisting us in the production of this journal.

We sincerely hope you enjoy the third volume of Landmarks.
The Landmarks Editorial Board

No Longer One Singular Sensation: Analyzing the Precarious Labour of Musical Theatre Performers and Problems with Occupational Identity

Jacob Dimen-Wagner

As a theatre performer, job insecurity is understood to be an occupational hazard. However, the insecurity and uncertainty faced by musical theatre performers extends beyond the job and infiltrates the identity of the performer both on and off stage. How do musical theatre performers manage the precarity of their identity within a shifting and unconventional field of work? By analyzing the experiences of musical theatre performers, this paper examines the high level of uncertainty that they face in securing consistent work, as well as assess the precarity of the job itself. The paper further assesses key issues surrounding occupational identification among musical theatre performers. The paradox of the musical theatre profession is the constant inability to 'identify' as performer, while simultaneously facing the dilemma that the embodied self and occupational confidence of a performer is essential in booking the show and obtaining a job.

Introduction

Early Friday morning I received a frantic phone call from a director-choreographer I had worked with the previous summer. He told me to get on a flight from Victoria, BC to Toronto because he needed a backup dancer for an upcoming tour. He said the job was mine. Two hours later the producer called and said that they would only consider me for the job, but I would not be hired officially until I auditioned for them in-person. Also, that any cost incurred flying from Victoria to Toronto would be my own and I would have to find my own accommodations for the duration of the four-week rehearsal period. Moments later the director called me back to discredit everything the producer had told me about being hired and said that if I do not get the job or decided not to take it upon arrival that he would personally pay for all my flight expenses. I was on a red eye flight the next night, auditioned Monday morning in front of the production and creative teams, and was officially hired on the spot. This was my first professional audition, my first professional show, and I was only 19 years old.

As a theatre performer, job insecurity is understood to be an occupational hazard. However, the insecurity and uncertainty faced by musical theatre performers extends beyond the job and infiltrates the identity of the performer both on and off stage. How do musical theatre performers manage the precarity of their identity within a shifting and unconventional field of work? Due to the nature of their work, musical theatre performers are constantly wrestling with their professional identity and the widespread societal perception—or misconception—that theatre labour is not a legitimate job, but rather a mere God-given talent. This constant struggle can be generalized across the various creative mediums of theatrical performance. However, a nuanced focus on musical theatre performers elucidates the extreme nature of labour precariousness and issues of occupational identification. Occupational identity is defined as a set of shared norms, skills and identities that shape and simultaneously intersect jobholders within a specific community (Leidner, 2016, p. 4-5). By analyzing the experiences of musical theatre performers, this paper will first ex-

amine the high level of uncertainty that they face in securing consistent work, as well as assess the precarity of the job itself. To attain future success as a musical theatre performer one must "pay ones' dues" as well as accept any available job or contract. Thus, decisions to accept work are often based on self-preservation not artistic integrity. Second, this paper will assess key issues surrounding occupational identification among musical theatre performers. I argue that the negative societal perception illuminates the underlying fears of a performer to self-identify with their occupation. The paradox of the musical theatre profession is the constant inability to 'identify' as performer, while simultaneously facing the dilemma that the embodied self and occupational confidence of a performer is essential in booking the show and obtaining a job.

Recent scholarship on the precariousness of labour in creative professions contains significant debate on how occupational identities are shaped and performed. More broadly, precarious labour continues to be exacerbated and exploited due neoliberal reform across low wage service sector labour markets. These labour markets exploit labourers based on class, race and gender. McLean (2014, p. 684) argues in promoting the Creative City, neoliberal policy prescriptions displace and segregate the labour which increases the level of precarity for racialized service work. Moreover, Conor et al. (2015) grapples with the increased tendency of cultural and creative industries (CCI) to fetishize the informality of the work as well as its precariousness. This is experienced differently across geographies of race, class and gender (Banks, 2007; Conor et al., 2015; Maclean, 2014). Although these differences are not explicitly described in this paper, it is important to mention the dimensions in which creative labour intersects with minority groups and the subsequent consequences this intersection has on occupational identification.

Beck (2000), Gorz (1999) and Lazzarato (1996) argue that the temporal and uncertain aspects of a creative job make it increasingly difficult to derive an occupational identity from work. Banks and Milestone (2011) and Dean (2005) discuss the aesthetic labour aspect of the creative industry and posit that there is a performative aspect of self at work when securing a job as a professional artist. My research focus builds on these questions of precarious identities. Leidner (2016), Ibert and Schmidt's (2012; 2014) scholarship is central to the proposed question of how musical theatre performers reconcile their identity within a shifting and unconventional source of work. Ibert and Schmidt (2014) tackle the issue of adaptability within the profession, as well as the fragmentation of identity that subsequently occurs. A musical theatre performer's identity is connected inherently to their talent (whether voice or dance), which is tailored specifically to the profession. However, due to the precariousness of the field, the competitive aspect and lack of adequate opportunities, these skills are circumvented in the process of securing financial stability and livelihood. Instead, more applicable skills related to other part time work become the new vernacular for the performer. Therefore, if skills and identity are inexplicably linked, the precariousness of the profession alienates the performer from their labour and a strong sense of occupational identity. My research further elaborates on how the musical theatre profession itself is built upon uncertainty, which leads to performers deriving a cynical sense of self from the very profession that brings them artistic fulfillment.

The Audition: To (In)Secure Work

The audition is the musical theatre performer's job interview. Yet it is a form of interview that is completely based on the sense of self one portrays at that exact moment in time, to be judged above all other achievements or

accreditations. Dean (2005, p. 764)—although focusing specifically on the feminized segregation of actors in terms of pressures related to physical appearance and income inequality[1]—argues that performers are judged based on the perception of their image presented in that moment. The commodification of self is the entry point into the entertainment labour market (Entwistle and Wissinger, 2006). Due to the highly subjective nature of the profession, actors are continually refining their sense of self to match the corresponding job. Furthermore, Ibert and Schmidt (2012) argue that due to the subjective nature of qualification standards (i.e. physical appearance, height and ability), musical theatre professionals endure intense competition amongst themselves. Often roles can be extremely specific, especially when the show is partially cast or a remount. This is based on the production company's allocation of resources and the types of roles to fill. For example, a swing—a performer who covers multiple performance tracks, like an understudy—must embody the abilities of several different roles in a show. Swings are used in the case of the principle cast members becoming ill or being absent for any reason. Much of the time, performers are auditioning blindly and trying to showcase all their talents simultaneously.

My own personal experience in securing the job has been a tumultuous one with varying positive and negative experiences. Many times, I have been unable to get into the room to even be seen by the creative team to be considered. Once in the audition room, I have been told I am the wrong height, wrong build (i.e. more muscle needed), cannot sing high enough, or, every actor's nightmare, the dreaded, "thank you." Essentially, 'thank you' in the audition room means you are automatically rejected.

The audition is only the first phase within the precarity of the music theatre profession. Often guided by informal networks, one must also take classes (acting, singing, and dancing), participate in workshops and use social media to remain employable. Smith (2001, p. 281) posits that actors (musical theatre performers) are continually preparing and competing for entry into the labour market, instead of participating in it. This is known as making connections and 'paying ones' dues.' Moreover, Ibert and Schmidt (2012, p. 351) empirically argue that musical theatre performers use underpaid positions as an entry point to scale the labour market. In my personal experience and as argued by scholars like Ibert and Schmidt (2012) and Leidner (2016), trying to utilize underpaid positions to gain access to the labour market is often a futile pursuit due to the nature of contractual work and the hustle from job to job. As a musical theatre performer, future contracts do not forward one's placement within the labour market. Instead, one's identity and trustworthiness increases with each new contract, while the job type often remains the same. Moreover, wage varies from contract to contract and is based on a multitude of factors from specific role(s) to size of the theatre. Therefore, there is a social hierarchy within musical theatre labour market built on past experiences (trust) that act as a currency in attaining the job. However, the movement within the labour market continues to be lateral and not vertical.

The "winner takes all" mentality in demarcating workers is extremely subjective, which compounds the uncertainty of securing and maintaining work. To secure consistent work, musical theatre performers must be extremely adaptable in dealing with occupational precarity—short-term work or no work at all. Adaptability can be defined as the abil-

1 The feminization of creative labour is an important aspect of this research. However, due to its complexity and the scope of this paper, further scholarship exploring this intersectionality within musical theatre is necessary.

ity to remain functionally stable despite the shifting uncertainty that corresponds to one's environment and external structures (Pike et al., 2010). Ibert and Schmidt (2014, p. 4) argue that adaptability is inherently connected to a performer's resilience. Moreover, the labour market (both in in the context of musical theatre and the joe job) inform the identity of a performer. The need to constantly adapt to new forms of labour, skews how one identifies with their work. For example, in the day a musical theatre performer may be auditioning (singing and dancing under the microscope) only to race out to their serving job in the evening. The multiplicity of forms of work, often daily, take a toll on one's identity. Therefore, adaptability and resilience facilitate all creative labourers who must hustle.

The high level of subjectivity and precarity in the labour market only underscores the need for consistent work. The result manifests in the finding and procuring of many different jobs within and outside the profession. Haak and Schmidt (2001, p. 165) posit that creative labour is highly saturated due to the oversupply of qualified workers and the lack of corresponding jobs. Many musical theatre performers are also teachers, choreographers, camp directors, as well as servers, baristas, sales associates and promotional workers. The creative labour market is not sufficient to absorb the supply of talent, in part due to the winner takes all mentality. As such, performers must diversify their labour to maintain an adequate standard of living (living pay cheque to pay cheque). Ibert and Schmidt (2012) argue that spatially, music theatre performers labour manifests itself in "transient, multi-local activity spaces in the labour market" (p. 349). The musical theatre profession has a transient geography, as performers must cross the country and the world to pursue different opportunities. Most often, home base does equate to one's professional base. The constant(?) pursuit of the job in different locales adds a geographical element to the precarity of the profession. Therefore, it is not just one set of skills utilized by a performer, but rather a constant adaptive response is necessary to maintain a standard of living and wage.

The discussion of identity-based work—labour that utilizes and commodifies one's identity as a product—is often associated with the structural and economic factors plaguing creative labourers. Musical theatre performers exemplify this intrinsic connection between personal identity and professional identity as well as identity as a product or commodity. Hesmondhalgh and Baker (2010) argue that this labour is irregular and short-term. Pay is scaled per contract and, importantly, must be accompanied by other temporary work. Further, Freidson (1990) argues that this is reconciled under the concept of labour of love, which refers to acceptance of unpaid labour because the performer loves their craft in which the lines of passion versus profession are blurred. Yet, Leidner (2016) argues, such irregularity and insecurity does not dissuade music theatre performers and other creative labourers. Rather, it is expected within the context of the job. Musical theatre performers are continually fighting to have their profession recognized as a viable profession within society more broadly.

Am I My Resume?

The occupational identification of music theatre professionals remains highly fragmented due to the precarious nature of theatre work, as well as the societal perception that creative labour is not legitimate labour. Beck (2000) characterizes the inability to identify with work with a "political economy of insecurity" (p. 87). Gorz (1999) elaborates on the issue of occupational identity and posits that there is a normalization of insecurity occurring within the labour market. Normalizing

insecure work has a correlative effect with issues of occupational identity and overall connectedness with one's profession. Creative labourers, and musical theatre performers in particular, are entrenched in another layer of precarity: their identity. This precarity is due to the constant need re-commodify to their identity to fit a specific role to secure work. This identity is frequently changing and in flux. A performer's identity is attached to their work and further, informs their work[2]. Therefore, a performer feels that he or she is only a performer when they have been contracted to do so.

Musical theatre performers' identity is inherently linked to the pursuit of the job. Questions surrounding work and future work reinforce musical theatre performers' ability to reassert their identity as a performer, as well as their ability to prove their legitimacy within the labour market. Leidner (2016, p. 11) argues that performers are constantly bolstering their identity despite the insecurity within the job market. By rifling off a laundry list of upcoming projects, performers feel that being hired asserts their legitimacy as a professional. In her research, Leidner (2016, p. 21) finds that some performers with theatre credits and resumes responded confidently that they are in fact musical theatre performers, while others who were not working were more reluctant. The reality remains that sometimes performers are not working. This leads to musical theatre performers, and most creative labourers in general, to constantly defend their career choice (Dean, 2005). This includes the amount of work they derive from that career and, above all, how they identify themselves within their profession. Cohen (2004) further elaborates and posits that the confident belief of being an actor enables ones' authority over the profession to further "galvanize every aspect of your personality" (p. 12). The belief in one's self and abilities is a determinate to success in the musical theatre labour market.

A confident identity often takes precedence over all other factors, including one's ability. In musical theatre college, I was given the single best piece of advice. As I walked into the room for my mock audition—to practice the very thing we needed to do best at—my instructor yelled stop! He continued, "I already know I am not going to hire you. I know this from the way you walked into the room. Go and take five minutes and believe in yourself so that I can believe in you." This experience perfectly articulates the complex interplay between confidence, desperation, and fear in procuring the job. The precarity of the job radically impacts the performer's confidence and self-worth, making it extremely difficult to cultivate an assertive identity. As Entwistle and Wissinger (2006) argue, a performer must "always be on" (p. 774).

The occupational identity conflict felt by musical theatre performers blurs the boundary of self. Due to the commodification of self and identity, musical theatre performers are constantly re-imagining and defending a form of self. These spaces of uncertainty come from within a profession that entails constantly searching for work and moving from city to city. Creative workers are continually shifting to move up the ladder to reasonably identify with their creative profession and not their temporary job (Leidner, 2016). The compounding struggle of promoting your brand as valuable takes an incredible toll on the performer's sense of a self that is independent of the career (Entwistle & Wissinger, 2006). Most often, the line between professional self and private self no longer exists. In the classic

2 This research omits the discussion of the racialization of musical theatre due to its nuanced complexity, lack of existing scholarship and the overall scope of this research. However, scholarship discussing race, gender and sexuality as well as embodiment of identity are salient and require much needed research. Power structures and hierarchies within musical theatre intersect with and compound these varying identities writ large.

musical, A Chorus Line (1975) the performers sing,

"Who am I anyway? Am I my resume? That is a picture of a person I don't know. What does he want from me? What should I try to be? So many faces all around, and here we go. I need this job, oh God, I need this show" (Hamlisch and Kleban, 1975).

Here, Hamlisch and Kleban (1975) epitomize the musical theatre performer's effort to get a job by being seen, exemplifying the struggles of self-identification within a precarious labour market.

Conclusions

Creative labour industries are plagued with a form of precarity and temporality. It is the nature of the work and the labour market. By examining the unique case of musical theatre performers, we see how the precarity and temporality of work is exacerbated and continually re-enforced. These factors begin to affect the ways in which a performer views their work and the overall occupational identification within the labour market. The precariousness of labour in the musical theatre profession not only negatively affects the ability to obtain work, but more importantly, engenders a distorted sense of self. By focusing on occupational identity and precarious labour, musical theatre performers exemplify a disenfranchisement of the worker in terms of their ability to identify with their work. Although this segmentation is built into the profession, questions surrounding occupational identity remain contentious and depressed. Performing remains a constant flux between varying types of work, as well as the overall lack of work. Furthermore, outside the profession a negative image of the performer continues to proliferate as non-working performers struggle to legitimatize their identity as a musical theatre performer. Yet, at the same time, obtaining work requires the embodiment of a confident and assured identity. This can be understood at the micro-level, as the performer battles their personal social anxieties and insecurity within the creative profession. At the macro-level, the manifestation of societal norms and the negative perception that musical theatre is not a legitimate form of work imbues fear among all performers to identify as such. Due to the precarious nature of the work, and the difficulty in describing its temporal aspect, performers are constantly justifying their occupation to society.

A focus on musical theatre performers within the creative industry works to illuminate connections between self-identification, creative labour and precarious labour. Within my own personal experiences, the musical theatre profession has given me a great deal. Yet, proud occupational identification, at times, remains elusive within the Canadian musical theatre community. To progress forward, the reassertion of creative work as work must be achieved. Furthermore, the trend of precarious labour only continues to rise within today's economy and labour market. Maybe it is time for the rest of the labour market to look at the dancer in the chorus line or my nineteen-year-old self for inspiration. This is the same dancer who every day must battle both physically and mentally for a job, just for a single chance to be in the show.

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Women, Food, and Justice: La Via Campesina's Gendered Approach to Food Sovereignty

Jennifer Del Riccio

La Via Campesina (The Campesino/Peasant's Way) is an international peasant movement active in over seventy countries, which advocates for food sovereignty as a solution to a variety of contemporary social and ecological issues. Founded in 1993, La Via Campesina, along with other alternative food movements such as non-GMO, organic, and fair trade, calls for an end to corporatized and industrialized food systems that perpetuate inequality, exploitation, and dependency. Through its demands for agrarian reform, La Via Campesina advocates primarily for the rights of small-scale farmers across the globe to create and support healthy, autonomous communities (LVC, 2011). But how do food sovereignty movements specifically address and improve the lives of farming women in the Global South? This paper will argue that while food sovereignty movements and feminist perspectives have often neglected the struggles of rural women of the Global South, La Via Campesina provides solutions to these shortcomings and offers women the opportunity for participation and empowerment at multiple scales.

Introduction

Throughout the world, and particularly in so-called developing countries, women play an enormous role in food production. According to the United Nations, "women produce between 60 and 80 percent of the food in most developing countries, and are responsible for half the world's food production" (FAO, 1995). At the same time, women are disproportionately being affected by global poverty and hunger: 60% of the people who experience food insecurity are women (FAO, 2013, p. 1), as are 70% of the world's poor (UNDP, 1995, p. 4).

In less than a century, agriculture has undergone enormous changes in terms of industrialization, globalization, corporatization, and productivity. The Green Revolution of the mid-20th century marked a turning point in the use of industrial machinery and chemical fertilizers within agriculture, and subsequent business and policy arrangements have allowed companies like Monsanto and Adecoagro to create a monopoly over food production across the globe (this operational arrangement will be referred to henceforth as 'agribusiness'). Based on Williams' (1977, p. 110) definition, agribusiness can be understood as hegemonic in the way that it constitutes "a whole body of practices and expectations, over the whole of living", fundamentally restructuring and dictating processes of production, consumption, and exchange. These changes have threatened the existence of small-scale, subsistence, and Indigenous farmers all over the world, and have had particularly gendered implications.

First, women's livelihoods are being especially threatened. Women in the Global South "remain much more dependent on agriculture for survival than male workers, due to their lesser access to non-farm jobs" (Agarwal, 2011, p. 7). Since women contribute the majority of the labour on small-scale farms throughout the world (Kulkarni, 2002, p. 196), agribusiness costs women their jobs, their livelihoods, and often the only means they have to provide for themselves and their

families. In many places in the world, especially in the Global South, there is no work for women except on small-scale or family farms, which leaves them extremely vulnerable to poverty in the era of agribusiness.

Second, women are being exploited by the neoliberal capitalist framework within which agribusiness operates. For the women who do find jobs in agribusiness, their labour is increasingly underpaid and unsafe. In the context of neoliberalism, defined here as a socioeconomic policy embracing free markets, deregulation, and globalization, agribusiness seeks the cheapest, most precarious and unregulated labour possible. This means that "the comparative advantage of agrifood industries in global markets rests on the comparative disadvantage of rural women in national labour markets" (Sachs & Alston, 2010, p. 279). Furthermore, as in any capitalist scheme, the separation of women from the food they produce means that they are unable to retain the surplus of their labour, causing them to struggle to feed themselves and their families despite producing food for a living.

Movements and Missed Opportunities

Food sovereignty is an approach that seeks to counter the problematic foundations, structures, and consequences of agribusiness. While the food security approach calls for consistent access to nutritious and acceptable food, food sovereignty extends these concerns into ethical demands, arguing that people should have not just access but fundamental rights to food, and to the creation, maintenance, and governance of their own food systems (Provost, 2013). Since access to and ownership of food is an issue with social, political, and economic implications, food sovereignty can be understood as a counter-hegemonic and anti-colonial concept, in that it prioritizes the rights of the individual and the community over the rights of the wealthy, the corporation, or the empire.

Despite its progressive vision, food sovereignty has been critiqued by some scholars for failing to address gender issues. Park and White (2015, p. 584) write that "few attempts have been made to integrate gender in[to] food sovereignty", partially because of the way the movement envisions itself as a fairly homogenous community of farmers struggling for autonomy. Often, these authors note, the particular struggles of diverse groups of people within the movement are lost under the metanarattive of homogeneity. An additional concern is that the broader food sovereignty movement overlooks the frequent ignorance and erasure of female voices in decision-making processes. The movement advocates for communities to be autonomous in their food and agriculture choices. Yet, as Bell (2014) notes, it fails to recognize that particularly in the rural Global South where the movement is most active, "peasant women are in secondary roles in decision-making areas", including food sovereignty initiatives. In order to promote equality, the food sovereignty movement would specifically need to work towards elevating the status of women to that of men as decision-makers, both within and beyond the movement.

It seems clear that the food sovereignty movement is missing an intersectional feminist framework in its conceptualization of global food issues. Arguably, mainstream feminism has not been particularly attentive to or useful for many agricultural women. Brandth (2002, p. 108) writes about the "poor fit" between feminism and farm women, saying that "feminism has been very much a silent issue in agricultural institutions, and at times there has been open resistance on the part of rural women towards equality principles". She goes on to suggest several reasons for this mismatch, including feminism's roots as a primarily urban, Western movement with which

farm women cannot identify, or the fact that some rural women see feminism as a threat to a sexual division of labour upon which their livelihoods depend (2002, p. 109). But above all, she writes that feminism and farm women are often opposed because feminism "wants to emphasize women's shared experiences… [and] fails to recognize the different sites of oppression and, potentially, different sites of struggle" of which agricultural women of the Global South are very much a part. Indeed, in order for feminism to be appropriate and empowering for these women, it "must be attentive to the micropolitics of context, subjectivity, and struggle, [and] the macropolitics of global economic and political systems and processes" (Mohanty, 2003, p. 501), such as global agribusiness. Just as food sovereignty fails to highlight women's struggles within its singular vision of a farmer community, feminism fails to highlight rural and farming women's struggles within its universalization of womanhood and the female experience. As such, Western feminism cannot and has not been successfully integrated into food sovereignty movements in order to promote gendered perspectives.

La Via Campesina: Food Sovereignty By and For Women

La Via Campesina (LVC) is considered by some to be "the most important transnational social movement in the world" (Martinez-Torres & Rosset, 2010, p. 150). Like most food sovereignty movements, its concerns go beyond food and agricultural issues at the surface level, exploring the deeper social, political, and economic systems that shape them. As a movement predominantly associated with Latin America, LVC follows the long tradition of Latin American social movements that have fought for "the democratization of society as a whole" and against "the cultural practices that [for] 500 years have [been] embodied in social relations of exclusion and inequality" (p. 155). Because of this focus on inequality, La Via Campesina is specifically attuned to the struggles of women in the Global South, and in terms of linking food and gender concerns through an equity lens, it addresses the oversights of both the broader food sovereignty movement and contemporary feminism. It does so by incorporating gender concerns into the broader food sovereignty agenda as well as its own, and by encouraging a better fit between feminism and farming women of the Global South.

The Centrality of Women in Food Sovereignty Struggles

La Via Campesina explicitly recognizes women as being disproportionately disadvantaged by global poverty and agribusiness, and integrates gender concerns into its analysis of food sovereignty. In fact, it is unique within the food sovereignty movement in the way that it conceptualizes food sovereignty as impossible without gender equality. In June of 2013, the "Women of La Via Campesina International Manifesto" was published, having been drafted at the movement's fourth and most recent assembly in Jakarta, Indonesia. It provides several key insights into the way LVC understands and stresses the fundamental link between gender justice and food justice. It declares that in order "to keep alive and strengthened our own food production, to recover food self-sufficiency to the greatest extent possible…[and] to exercise in practice food sovereignty, it's time for us to value, in all dimensions, the role of women in the development of our agricultures". It also offers a critique of the neoliberal patriarchy within which agribusiness operates, noting that achieving food sovereignty requires "ensuring equality of gender, strengthening mechanisms for participation of rural women in the formulation of public policy proposals, [and]… raising awareness in communities [about] political views and cultural barriers to ad-

vanc[ing] gender equality" (LVC, 2013). By making explicit both the importance of female farmers and gender equality, La Via Campesina departs from the broader food sovereignty movement that has often failed to highlight the crucial role of women in farming and in transforming the system.

The (Growing) Centrality of Women in La Via Campesina

Building on the notion that women – specifically the equality and empowerment of women – are crucial to achieving food sovereignty, La Via Campesina prioritizes women's voices and involvement internally. Brochner (2014) writes that La Via Campesina began to explicitly integrate gender concerns into its organizational framework after the Fourth World Conference on Women in 1995. In 1996, women within the movement formed a Women's Commission which aims to "evaluate the needs and specific interests of women with the purposes of developing strategies, mechanisms, and action plans at all levels" of La Via Campesina (p. 254). It also works to "ensure that LVC always complies with gender policies, the promotion of gender equality, [and] the empowerment of women" (2014, p. 256). Encouraging gender equality and highlighting female voices at an organizational level has meant improved gender awareness on the local scales at which LVC operates. Desmarais (2003) notes that "placing gender front and centre on the Via Campesina's agenda [has] forced the regions and their organizations to consider exactly how they would address… the gender question"(p. 144).

The movement has worked hard to integrate concerns about gender into its agenda, and also to empower women to take on leadership and decision-making roles. According to Martinez-Torres and Rosset (2010), "for some time, special emphasis has been put on making the gender parity of representation at all levels of La Via Campesina a reality" (p. 167), through actions such as ensuring that regional member groups are represented by both a female and male spokesperson at conferences and committees. This commitment to equal participation has recently also allowed women to represent LVC and the food sovereignty movement on the global stage; seven of the sixteen delegates representing La Via Campesina at the United Nations' 2015 COP21 climate conference were women (LVC, 2015). These efforts have provided women the decision-making and leadership platform that is lacking in other food sovereignty initiatives.

Localized Feminisms

La Via Campesina has also encouraged the growth of localized feminisms that help Global South women to become understood and empowered on their own terms. It advocates for what Edelman (2001) refers to as "globalization from below", as a movement that supports global communities and exchanges of people, ideas, and resources existing without the hegemonic constraints of government and industry as imposed by "globalization from above" (p. 304). According to the movement's website, La Via Campesina is a "pluralist and multicultural movement" whose "vitality and legitimacy comes from farmers' organizations at the local and national level" (LVC, 2011). These individual organizations, of which there are 164 so far, come together under the umbrella of La Via Campesina to form a truly plural and decentralized grassroots movement. This arrangement allows for a much broader range of interests and concerns to be represented and addressed, including the perspectives of farming women from all parts of the world. The movement's multi-scalar approach means "La Via Campesina allows women to have a double incidence" of effectiveness in their fight for food sovereignty and equality; locally, they "fight for a specific demand, such as food sovereignty…[and] proj-

ect this demand to other scales. Meanwhile, each demand returns to each [organization] and is fought for at that level" (Brochner, 2014, p. 256). This approach helps to circumvent feminism's tendency towards generalization; La Via Campesina fosters the creation of localized and specific responses to women's issues surrounding food and agriculture, rather than creating a metanarrative or a top-down, one-size-fits-all response to improving the status of women. Furthermore, the movement explicitly recognizes and values growing discourse surrounding what it calls "popular peasant feminism", and states within its Women of Via Campesina International Manifesto that it plans to "expand this debate within the organization of La Via Campesina at an international level" (LVC, 2013). Through its diverse base of organizations, LVC recognizes that feminism and equality for women in rural Thailand may differ from that of rural Mexico or Ghana, and is anti-colonial, intersectional, and sensitive in the way that it avoids proposing singular solutions based on "Eurocentric, falsely universalizing" (Mohanty, 2003, p. 501) Western feminism.

Conclusion

Food sovereignty movements are an important part of the global struggle against neoliberal, patriarchal, and corporate hegemonies, specifically as they attempt to restructure agriculture and access to food. Historically, however, these movements have failed to acknowledge the voices of farming women, and to create opportunities for these voices to be heard. The integration of mainstream feminist perspectives into these movements has been unhelpful, due to their failure to adequately address the diverse and specific struggles of rural women from the Global South. La Via Campesina, as a distinct iteration of the food sovereignty movement, has succeeded where these movements have failed, in three ways. First, it has highlighted the essential link between gender equality and food sovereignty. Second, it has provided opportunities for women to become active and powerful within the food sovereignty movement. And third, it has encouraged the use of localized feminist discourses to address the struggles of Global South farming women. These initiatives have afforded such women the opportunity for significantly increased participation and empowerment in civil society and beyond, by elevating the their status within La Via Campesina itself, the broader food sovereignty movement, and global agriculture as a whole.

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Canadian Water Contamination: An Analysis of Agricultural Impacts on First Nations' Water in British Columbia

Kimberly N. Hill-Tout

Embedded in the stereotypes of Canada is the myth of an abundant and accessible freshwater source to all its citizens. While Canada is home to one fifth of the world's freshwater supply, recent critiques have surfaced regarding the 'Third World' conditions many First Nation communities have been living in within the country. The water contamination effects on some of the most vulnerable populations within Canada have been previously overlooked for decades, and continue to result in very little attention and concern in both social and academic fields. This paper examines the effects and contributions of the agriculture industry on water contamination in British Colombian First Nation communities; what preventative measures are in place, and; what future holistic water management can be undertaken. Although British Colombia is seen as a progressive environmentally-friendly province, its agriculture and fishery sector is growing, bringing in a revenue of $12-$15 billion by the year 2020; First Nation communities are still 26 times higher to contract water borne infections, 2.5 times more frequently have water advisories issued, and to have the advisories last for years at a time. There are provincial Safe Drinking Water Regulation (SDWR) passed under the Health Act in 1992, Environmental Health Officers (EHO) and Community-based Drinking Water Quality Monitors (CBWMs) monitoring water quality, and pledges to invest more money into the protection of drinking water sources as recognized by the provincial government. Where the future may be headed for British Colombia is through Source Water Protection (SWP), the inclusion of women in governing councils to respect cultural knowledge shared in First Nation communities, and agricultural changes to decrease the farming wastes produced in the industry. By examining these effects in British Colombia, we can apply practical strategies to take charge of the water contamination crisis in First Nation communities in Canada.

Introduction

Canada has one fifth of the world's freshwater supply - home to thousands of lakes, rivers, streams and wetlands, with an estimated 9% of the world's renewable supply of fresh water and lakes accounting for roughly 7.5% of its inland surface area (Davies & Mazumder, 2003). However, there exists a myth about 'water abundance' in the country, because despite holding one of the largest amounts of freshwater in the world, the country has been under scrutiny for 'Third World' water conditions in First Nations communities. In the past decade two thirds of all First Nation communities in Canada have been under at least one drinking water advisory (Levasseur & Marcoux, 2015). As of July 32, 2015, 133 drinking water advisories were in effect for 93 First Nations communities across Canada, excluding British Columbia (BC), where as of August 31, 2015, 27 drinking water advisories were in effect in 23 First Nations communities (Figure 1) (Plotkin, 2015). BC is home to over 1500 businesses that produce foods and beverages, 200 agricultural commodities,

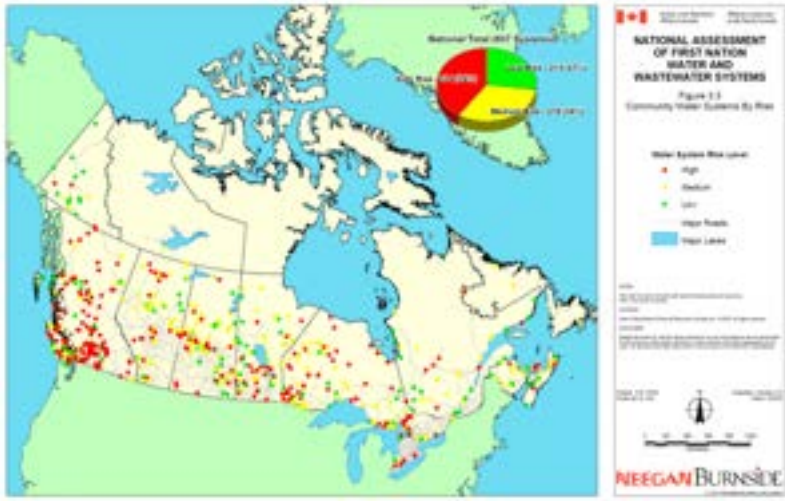

Figure 1: National Assessment of First Nation Water and Wastewater Systems (Neegan Burnside Ltd., 2011)

and 100 seafood species are harvested in the region (Wheatley, 1997). The business and agriculture industry contributes to water contamination in the province, and greatly affects the First Nations communities' water sources. With increasing freshwater consumption and the recent declaration of state of emergencies status in First Nations communities all across the country following decades of water crises (Harnum, 2010), research on source contamination is imperative for future water management and planning.

This paper will examine: (a) The effects and contribution of the agriculture industry on water contamination in First Nations communities by looking at BC's agriculture and fishery sector: the analysis will first have an overview of what the problem is regarding BC's water contamination by the agriculture and fishery sector, the contaminants found, their health implications, and a consideration of how these problems will exacerbate climate change; (b) What preventative measures are being taken in BC: the water treatment, agriculture and water management policies; (c) Factors of what can be done will be examined, such as source water protection, alternative agriculture methods, and involving women and traditional methods in future water management implementation planning. By examining these holistic effects in BC, one can apply practical implications and strategies to take charge of the water contamination crises in First Nations communities in Canada.

What the Problem Is

There are three types of drinking water advisories: boil water advisories, do not consume advisories, and do not use advisories. Advisories are issued after confirmation of water supply contamination with fecal pollution indicator organisms, and First Nation community water systems are 2.5 times more likely to have advisories issued. As part of the British Columbia Tripartite Framework Agreement on First Nations Health Governance on October 1st, 2013, Health Canada (2016) no longer reports drinking water advisories in BC First Nations communities. Provincial or territorial governments in non-First Nations Canadian communities are responsible for the issuing of drinking water advisories, especially those communities which are small, remote or isolated. Monitoring bacteriological contaminants in 2006 in water systems was only carried out at 29% of the recommended frequency by Health Canada. As

a result Health Canada concluded that drinking water quality monitoring in First Nations communities was not sufficient to protect public health. People living in First Nations communities are 90 times more likely to lack access to running water (Poulin, & Lévesque, 2013), and approximately 30% of First Nation community water systems are classified as high risk systems: the number of water borne infections in First Nation communities is 26 times higher than the Canadian National average (Patrick, 2011). Although Canadian cities experience boil water advisories they are shorter than those experienced in First Nations communities. In November 2006 Metro Vancouver experienced an advisory lasting 2 days, following landslides and water turbidity from winter rains. In contrast First Nation communities experience prolonged advisories lasting up to years at a time. Over time, the lands surrounding First Nations communities have become the used for urban development, recreation, forestry, mining, and agriculture which degrades their quality.

The twentieth century 'Green Revolution' transformed the food system from a local based production to a fossil fuel industrial system, causing food to become one of the key factors in water and other environmental crises. On the farm, fossil fuels are used to power machinery, and to create petroleum based chemicals for artificial fertilizers (e.g. Atharv Chemicals & Fertilizers, n.d.), to protect against pests and to stave off weeds. The BC agriculture and fisheries sector is of importance, and growing the economy is a key focus for the BC government - with a goal of building agriculture revenue from over $12 billion to $15 billion per year by 2020 (Climate Action Initiative BC Agriculture & Food, 2015). The majority of BC producers run a cow operation, and there is a small but important feedlot sector. Cattle are raised throughout BC for beef, and account for about 5% of the national beef herd (BC Environmental Farm Plan, Chapter 3). BC ranks first in Canada for the highest provincial herd at approximately 140 cows per herd, milk quality, and average milk production; most of BC dairy herds are located in the Lower Mainland, southwestern Vancouver Island, and north Okanagan Shuswap area (Chatwin, Jack, Wikeem, Wikeem, Colberg & Johnson, 2002). The province's hog industry is concentrated in the Fraser Valley, and is divided into two categories of hogs (Powell, 2015). Livestock that have free access to watercourses may impact both water quality and the land bordering the watercourse (the riparian area). Impacts can include direct deposit of animal excrement into the water, lowland that is seasonally flooded; spawning bed trampling, and removal of riparian vegetation. A consequence of overgrazing and monocrop production is soil erosion (the movement of soil by water, wind, or gravity). Although erosion occurs naturally, industrial farming practices such as irrigation, and tillage have increased the speed at which agricultural soils are eroded. Intensive tillage eliminates protective groundcover from the soil surface, and extensive irrigation salinates the soil. Erosion pollutes waterways with sediment, bacteria, excess nutrients, and chemicals, all of which degrade aquatic systems by reducing stream depth, increases turbidity, and alters pH balance downstream from the point source. Nutrient pollution damages aquatic ecosystems by increasing algae blooms, accelerating eutrophication of the water system, creating "Dead Zones". What is of concern regarding the agriculture sector is that in feedlots, manure storage areas leeches into groundwater and First Nations communal wells, carrying heavy metals and fertilizers (e.g. Arsenic, Nitrogen, Phosphorus, Copper, Zinc, Magnesium, Calcium, ammonia, nitrates, and Potassium), antibiotics, endotoxins, nutrients, and pathogens, which contaminates the groundwater, aquifers, and directly affect fish (Bor-

deleau, Asselin, Mazerolle, & Imbeau, 2016), and by consequence, affect human health as well. Manure affects fish habitats as it deposits bacteria, and it is a high oxygen demanding substance (measured as biochemical oxygen demand, 'BOD'), lowering oxygen levels in the water, increases the rate of eutrophication, and results in water sensitivity to temperature increases since warm water holds less oxygen than cool water.

Incidentally BC's coastline is ideal for its fishery industry because of its climate, water quality and sheltered bays; salmon, shellfish and marine phytoplankton are its three main cultured species (Brown, 2006). First Nations communities are traditional-food insecure as a result of Western industrial development, as seen with environmental Mercury pollution in the country's fish, and concern for traditional hunting and preservation of aquatic birds that reside in their waters (Wheatley, 1997). As traditional foods become contaminated, alternative foods are sought. A change in diet from high protein fish and meat to carbohydrate 'junk' foods, contributes to a prevalence of diabetes (Galloway, 2015). Heavy metals are found to have adverse effects in small quantity, and have been the cause of many of the drinking water advisories in First Nations communities (Grieder, 2016). Likewise, Nitrogen contaminants in the water can cause methemoglobinemia, baby blue syndrome, and spontaneous abortions in women (Wheatley, 1997); e-coli strains have had outbreaks in many First Nation communities, with increased popularity for documentation following the Walkerton, Ontario outbreak. Of the chemicals listed in the Canadian Drinking Water Guidelines in Health Canada (1996), most are used in agriculture or industry. Lack of trust for tap water has created dependency on expensive bottled water, and encouraged consumption of cola-based beverages. Furthermore, First Nations communities have higher rates of chronic illnesses, for example the rates of cancer are three times higher than in non First Nation communities (Table 1 Figure 2), and adverse health conditions can be attributed to poor water quality (Harnum, 2010).

As it is, Nazko First Nation, Alexis Creek First Nation and Lake Babine, all in BC are

Figure 2: The Community Well-Being Index (AANDC, 2011)

Table 1: Concentration of heavy metals in soils of agricultural areas

centration of heavy metals in soils

Element	Target (A) value (mg/kg soil)	Intervention (C) value (mg/kg soil)
Arsenic	29	55
Barium	200	625
Cadmium	0.8	12
Chromium	100	380
Cobalt	20	240
Copper	36	190
Mercury	0.3	10
Lead	85	530
Molybdenum	10	200
Nickel	35	210
Zinc	140	720

Notes:
(1) Intervention value. This indicates serious contamination of soils where remediation is necessary.
(2) For heavy metals, the target and intervention values are dependent on the clay/silt and organic matter content of the soils. Standard soil values must be modified by the formula:
Ib = Is {(A + B% clay/silt + C% organic mater)}/(A + 25 B + 10 C)
Where Ib = Intervention values for a particular soil.
Is = Intervention values for a standard soil (10% organic matter and 25% clay)

Source: Food and Fertilizer Technology Center, n.d

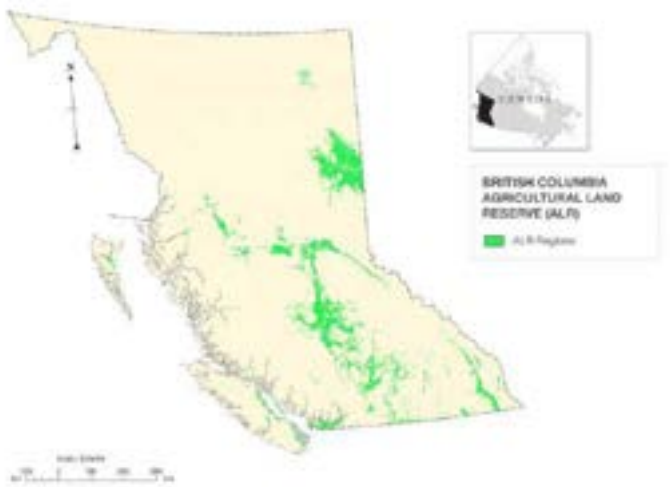

Figure 3: British Columbia Agricultural Land Reserve (Geography Open Textbook Collective, 2014)

all ranked second on the longest running water advisory- spanning 16 years. These areas are located in Northern Central Mainland BC, where it is becoming a hub for agriculture due to cheaper land prices. Where land goes for $55,000- $60,000/ acre in the lower Fraser Valley, Northern Mainland can be purchased for $2,000-$3,000$/ acre (Sandlos, & Keeling, 2016) (Figure 3). Regionally, the area specializes in fruits, vegetables, berries, hay, beef cattle, dairy, sheep, bison, and honey. Likewise the Northwest Central Interior, Bulkley Nechako Valley produces forage, oil seeds, and cattle ranching. Together along with the Peace River District, there are around 3050 farms generating $241 million in farm receipts (Tam, Findlay, & Dafna, 2014). Certainty of access to water is crucial for agricul-

tural development and food security in the province. Approximately 3% of water licensed in BC is for consumptive uses such as industrial, commercial, drinking water or agriculture. This includes reservoir water for the 4.7 million hectares of agricultural lands in BC (Doyle, Blais, & White, 2012). In some parts of BC, high levels of precipitation and seasonal runoff can cause the soil on which agricultural crops and livestock are being raised, to become water logged. With climate change comes further demand for irrigation of crops and animal watering. The heating of the earth removes moisture from the soil, and more surface freshwater and groundwater sources are exploited to irrigate the crops (McGregor, 2008). BC is already dependent on 75% of its surface water to provide water for their citizens (Doyle et al., 2012), and these bodies of water will become stressed, should lakes continue to disappear at alarming rates through cultural eutrophication, and groundwater depletion. More so impacted are the vulnerable and marginalized First Nations communities within the province whom already are dealing with water contamination and higher health risks, exacerbated by the agriculture industry.

What is Being Done

The link between human health and the environment manifests itself with our reliance on clean drinking water. Surface source water is defined as untreated (i.e raw) water from lakes, streams, and rivers that water utilities or individuals use for drinking (Davies & Mazumder, 2003). Quality drinking water has become to be defined as that which is safe for drinking and cooking: (1) free of disease causing organisms, (2) harmful chemicals below defined thresholds and physical parameters within acceptable ranges, and (3) with radioactive compounds below defined thresholds (Davies & Mazumder, 2003). Filtration is often used prior to disinfection to physically remove particles and pathogens, however users of surface-derived drinking water are at a higher risk for infection by Giardia and Cryptosporidium. The prevalence of surface water as a source may be a contributing factor to BC having higher reported enteric diseases compared to the rest of Canada (Davies & Mazumder, 2003).

In Canada there is a division between the federal and provincial governments' roles and jurisdictions in protecting drinking water. The provinces are responsible for use of water, flow regulations, development relating to water, and legislate pollution control and water supply (Davies & Mazumder, 2003). BC passed the Safe Drinking Water Regulation (SDWR) under the Health Act in 1992 (BC Gov., 1992). The SDWR replaced the responsibility of safe drinking water provision on water purveyors subject to approval of Medical Health Officers and set the micro-biological limits of bacteria in finished water. Prior to 2001, Health Canada was investing $5 million annually in its Drinking Water Safety Program for First Nations communities (Health Canada, 2016). From April 2001 to March 2003, Health Canada (2016) invested an additional $5 million to protect and enhance drinking water quality on reserves. In the 2003 budget, $600 million over five years was announced to support the implementation of the First Water Management Strategy, developed by Indigenous and Northern Affairs Canada (INAC) and Health Canada, to promote the safety of water supplies in First Nation communities from 2003-2008 (Health Canada, 2016). In First Nations communities, Environmental Health Officers (EHOs) and Community-based Drinking Water Quality Monitors (CBWMs) share responsibility for drinking water quality monitoring at tap (Poulin, & Lévesque, 2013). As part of the British Columbia Tripartite Framework Agreement on First Nations Health Governance, on October 1st, 2013, Health Canada transferred its role in the design, management,

and delivery of First Nations health programming in BC to the new First Nations Health Authority (FNHA) (Health Canada, 2016). Therefore, Health Canada no longer reports drinking water advisories in BC First Nations; Chief and Council in First Nation communities are responsible for planning and developing their capital facilities to provide for the basic infrastructure needs of the community, including drinking water. They are responsible for the day-to-day operation of water and wastewater systems on the reserves, including sampling and testing drinking water (Davies, & Mazumder, 2003). Still, First Nations peoples have also faced the threat of water privatization, and public-private partnerships (PPP) between companies and the government (Brunger, & Schiff, 2013). Furthermore, the federal government maintains jurisdiction involving navigation and fisheries (e.g. section 35 under the Fisheries Act), national parks, and aboriginal reservations (Harnum, 2010). The BC public wants enactment of strong legislation, including raw and finished water standards, public education, research on drinking water issues, and watershed protection. (Davies, & Mazumder, 2003).

In terms of agriculture, there are regulations and standards in place to protect streams and water quality. The Range Practice Regulation states that in community watersheds, "livestock use of riparian areas must not result in fecal deposits, trampling of vegetation, deposit of sediments or exposure of mineral soil to the extent that the district manager considers detrimental" (Houghton, & English, 2014). However, there is no absolute measure, for the amount of fecal deposits considered detrimental. The Agricultural Waste Control Regulation of the Environmental Management Act contains the Code of Agricultural Practice For Waste Management; the Code, administered by the Ministry of Environment, deals with agricultural wastes and pollution concerns (Bactawar, 2003). Direct access to a watercourse may be classified as either managed or unrestricted; restricting access will limit livestock impacts on water quality and sensitive streambank areas, but will concentrate impacts onto the access site. In January 2015, the Animal Health Act was updated to allow the province to better manage and respond to animal diseases that can spread between animals and humans, and ensure that BC farms remain competitive on the global market (Powell, 2015). In term of fisheries, BC is committed to ensuring that the conservation of the resource will be the basis of sustainable fisheries and seafood supply; the federal Fisheries Act and Species at Risk Act has sections to protect wildlife, fish, aquatic life, and their habitats (Brown, 2006). Impacts to habitat or the deposit of deleterious substances into watercourses are prohibited, both of which could occur from livestock access to watercourses (Brown, 2006).

The Auditor General of BC voiced concern of BC's lack of an effective and integrated approach to land-use management with respect to protection of drinking water sources in 1999, and the importance of non-point source pollution (e.g. agricultural runoff) is recognized by the BC government; BC is the only province in Canada to develop an action plan to address this issue (Davies & Mazumder, 2003). The Auditor General estimated that adding filtration systems to the smaller water systems outside Vancouver and Victoria would initially cost around $700 million with an additional $30 million for annual maintenance (Davies & Mazumder, 2003). Other estimates suggest initial cost may be as high as $2 million (BC Gov., 2001). There was previously a $5 billion deal signed with First Nations in 2005 by former Liberal Prime Minister, Paul Martin, that aimed to address a wide range of issues faced by Canada's First Nations, but was scrapped when the Conservatives came to

power (Galloway, 2015). This deal included a promise of $400 million to bring clean water to remote First Nations communities (Galloway, 2015). But some people say that the water problems faced by the First Nations are almost too big, broad, and cannot be solved by cash alone. To overcome the risk associated with water events in First Nation communities, INAC invests in expensive water treatment facilities. They provide funding for water services and infrastructures such as the construction, upgrading, operation and maintenance of water treatment facilities on First Nation reserves (Health Canada, 2016). This approach has been less than successful, in part because of the high unit cost of water treatment facilities and the relatively small population base of each reserve. It is also questionable to have a conventional water treatment facility in many of these communities because of inappropriate design specifications, dependency on chemical treatment, lack of trained operators, and high operation and management costs.

In BC, the Ministry of Health and the local Health Authorities are lead agencies for drinking water protection. The Drinking Water Officer (DWO), or Medical Health Officer designated in the Health Authority, has power to require expensive water treatment plants, requirements that medium and small water operators can ill afford such as in First Nation communities. Similarly, these health officials have power to order source water assessments, essentially the first stage of any source water protection plan and assessment response plans, as outlined in the BC Drinking Water Protection Act of 2001 (Patrick, 2011). Based on the 2008 Okanagan Basin study, watershed stakeholders typically do not communicate well across sectors, and First Nation water operators are rarely considered in land management decision-making of the provincial government. Health officials including DWO and Medical Health Officers in BC now have the legal instruments in place to "order" Source Water Protection (SWP) planning (Patrick, 2011). These powers have the potential to bring watershed stake-holders, including First Nation and non-First Nation land managers and water operators together to better coordinate land use activities in the interest of protecting all source waters.

What Can be Done:

We are faced with the need to adapt as well as to mitigate to the changing technologies around agriculture and water management. However, we also need to take action with what can be done in the present to reverse and prevent water contamination from agricultural factors, especially amongst the First Nations communities. For example, fully protected watersheds had lower Giardia, but not Cryptosporidium concentrations in watersheds of limited access, compared to those with recreational and agricultural activities, or those with sewage and industrial discharge (McGregor, 2008), proving we have areas we need to focus our concern.

Methods

A method proposed is the multi-barrier approach. The Canadian Council of Ministers of the Environment (CCME) define the multi-barrier approach as "an integrated system of procedures, processes and tools that collectively prevent or reduce the contamination of drinking water from 'source to tap; in order to reduce risk to public health" (Patrick, 2011). This method is to reduce the risk of drinking water contamination through the presence of system redundancies/ barriers built into the water system. There are three main components in the multi-barrier approach: source protection, drinking water treatment, and attention to the drinking water distribution system (Patrick, 2011). This holistic approach to safe drinking water has been

supported across Canada as it endorses watershed and groundwater protection.

Source water protection (SWP) is a safe, logical, and affordable means of protecting human health in First Nations communities, it involves delineation of watershed or groundwater recharge area, inventory of potential sources of contamination, assessment of vulnerability of water supply to contamination, and implementation of a source protection management plan (AANDC, 2014). It is watershed management programs with a specific goal of protecting drinking water supplies; it is a watershed specific planning process encompassing numerous potential initiatives and programs, and aims to reduce the risk of waterborne contamination at the water source. SWP makes economic sense for three principal reasons: it is reported to be several times less expensive to protect a water source from contamination than it is to remediate after contamination; it has been shown to be more cost effective to invest in natural capital, such as purchasing development rights or land acquisition within a watershed, rather than to invest in physical capital, such as water treatment technologies; SWP is the first barrier of defense for clean drinking water as it reduces water treatment challenges and costs (Houghton & English, 2014). Yet, for all its benefits, SWP has proven to be difficult to practice on the ground. Recent Canada-wide studies suggest that small and medium sized water operators lack sufficient financial, technical, human, and legal capacity to undertake SWP (Patrick, 2011). Many First Nation communities in Canada are classified as small water systems (less than 250 water connections), lacking sufficient financial and technical capacity when measured against medium-sized municipal water systems (Patrick, 2011). Research from British Columbia's Okanagan Basin has revealed constraining factors to attaining municipal water systems; ineffective watershed stakeholder communication, fragmented inter-agency relations, and competing resource interests have all been shown to constrain SWP at the local level. Current research suggests that factors constraining SWP tend to be institutional and jurisdictional rather than technical or scientific (Plotkin, 2015). With authority to order source water assessments public health officials have potential to act as catalyst to pull together all stakeholders involved in watershed activities, from forestry and mining to cattle range and recreation, meaning the obligation to reach a more effective solution lies heavily with them.

The Canadian government has spent about $2 billion on the issue between 2001 and 2013, but the problems are as severe as ever (Sandlos & Keeling, 2016). A more targeted approach is needed, along with better communication between the government and First Nations.

"Chronic government underfunding of water systems is to blame for the lack of progress; a national assessment commissioned by the federal government found $470 million was needed per year over 10 years."
- Emma Lui, Council of Canadians

Despite $3.5 million spent on fixing water systems in the last few years of that funding session, but water advisories persist.

"They took the easy route. They sent money but did not put someone on the ground."
- Alec, Council of Canadians

Health officials including Drinking Water Officers and Medical Health Officers in British Columbia have the legal instruments in place to "order" SWP planning (Patrick, 2011). These powers have potential to bring watershed stake- holders, including First Nation and non-First Nation land managers and water operators, together to better coordinate

land use activities in the interest of protecting all source waters. The result of expanded source water protection planning for First Nation communities is improved communication between all watershed stakeholders, with the goal of enhanced drinking water quality (Patrick, 2011). As proven elsewhere, greater attention to source water protection delivers cleaner, safer, and more affordable drinking water. Additionally, source water protection has the potential to reconnect health and place for First Nations in Canada; the rescaling of First Nations' place as a result of colonization continues to impact health: loss of access to traditional lands, the transference of resource management activities to the government, and the forced resettlement acted against land and water protection (Patrick, 2011). By introducing source water protection at the local level, it opens up new opportunities for not only enhanced water quality but also community engagement, intergenerational knowledge translation (Elder to youth), and the reconnection of health and place for First Nations in Canada (Sandlos, & Keeling, 2016).

Involve Women

Attention should turn to the role of First Nation women with water, and the impact they can have with water management. This opportunity will diversify and enrich the discourse on water management and contribute to improve water management strategies. Across time and culture, women are considered the holders of water knowledge and assume the primary role in the protection of water resources. Given that a high proportion of First Nation women live in poverty, they are amongst those least able to afford these kinds of short-term and individual responses to substandard water quality. The voices and experiences of First Nation women are seldom evident in dialog or policy development; concerns about water quality in First Nation com-

Figure 4: First Nation families preparing traditional foods and food sharing (left): (a) Sockeye salmon being butterflied and prepared for drying; (b) Sockeye salmon being dried on racks in the open air (right): (a) Moose meat being cut into thin strips and prepared for drying; (b) Moose meat being dried on racks in open air (COSEWIC, n.d.).

munities led to the formation of an Expert Panel on Safe Drinking Water for First Nations in 2006, but First Nation women were not invited (Anderson, Clow, & Hawthorn-Brockman, 2013). Stories offered by Grandmothers and other female elders provide insight on water management; more research is needed in this area, particularly research that invites Aboriginal women to share their knowledge about water and their recommendations for solving today's water quality and security issues. Although it is a small contribution to the discourse on water quality, it is a crucial one because it creates a forum for the voices of First Nation women to be heard.

Agriculture

Individual farming projects can be undertaken- promoting a change in individual behaviours to facilitate change. Along the theme of changing individual behaviours, one can help create a reduced meat diet dependent market. Food sharing between family members, and within the community and friends is practiced among First Nations people, and results in less food waste (Tam et al., 2014) (Figure 4). The adaptation and mitigation we will undergo provides an opportunity to better understand and practice sustainable agricultural practices, including but not limited to: windbreaks, crop rotation, rainfall irrigation, reducing number of livestock, sustainable fishing policies, waste recycling, animal diet manipulation. The ministry of agriculture has committed $900,000 this year to initiatives aimed at preparing BC farmers for climate change, funding for regional adaptation strategies in Cowichan Valley, Delta and Peace County; a five year federal-provincial farming risk management fund 'Growing Forward' also includes $110 million for programs promoting innovation, adaptation and sustainable agriculture (Climate Action Initiative BC Agriculture & Food, 2015).

Conclusions

In recent decades, a higher proportion of pollution has come from agricultural sources than the first two thirds of the twentieth century, as a result of industrial, agricultural, and human effluents into watercourses. Agricultural intensification impacts water quality through the release of nutrients, chemicals, biological waste, and via soil erosion washed off farmland into the water environment. Challenges for managing farming's impact on agricultural water pollution can originate from either a point source (e.g. from a slurry store) or diffusely as a non point source (e.g. run off from larger areas of farmland). As non point source pollution can arise from the contributions of many smaller sources, it is difficult to attribute it to a specific sector or activity and the impacts of pollution can occur some distance from the source. These effects are being seen in First Nations communities where 23 communities are at a health and safety risk, under 27 drinking water advisories, and are suffering adverse health consequences. As both the responsible and regulatory agency, the government needs to maintain incentive for implementing, improving, and managing these systems. It is in BC's interest to conduct studies examining source water supply on human health so that agricultural water contamination can be better understood. While short term costs may be lower, unchecked development can lead to increasing future costs and risks through environmental degradation. Prevention of water pollution, and source water protection may be our solutions for future water source sustainability. Methods such as: alternative farming techniques, waste management, and including women in the water management discussions can establish and sustain water quality in First Nations communities in BC.

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Urban Pathway Design and Pluvial Flood Management in Toronto

Tian Wei (Sarah) Li

Today, floods are one of the most frequent urban hazards; urban spaces, such as streets and sidewalks, are often the most vulnerable areas. This is important and relevant in Toronto, which has experienced numerous floods over the past century. However, when it comes to flood management, people's attention tends to focus on increasing and improving green spaces, green roofs, water storage, and other green infrastructures. Relatively little attention is paid to altering the very materiality and design of impervious pathways. This research paper contributes to flood management in Toronto by examining how the conventional impervious paving system of urban roadways and sidewalks makes downtown more susceptible to urban pluvial-floods. It also recommends strategies such as pervious pavement and wet-proof pathway design (floating, submergible, and cantilevered pathways) that are relevant to future flood-management solutions.

Introduction

Today, floods are one of the most frequent urban hazards; urban spaces, such as streets and sidewalks, are often the most vulnerable areas (Silva & Costa, 2016). This is more important and relevant when Toronto has experienced numerous floods over the past century, including the Hurricane Hazel Flood, the 1976 Flood, the 2005 Flood, and the 2013 Flood; they caused transportation closures and property damages amounting to more than $850 million for the latest event (Armenakis & Nirupama, 2014). However, when it comes to flood management, people's attention tends to focus on increasing and improving green spaces, green roofs, water storage, and other green infrastructures. Relatively little attention is paid to altering the very materiality and design of impervious pathways. In a densely populated and heavily constructed urban network such as Toronto, the roads, sidewalks, bridges and promenades add a significant number of impermeable surfaces, increasing surface runoff and overland flow in the case of storm events and making the city more susceptible to flooding. Low-lying areas and places where the infrastructure is relatively old, such as The Beaches, are especially prone to floods. Due to the scarcity of undeveloped land in the city, putting aside a sufficient amount of undeveloped land for water storage and vegetation coverage is often a challenge. Thus, modifying existing conditions, such as pathways, is more practical for flood management. This research paper contributes to flood management in Toronto by examining how the conventional impervious paving system of urban roadways and sidewalks makes downtown more susceptible to urban pluvial-floods. It also recommends strategies such as pervious pavement and wet-proof pathway design (floating, submergible, and cantilevered pathways) that are relevant to future flood-management solutions.

Objectives, Limitations and Hypothesis

The aim of this paper is to explore how scholarly sources, governmental data, and scientific data indicate that impervious urban pathways contribute to flooding in the City of Toronto. This paper also examines Toronto's governmental regulations and management

strategies that address the urban pathways' paving systems and material weaknesses in relation to flood prevention. The limitations of current regulations and strategies will also be investigated. To address these limitations and assist with mitigating the damage of urban floods in Toronto, this paper recommends pervious hardscape paving and wet-proof pathway designs (floating, cantilevered, and submergible pathways) that have been adopted by other cities. However, due to the its length, the scope of this paper will be limited to generic recommendations without details about scientific justifications and detailed applications. Moreover, the governmental data tend to survey major pathways instead of small and private ones, so the accuracy is limited. This limitation affects the paper's ability to assess the impacts of Toronto's pathways in terms of flood-induction.

In sum, it is appropriate to hypothesize that the materiality and paving system of the majority of Toronto's urban pathways make downtown more susceptible to flooding. This is due to the wide use of impervious asphalt and concrete for roads and sidewalks that promote runoff and accelerated flow, the low level of water retention and infiltration, and the low level of adaptability of the design to floods. Thus, new flood management strategies can include permeable paving and wet-proof pathway designs, which have direct application in the establishment of flood management policies.

Study Area and Scope of Research

The chosen study area is downtown Toronto. This was chosen because it is a standard example of heavy urbanization, and has a vast roadway-network and drainage systems in need of renewal. It is therefore an appropriate site to study how the paving of roadways and sidewalks contributes to floods. Moreover, because Toronto is located near both open and 'buried' waterbodies, its transportation networks and ground-level built forms are more vulnerable to floods, making the design of pathways even more crucial. Therefore, understanding the relationship between pathway paving and floods and identifying possible solutions is key to reducing flood damage in Toronto and other heavily urbanized areas.

General Approach

In order to provide an in-depth analysis of how urban pathways may aggravate flood risks in Toronto, the paving systems and the imperviousness of material are the main focus. To illustrate the flood-inducing qualities of impervious and conventional pathways, scholarly articles on impervious materials and paving systems are incorporated. In order to prove their relevance to Toronto, the City of Toronto's administrative files and management plans, along with resources from Toronto Water, Transportation Services, and the City of Toronto are used.

The body of this paper is divided into three sections. The 'Paving Systems, Impervious Materials, and Flooding' section analyzes the current state of impervious pathways in downtown, their contribution to flooding, and their significant reactions with local factors in the context of Toronto. The 'Existing Governmental Regulations and Management Strategies' section evaluates Toronto's regulations and strategies that address the materiality and paving issues of roadways. Lastly, general recommendations from successful cases are used to propose pervious paving, city-wide replacement plan, and wet-proof pathways as potential solutions.

Current State of Downtown Toronto's Pathways: Paving Systems, Impervious Materials, and Flooding

Due to the extent of urban pathways constructed with impervious paving systems, there is increased speed of surface water flow as well as lower rates for both water retention and infiltration, which cause urban pluvial floods in downtown Toronto. Here, pluvial floods are defined as surface floods caused by precipitation and a lack of drainage in cities (Flooding in urban areas, n.d.) Specifically, the City of Toronto has an extensive network of around 5,200 centreline-kilometres of roads and over 250 centreline-kilometres of laneways (Applied Research Associates, 2006; see Table 1). More importantly, transportation-related imperviousness – roads and sidewalks – is often the predominant source of imperviousness in cities (Ontario Ministry of Municipal Affairs, n.d.).

Table 1: Total Kilometres of roads in Toronto

Road Class	District				City-wide (km)
	Toronto and East York (km)	Etobicoke York (km)	North York (km)	Scarborough (km)	
City Expressway	54.58	33.47	34.99	6.03	129.07
Major Arterial	159.44	243.73	173.30	180.47	756.94
Minor Arterial	123.75	97.36	59.47	130.50	411.08
Collector	115.27	187.73	211.68	255.81	770.49
Local	621.98	992.39	878.85	798.04	3291.26
Total (km)	1075.02	1554.68	1358.29	1370.85	5358.84

Source: City of Toronto, 2013, p. 31

Downtown Toronto typically uses impervious paving systems such as composite pavement and flexible pavement for sidewalks, multi-use pathways, major and minor arterial roads, and so on (City of Toronto, 2016). Examples include Yonge Street and Bloor Street. Specifically, composite paving has a non-porous surfacing and composition (see Figure 1). Flexible pavement, on the other hand, has an important feature called the 'surface course' that reduces the amount of water entering into the pavement and remains impervious to the effects of water (Kumar, S., Parveen, Dass, S., & Sharma, A., 2013). Nonetheless, both systems use impervious materials such as asphalt and concrete (see Figure 2).

Impervious Materiality, Paving Systems and Flooding

The high density of urban pathways, accompanied by the proximity to numerous waterbodies and the use of impervious paving systems and materials, accelerates the speed of surface water flow, as well as lowering the water retention and infiltration rates. During pluvial events, water is diverted to storm systems, contributing to urban pluvial floods in Downtown Toronto (Furberg, D., & Ban, Y.,

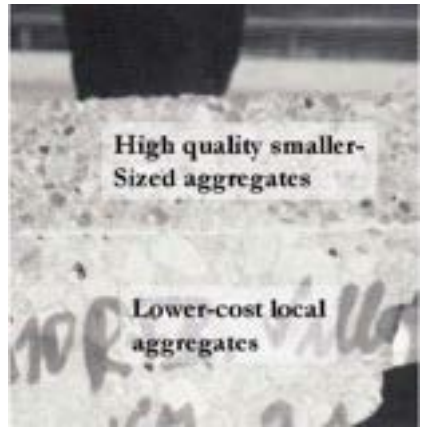
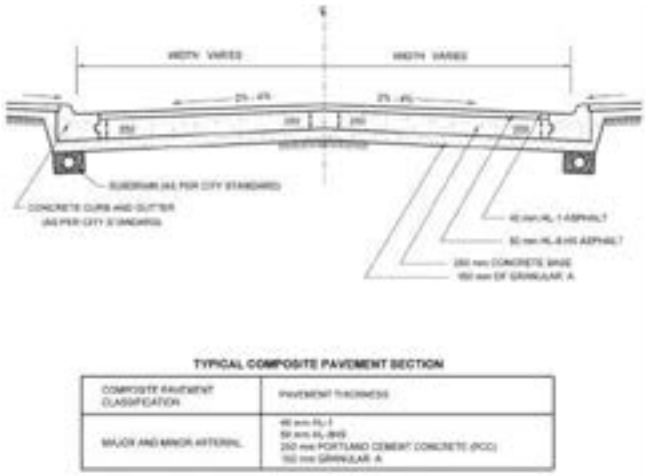


Figure 1: PCC over PCC, a type of composite pavement that lacks porosity (source: Tompkins & Darter, 2008)



TYPICAL COMPOSITE PAVEMENT SECTION

COMPOSITE PAVEMENT CLASSIFICATION	PAVEMENT THICKNESS
MAJOR AND MINOR ARTERIAL	40 mm HL-1 50 mm HL-8/HS 250 mm PORTLAND CEMENT CONCRETE (PCC) 150 mm GRANULAR A

Figure 2: Composite pavement construction for major and minor arterial roads in Toronto (source: City of Toronto, 2014)

2012). Specifically, extensively using impervious paving materials and methods on roads and sidewalks significantly decreases the roughness of runoff routing, shortening the travel time of overland flow and the lag time between precipitation and peak discharge; this increases peak discharge in nearby water bodies and the associated flood risk (Du, Shi, Rompaey & Wen, 2015). Moreover, impervious roadway-pavement drastically lowers total infiltration into soils due to its lack of porosity, and thus significantly increases infiltration-excess precipitation and direct runoff into water bodies, thereby amplifying the associated flood risk (Du et al., 2015). This means that when rainfall is unable to infiltrate into the soil, runoff enters water bodies more quickly, causing increased peak stream flows (Raffensperger & Cochrane, 2010) and rapid onset of floods (Brody, Blessing, Sebastian & Bedient, 2013).

The issues mentioned previously are especially significant to Downtown Toronto since it is situated above numerous 'buried' water bodies, i.e. streams and rivers buried in sewer pipes (Armenakis & Nirupama, 2014. See Figure 3). This indicates an even shorter travelling time and distance for roadway pluvial runoff to enter sewers and overwhelm the water bodies that cannot handle large amounts of water so quickly (Verma, 2016). In other words, the buried water bodies lose their natural waterways toward Lake Ontario and are forced to overflow their banks during pluvial events, causing flooding (Armenakis & Nirupama, 2014). Thus, coupled with artificial drainage and sewer pipes that accelerate the flow of rainwater into these water bodies, overflow can happen during a 2-5mm/hr precipitation event (Grima, 2016). Impervious roadways cause faster response, greater mag-

Figure 3 : lost rivers of Toronto;buried in pipe systems underground (Toronto Green Community, n.d.)

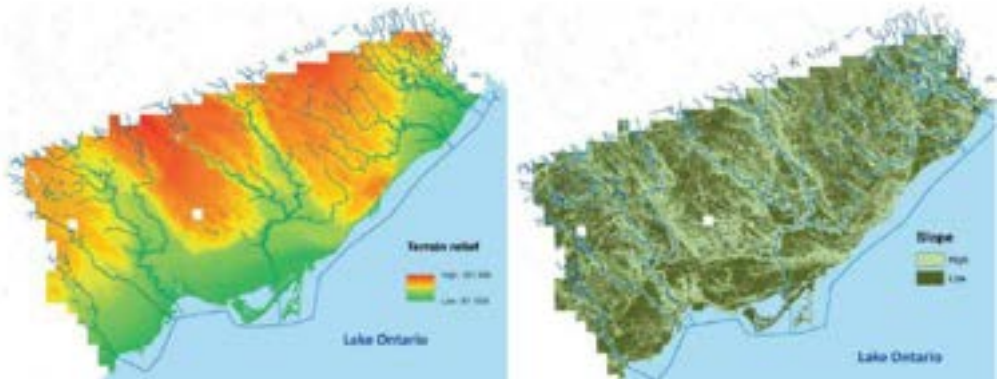
nitude of river flow, and higher recurrence of small floods (Miller et al., 2014).

Impervious Materiality, Paving Systems, and Flood-Risk Amplifying Factors

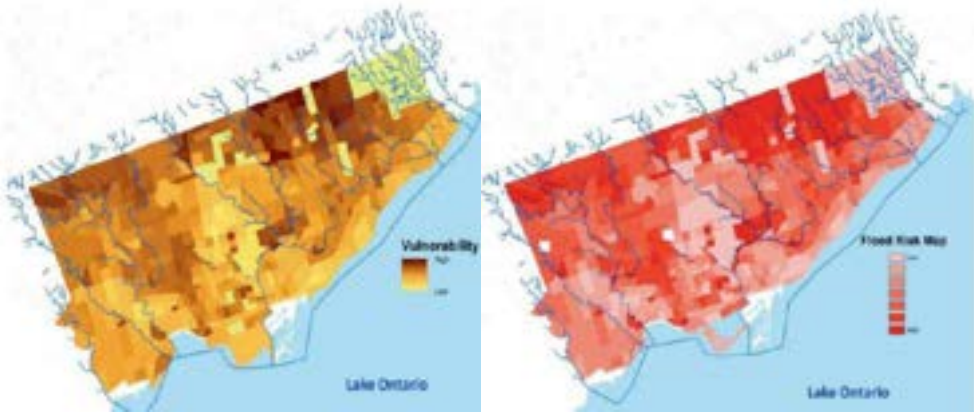
These impervious-pavement issues are aggravated by Downtown Toronto's low elevation, flat terrain, pathway-width, growth of impervious cover and roadway cover, and street-network density. Specifically, downtown Toronto is situated in a low-lying area relative to its surrounding region (see Figures 4 and 5).

Due to the vast extent of impervious pathways, low elevation, and flat terrain, there is a reduction in infiltration, which means that overland flows can converge from surrounding areas and pond in certain locations (Nirupama & Simonovic, 2006). Because of reduced time to peak, this can also overwhelm underground-rivers (Nirupama & Simonovic, 2006). These factors may contribute to Downtown Toronto being one of the areas with higher vulnerability and flood risk (see Figures 6 and 7). Due to heavy reliance on automobiles, Toronto tends to build wider pathways, increasing the total area of impervious pavement. This further aggravates flooding issues. Lastly, in Toronto, impervious cover increased from 45.6% in 1999 to 47.9% in 2009, which is an average annual increase of about 0.23% per year -- a statistically significant increase (Nowak et al., 2012).

Additionally, road-cover increases annu-



Figures 4 & 5: Slope and terrain relief of the Toronto region (source: Armenakis & Nirupama, 2014, p. 324)



Figures 6 & 7: Flood vulnerability and risk of the Toronto region (source: Armenakis & Nirupama, 2014, p. 325)

Figure 8: Stranded passengers waiting for TTC buses. (Globe Staff, 2014)

ally in each category (see Appendix). Impervious cover has a 12-fold impact relative to tree cover, meaning that an increase of impervious cover by 1 percent averaged a 2.2 percent increase in stream flow (Nowak et al., 2012). Further, since runoff from an acre of pavement is about 10-20 times greater than the runoff from an acre of grass, impervious surfaces can quickly trigger devastating floods (Frazer, 2005). In other words, if the water overflows the stream banks, it will seek the path of least resistance, which, in the case of Toronto, means the roadways. This increases the likelihood of a catastrophic urban flood (Frazer, 2005).

All of the above issues could have contributed to historical floods such as the flood in 2013, during which the downtown core saw more than 90 mm of rain in a three-hour period (Edmiston, 2013), causing public transportation systems to break down (see Figure 8).

Existing Governmental Regulations and Management Strategies

In order to address the flood-inducing impermeability and flow-accelerating quality of paved roadways, different Toronto authorities and governmental units have proposed regulations, plans, programs, and other management strategies For example, the city of Toronto has developed a 'Wet Weather Flow Management Guidelines Plan' (hereafter referred to as 'The Plan') that proposed the following flow-velocity reducing strategies: velocities in overland flow channels should be minimized; creation of steep slopes should be minimized; and the velocities and depths of flow for the major overland flow systems

Table 2: Permissible depth for submerged objects

Permissible Depths for Submerged Objects	
Water Velocity (m/s)	**Permissible Depth (m)**
0.5	0.80
1.0	0.32
2.0	0.21
3.0	0.09
Note: The above values are based on a 20-kg child and concrete-lined channels. Source: Stormwater Management Guidelines for the Province of Alberta (1999)	

Source: D'Andrea, 2006, p. 26

should not exceed the combinations outlined in Table 2 (D'Andrea, 2006).

By increasing the travel-time of flow and lag-time between precipitation and peak discharge, the velocity-reducing strategies may help to address the issues of increased peak discharge and thus flood risk in 'lost' water-bodies under Toronto. However, The Plan's strategies are limited. Because Toronto already has a relatively flat terrain, there is little room to further minimize the slopes. Also, they do not have adaptive and flexible solutions to address flood-inducing runoff closest to its sources, a major one of which are roadways. Furthermore, minimizing the slopes cannot address the ponding of flood-water caused by impervious pathways.

The Plan also recommended infiltration-promoting strategies: controlling pervious driveways and pavement on properties, and conveying pervious technologies such as the Etobicoke Exfiltration system for highways and local roads. These technologies reproduce natural infiltration and groundwater recharge using engineered perforated pipes (Ryerson University, n.d.). The Plan also proposed ways to minimize impervious surface for Low Impact Development (LID) Practices, which include: minimizing placement of new structures or roads over porous or erodible soils; reducing to one lane, or eliminate if practical, on-street parking lanes on local access roads; limiting sidewalks to one side, or eliminating if practical, on local low traffic roads; utilizing turf pavers, or other porous surfaces for sidewalks, driveways, and parking lots. Alternative roadway designs are also considered, such as narrower road sections, reduced impervious surfaces, use of porous pavers, elimination or reduction of sidewalk to one side of local roads, and reduction of driveway length and width (D'Andrea, 2006).

These strategies may help to reduce and slowdown runoff to decrease flood-risks. However, the LID strategies are limited in that they do not compensate for the cumulative and adverse effects from road networks and other activities outside of the development site (D'Andrea, 2006). This is especially concerning because flooding is a regional issue. There is also a lack of information on maintaining impervious paving, installing pervious paving on local roads and highways, and addressing ponding that happens to pervious pavements due to clogging (Wells, 2013).

The city of Toronto, in collaboration with the Municipal Infrastructure Group and Schollen & Company, also proposed a Tower Renewal Program. This program aims to reduce runoff from roads and sidewalks to alleviate the flows within storm sewers during rainfall events, and thus basement flooding (Schollen & Company Inc., 2011). Its strategies include adopting pervious pipe systems, using pervious pavements in parking areas, and reducing lot grading, among others (Schollen & Company Inc., 2011). Toronto Water, on the other hand, proposed a management strategy of implementing a storm-water charge (or fee) based on the amount of impervious area, thus giving some responsibility for the cost of storm-water management to those causing the increase in runoff (Kellershohn, 2016). The Toronto City-Wide Zoning Bylaw and Sewers Bylaw prohibit reverse slope driveways and connections to storm sewers from private property (Kellershohn, 2016). Toronto's Green Standard also proposed permeable walkways, open grid pavement with at least 50% perviousness, and permeable pavers, asphalt, and concrete for hard surfaces in residential areas (Livegreen Toronto, 2015). However, these methods tend to focus on private properties and underground infrastructures. They fail to address the main culprit, which is the vast impervious area covered by extensive public roads and highways.

Table 3: Alternative urban pathway design

Floating structures	a	Floating pathway	77	West India Quay	London
			78	Ravelijn Bridge	Bergen op Zoom
	b	Floating platform	79	Yongning River Park	Taizhou
			80	Landungsbrücken pier	Hamburg
	c	Floating islands	81	Spree Bathing Ship	Berlin
			82	Leine Suite	Hannover
Wet-proof	a	Submergible parks	83	Rhone River Banks	Lyon
			84	Parque fluvial del Gallego	Zuera
			85	Buffalo Bayou Park	Houston
			86	Parc de la Seille	Metz
			87	Park Van Luna	Heerhugowaard
	b	Submergible pathways	88	Passeio Atlântico	Porto
			89	Quai des Gondoles	Choisy-le-Roi
Raised structures	a	Cantilevered pathways	90	Elster and Pleiße Millraces	Leipzig
			91	Terreiro do Rato	Covilhã
	b	Elevated promenades	92	Waterfront promenade	Bilbao

Wet-proof pathway design, including floating, submergible, and cantilevered pathway designs. Here, successful cases of implementation are indicated in the columns to the right (source: Silva & Costa, 2016, p. 9)

Possible Solutions

Some of the proposed plans and policies from City authorities that address impervious urban pathways have weaknesses as illustrated in previous sections. These weaknesses include LID's inability to address the cumulative flood-impacts of road networks and the lack of consideration for pervious public roadways and ponding. Fortunately, the adoption of porous materials for major roads and sidewalks, a citywide plan for road-pavement replacement, and wet-proof pathways may help with mitigating these issues.

As part of effective water governance, the City of Toronto can build partnerships and institutional arrangements with other public sectors, research centers, private sectors and stakeholders (Rogers & Hall, 2003). Together, they can invest in generating a citywide plan for road-pavement replacement that considers the watershed (the unit of management) as a whole (Verma, 2016). This form of collective action and enforcement of institutions can help to ensure a balanced field of knowledge and the avoidance of exploitation (Rogers & Hall, 2003). An example is the citywide Road Map for Pervious Pavement Plan of New York City, which was generated by the city's department of transportation in collaboration with Columbia University and the urban designer of the City of Minneapolis (NACTO, n.d.). Its goal was to capture the first inch of rainfall on 10% of the impervious areas in combined sewer watersheds by using pervious pavement (Basch et al, 2012).

When creating a citywide plan, the city can consider porous concrete and asphalt for major roadways and porous pavement for sidewalks and light-traffic pathways. Specifically, sidewalks and other light-traffic pathways can adopt open-jointed pavers filled with turf or aggregate, "soft" paving materials such as wood mulch and crushed shell, and decking (Frazer, 2005). Heavy-traffic pathways can use porous concretes and asphalts that provide solid, safe surfaces for foot and vehicle traffic, but also allow rainwater to percolate down into subsurface soils (Frazer, 2005). According to Bruce Ferguson, director of the University of Georgia School of Environmental Design, pervious surfaces in high-traffic areas are just as durable as their impervious ancestors. Successful cases can be seen in Minnesota and Alaska, which both experience climatic extremes, as

well as in Georgia and Oregon (Frazer, 2005). Another case is a porous stretch of highway in Arizona, which is more than 20 years old and still functions well (Stiffler, 2012). Moreover, the city can consider pervious paving as a way to decrease flow velocity, because even when pervious pavement structure is saturated, its rough surface texture can still slow surface flow of stormwater (Lakesuperiorstreams, 2009).

Ponding and flooding issues in the urban environment can be mitigated by wet-proof pathways such as floating, submergible, and cantilevered pathways (see Table 3). These design strategies are flexible enough to function with and without floods and ponding. For example, on raised structures, traffic flow can still be maintained when flooding or ponding happens. When floating and wet-proof pathways are implemented in locations close to waterbodies, floods cannot impede pedestrian flow because the design can adapt to water-level change.

Conclusion

This research paper examines how the current impervious paving system using impermeable materials of urban pathways, such as public and private roads and sidewalks, make the downtown area of the City of Toronto more susceptible to urban pluvial-floods. Although the city and related authorities have proposed plans and regulations to reduce runoff-velocity and runoff-quantity as an attempt to reduce flood-risk caused by impervious surfaces, there are weaknesses that can be addressed by new solutions. Specifically, these weaknesses include the disconnection between LID and the larger urban context (which fails to address the cumulative flood-impacts of road networks), and the lack of consideration for public roadways and ponding. Fortunately, the adoption of porous materials for major roads and sidewalks, a citywide plan for road-pavement replacement, and wet-proof pathways – such as floating, submergible, and cantilevered pathways – may help with mitigating these issues.

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Low-Rise Housing in Toronto and Lima in 1968: A Rejection of the Corbusian High-Rise or Modernization through Appropriation?

Sonia Ralston

In the late 1960s, social housing across the globe was built as low-rise housing in a style popularized by 1920s modernist architects, as opposed to the high-rise tower blocks that dominated social housing projects in the 1950s. In 1968, both Toronto and Lima revived the low-rise social housing style to address housing shortages, clear slums, and provide safer housing for low-income people. By comparing Toronto's Alexandra Park project and Lima's Proyecto de Vivienda Experimental (PREVI), the paper explores how despite some similarities in terms of their typology, the reasons for abandoning the high-rise tower of the 1950s and marking it as a failure are different in each case. While Toronto had an existing social housing infrastructure, replete with high-rise housing projects such as Regent Park which was deemed a failure in the 1960s, Lima's PREVI project saw an import of Global North architects who attempted to improve upon the slum vernacular built in extra-legal settlements as a response to the Peruvian government's inaction on housing conditions for low-income people. The paper compares not only the designs of both projects but also the social and political conditions of their constructions in order to deconstruct the 1960s shift towards low-rise social-housing in the contexts of the Global North and the Global South. As such, the low-rise social housing typology of the late 1960s reveals not only the perceived failure of high-rise projects, but also a continued vilification of informal settlements, and a paternalistic approach with heavy echoes of modernization and appropriation of vernacular in the development of low-rise social housing in Global South countries.

Introduction

In the 1960s, following widespread use of the high-rise tower block, a return to low-rise social housing[1] was favoured across Europe and North America to address housing shortages as well as slum clearance efforts. The low-rise housing style was used widely in the 1920s to address housing shortages and move residents outside of declining city centres. In 1968, in a revival of the 1920s principles, Toronto, Canada and Lima, Peru undertook the construction of low-rise housing projects in an attempt to clear slums and provide safer housing for low-income citizens. A comparison of Toronto's Alexandra Park housing project[2] and Lima's Proyecto de Vivenda Experimental (PREVI) reveals a shift away from the high-rise social housing typology that proliferated during the 1950s, towards low-rise housing. Toronto in the 1960s had social housing infrastructure and funding in place, and the choice to instate low-rise housing was a deliberate rejection of modernist ideals. However, in the case of PREVI, the import of Global North

1 Low-rise housing –grouped housing that has fewer than four storeys— has been a popular form of settlement for hundreds of years because construction technology limited height until the industrial revolution. Therefore, the scope of the definition of low-rise housing will be limited to housing blocks built after the industrial revolution because it was a deliberate choice in spite of technological advancement.

2 For the purpose of this analysis, the scope of the paper will be limited to Markson's 1965 designs, and will not include an evaluation of the current revitalization project in Alexandra Park.

architects aimed at appropriating and improving on slum vernacular is more problematic considering that the Peruvian government's inaction on improving housing conditions created a necessity for low-income people to build extra-legal informal settlements. As such, the low-rise social housing typology of the late 1960s reveals not only the perceived failure of high-rise projects the world over, but a continued vilification of informal settlements in the Global South and a paternalistic approach to the development of low-rise social housing that echoed ideas of modernization and appropriation of vernacular in Global South countries.

Modernist Canons: Low-Rise and High-Rise Housing

Low-rise housing projects were popularized in the 1920s as a means to address housing crises in Western Europe. The most celebrated project of the era was the work of Ernst May in Frankfurt am Main, where he along with other modernist architects, built over 15,000 units of social housing to accommodate working class families after the hyperinflation crisis in 1922 in Weimar Germany caused by currency devaluation (Henderson, 2010). Many families lived in burgeoning, overcrowded cities lacking the infrastructure to adequately house the population. May's Römerstadt project (1928) in Frankfurt am Main is one of the many examples built in the city, and contains 1182 low-rise housing units of two to four bedrooms that are highly similar in appearance (Dreysse, 1988). The streets curve to fit the riverside context of the project and are reminiscent of the curving street of 19th-century romantic suburbs that aimed to associate housing with tranquility, as opposed to overcrowded cities. The units are small but adaptable for different family sizes, rooted in the principle of "existenzminimum", creating the means to live comfortably on a subsistence wage (Wiedenhoeft, 1985) (see Figures A1 & A2). As a result, the design eliminated corridors, and a rational division of space created units with up to four bedrooms over three floors, often less than a total of 100 square metres (Dreysse, 1988). Overall, the Frankfurt projects aimed to provide alternatives to increasingly overcrowded and impoverished cities. The projects instead offered adequate, low-density low-rise housing in the suburbs, predicated on notions of romantic suburbia and affordability to lessen the negative effects of the housing crisis. The Frankfurt projects thus became the canon of low-rise housing architecture.

Despite the popularity of low-rise housing in 1928, most social housing architecture built in the postwar period replicated Le Corbusier's Unité d'Habitation, a high-rise modernist tower built in Marseilles between 1947 and 1962 (Millais, 2015) (see Figures B1, B2, B3 & B4). In the postwar, many states' welfare policies focused on constructing large projects to address housing shortages and slum clearances to improve living conditions. Le Corbusier's Unité d'Habitation in Marseilles was built as a housing block for 1600 people, characterized by skip-stop corridors conceived as streets, prefabricated elements, and placed in a park to allow greater access to outdoor space. The high-rise blocks inspired by Le Corbusier's Unité d'Habitation—the Tower in the Park model—of the 1940s, was eventually favoured by housing authorities across the Americas in the postwar era (Henderson, 2010; Wright, 1981). For example, Le Corbusier's high rise tower was first deployed across France to contribute to the reconstruction effort, and used in the 1950s Pruitt-Igoe housing project in St. Louis which provided alternative housing for slum renewal projects, and Chicago's Cabrini-Green high-rises completed in 1957 (Millais, 2015, p. 114; Miller, 2008). The model was also used in Latin America, with the example of the 23 de Enero buildings in Vene-

Figure A1: An aerial shot of May's Römerstadt housing project in Frankfurt, one of many projects that helped to address the housing crisis. Note the low-rise scale of the building and the curving streets that make it resemble a romantic suburb (source: Ernst May Society, n.d.)

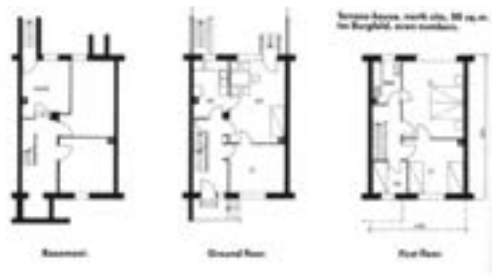

Figure A2. The plans of a standard 3 storey unit in Romerstadt are indicative of May and the modernists' aim to reduce unusable spaces such as corridors to favour spaces with many options for programmatic use, a key component to "existenzminimum" (source: Dreysse, 1988, p. 16).

Figure B1: Unité d'Habitatio (source: Kozlowski, 1997 © FLC/ADAGP).

Figure B2: Vista de Bloques del 23 de Enero (source:).

Figure B3: 42 Blevins, Peter Dickinson, Regent Park (source: Ralston, 2014, November 17).

Figure B4: (source: Carmona, 2013).

Le Corbusier's Unité d'Habitation (top left) was influential in that multiple countries across the world implemented his housing model to address housing shortages in the 1950s, such as Chicago, Toronto, and Venezuela. Many of these housing blocks were destroyed.

zuela being conceived as a solution to housing crises and rising informal housing. The high-rise model was attractive in that it was relatively cheap to build due to its prefabricated designs, and housed thousands of people in a small, quick solution for housing impoverished people. However, with the exception of Le Corbusier's original project, all cases mentioned fell into disrepair and were widely stigmatized; Pruitt-Igoe was famously demolished in 1972, Cabrini-Green was demolished in recent years to make way for a mixed-income development, and 23 de Enero is now a notorious informal settlement—a barriada—in Venezuela (Millais, 2010; Miller, 2008). Barriadas are large extra-legal settlements formed as dissident organized projects which were used extensively in Peru. In short, the proliferation of high-rise housing in the 1950s is tied to the popularity of Le Corbusier's ideas and was replicated a number of times as a means of social housing, but this model became rapidly stigmatized due to rising crime and disrepair in the buildings across the world.

Existing Housing Conditions in 1960s Toronto and Lima: Towers in the Park and Informal Settlements

Between 1948 and 1968, the Canadian Mortgage and Housing Company (CMHC) adopted a policy of urban renewal that razed dilapidated, low-income neighbourhoods to construct new homes, many of which were managed as public housing (Filion, 1988). The most infamous of these massive urban renewal projects is Toronto's Regent Park neighbourhood which was built over parts of a neighbourhood called Cabbagetown, featuring a number of high-rise towers closely modelled on Le Corbusier's designs and completed in 1958 to house thousands in the southernmost part of the site (Fumia, 2010) (see Figure B3). The Cabbagetown neighbourhood in the 1940s was impoverished; housing conditions were poor, there was a lack of basic amenities, overcrowding was commonplace, and it was widely subject to stigmatization (Purdy, 2004). The CMHC razed the majority of the neighbourhood and over the course of several years built a Corbusian Tower in the Park style development, with several large high-rise apartments interspersed between low-rise cruciform buildings on a superblock (Fumia, 2010). Prominent Toronto modernist architect Peter Dickinson's housing blocks that made up part of the development borrowed heavily from Le Corbusier, with skip-stop corridors and two floored units (Landau, 2015). Despite being praised at the outset for providing low-income households with more housing options, by the mid-1960s, the project was subject to heavy criticism on the grounds of being poorly maintained and a site of increased crime (Purdy, 2004). The social housing infrastructure in Toronto that existed prior to the low-rise Alexandra Park project was largely limited to the massive and heavily stigmatized Regent Park projects.

In the case of PREVI, Lima's public housing infrastructure was essentially non-existent and instead barriadas dominated the urban landscape for low-income residents. The Peruvian barriadas were built as a result of three different processes; the gradual occupation of a site, the organized invasion and occupation of a site—often state-owned land— or, more commonplace after 1950, government authorization of the extra-legal activity (Gyger, 2013). In contrast to the social housing infrastructure in Toronto and the Global North more broadly, Lima did not have any recent projects executed by the state to house low-income people; rather, informal methods as a result of extensive organizing were the norm. The government had limited ability to fund slum clearance in this period and was unable to alleviate the burgeoning housing issues in Lima, but wanted to secure the votes of low-income people to remain in office (Gyger, 2013).

Seeing as the barriadas housed hundreds of thousands of lower-income Peruvians, many of the informal projects were given extra-legal approval (Gyger, 2013). The housing built in barriadas used informal construction methods, something that local institutions such as architecture schools were highly critical of, and in later projects these institutions aimed to help squatters construct safer housing (Gyger, 2013).

Both PREVI, completed in 1971, and the Alexandra Park (1968) development were conceptualized as projects that rejected the high-rise model and would aim to increase the standard of living by providing safer low-rise housing alternatives instead. Alexandra Park's 627 units of social housing are largely low-rise projects that open onto a central pedestrian street, which acts as the central collective gathering space for the community (Markson, 1980). The units, predicated on the principles of existenzminimum, are multi-floored and typically have up to five bedrooms in order to accommodate large families (Taylor, 2006). PREVI's competition guidelines and the resulting designs were similar in their social aims; each house had to be able to accommodate at least eight people and many of the urban design proposals, including the winning design, utilized pedestrian streets as the main community gathering points (Ramis, 2012b). In addition to a rejection of the high-rise model, both projects also aimed to increase interaction with their contexts via the construction of smaller scale buildings. Alexandra Park was located in a largely three-storey neighbourhood, and PREVI drew from the local vernacular of shorter informal housing. Furthermore, both projects drew from the CIAM urbanism principles of the 1920s, as in May's projects, in that they each provided the project with a community centre and school. In short, each project had goals that drew from the 1920s model to help safely house lower-income people who were living in substandard conditions, regardless of their differing existing social housing infrastructure.

Figure C1. Vanauley Walk in Alexandra Park. The smaller scale of the building emphasizes a more "human scale" that more closely resembles town homes than housing blocks. The jig-jogging of the street also breaks up the street wall and makes the space more engaging (source: Ralston, 2016, September 30).

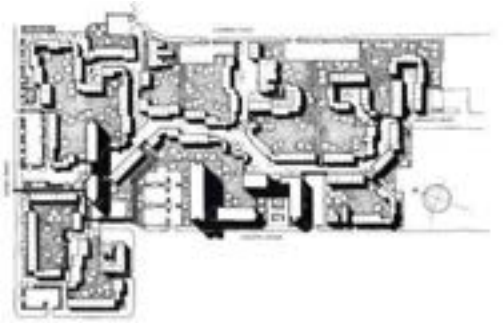

Fig ure C2. The master plan of Alexandra Park revolves around the central, curving Vanauley Walk and separates pedestrians from cars by placing parking lots on the perimeter (source: Jerome Markson Architects, 1968).

The Political Implications of PREVI and Alexandra Park: Development and Modernization

The similarities between PREVI and Alexandra Park end when the projects' respective aims are considered beyond the surface-level social and humanitarian goals, and instead to what degree these projects rejected high-rises and interact with the local vernacular. Jerome Markson, a popular modernist architect in Toronto, was selected by the City of Toronto to design Alexandra Park as part of the city's portfolio of urban renewal projects. The central aim of the design was not to interact with the local style, but rather to reject the failed high-rise typology, as evidenced by the limited contextual references (Taylor, 2006). The project did not borrow from the local vernacular beyond the brick material commonly used in Toronto and the local low-rise typology. The Alexandra Park project was designed as a response to the failure, as the media of the time attested, of the Regent Park designs (Purdy, 2004). When Markson designed the Alexandra Park housing project, rather than merely borrowing from the scales of the surrounding building, it seems that he aimed to differentiate the project from the stigmatized Regent Park project by adopting the low-rise "human scale" appearing in the 1920s Frankfurt am Main project in Germany (see Figure C1). The unit typology, as previously explained, was nearly identical to the existenzminimum units that May designed in Frankfurt am Main, and even the unit's fenestration is nearly identical to May's projects; each floor has a horizontal band window which creates natural light but maintains privacy, and the stairwells have vertical windows as in May's project (Taylor, 2006). The enclosed pedestrian street differs from May's designs that allowed automobile access, but the street's curving nature reflects the ideas of tranquility and limited site lines in May's projects to reinforce a sense of community (see Figure C2). Many mischaracterize Alexandra Park as a repeat of Regent Park, such as government officials; former mayor John Sewell argues that this is the case in his book on Toronto, *The Shape of the City* (1993). Alexandra Park is, however, dramatically different from Regent Park's Corbusian Towers in the Park as it draws directly from May's Frankfurt am Main low-rise typology and makes community spaces part of an enclosed street.

PREVI, in contrast to Alexandra Park, was an international competition and modernization project that was viewed as a cutting-edge modernist design intervention in an informal settlement rather than a project assigned to a local architect in a pre-existing social housing framework. Peter Land, a British architect trained in South America, created the idea of an international invitational competition to design 1500 experimental units drawing from the low-rise vernacular of the area to encourage fewer "unsafe" squatter settlements, and instead create safer, state-funded and -built social housing (Gyger, 2013). The invited architects from the international division were the stars of 1960s Western modern architectural practices with humanitarian aims: James Stirling, Charles Correa, Atelier 5, Fumihiko Maki, and Aldo van Eyck were some of the international architects involved (McGuirk,

2014). Fernando Belaúnde Terry, the president of Peru during the period, was trained as an architect and was widely known for his policies that aimed to modernize Peru and to restore its position as an important player in South America and the world, and supported multiple infrastructure projects during his first period as president in 1960-1968 (Castañeda, 2013). Belaúnde supported Land's idea for the competition in the mid-1960s and subsequently approached the United Nations Development Programme (UNDP) to fund the project in an effort to reduce the spread of informal squatter settlements in Peru through modern and government-mandated means (Gyger, 2013). The UNDP agreed to fund the project, even when Belaúnde's government was overthrown by a military junta (McGuirk, 2014). The involvement of the UN, as well as favouring Western architectural practices, suggests that Belaúnde's aspirations for development were to create a more advanced populace through low-rise housing and its connection to Western understandings of modernity. Therefore, PREVI is a developmental, modernist design intervention that created as a response to the illegal construction of informal settlements on state land.

A major point of different between PREVI and the Alexandra Park project is PREVI's self-help architecture style where the houses designed by each participant were meant to follow the "growing house" model that drew directly from the local vernacular rather than a static design as in Alexandra Park (see Figure D1). All architects involved in PREVI were required to spend a week in the informal settlements and create a design with the intention for low-income users to modify the units to suit their changing needs—self-help architecture. The growing house model aimed to provide the residents of the houses with a starting point, as Justin McGuirk explains in Radical Cities, for the eventual houses that they would build by adding onto the existing house (2014). For example, internationally renowned British architect Charles Correa's design emphasized flexibility; the design created the core served spaces on the bottom floor, but the strong structure encouraged further development for other rooms on the roof to increase the potential for density, illustrating Correa's limited expectations for formal purity over time (PREVI/Lima, 1970). However, if we consider the growing house model and self-help architecture rhetoric of the project in the context of Peru's broader history of dis-

Figure D1. Small pedestrian streets linked together the projects, and most were built at a small scale, emphasising the opportunity to densify housing projects by building upwards. Pictured is Fumihiko Maki's Metabolist project (source: Project Japan, Taschen/Köln, 2011, cited in Baumgartner & Ramis, 2012).

*Figure D2.*An aerial shot of PREVI reveals not only its low-rise scale, but also its urban design that aims at collective street spaces. The project, however, looks like it could be implanted anywhere; it is not exactly related to its context (source: grahamfoundation, copyright Peter Land, 1976).

sident informal settlements, the implications are problematic. Given that the project was spearheaded by famous Western modernist architects and funded by the UNDP as a development project to appropriate and improve upon the already-existing building techniques of low-income Peruvians who built their housing as a means to survive, the idea of self-help architecture in this context becomes conflated with issues of paternalistic modernization and colonialism. The participation of Western architects and the UNDP suggests that Peru was still considered to be ripe for modernization to better reflect the housing typologies of North America and Europe, and that the dissident informal architectures built to address the needs of the population that were not being addressed by the Peruvian government were insufficient and unsafe.

While Alexandra Park is highly reflective of Frankfurt am Main, PREVI is typically compared to the Weissenhof Siedlung (1928), which indicates that PREVI is viewed largely as an experimental project, and not necessarily as a housing project to help house people living in substandard conditions. While the PREVI competition originally selected three winners from each category to build a total of 1500 units, the competition format was abandoned because of a desire to test all of the entries, and all 26 were included in the first phase of the project for a total of 500 units (Ramis, 2012a) (see Figure D2). The remaining phases were never built, thus making the built portion of the project a collection of many different architects' designs (Ramis, 2012a). The Weissenhof Siedlung's master plan was drawn up by May, and featured the work of a number of popular modernist architects such as Mies van der Rohe and Le Corbusier, and was primarily developed as an experimental platform for various architects to experiment with designs, and not necessarily to address a particular issue (Gyger, 2013). The comparison of PREVI to the Weissenhof Siedlung thus suggests that the relationship architects had with the Peruvian project was a platform to test ideas rather than a humanitarian project. This again problematizes the relationship of the Western architects to the project because it suggests that it was largely a superficial means to experiment for future work.

The most important difference between Alexandra Park and PREVI, however, is who they each aimed to house. Alexandra Park, as part of the urban renewal portfolio for the City of Toronto, displaced a number of low-income residents, though the spaces were intended to house low-income people through rent geared to income or affordable housing units (Filion, 1988). The displacement of many low-income people is certainly problematic and continues to be widely criticized, but the project was at least specifically reserved for housing low-income households because an institutional welfare system existed within Canada. PREVI, by contrast, was not intended to house poor Peruvians, but acted as a model project to inspire future projects. The development model was oriented towards middle-class Peruvians who could afford to pay for the later phases of the project, but the project eventually became too expensive due to delays to be affordable for even middle-class dwellers (Gyger, 2013). The project, however, was largely celebrated for its work to house Peruvians previously living in substandard housing, which again construes the frame of the project. PREVI thus becomes an example of President Belaúnde's efforts to modernize Peru regardless of to what degree it actually improved the lives of low-income people.

Conclusion

Overall, both Toronto's Alexandra Park and Lima's PREVI use principles expounded by the 1920s Ernst May projects to develop low-rise social housing, though Alexandra Park adheres more strongly to these principles than PREVI, which undertakes an experimental rhetoric. To some degree, the re-emergence of the low-rise typology for social housing popularized by Ernst May in the 1920s for both projects is tied to the worldwide notion that high-rise housing, a trend started by Le Corbusier in Marseilles, was an abject failure and was not sufficient to house low-income people because a number of social issues occurred in the buildings. However, if we consider PREVI in greater detail, the project did not necessarily reject the high-rise as a failed model but rather reacted against the dissident informal settlements in Peru that overtook state land. Instead, PREVI attempted to modernize the existing informal housing landscape through a Western paternalist lens by appropriating its experimental qualities, while simultaneously acting as a laboratory for architects and a vehicle for Belaúnde's desire for Peru to appear modern in the eyes of the West. Thus, it seems that despite well-intentioned work in the Global South, by taking on the local vernacular in architecture, the systemic issues that surround the project cannot be erased when modernism is applied as a developmental project without an institutional framework to at the very least support residents.

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Improving Toronto's Business Improvement Areas and Considering Commercial Rent Control as Another Policy to Support Small Businesses

Martin Marchiori-Wong

The first business improvement area was founded in Toronto, and successor organizations are now recognized as official service agencies of the city's municipal government. However, the city's policy regarding business improvement areas neglects the small businesses in lower income neighbourhoods and the original commercial and residential tenants of gentrifying areas. Indeed, Toronto's system of BIAs contributes to the spatial polarization and gentrification of the city's small business communities. This paper proposes greater funding for business improvement areas in lower income neighbourhoods, the introduction of a levy cap for others, equal representation for local residents on each organization's board, and commercial rent control as policies that would improve Toronto's business improvement areas. Ultimately, these recommendations have broader implications for studying citizenship and public policy issues at the municipal level in Canada.

Introduction

Toronto established the world's first business improvement area, or BIA, in 1970 (Ontario Ministry of Municipal Affairs and Housing, 2015). The Bloor West Village BIA started collecting a mandatory levy from local businesses to fund streetscaping, community events, and marketing initiatives to attract visitors and new customers to the neighbourhood (Bradburn, 2013). In Toronto today, BIAs are recognized as official service agencies in the city's governance structures (City of Toronto, City Manager's Office, 2017a). However, Toronto's system of BIAs has not benefitted all stakeholders, in particular small businesses in lower income neighbourhoods and the original commercial and residential tenants of gentrifying areas. In this paper, I will propose reforms that would improve Toronto's policy regarding BIAs. For example, greater funding for BIAs in lower income neighbourhoods and the introduction of a levy cap for others would help reduce spatial polarization. Further, equal representation for local residents on the boards of BIAs would improve the participation of the wider community, and might reduce each organization's contribution to gentrification. I will also argue that commercial rent control is another policy reform by which the Ontario provincial government could support small businesses in Toronto and across the province.

Toronto's Business Improvement Areas: Polarization and Gentrification

Chapter 19 of the Toronto Municipal Code regulates the city's BIAs (City of Toronto, 2016b). This legislation defines the mandate, responsibilities, and financial requirements of each organization (Green, 2008). This policy, however, has not produced outcomes that benefit all stakeholders, including small businesses in lower income neighbourhoods. In Toronto, BIAs are funded by a property tax levy which is paid by all commercial properties within their boundaries (Toronto Association of Business Improvement Areas, n.d.). Each member's individual levy is determined by their share of their neighbourhood's total property assessment, while the Toronto

municipal government does not provide any funding for the operating budgets of the city's BIAs (Toronto Association of Business Improvement Areas, n.d.). Consequently, BIAs in locations with higher property values will have access to more financial resources than those in lower income neighbourhoods. Indeed, the City of Toronto's Business Improvement Area Office (n.d.) warns that "[BIAs] with large assessment bases are… able to levy more funds from [their] members at the same tax rate as [BIAs] with smaller assessment base[s]." One outcome of Toronto's policy regarding BIAs then is that the business communities with the greatest organizational capacity to promote themselves are those that are already located in the city's most desirable neighbourhoods.

A comparison of the operating budgets of Toronto's BIAs for 2016 illustrates this pattern of spatial polarization. Many of the BIAs with the greatest operating budgets, like the organizations that represent the Bloor-Yorkville, Downtown Yonge, Entertainment District, Bloor Street, and Financial District areas, are located near Toronto's downtown (City of Toronto, 2015). Meanwhile, priority neighbourhoods with their own BIAs, such as Mount Dennis and Weston, have some of the lowest budgets (City of Toronto, 2016a; City of Toronto, Social Policy Analysis & Research, 2017). Accordingly, Toronto's policy regarding BIAs does not appear to have benefitted small business communities in lower income neighbourhoods. These budgets substantiate Goar's (2011) claim that Toronto's BIAs have made the city "more polarized [since] prosperous neighbourhoods [have] become more attractive, [while lower income] neighbourhoods… [have fallen] further behind." Indeed, BIAs in lower income neighbourhoods have less resources with which to respond to their members' needs (Morçöl et al., 2008, 5). Similarly, Lee (2014) finds that "immigrant gateway" communities have the BIAs with the least financial capacity. Thus, reforms are necessary to support small businesses in Toronto's lower income neighbourhoods, while also limiting the resources with which organizations in already prosperous areas can use to promote themselves.

Toronto's policy regarding BIAs, though, has not necessarily benefitted small businesses and residents in thriving neighbourhoods. BIAs that attract new customers to a neighbourhood can contribute to higher property taxes or rents as the demand for local real estate increases (Caruso & Weber, 2008, 332). Consequently, some of the area's original commercial and residential tenants might be displaced if they cannot afford the higher rents, or if the properties that they occupy are demolished for the construction of a new building or land use (Caruso & Weber, 2008, 332). Further, the remaining residents could also suffer from "the disappearance of affordable amenities" as more expensive stores move into the area (Mazer & Rankin, 2011, 824). Chapter 19 of the Toronto Municipal Code states that the official mandate of the city's BIAs is to promote their neighbourhoods as "business, employment, tourist or shopping areas" (City of Toronto, 2016b). However, since BIAs are not required to consult others about their program decisions, there is no public accountability for any gentrification that occurs in the community (City of Toronto, 2016b). Hence, another outcome of Toronto's policy regarding BIAs is that local residents are unable to participate in governing decisions that can make their neighbourhoods more popular yet costly.

The actual contributions of Toronto's BIAs to increases in local real estate values suggest that their actions have produced some negative externalities that are associated with gentrification. Rankin (2008) finds that the West Queen West and Roncesvalles neighbourhoods, which have two of the city's more

active BIAs, experienced average land value increases between 2001 and 2005 that were respectively 36% and 19% greater than the average land value change in the surrounding area. Further, Darchen (2013) and Catungal et al. (2009) claim that BIAs are "leading to [the] gentrification of inner city areas in Toronto," like the Entertainment District and Liberty Village neighbourhoods (p. 190; p. 1100). Although individual BIAs make varying contributions to the gentrification of their neighbourhoods, it seems that their overall decisions prioritize stakeholders that benefit from the incidence of more affluent customers and higher real estate prices. Indeed, the residents and business members that are not involved in the administration of their local BIA "are usually those most vulnerable to increases in property values" (Rankin, 2008). Accordingly, Toronto's BIAs should be required to have equal board representation for local residents in order to ensure that each organization's decisions are informed by members from the wider community.

Improving Toronto's Business Improvement Areas

The Toronto municipal government could lessen the spatial polarization that is associated with its current system of BIAs by providing greater funding for organizations with less financial capacity. For example, the City of Toronto's Business Improvement Area Office (2015) proposed a "Stepping Stones to Success" grant program that would provide $50,000 to BIAs in lower income neighbourhoods. Although greater financial assistance might be required to meaningfully improve the capacity of these organizations, it is encouraging that the Toronto municipal government is already considering such action. However, additional reforms are needed to address the disparities between Toronto's small business communities. Indeed, a levy cap could be introduced to prevent the city's wealthier BIAs from collecting excessive funds, as was the case with the Bloor-Yorkville BIA's $3,019,696 operating budget for 2016 (City of Toronto, 2015). Comparable levy caps have been used by municipalities in California, Kansas, Massachusetts, and Michigan to prevent higher capacity organizations from overwhelming their less advantaged counterparts (Jimerson, 2006). Further, a levy cap would also support small businesses in higher and lower income areas alike since a maximum levy would limit the costs that are borne by the individual members of BIAs (Harold, 2005; City of Kelowna, 2013). Together, the provision of greater funding for BIAs in lower income neighbourhoods and the introduction of a levy cap for other organizations would help address the spatial polarization that is currently associated with Toronto's existing policies.

Another reform to Toronto's policy regarding BIAs could be a new requirement that local residents be represented equally on each organization's board. Although some residents would not oppose gentrification, it is more likely that BIAs would emphasize other goals besides attracting more customers to the neighbourhood following input from the wider community. Further, this reform would address Hoyt and Goppel-Agge's (2007) claim that the democratic shortcoming of BIAs arises from their "boards [having] inequitable representation of residents [and] voting that devolves larger property owners more authority" (p. 951). Indeed, the greater participation of local residents in Toronto's governance structures would facilitate an urban citizenship reminiscent of what Harvey (2008) associates with the "right to the city" (p. 23). Residents could be chosen as board members, though preferably not by having business owners or politicians appoint their allies to the positions. One option would be to randomly select people living within or nearby each BIA, resembling the process by which citizen's assemblies

were chosen in British Columbia and Ontario in the mid-2000s (Pateman, 2012, 8-9). Alternatively, BIAs could be required to have members "nominated by a local resident's association" (City of Toronto, City Manager's Office, 2017b). It could also be necessary for residents that served on a BIA board to not have any business holdings themselves to avoid a conflict of interest (Justice & Goldsmith, 2006, 127). Overall, any change that required the equal board representation of local residents would improve the democratic participation of the wider community, and might reduce each BIA's contribution to gentrification.

Commercial Rent Control as an Another Policy to Support Small Businesses

Changes to Toronto's existing policy regarding BIAs that addressed the outcomes that are related to polarization and gentrification would be significant reforms. However, there are other policies that could be considered to support the city's small businesses. For example, the Toronto municipal government could provide a property tax rebate to all small businesses or specifically to those that are located in lower income neighbourhoods. Further, commercial rent control would support small businesses in Toronto, and prevent their displacement following increases in demand for local real estate. Residents have similar protections under the Ontario provincial government's Residential Tenancies Act, which limits their rent increases each year (Pigg, 2013). However, there is no corresponding legislation that limits rent increases for commercial properties in Toronto or in any other Canadian city (Central Business Ontario, 2015). The regulation of rent increases for commercial properties would benefit all small businesses, and would counter some of the negative externalities that are associated with Toronto's system of BIAs. Schaller and Modan (2008) argue that "institutionalized safety nets like rent control [would] secure the tenure of… small businesses" that are experiencing pressures from gentrification (p. 381). It would also prevent property owners from excessively raising commercial rents as with the 50 percent increase that was imposed on a small business in the West Queen West neighbourhood (Balkissoon, 2010). Therefore, commercial rent control is another policy option that would support Toronto's small business communities.

It should be noted that policies that are related to rent control for residential or commercial properties are under the jurisdiction of provincial and territorial governments according to their oversight of "civil and property rights" in Canada's Constitution (Lampert, 2012). For example, small businesses owners in Vancouver have called on Premier Christy Clark to include commercial rent control in British Columbia's Commercial Tenancy Act (Korstrom, 2013). Notwithstanding greater authority for Canadian municipalities in more policy areas, the realization of commercial rent control in Toronto would depend on its implementation by the Ontario provincial government Good (2008). However, since Premier Kathleen Wynne has faced opposition to her recent decision to extend rent control to all residential properties across the province, the Toronto municipal government might have to lobby for such changes only after pursuing reforms to the system of BIAs that is within its mandate (Kalinowski, 2017). Although Keating (1985) maintains that commercial rent control should apply to specific properties, it is debatable how to most effectively target support for the "small, neighborhood-serving [sic] businesses that need protection most" (p. 181). Indeed, it is questionable whether "the size of rentable space [and] the number of employees" are appropriate measures for determining the support that is needed for small businesses (Keating, 1985, 181). Nonetheless, any commercial rent control that is introduced by the Ontario provin-

cial government would benefit small businesses in Toronto and across the province. Despite challenges that are related to its application, commercial rent control should be considered as another policy that would support Toronto's small businesses alongside reforms to the city's system of BIAs.

Conclusion

Toronto's existing policy regarding BIAs has not benefitted all stakeholders in the city, including the small businesses in lower income neighbourhoods and the original commercial and residential tenants of gentrifying areas. I argue that policy reforms such as greater funding for BIAs in lower income neighbourhoods, the introduction of a levy cap for others, and equal representation for local residents on the boards of BIAs would address some of the shortcomings of Toronto's current legislation. Further, I suggest that commercial rent control is another policy that would support small businesses in Toronto, despite the challenges that are related to its implementation. These recommendations have broader implications for understanding citizenship and policy issues at the municipal level in Canada. This paper suggests that government action might be necessary to reduce the barriers that individuals experience in participating in local decision-making. It also supports the idea that Canadian municipalities require greater authority in many policy areas, such as commercial rent control, to address the unique challenges that are faced by their constituents.

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The Canary District: Evaluating Early Economic and Social Sustainability in a post-PanAmParapan Am Games Legacy Community

Vanessa Opassinis

Thanks to the hosting of the 2015 Pan Am/ Parapan Am Games, Toronto is home to a new post-games legacy waterfront community - The Canary District. The neighborhood claims to be built on notions of economic and social sustainability. Are these trends found in economic growth in the adjacent neighborhood of the district? How accessible is this social infrastructure within this community to various groups, and what does that reveal about Toronto's long-term social goals? As the city's waterfront continues to under-go intense redevelopment based on ideals of economic and social sustainability, the answers to these questions are essential in realizing equitable growth in Toronto's waterfront urban redevelopment.

Introduction

Mega-events can spur new processes of urbanization in their host cities. For Toronto, hosting the 2015 Pan Am Games helped build a new waterfront community, The Canary District. Previously used as an Athletes' village, where the games housed their athletes, it is now a mixed-use and mixed-income community and is built on new urbanization processes based on economic and social sustainability ("Athletes Village," n.d; "Canary District," n.d). This paper will be focusing on how the new Canary District is currently developing, and what effects this has had on the adjacent neighborhood, known as Corktown. The Canary District and Corktown are located in the Toronto waterfront area known as the West Don Lands (WDL). Therefore each neighborhood's development contributes to the social and economic sustainability of Toronto's greater waterfront area, and Waterfront Toronto is the organization leading the redevelopment of Toronto's waterfront lands.

Principles of economic and social sustainability are outlined in the planned legacies of the project within the Pan Am Bid Book. A key factor in achieving the aim of social and economic sustainability and the long-term benefits of inclusivity is the plan for housing and amenity provision in the district. Thus, whether economic growth and social sustainability can be compatible in the long-run is contingent on housing policy and local agency, for each have implications on the "social-mix" aspect of the district. As Toronto's waterfront continues to develop and cities continue to host mega-events, early evaluation of legacy should be conducted to ensure successes and potential failures are noted and learned from.

In this paper I draw on Waterfront Toronto's definitions of social sustainability and economic sustainability and the planned legacies outlined in the Pan Am Bid Book to evaluate current conditions and provide recommendations for success, specifically focusing on notions of equity. I use data and interviews from resident and professionals in the area to garner the extent and nature of economic growth in Corktown. I also draw on interviews with the two social housing agencies to evaluate the extent to which the aims of social sustainability are being met. I argue these social and economic goals are apparent in the planning,

infrastructure, population and commercial status of the redevelopment of the Canary District and Corktown. However, if these characteristics are to be sustained in the long-term in the greater WDL area, the interests and perspectives of community members and more equity-based policy must be taken into greater account.

The New Don Lands

The City of Toronto and the Greater Toronto Area hosted the Pan Am Games from July to August of 2015. The Pan American Sports Organization, the organizing body of the Pan Am/ Parapan Am Games, requires host cities to house the incoming athletes and officials in what is called an "Athletes' Village". Toronto formed an Athlete's village in six buildings within the West Don Lands (WDL) area of Toronto. Previously a provincially owned 80-acre former industrial area that had become a brownfield site, this location hosted over 10, 000 athletes and officials (Rana & Kapamas, 2005; "Toronto 2015 Pan," 2015).

Though the Pan Am games are over, this site is still undergoing redevelopment, and is now acknowledged as the Canary District ("West Don Lands," n.d). The Canary District was to be built regardless if Toronto held the games or not ("Toronto 2015," n.d). However, the Pan Am Games sped up the timeline of the initial plans for redeveloping this area of the WDL by seven years (Jaihal, 2012). Post-Games, the six buildings constructed now consist of four residential towers - two of which are dedicated to social housing, a George Brown Student Residence, and a YMCA. The area has also seen the development of a new eighteen-acre park called Corktown Common's ("West Don Lands," n.d).

Definitions and Benchmarks

Two key documents will be used in the paper that define the legacy of the Athletes' Village and what guided its development post Pan Am games. These documents are the Bid Book and West Don Lands Precinct Plan. The former is what the City of Toronto presents to the Pan Am Organizing Committee to showcase potential impacts and benefits that hosting the games would have in Toronto neighbourhoods. The latter is a master plan completed in 2005, and is a comprehensive set of guidelines on how the area is expected to develop, ranging from use of public space to transportation ("West Don Lands Precinct," 2005). The precinct plan outlines and informs how exactly the claims in the Bid Book can be realized.

In this paper, social sustainability will be defined as creating functional neighbourhoods that put the lives of people first with provision of a range of sustainable amenities ("Social Performance," n.d). From 2003 to 2004, extensive public consultations as to how to incorporate social and economic sustainability in urban planning were held. The key results were accessibility and good use of public spaces, provision of amenities, and mixes of social and market-based housing. These have had a large influence on the precinct plan ("West Don Lands Precinct," 2005; "West Don Lands Precinct Plan," 2004). Currently, all developments in this area must be pre-approved by Waterfront Toronto to meet the green and sustainable development criteria of what is known as LEED Gold building standards, and this must be approved before developers can purchase and build on the land ("West Don Lands," n.d).

The Bid Book describes the Athletes' Village as being a post-games legacy community that will be "economically, socially and environmentally sustainable" ("Toronto 2015," n.d). The goal of redeveloping the waterfront is to counter unsustainable development, which the Bid Book identifies as urban

sprawl. Additional policy goals outlined in the Bid Book include building sport infrastructure, high-quality affordable housing, and environmentally friendly transportation ("Toronto 2015," n.d). Not only is the Canary District LEED Gold Certified, but the Bid Book also claims that the Canary District is eligible to meet LEED Neighborhood Design (ND). LEED ND takes walkability, affordability, community diversity, and community involvement into account ("Toronto 2015," n.d). Waterfront Toronto analyzes their economic and social performance with a wide variety of measures, which will be used to reference whether the Canary District matches the Bid Book's claims. In particular I will be looking at specific economic indicators of commercial vibrancy and population growth, and analyze these through corresponding changes in the local housing market ("Economic Performance," n.d; "Indirect Economic," n.d).

Relevant Literature

Few studies have been conducted about Pan Am Athletes' Villages and their long term impacts after conversions on their host neighbourhoods. However, there is an abundance of research on hosting mega-events as catalyst for urban redevelopment. Various Athletes' Villages formed from mega events like the Olympics and Commonwealth Games have been analyzed to understand their uses and impacts post-games; specifically by scholars such as Bornstein (2010) and Matheson, who focus mega-event led urban revitalizations (2010). Alternatively, Marxist geographers greatly focus on waterfront redevelopment as a manifestation of the neoliberal agenda of urban redevelopment, and how the term sustainability acts as a mask for state-led gentrification (Bunce, 2009; Raco, 2005; Bunce & Desfor, 2007). Other researchers have instead evaluated mega-event led urbanization and the Athletes' Villages effects on spurring economic growth. Also considered are issues surrounding community benefits and inclusivity (Yamawaki & Duarte, 2004; Kearns, Clark & Cleland, 2016; Kontokosta, 2011; Bornstein, 2010; Atkinson & De Lisio, 2004).

This paper builds on the latter body of literature in the context of planned social and economic sustainability post neighborhood transformation. This is important as Waterfront Toronto is continuing urban development beyond the WDL area. Early evaluation of The Canary district development progress provides an example of what aspects of sustainable development and current policies are successful and promote inclusivity, and which need to be changed (Lu & Yang, 2014).

Facets of Local Economic Growth

One of the key aims of this paper is to understand if housing prices and commercial enterprise has increased at an equal level between the Canary District and Corktown after the games, and how that relates to sustainable economic development. When cities host mega-events like the Olympics, expected economic benefits from the Olympics include employment growth, increased retail sales, and increased housing prices due to new amenities in the host location (Kontokosta, 2011). However studies show that regions in which Olympic Athletes' Villages are located may or may not see equal increases in property prices. This was the case for Sydney, Australia after the hosting of the 2000 Olympic Games. The region where the Athletes' village was located in experienced increased housing prices at highly uneven levels throughout the region due to poorly foreshadowed urban development instigated by the Olympic games, leading to unequal and unsustainable urban growth (Yomokaski & Durante, 2014; Kontokosta, 2011).

The Canary District is located next to an existing affluent community called Corktown

(S. Apallas, personal communication, October 14, 2016). It is important to note that the first development in the WDL was not the Athletes' village. In 2014 a LEED- certified development called River City completed the first phase of Toronto's Waterfront reconstruction ("West Don Lands," n.d). From 2014 to 2015, Real Estate Board analyzed that the composite housing prices in the area of Corktown and future Canary District area grew 3.45% ("Market Watch," 2015). From September 2015 to September 2016, there was composite change of 9.77% ("Market Watch," 2016a). From October 2015 to September 2016 there was an 11.69% increase ("Market Watch," 2016b). This comparison indicates housing prices in the Canary District is located in are rising. However, does this also indicate that the development of the Canary District contributed to their increase?

There is a likely chance prices may have initially increased because of the new attention to the area the Athletes' Village was located in, complementing the general rises in real estate prices occurring throughout Toronto at similar times ("Market Watch," 2016a). Member of the Corktown Residents and Business Association (CRBA) board of directors, Socrates Apallas, claims the hosting of the Pan Am games did bring attention to the neighborhood. He states that most people who now visit the area did not even know Corktown existed prior to the games (personal communication, October 14, 2016a). In a recent downtown Toronto population study conducted by the Canadian Urban Institute, the neighborhood The Canary District is located in, which they identify as "St. Lawrence-Distillery", reached an estimated 2015 population of 10,075-10,295, an almost 4000 person increase since a 2011 population of 6, 388 ("TO-Core," 2016). Apallas highlights this increased attention to the area and how this may have played a role in the increased real estate prices. Furthermore, Resident of Corktown for over two years Chris Vassalos observed that there has been an increased amount of people and shops opening up today than when he first moved to the area two years ago (personal communications, October 14, 2016b). This suggests that population intensification and commercial vitality are mutually supportive which can contribute to the economic sustainability sought by Waterfront Toronto.

However, the current population levels and their correlation to commercial vitality are further reflected by Apallas's voiced frustrations that retail along Corktown's major street, Queen St. E, is still not what it could be. Slow growth of commercial activity is still present, and according to Apallas, this is due to the CRBA not having the same powers as a "Business Improvement Area" (BIA) projects, for monetary capacity of the association is limited (Personal Communications, October 14, 2016a). Vibrancy is a measure of economic sustainability, and Waterfront Toronto defines vibrancy as attracting people and businesses to the neighborhood, emphasizing that commercial development should be further pursued ("Economic Performance," n.d).

The commercial edge the Canary District has within the neighborhood and Corktown is its branding as a healthy life-style district. The development is guided by the slogan "LiveWorkPlayLearn" to hand pick storefront retail to match healthy lifestyle choices (Socrates Apallas, personal communication, 2016). Branding is a tool of economic development and competition and is common in the production of urban space. Branding may be a strategy for the Canary District to create an increasingly vibrant commercial and retail strip that matches their definition of economic sustainability (Munoz, 2006). In the future, once all current and under review real-estate developments are complete, the population is estimated to total to 19,225-20,075 ("TO-

Core," 2015). As the area matures, an evaluation is needed whether the Canary District and Queen St. E's retail area have stable and similar amount of commercial activity. Increased retail on Queen St. E. may be a long-term effect of increased population growth. However, it remains to be seen whether uneven urbanization processes will result in Corktown, resulting it to need a BIA to obtain greater neighborhood economic sustainability. In either situation, Waterfront Toronto can learn that medium to high residential density with a close commercial district creates economically sustainable environments. In future waterfront development, the commercial and residential planning should be repeated.

Housing and Neoliberal Contestations

Though medium to high-density housing should be repeated, can housing supply and demand ever meet an equilibrium and be affordable to a variety of groups? According to Julian Soriano, a real estate agent active in Corktown and the Canary District, Toronto is in need of increased supply of market housing. When supply and demand are not in sync, prices will continue to rise (personal communications, October 7, 2016). If market housing supply increases, government policy must intervene to ensure the area maintains itself as a truly mixed-income neighborhood with sufficient provision of social housing. Scholar Matheson's (2010) analysis of the Glasgow Commonwealth Games in 2014 argues that during event-led urban regeneration, the government must keep in mind the potential of this inducing gentrification processes and have long-term plans to address this matter. This intervention is important because as the area's population rises, it often experiences increased attraction and its retail sector expands. This can induce gentrification through increased land values in the area, displacing poorer residents (Kontakosta, 2012; Bornstein, 2010). However, the Glasgow Games Village was located in a lower-income neighborhood, which may be why the community experienced displacement (Clark, Kleland & Kearns, 2016). Alternatively, the Canary District is located in a brownfield site and did not have to displace any existing households. Rising real estate prices mainly raises concern regarding whether the Canary District will turn into a predominantly affluent community or remain mixed-income, and how this will effect economic and social sustainability in Corktown and the greater waterfront area.

An example of a policy that can mitigate the negative effects of rising real estate prices is the creation of a National Housing Strategy (NHS) and a National Aboriginal Housing Strategy (NAHS) (M. Ashton, personal communication, October 17 2016; A. Palmer, personal communication, October 21, 016). The National Housing Act was renounced in 1996 by the federal government, which eroded federal ability to create affordable housing and downloaded responsibility to the provinces, and then eventually down to municipal governments. Palmer cited that at the time of applications for units to the new Wigawamen building, they had 650 aboriginal families on the waitlist. Currently, they have 800, even after some have been housed. This indicates that Toronto has a serious housing affordability issue that municipal governments alone are unable to effectively manage (personal communication, October 21, 2016). A national strategy aids to the development of long-term goals of economic and social sustainability by having a comprehensive federal framework to assist municipalities in addressing housing affordability across different groups. Implementation of a NHS/NAHS could further cement the long-term goals of social mix in a vibrant area. (Jago, Dwyer, Lipman & Vorster, 2010; Lu & Wang, 2014; Shapcott, 2007).

Tokenization of Social Housing and Establishing Social Goals

Economic and social sustainability are intricately linked and are not mutually exclusive measures. Facets of economic sustainability such as population growth and housing provision are best understood when facets of social sustainability are analyzed. This includes the provision of amenities provided for rising populations, and mandates for social mixing of these rising populations. The new transit, walkability of the district, public consulting, and the district's proximity to the Toronto's downtown core all reflect Waterfront Toronto's measures of social sustainability. An integral question to ask is whether the amenities are accessible to a diversity of groups. The amenities may be but scholars Atkinson and De Lisio (2010) argue sustainable mega-event spurred infrastructure is typically for the elite to enjoy. If this claim is applicable to the Canary District, what does that reveal about social sustainability and future urbanization processes in Toronto's waterfront area (Clark, Kearns & Cleland, 2016)?

Mega Events do have the capability of deepening geographical polarization of low and high income demographics (Yamawaki & Duarte, 2014). Critical urban scholar Bunce (2009) argues middle class waterfront development reveals different values and tensions between different class groups that exist in urban spaces. In the context of a mixed-income community, scholars Clark, Kearns and Cleland (2016) discuss how the addition of social housing in waterfront development can be a guise for neo-liberalism, and "mixed-income communities" can be used for marketization or appeal of the area and lead them to be further exploited. Neoliberalism is an ideology whereas market forces dictate the evolution of urban space, yet different actors compete to make an area more appealing for capital (Peck, Theodore & Brenner, 2009). As noted before, the area is embedded in economic competition, and this could erode its ability to maintain itself as a mixed income neighborhood.

Tokenization of social housing raises the question whether the continued urbanization of the Waterfront area will be socially sustainable, as well as if the development even is now. In the Canary District there is a total of 767 housing units. 100 of these are affordable home ownership and 253 affordable rental housing between two non-profit social housing providers, Fred Victor and Wigawamen. Additionally there is a new Toronto Community Housing complex in the WDL with a total of 242 units ("Affordable Housing," n.d). The presence of social housing is essential for Waterfront Toronto's definition of social sustainability. The two heads of the social housing providers of the buildings, Fred Victor's Executive Director Mark Ashton and Wigawamen's General Manager Angus Palmer, spoke positively of the affordable housing mandate in the Athletes' Village legacy and the opportunity for social housing in the waterfront (personal communications, October 17, 2016; personal communications, October 21, 2016).

One cannot dismiss social housing as pure tokenism when the topic of affordable housing was a key goal substantiated in public consultations by Waterfront Toronto alongside the provision of amenities. Yet evidence shows that the neighborhood currently is meeting the definitions of social sustainability. Important to note is that there has also been previous calls by scholar Helen Lenskyj (2006) to mandate an affordable housing legacy when Canada hosts mega-events. In fact it was a group of residents from Corktown that spurred the government to develop long-term goals for the former industrial site to include affordable housing (Damajanovic, 2015). The city has also held public consultations for the development of the West Don Lands since the approval for the precinct plan (Jailal, 2012).

This public consultation is important to note because critiques of legacy planning cite undemocratic processes of decision-making in legacy development (Atkinson & De Lasio, 2010). However, this is clearly not the case in the redevelopment of the WDL area.

Democratic decision-making and positive remarks by the social housing providers show how economic growth is not the only goal of Waterfront Toronto. Alongside the long-term planning and public consultations, Waterfront Toronto's financial plan for the building and provision of social housing indicates the corporation does have an embedded interest in ensuring the Canary District housing remains socially-mixed. Lessons were learned from the failed provision of social housing in the Vancouver 2010 Olympic Games Athletes' Village. The organizers had to sell off their planned social housing because too much financial risk was placed on the housing market, along with poor budgeting (Jailal, 2012). The lessons learned from Vancouver, alongside the community input, shows that the inclusion of affordable housing was not just tokenism. Long-term financial strategies and intensive public consultations should be repeated in future developments and mandates of Waterfront Toronto.

Social Legacy

Legacy planning that is founded on long-term visioning can produce tangible positive effects (Matheson, 2010; Jago et al., 2010). One may argue that in the broader context of the WDL development, there is still not enough social housing, and prospects of economic development trumps the welfare of those occupying social housing units (Hall, 2006). Ashton, in response to the concern of the amount of social housing, stated how one must consider "what is the value of a mixed-income community?" To Ashton this is eradicating stigma associated with persons who live in social housing. Alongside social mix, high quality housing plays an essential role too (personal communication, October 17, 2016). Angus Palmer added that ensuring buildings are well maintained further eradicates the stigma lower income members of the community face (personal communications, October 21, 2016). The 2014 Glasgow Commonwealth Games cited the high quality of the new housing built as a great benefit to the lower-income community members of the neighborhood, for they experienced large amounts of stigma as indicated by Ashton and Palmer (Clark, Kearns & Kleland, 2016). As stated in the Pan Am Bid Book, high quality affordable housing is a policy objective ("Toronto 2015," n.d). However, stigma eradication of the users of social housing through building design and maintenance is essential for an inclusive legacy and sustainable community defined by Waterfront Toronto. Therefore, high quality affordable housing must be provided with similar levels of sophistication that higher income residents experience, as it would contribute to a more socially sustainable Waterfront redevelopment in Toronto.

Maintaining and Building Inclusivity

A key aim of this paper is analyzing whether the amenities in the Canary District were in fact accessible to the groups living in social housing. Angus Palmer and Mark Ashton were both pleased with the amenities in the area and believe they are all accessible to their clients (personal communications, October 17, 2016; personal communications, October 21, 2016). Palmer, whose clients are mainly low-income Aboriginal persons and families, stated the area was "well done (in) developing social infrastructure" (personal communications, October 21, 2016). The infrastructure refers to not only the social housing, but also the new YMCA, and 23 acres of public space and parks accessible to different groups. Currently, Waterfront Toronto is in

the process of repurposing a heritage property on site into an Anishanawbe Health Centre. The center will be an aboriginal cultural hub that is accessible to various communal groups (Webb, 2016). The ensuring of a diverse array of social infrastructure should be repeated in as the development of the area continues. A recommendation for Waterfront Toronto going forward with the whole of Toronto's waterfront development is ensuring assets, such as surplus land, are available and can be used in an equitable fashion for community benefit and long term inclusivity. As the WDL population of homeowners rises alongside residents in social housing, maintaining the Canary District's current level of social sustainability is feasible. Rio de Jainero's experience hosting the Pan Am Games in 2007 highlights the success of the Canary District's social benefits. Rio has been criticized for not using the games to address social needs or build public infrastructure. They did not incorporate any long-term planning (Jailal, 2012). Long-term visioning, grounded in the precinct plan, makes the Canary District a successful example planning for how hosting mega events can spur social benefits across neighboring communities that can be sustained, as the district evidently has great potential to maintain itself as an equitable redevelopment area (Jailal, 2012).

How is inclusivity actually enhanced by development of social infrastructure? Palmer suggests this remains to be seen in the Canary District, as he quotes "building does not come automatically with acceptance, it comes with knowledge and experience and knowing people, and acceptance comes from people who are middle class seeing those buildings occupied by others are not different, these people are not others, they are human beings" (Per personal communications, October 21, 2016). Utilizing the social infrastructure through community events that can attract the diversity of groups living in the district will help realize the benefits and strengths of inclusivity and add to the district's successful attainment of social sustainability. Currently as a community-builder, Apallas voiced frustration at the difficulty of building a strong community, and Vassalos cited feeling a lack of community in Corktown (personal communications, October 14, 2016a; personal communications, October 14, 2016b). Economic sustainability may help build community and inclusivity because of the increased attention can attract a diverse population to the neighborhood. However, maintaining inclusivity requires agency. Different organizations such as the CRBA and social housing providers should utilize the potential of community centres and public spaces and build the values of accessibility and diversity into this social infrastructure, to ensure they are accessible to a wide range of groups within the neighbourhoods. Perhaps the new facilities, paired with growing population levels and continued use of public spaces used for leisure time and activities, can help generate an inclusive community. In the long-term scale, increased research is needed to examine whether different groups living in the Canary District and Corktown feel it is an inclusive community in which they feel they belong.

Conclusion

The Canary District is a window into the future of Toronto's continued waterfront development. The post-games legacy community is guided by the mandates outlined by Waterfront Toronto and the Pan Am Bid Book of economic and social sustainability. Though the area is embedded in economic competition, the neighborhood of Corktown is benefiting from increasing house prices and commercial activity from an increasing population. However, in the long-term, a National Housing Strategy and BIA for the neighborhood would assist in the creation of more eq-

uitable economic market and housing conditions.

The social housing and amenities in the area, including transit and vast public spaces, are accessible to a diverse group due to over 500 units of social housing in the area. The high levels social housing and social infrastructure are catalysts for social change, which is strengthened through long-term agency. Increased population and attention to the area can aid to this catalyst and should be utilized by community agents. Further studying of the Canary District and how goals of economic and social sustainability manifest is essential for an economically and socially successful and sustainable redevelopment of Toronto's waterfront areas. At this point, the Canary District generally matches measures of economic sustainability and social sustainability measures. Needed are more long-term planning and evaluation of these measures to maintain equitable and inclusive economic and social conditions.

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Exploring the Link Between Rising House Prices and Counter Urbanization in Toronto with a GIS Approach

Erina Baci, Josie Costantini, JayLynn Hines, ARe, AIS & Bronwen Hunter

Toronto is one of Canada's most popular cities and is a hub for economic and social activity. Although Toronto is becoming one of the most attractive cities in North America to live and work, its affordability in terms of housing is a cause of some concern among people who are looking to settle here. Popular media discourse portrays Toronto as being "too pricey", which is perhaps forcing some people to reconsider living here (Kelly, 2015). While articles in publications like the Economist (2015) have named Toronto "one of the world's most livable cities", new studies show that this may not be the case. The Angus Reid institute research revealed that 40% of people are considering moving away from the city, and 84% are worried that future generations will not be able to afford homes in the city (The Angus Reid Institute, 2015). Our research will explore the following question: to what extent do rising house prices in the city of Toronto cause population movement out of the city?

Introduction

Toronto is one of Canada's most popular cities and is a hub for economic and social activity. Although Toronto is becoming one of the most attractive cities in North America to live and work, its affordability in terms of housing is a cause of concern among many people who are looking to settle here. Popular media discourse portrays Toronto as being "too pricey", which is perhaps forcing some people to reconsider their decision to live here (Kelly, 2015). While articles in publications like the Economist (2015) have named Toronto "one of the world's most livable cities", new studies show that this may not be the case. Research from The Angus Reid Institute (2015) has revealed that 40% of people are considering moving away from the city, and 84% are worried that future generations will not be able to afford homes there. Our research will explore the following question: to what extent do rising house prices in the city of Toronto cause population movement out of the city?

Toronto's population has been growing rapidly for years. From 1996 to 2011, the population of the Greater Toronto Area (GTA)[1] has grown by just under 2 million (City of Toronto, 2015). This has led to a population increase of 10.5% in 2001 and an additional 9.2% in 2011 which is predicted to continue growing (City of Toronto, 2015). Demand for single-family homes in established GTA neighbourhoods has outpaced supply which is driving up prices in these areas. As a result, people have to make the choice between spending more money to stay downtown, or potentially purchasing a home further away from the city to save money while facing longer commute times back into the city. The Toronto Real Estate Board (TREB) has said that the average price of a home in the city of Toronto has increased to $845,883 in comparison with $595,545 for a similar sized house just outside of the city (Bouw, 2013). A condo in Toronto also averaged $395,865 versus $275,664 in

1 The Greater Toronto Area includes the central city of Toronto, and four surrounding regional municipalities: Durham, Halton, Peel, and York

surrounding regions (Bouw, 2013). We aim to examine the different aspects of this shift through an analysis of changing house prices, population, average monthly expenditures, affordable housing availability and assessing different measures of accessibility over time.

Previous Analysis of Housing Prices and Counter Urbanization

There is a vast literature on counter urbanization around the world and within Canada specifically (Clare J.A. Mitchell, 2004; Janzen, 2013; Mitchell, 2008). However, the literature that we have reviewed is mainly from a macro perspective which focuses on how to analyze the factors that cause migration out of large urban cities. There is little literature that exclusively focuses on Toronto and its largest neighbouring cities as well as a lack of studies that focus directly on the relationship between housing prices and on the counter urbanization phenomenon in Toronto.

Research outside of the Canadian context has pointed to the importance of the relationship between housing prices and counter-urban migration. Islam (2009), for example, argues that there are two dimensions of counter urbanization; the first being that people prefer to leave cities because of "congestion [and] high cost of living" and the second being that urban populations "decrease naturally" as countries become more developed and urban centers grow "old" (Islam, 2009, p. 154). According to Islam (2009), employment opportunities and labour forces shift to suburban and rural areas due to a variety of factors, such as changes in prices of real estate for businesses, changes (increases) in taxes and regulation on businesses and changing prices of houses for individuals and families. Meanwhile, Liu and Roberts (2013) consider the relationship between population redistribution and house prices in Aberdeen (Liu & Roberts, 2013). Although they do acknowledge the relationship between housing prices, income and residential choice, their analysis is more focused on the effect of population movement on the housing market and house prices.

TREB Basemap Greater Toronto Area

In the Canadian context, while research on our specific topic is limited, there is literature on the counter urbanization phenomenon more generally. For example, Mitchell (2008) analyses how rural and small municipalities have experienced growth in residents due to migration from larger Canadian municipalities (Mitchell, 2008). Her paper focuses on the migration of people to rural and small towns (RSTs) and how they experienced growth from 1996 – 2001, yet her focus is on the magnitude of migration rather than specifically on contributing factors. Overall, we have found that the relationship between counter urbanization in Toronto and changes in housing prices is under-researched; especially from a GIS perspective. In order to address this gap, our project will attempt to provide some insight (based on GIS and spatial analysis) on the patterns of counter urbanization in Toronto and their relationship to rising housing prices in the city from 1996 to 2015.

Methods

Study Area and Time Frame

Our analysis is divided into three parts. The study area for parts one and two is the same; it includes the regions of Peel, York, Durham and Toronto. Part three examines the core of the GTA. The cities involved in this analysis include Toronto, Markham, Vaughan, Brampton and Mississauga and the time frame for our research ranges between 1996 and 2015. We chose these dates for three reasons; firstly, they encompass three census years, from which we drew our demographic data. Secondly, they provide us with a concise time frame that was large enough to evaluate any significant changes in the real estate market without being too broad of a period. And lastly, it allowed us to include recent data in our analysis which is particularly useful when looking at the rise of housing prices in the GTA.

Data Acquisition:

TThe data we are using to analyze our research question is from a number of different resources which we were able to access through the Map and Data Library at the University of Toronto and other open data websites. The sources for our data include Statistics Canada, The TREB, The Canadian Real Estate Association (CREA) and Landsat Data. Statistics Canada provided the necessary 2011 census data which we chose instead of 2006 data; although the 2011 data was acquired though a voluntary census it contained the most recent demographic information. The main basemap used is from the TREB which was digitized as part of a project by the University of Guelph in 2007. This is the basemap that is used most frequently; however other basemaps are from sources such as the City of Toronto which was also accessed through the Map and Data Library as well as GeoPortal. Certain shapefiles, particularly the ward boundaries for the cities of Vaughan and Markham were acquired after contacting each respective city's department of planning, as the data was not available on open data sites.

Additionally, the inflation percentages needed in order to calculate the housing and rent prices throughout our time frame came from the Bank of Canada website. The Bank of Canada uses the Consumer Price Index (CPI) to calculate the rate of inflation in the country. The CPI, which is calculated based on information from Statistics Canada, acts to provide a general measure of the cost of living in Canada (Bank of Canada, 2013). Expenses accounted for in the CPI include the average household's expenditures on food, transportation, clothing, recreation and of course, housing (Bank of Canada, 2013). The rate of inflation for the years 2001, 2006, and 2011 were 1.2955, 1.1611 and 1.0618 percent respectively (Bank of Canada, 2016). The inclusion of inflation was essential for comparative purposes

between the years we analyzed for topics such as rent and average house cost. This is simply due to the fact that Toronto has experienced an increase in its general price levels over the range of years included in our study.

Steps

Population and House Prices:

The first part of the preliminary research for this project consisted of creating choropleth maps. Data was manually recorded or exported from various open data sites to acquire the necessary data needed to carry out our analysis. These tables were then joined to the corresponding shapefile using the join function to attach our target field with a key field from the shapefile attribute file. In many cases, before the tables could be joined to the shapefiles, we had to edit the attribute tables of the shapefiles. Brampton, for example, required a new field of Ward ID's as the original had two entries for Ward 1. We also created new ID fields within many of the shapefiles to ensure that the fields through which the joins would be constituted on were of the same data type. In the case of Vaughan (where no open data was available) we used the spatial join tool to aggregate census tract level data to ward level by joining the ward shapefile spatially to a census tract shapefile.

Once our tables had been joined to the corresponding shapefiles, we proceeded to create the choropleths. We decided to display the data mainly in quantiles, but in order to best display the dataset we chose varying numbers of categories to be displayed based on the nature of the different data sets. In the first part, 12 categories were used, in growing increments of 100,000 to best display the increase of house prices in the GTA. As any house priced over $1,000,000 has been assumed to be highly unattainable by our study population for the purposes of this study, these house prices have been more generalized and only separated into two classes. We chose to analyze two or more months at the beginning and latter parts of the year to show the disparity between the low and high activity seasons in the housing market. In the second part, 10 quantiles were used to display the percent in population change from our target years. We had originally planned to display raw population counts but decided to display percent population change as this better displays the movement of people in our study area. For the third part, 5 quantiles were used to display both the ward level and census tract level data. For this part of the analysis, we created and analyzed individual choropleths for each of the municipalities and then created composite choropleths to see if there were any overarching patterns within our entire study area. An outline of the core of the GTA was created by merging the shapefiles of the different municipalities that were being analyzed, and dissolving the boundaries to create one solid outline.

Inflation:

The first part of this stage involved accounting for inflation in our income and housing price maps. This was a relatively simple procedure; a new field was created in the existing attribute tables of these maps and the field calculator was used to calculate the value of the average home, rent or income based on the percent of inflation from the Canadian dollar in the that year as compared to the value of the Canadian dollar in 2015. This was not done in the average house price maps as the class ranges in these maps were manually set for comparative purposes between years.

Location and Rent:

To analyze the correlation between location and rent, we decided to focus only on the city of Toronto, as this is the only municipality that we could access data for in regards

to neighbourhood ranking. We acquired our information from Toronto Life (2016) which came in the form of an interactive web map showing the neighbourhoods in Toronto ranked in respect to 10 categories. These categories include housing, public transit accessibility, proximity to workplaces, shopping, schools and crime rate amongst others. The data was transferred to an excel sheet which was joined to a shapefile of the neighbourhoods in Toronto. Toronto's 140 neighbourhoods were then displayed in a choropleth that divided them into 5 quantiles, with the first being composed of the best neighbourhoods and the last being composed with the worst neighbourhoods. The top quantiles for rent in each census year were selected using the select by attribute tool to attain the census tracts that have a value equal to or greater than the lowest end of the highest quantile. In 2011, the selection was modified to include the values from the two highest quantiles.

Network Analyst:

Before the network analyst was built, the necessary points for the analyst were selected from larger point files of addresses throughout the GTA. The points were not picked at random but actually represented homes that were on the market at the time of this study throughout the GTA. This was specifically done to show how the prices for 3-bedroom, 2-bathroom houses fluctuated based on location. For the target location, we chose 77 King St West (TD Center) primarily for its central location in downtown Toronto's financial district. The points were selected based on their street name attribute and exported as a new layer file. Once identified and selected, the individual points were exported and saved as individual layer files.

The data acquired for the network analysis began with the TREB basemap showing all of wards and boundaries within our study area (Brampton, Mississauga, Markham, Vaughan, Ajax, and Toronto). The Ontario road network and turns were obtained from the Map and Data Library. The house points were extracted from the TREB data one by one and added to the map. First to get all of the separate cities into one we did a group merge by selecting all of the shapefiles as input. We then had to dissolve all of the inner boundaries so that we could get an outline of the main cities. For this a separate dissolve function was done on each ward and then added on top of the merged file to complete the outline.

After importing all of the housing point files, we had to project them in the NAD 1983 Zone 17 projection. From here we imported the road data into a new geodatabase and created the network data set, using time as the optimizing feature. Once the network was created we computed for new routes, loaded the locations of the houses and attained a route for each separate house to our target location. This produced four separate routes which were each associated with a travel time for travelling that particular path.

Limitations

One of the biggest limitations we have encountered in our analysis was the nature of the 2011 census data which was collected on a voluntary basis. The data from this census is not equitable with that of previous years which made direct comparisons between the data sets futile. While we had originally planned on using this data sparingly, due to unavailability and variability of certain data sets we have been forced to rely more heavily on 2011 data than originally anticipated. In trying to access the necessary data, we soon discovered that ward level data is rather difficult to come by (especially for previous census years). Many municipalities only had 2011 data readily available, while some had none at all. To overcome this hurdle, we decided to ag-

gregate the necessary data from census tract data which is openly available. However in the case of Markham, we were not able to display 2006 data because the ward boundaries for 2006 and 2011 differ, and due to accessibility, the 2006 boundary file has eluded us.

We encountered problems with variability within the available data. For example, most municipalities had population data for the age group we wanted to analyze (25 - 44); however the cities in Peel region had their population data grouped differently which made direct comparisons difficult. In our analysis we are making the assumption that the trend of people moving outwards from the city will continue in the years following 2006, as this is the year at which we are concluding our research.

In the second part of our analysis, the limitations we encountered were much the same. Data quality and accessibility were two of the main recurring limitations which again relied more heavily than we planned on 2011 census data, as well as accessing high quality shapefiles. We had some trouble at first with a poorly digitized lake file and additionally trouble finding a road network file that included the necessary data for the network analyst work. The first file we accessed was missing the turn table, which skewed with our results. A new limitation that we encountered in this part of our analysis was a lack of research on our topic. The available data was often outdated or based on US statistics, leaving few reliable sources on rent and condominium trends in the GTA.

Results

House prices have increased dramatically

The cost of buying a home in our study area (especially in Toronto) has increased significantly from 1996 to 2015. The maps we produced (Figure 1) show this through the changing colour gradient from year to year, which also accounts for inflation. When comparing the 2015 maps to the 1996 and intermittent years' maps, the maps from 2015 have the most areas with the highest prices, as evident through the darkest tones of red. Also, there was a significant increase just from seasonal fluctuations alone in the real estate market. It is immediately evident in our findings that house prices have increased in all districts between 1996 and 2015. Central Toronto has remained the most expensive region in city in relation to its surroundings as predicted. This could be due to its location within the most developed areas of the city, as well as its proximity to important services such as the Yonge-University subway line.

Interestingly upon initial observation it may be assumed that Toronto and its surrounding areas are the same in terms of average house prices. However, averages are always susceptible to outliers, and thus may not be accurate representations of an average price for a home. Areas like Vaughan and Mississauga have increased dramatically in price and are in the highest ranges of average house cost. This could be due to major developments in these cities over the past few years, which highlights the importance of taking into consideration how housing prices vary both as a factor in motivating relocation as well as an impact of relocation. As the literature states, housing prices are a good estimator of population distribution and where people are choosing to locate.

It is not surprising that our findings indicate that location and proximity to amenities significantly affect housing prices. In addition to falling in typically nicer neighbourhoods, the census tracts in the highest quantiles for rent throughout the study period also tend to fall near the TTC subway line. The neighbourhood statistics are calculated based on 10 categories: housing, crime, transit, shopping,

health, entertainment, community, diversity, employment and schools. Some of the highest ranked neighbourhoods (shown in blue) include Yonge-Eglinton, Casa Loma and Playter Estates-Danforth while some of the lowest include Downsview-Roding, West Hill and Westminster-Branson (Toronto Life, 2016). The maps (Figure 2) show that tenants are willing to pay a higher rent to be in a better and potentially "safer" neighbourhood with easy access to public transit.

Rent has decreased overall

Shown by the changes in colour on the maps below (Figure 3), there are fewer areas encompassed in the darkest red which means that there are fewer neighbourhoods with rental values that are in the highest quantiles over time. The 2011 map also shows a more uniform colour gradient which could represent a flattening out of rent values across the board. The maps below show the average monthly rent that a tenant pays per census tract in the GTA in the years 2001, 2006 and 2011. Quite to our surprise, they show that average rent has decreased over the years and that generally rent is more expensive in the periphery of the GTA.

One reason why rent may seem cheaper in Toronto is because people may be more seem more prone to renting apartments in the city. Meanwhile, it is very likely that in the periphery of the GTA, people are renting homes. The housing market confirms this suspicion, as a simple search for rental properties in Markham revealed that most of the listings were houses, with rent anywhere from $1,700-$3,000 per month. We must also keep in mind that these numbers are outdated, and that they have changed drastically over the past five years. Renting will always be an attractive option in the GTA as shown by the wave of millennials who are more than willing to pay higher rental prices in the downtown core which are conveniently located near amenities and work. Mnasari shows in his article that when faced with the buy or rent dilemma, many young individuals are drawn to renting; not because of the constraints placed by down payment requirements but by lifestyle choices such as the freedom to relocate and proximity to amenities and entertainment (Mnasari 2015, Pigg 2016). Factors such as having two major universities and a number of smaller colleges right downtown, being the economic and finance capital of the province (and country) as well as being a trendy area to reside in (especially for younger and working people) will always draw buyers to the downtown core. Those who are not attracted to the idea of renting for life however, as Pigg (2016) points out, are more likely to look outside of Toronto to stand a chance at buying a home.

Finally, the general decrease in rental rates also bears further analysis. In 2011, average monthly rent has decreased, with very few census tracts in the highest quartile. There are several possible explanations for this. One possible explanation is that the average cost for most of the census tracts in 2001 or 2006 was much lower than $3,000. However, upon analyzing the ranges of the values in the highest quantile we noticed that the range of values in 2011 is much smaller than in the two previous years. The range in the highest quartile in 2001 was $1,419-$3,395 and $1,373-$3,020 in 2006, while in 2011 it was $1,732-$2,843. If you were to combine the highest two quartiles in 2011, you would attain roughly the same number of census tracts as in 2001 or 2006. It appears that while the upper limits of the average rent have decreased over time, the distribution of the census tracts that are paying roughly $1,300 -$3,000 remains largely unchanged in the city of Toronto.

People who earn the least are those who are spending 30% or more of their income on housing costs

On the average household income map below (Figure 4), the lightest shades of blues represent those areas in which people are earning the lowest amounts of average income. Some of these areas correspond to the areas on our composite map of the percentage of households spending 30% or more of their income on housing costs (Figure 5). The darkest areas of green within the composite map of our study area are those that represent the highest percentage of households spending 30% or more on costs. If you compare this to the locations of the working population in 2011, the areas with the lowest percentages of this population correlate with those areas that have the lowest percentage of households spending 30% or more of their income on housing costs.

One explanation for this correlation is that the younger population is not able to afford living in areas where their housing costs would erode so much of their income. Two exceptions on this map are Vaughn and downtown Toronto; the latter we believe is likely due to the autonomous pull factors described above (Figure 6).

On a large scale, population numbers fluctuate around the city but remain relatively stable in Toronto

The maps below (Figure 7 and 8) show that the percentage change in Toronto is not significant enough to represent a dramatic exodus of people out of the city in search of cheaper housing, contrary to our hypothesis. We anticipated a significant portion of the population to be moving out of the city and opting for housing with lower prices which would correspond with the literature we have found on rising house prices and counter urbanization. What we end up seeing, we believe, is due to the notion that Toronto is an attractive place to live, despite cost-based push factors as it continues to grow as a metropolitan area.

From 1996-2006, the highest change in population came from adjacent cities such as Vaughn, Milton and Whitby with cities such as Richmond Hill, Markham, Brampton and Ajax close behind. From 2006-2011 the cities of Ajax, Bradford, Bowmanville and Newcastle were added. The biggest difference between the two maps is that from 1996 - 2006 the movement was relatively close to the city, whereas in 2006-2011 the highest percentage of population change were in areas further away from the city of Toronto. This suggests that people started migrating even further out than just to directly adjacent municipalities. There is no significant change in the downtown core, perhaps because people are moving in and out of the city all of the time which renders the percentage change very small. What we found is that within the first time frame, the majority of population increases occurred west or north of Toronto whereas in the second time frame (in addition to still moving west and north), population increases occurred to the east as well (Figure 9). This could show that the people of Toronto are willing to move out of the downtown core in any direction.

Overall, the data reveals potentially contradictory trends with regards to working age population movement in the study region. In Mississauga, the largest concentration of the working age population was in areas further away from Toronto in 2006 (Figure 10). The concentration of the working age population was in a central location in 2006 and moved further west (away from Toronto) in 2011. This supports our hypothesis that people are moving away from Toronto, which could be related to rising house prices. However, in other places, we find a general trend in which

the working population is moving closer to Toronto between 2006 and 2011.

For example, in Brampton (Figure 11) there was a higher percentage of the population that we have classified as "working age" in the western part of the city (further away from the city of Toronto) in 2006. There were lower amounts of the working age population as a percentage of the total population living in south-east parts of Brampton, towards Toronto. This pattern changes in 2011, where the highest quantile of the working age population seems to have moved closer to the city of Toronto, with the darkest areas representing the highest percentage of 25 - 44 year olds. According to the map, the percentage of the total population that is working age has also decreased in 2011. However, we believe this can be attributed to the voluntary census data and the decreased age range. Despite this is limitation of the data, we can still focus on the movement of this population group as they are seen to be the most mobile. The 2011 map shows that lower numbers of the working age population are living on the outskirts of Brampton and are concentrated in larger numbers in areas closer to Toronto.

Meanwhile, when looking at the maps of Toronto from 2006 and 2011, there is not much change in location of the working age population when comparing data from the two years. If you look at the larger composite maps of the wards of all the cities included for 2006, there is a high concentration of the working age population in downtown Toronto but decreasing concentration of this group moving away from downtown. We did not have data for Markham for 2006 which is why it is left blank on this map. Overall, when compared to the 2011 data there are higher concentrations of our target population further south in Brampton (closer to Toronto), movement further away from Toronto in Mississauga and the same concentration of this group in downtown Toronto. Another difference is that there are now higher percentages of this population group in Vaughan which could suggest that more people have moved out of Toronto. However, a general finding of this analysis is that the outskirts of Toronto are showing higher percentages of the working age population. This could be explained as either a) they are moving out of the downtown core into areas further away in search of cheaper prices (but still close to the core) or b) they are moving from the other cities towards downtown Toronto, possibly despite facing increases in housing prices.

Drive 30 minutes, save $100,000:

For the network analyst part of our analysis, we wanted to determine if the extra time added onto a person's commute was worth the savings that could be made by moving further away from the city. The network analyst has yielded times for each route to our target as follows:

- Target: 77 King St W, Toronto.
- House 1: 61 Frazer, Ajax, $335,800
  Time to Target: 44 Minutes.
- House 2: 88 Miley Markham, $699,990
  Time to Target: 33 Minutes.
- House 3: 58 Edilou, Etobicoke, $669, 000
  Time to Target: 19 Minutes.
- House 4: 255 Richmond St E, $769,900
  Time to Target: 2 Minutes.

The map reveals that by adding 20 - 30 minutes to their commute, buyers could save $100,000 and by adding up to 45 minutes a buyer could save $400,000 (Figure 12). Depending on how much time the commuter could spare in their schedule, it seems more practical to save money by living further away from the core. These times do not account for traffic, although traffic fluctuates every day and at all times so adding approximately 30 additional minutes for traffic would make it

roughly 45 minutes added to save $100,000, and roughly up to 70 minutes to save $400,000.

Our findings agree with those of Rhiannon Russell in an article weighing the pros and cons of travel time and savings for commuters. Russell (2016) suggests that if the commuter can afford the extra travel time, the savings made to live just outside of the city largely outweighs the extra time. In the article, Russell calculates that with the cost of commuting at roughly $700 a month it would take at least 12 years in commuting costs to equal the $100,000 plus dollars that a commuter could be saving by moving further away (Russell, 2016). Another article by Jann Lee (2015) discusses millennials (roughly 20 - 35 years old) who have made the move to the suburbs for the sole purpose of price and square footage. In this article the residents share their pros and cons, with most of the cons concluding that commute times are long and sometimes get tiring. In the end, however, the majority of residents claim they prefer the trade off because of the savings and the area (Lee, 2015). Notably, many of the residents have found that within just two years of owning these houses, the property value has gone up almost $150,000 (Lee, 2015). This again points to the complex relationship between housing prices and migration patterns.

Conclusions

Based on our findings, we have been able to establish several conclusions that support our hypothesis that a growing percentage of the working population is unable to afford to live in the city of Toronto. We have established that house prices have risen, that population has grown substantially outside of Toronto in many regions and that those who earn the least spend 30% or more of their income on housing costs. Our network analysis has also shown an approximation of the money one can save by moving outside of Toronto (through a sacrifice of time). However, we have also seen how rent prices have decreased over time and that sections of the working population in regions such as Brampton have continued to move closer to the city, despite rising house prices. So, to what extent are rising house prices in the city of Toronto causing population movement out of the city?

We conclude that there is population movement out of the city of Toronto as a result of the state of the housing market; however, this movement is not as drastic as we originally anticipated. Toronto's population has remained relatively consistent over the past decade as shown in our maps, and it is clear that people are choosing to remain in "the most livable city in the world" despite these rising housing costs (The Economist, 2015). As a growing metropolitan hub that is globally ranked for its safety, healthcare, educational resources, infrastructure and environment, people will always be drawn towards one of the greatest cities in the world (The Economist, 2015). In comparison with other cities such as New York City or San Francisco, Toronto is, on average, considerably cheaper to live in while offering similar amenities to these more expensive municipalities which make it all the more appealing to city dwellers (Fortune, 2016). We expect that coverage and interest around this topic will continue as long as prices continue to soar. Due to the limited scope of this analysis, we omitted some factors that deserve further attention. To further our study in the future, we would include factors such as rent controls, interest rates, accounting for more types of housing and a more thorough network analysis that accounts for a wider range of locations and property costs. As the availability of 2016 census data is fast approaching, the expansion of these results (with more reliable data) is very possible.

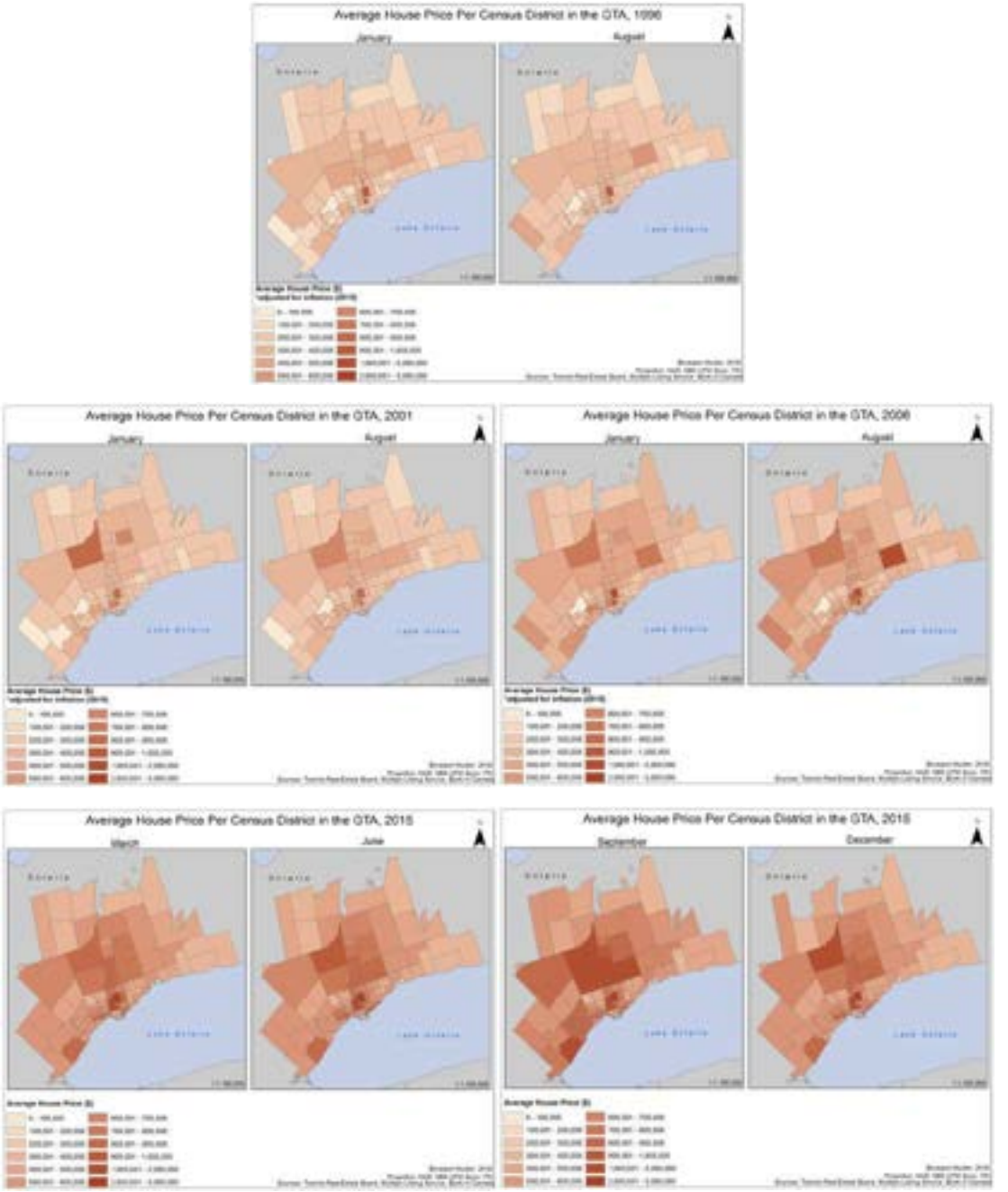


Figure 1: Change in average house prices per census district in the GTA

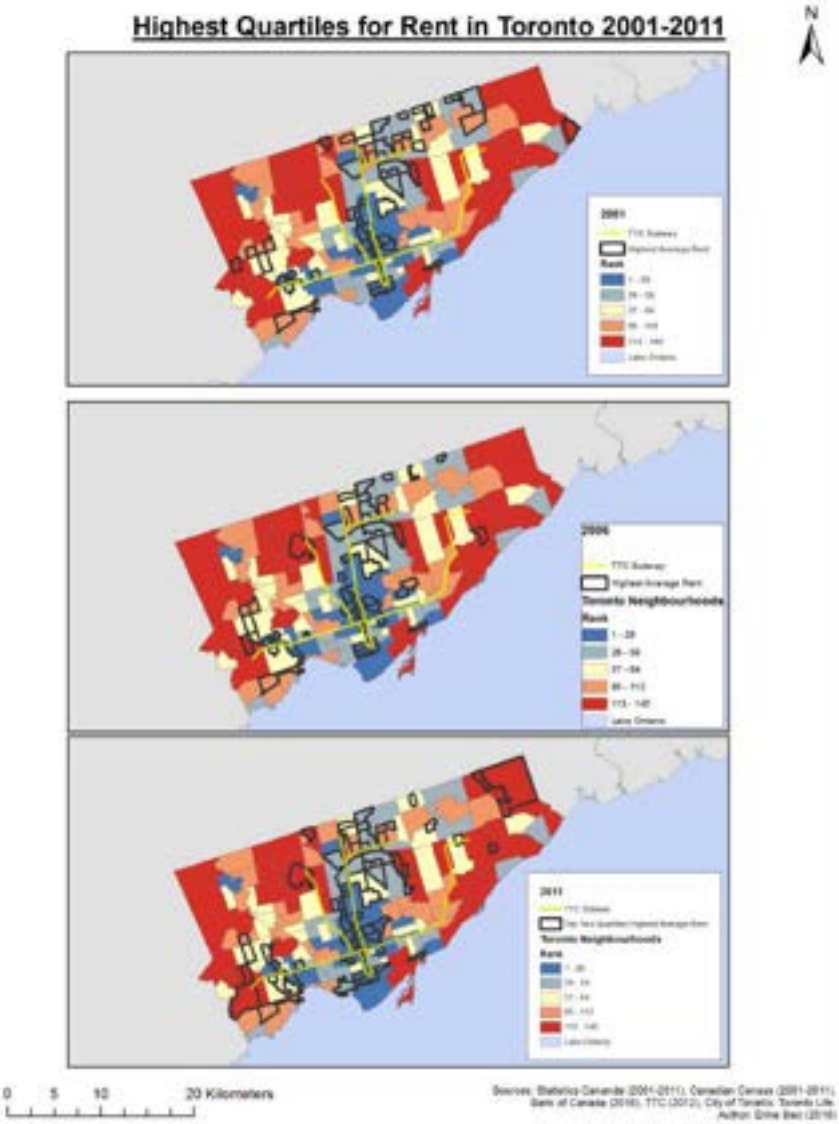


Figure 2: Change in highest quartiles for rent in Toronto 2001-2011

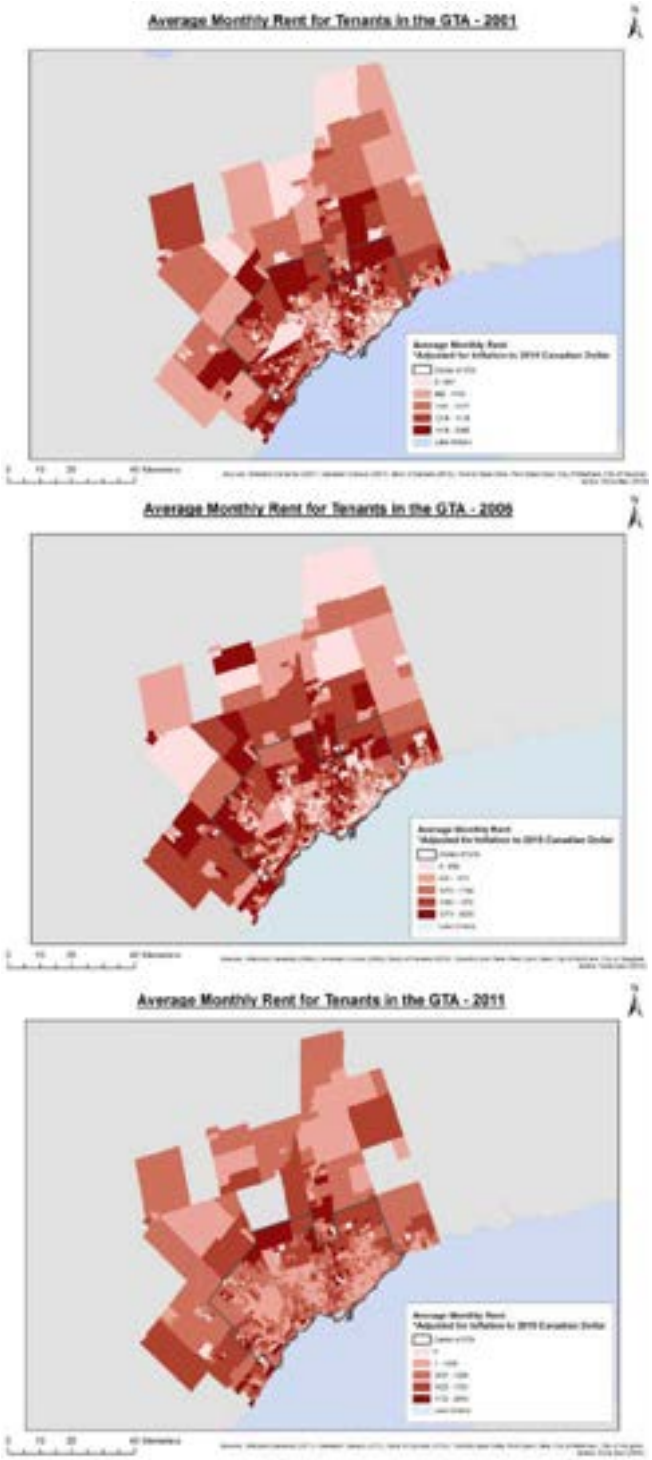


Figure 3: Change in average monthly rent for Tenants in the GTA

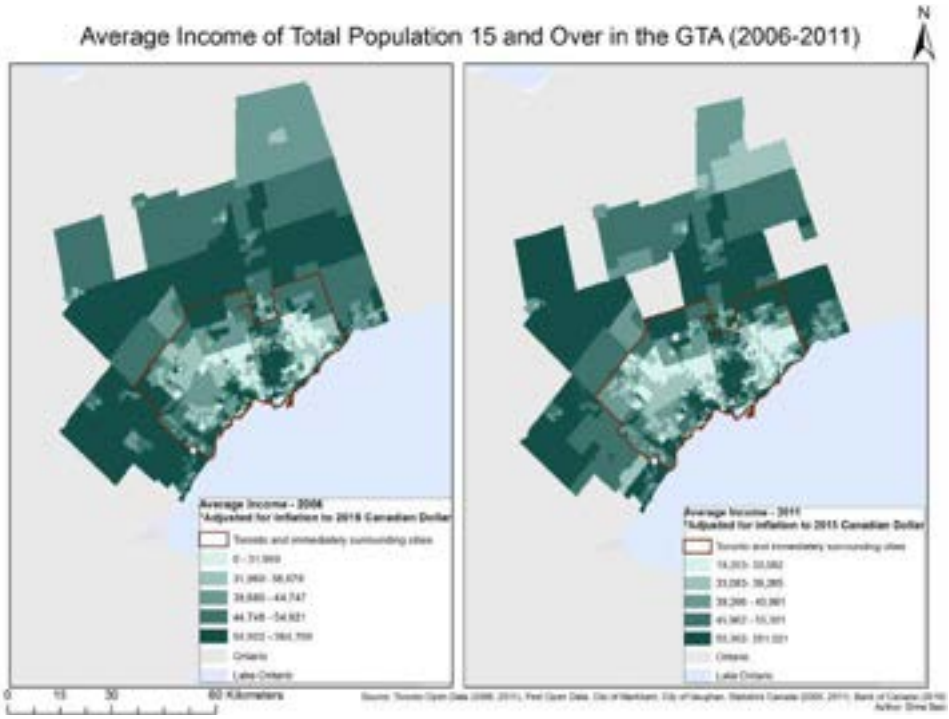


Figure 4: Change in average income of total population 15 and over in the GTA

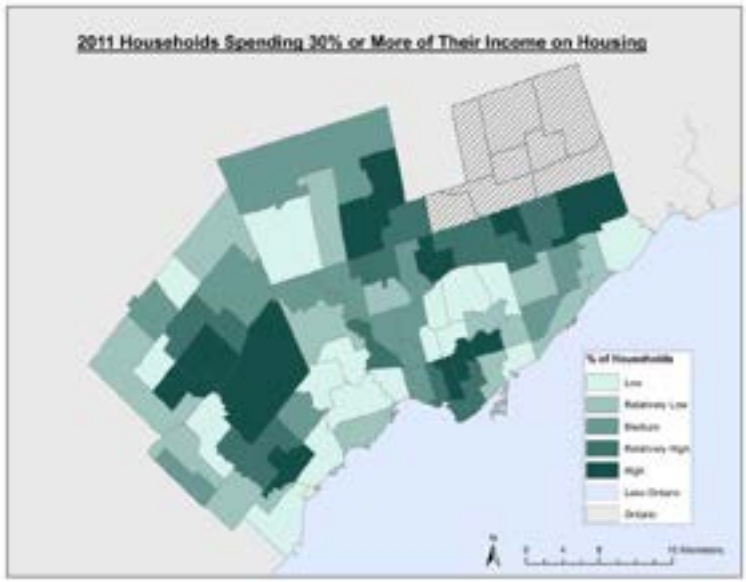


Figure 5: Households spending 30% of more of their income on housing

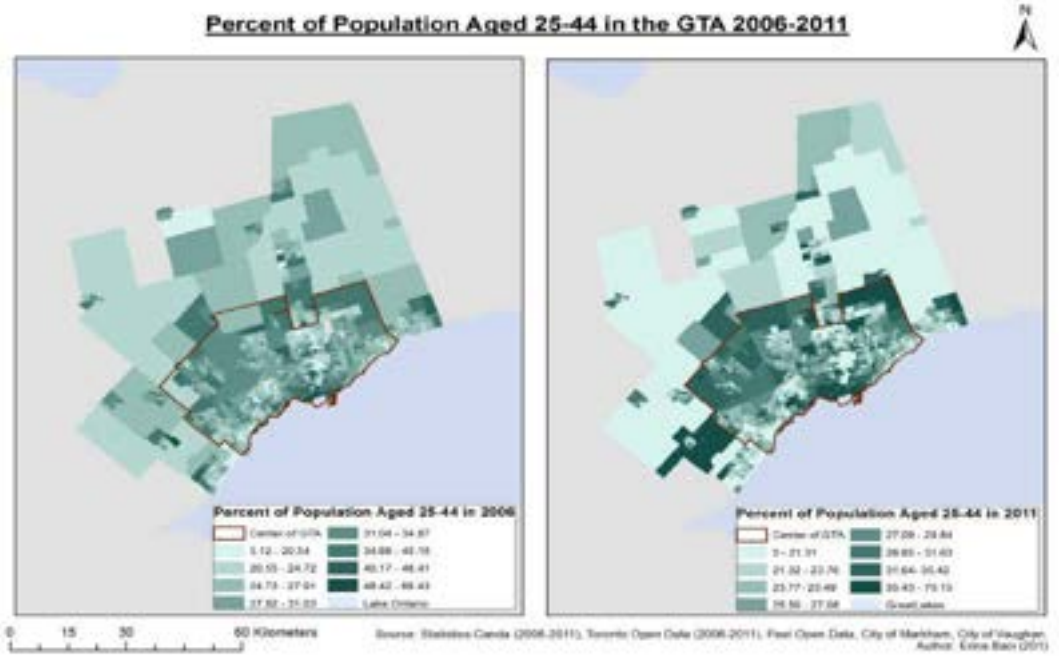
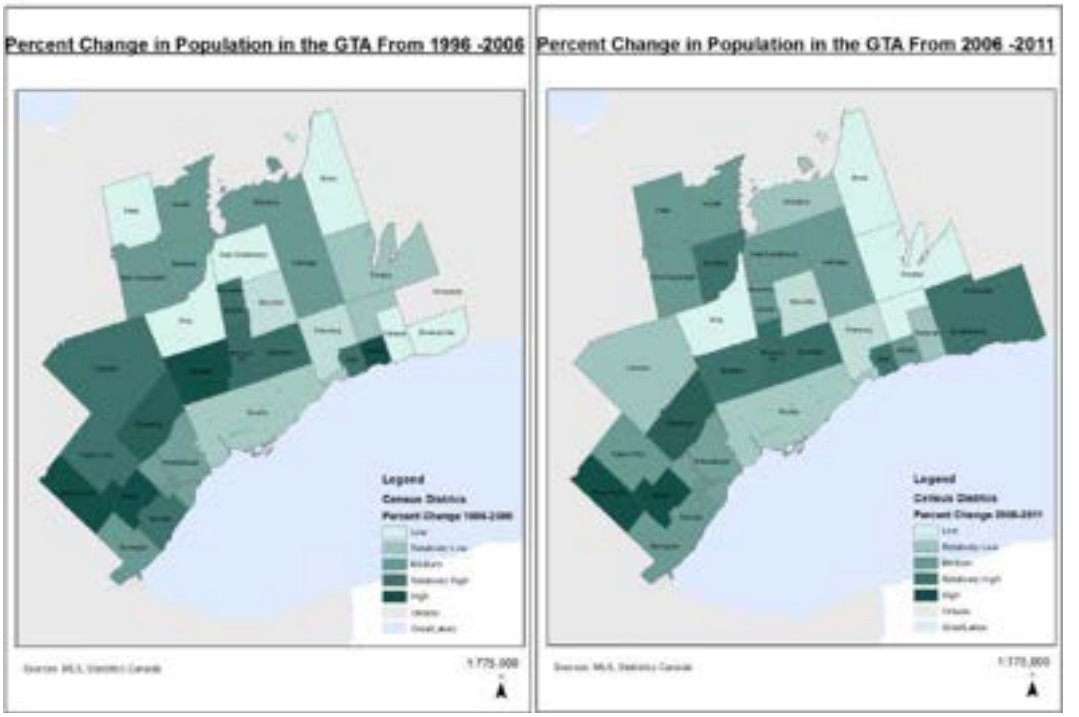


Figure 6: Change in percent of population ages 25-44 in the GTA



Figures 7 & 8: Percent change in population in the GTA

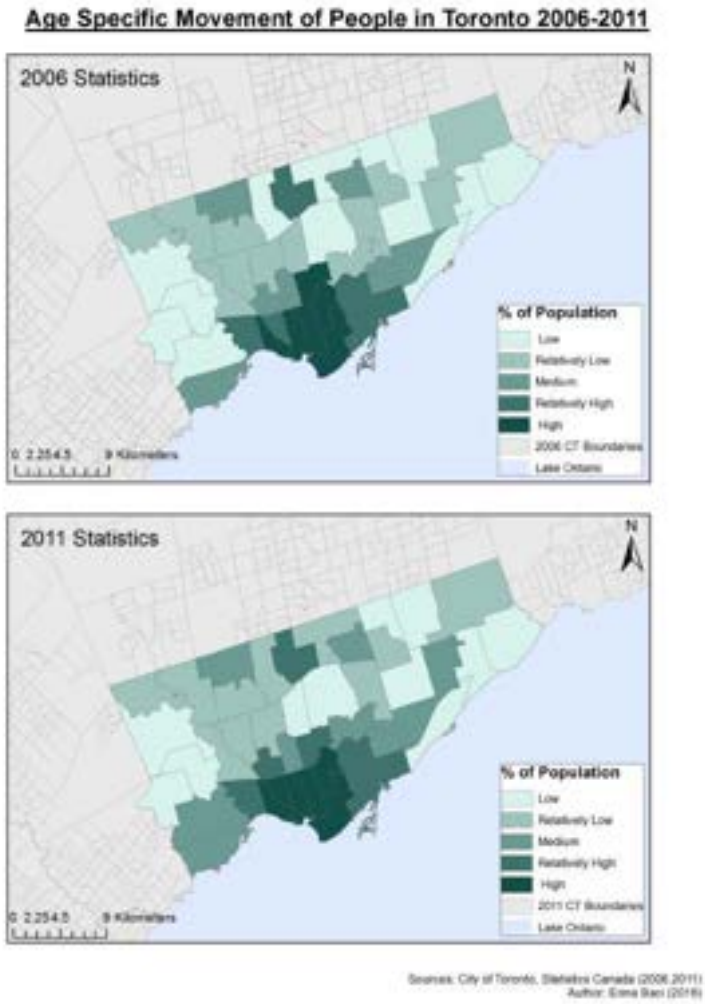


Figure 9: Age specific movement in Toronto

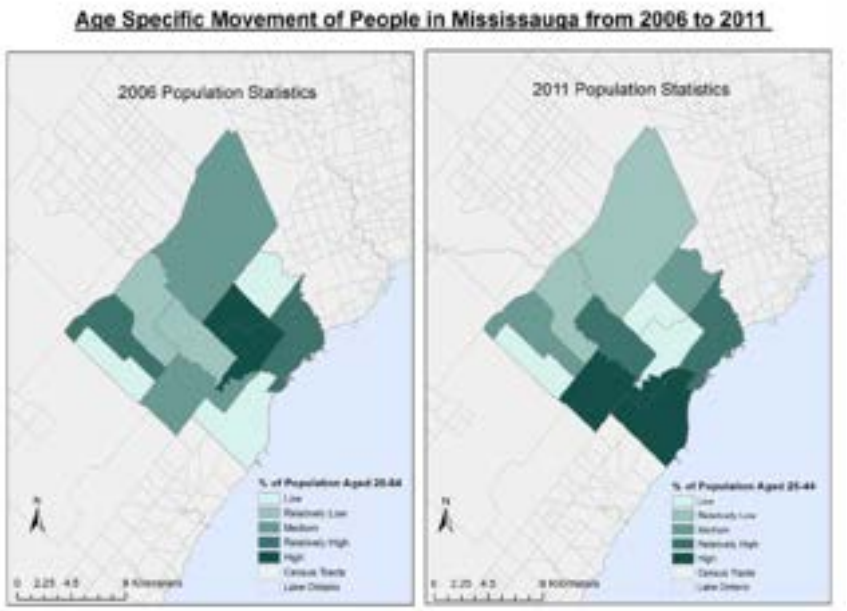


Figure 10: Age specific movement in Mississauga

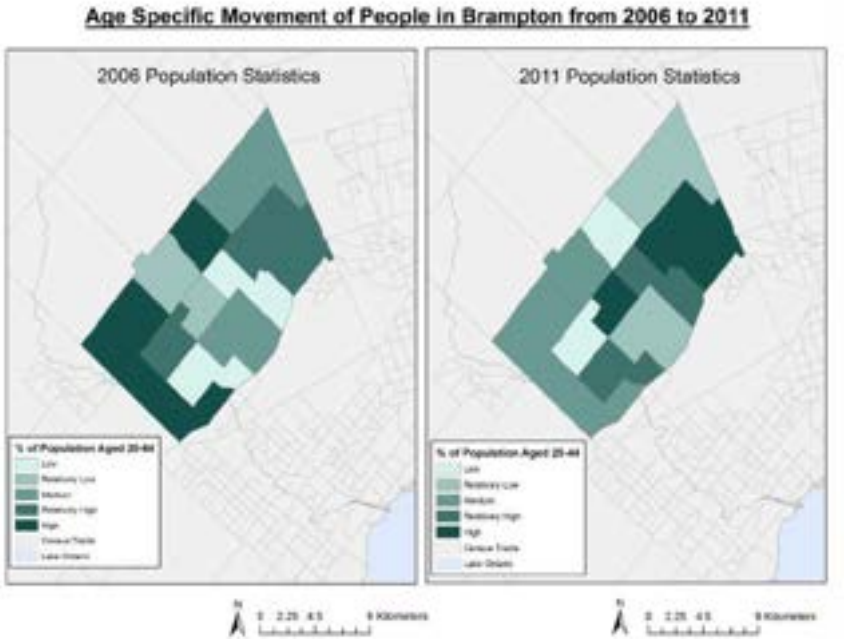
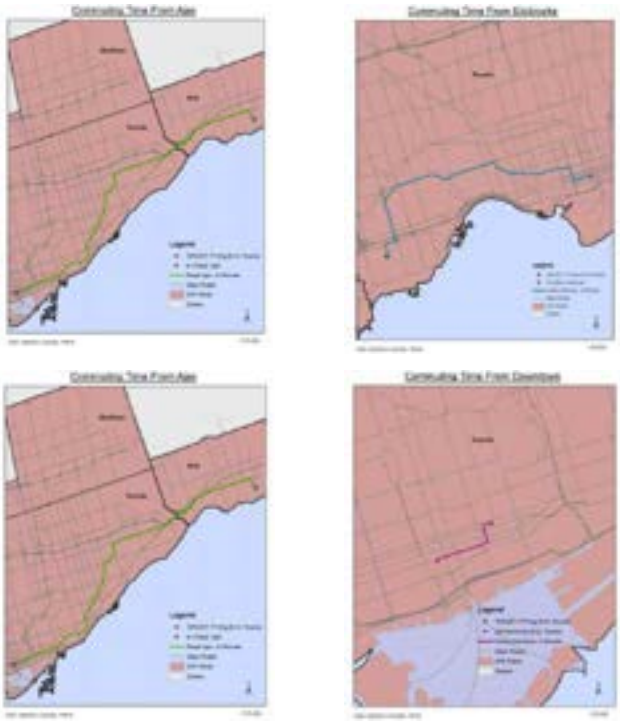


Figure 11: Age specific movement in Brampton

Figure 12: Network Analyst results, commuting times from Ajax, Markham, Etobicoke, and downtown Toronto



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